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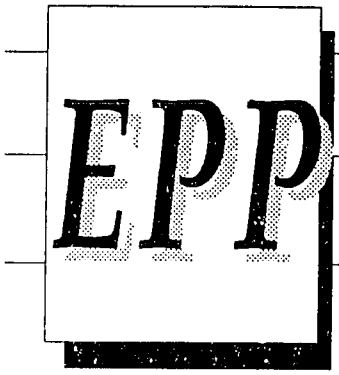

EDUCATIONAL POLICY AND PLANNING PROJECT

A GOVERNMENT OF INDONESIA - USAID PROJECT

Education, Economic, and Social Development

Second 25 Year Development Plan and Sixth 5 Year Development Plan Background Papers and Goals

Boediono, Walter W. McMahon, and Don Adams, Editors

Pusat Informatika
Balitbang Dikbud

Center for Informatics
Office of Educational and Cultural Research and Development

DEPARTMEN PENDIDIKAN DAN KEBUDAYAAN

MINISTRY OF EDUCATION AND CULTURE

Jakarta, Indonesia

EDUCATION, ECONOMIC, AND SOCIAL DEVELOPMENT

SECOND 25 YEAR DEVELOPMENT PLAN AND SIXTH 5 YEAR DEVELOPMENT PLAN BACKGROUND PAPERS AND GOALS

Boediono, Walter W. McMahon, and Don Adams,
Editors

Center for Informatics
Office of Research and Development, Ministry of Education and Culture
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Volume I

EDUCATION, ECONOMIC, AND SOCIAL DEVELOPMENT

25 Year Education Goals and Background Papers for the Second 25 Year Development Plan, 1994-2018

Developing the Ability and Improving the Quality of Life of the Indonesian People

Boediono, Walter W. McMahon, and Don Adams, Editors

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No statement in this volume, or conclusion reached, in any way represents the official policy of the Indonesian Government, the Ministry of Education and Culture, or USAID. All statements, and all errors, are the sole responsibility of the editors of this volume and of the individual authors of the background papers.

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PREFACE

This volume has been the result of close cooperation and a friendly working relationship between Indonesian and American specialists over a considerable period of time.

Research for the background papers began when Fuad Hasan, Minister of Education and Culture, charged Pusat Informatika, Balitbang Depdikbud, with the responsibility of preparing the Ministry's contribution to the Second 25 Year Development Plan. A National Team for the 25 Year Plan was established that started to collect suggestions for 25 Year Goals and maintained a two-way communication with the research in process.

Boediono set out the initial conceptual framework for this volume in March, 1990, and Walter McMahon and Boediono completed Chapters II, III, VIII, and much of the data collection for Chapter IX by the end of the Summer of 1990, the latter two with the help of Nina Triaswati. Don Adams proposed a conference to review the results of these efforts. He also participated with Boediono and Walter McMahon throughout 1991 in planning additional research, assuming major responsibilities for Chapters IV and VI related to cultural and social change and related to the internal operation of the schools. James Cobbe contributed the chapter on demographics, which underlies the enrollment and access goals, and Rony Bisry, Moegiadi and McMahon during September of 1991 prepared the chapter on Technology and Education which has implications for the growth and curriculum content of secondary and higher education during September of 1991.

Walter McMahon drafted Chapter I containing the quantitative goals and Executive Summary of the background papers in cooperation with Boediono and Don Adams and revised and updated all parts prepared earlier in 1992. All three authors of Chapter I are indebted to Nelson Xu for assistance in preparing the computations. Reta Hendrati Dewi assisted by cross-checking the data in Chapters VIII and IX, and with preparations for publication.

The 25 Year Education Goals collected by the National Task Force, estimates of their feasibility, and the Executive Summary of the background papers all have undergone a very extensive process of nationwide consultation and review. The net was first thrown very widely with two national conferences with wide academic and community participation organized by Boediono in 1990 and early 1991 that generated many suggestions. Results of these conferences were processed by the National Team,who generated the first draft of the broad qualitative goals. These in turn were fed into the research in process. Long term planning goals were further discussed and refined at RAKERNAS in June 1991 with additional suggestions that led to refinements in the Team's draft of qualitative goals and to the second draft of Chapter I. Walter McMahon and Boediono presented this second draft of Chapter I at a conference of worldwide specialists in educational efficiency and economic development sponsored by IEES in Washington DC in November 1991 and received professional feed- back. The third draft of Chapter I then was reviewed in detail with the National Team at an all day meeting in December 1991. It was discussed with officials in BAPPENAS (H.A.R. Tilaar and Soekirman), in higher education (Pak Utomo, Yuhara Sukra and others), and in other branches, all of which resulted in a number of refinements. The fourth draft of Chapter I in this form, all of the background papers, and the summary draft generated by the National Team then were all presented

and discussed at a major national conference opened by the Minister of Education and Culture on January 20-22, 1992. Special thanks is due to Harsja W. Bachtiar, Abas Gozali, Bambang Suwardi Joko, Dedi Syahrijal, Dwina Lenita, Hermansyah, Hopman Nababan, Djuhendar, Mursipah, Nemin Zahro, Prayitno, Reta Hendrati Dewi, Retno Wibowo, Robert Sinaulan, Saleh Bachtiar, and Sutopo Derpoyudo on the Balitbang staff for the excellent arrangements for this conference to which many from higher education, primary and secondary education, non-formal education, BPPT, BAPPENAS, and Provincial Offices and many others were invited. Special credit is due to Pak Moegiadi whose skillful work behind the scenes and in chairing a number of the key sessions resulted in the generation of many useful suggestions that have now been incorporated in the fifth draft of Chapter I, and to the other background papers in this volume. Hidayat Syarif and Soekirman then reviewed and made additional suggestions now incoporated in the sixth draft of Chapter I, as did the Secretary General Bambang Suhendro and other participants at several meetings he chaired in February and March of 1992.

Finally, we must express our special appreciation to the National Task Force consisting of Abas Gozali, Abdul Manan, Ace Suryadi, Ade Cahyana, Agus Dharma, Asmawi Zainul, Ibrahim Musa, Reta Hendrati Dewi, and Sardjono Jatiman for their liason with the D. G.'s, the flow of written information coming from them, their specific oral comments at several points, and the positive cooperative spirit throughout in which all entered into this joint enterprise.

The editors of this volume also are indebted to several people who assisted in major ways with its preparation. Simon Ju, the EPP Chief of Party, initiated and has been very supportive of the plan for publication. Reta Hendrati Dewi and Jerry Messec at Florida State University have contributed their expertise and assistance in making all of the final editing and publication arrangements. We wish to thank Sumarto and Ida Kintamani for their helpful assistance with the enrollment projections and enrollment graphs. Special thanks are also due for the typing of manuscripts to Marini Sri Rejeki and Tri Maulidiningsih of the EPP project staff, Jakarta, Carol Holliday of the Word Processing Center, Urbana, and Yvonne Jones at the University of Pittsburgh.

Finally, we are especially grateful to our wives, Sukartini, Carolyn, and Janet for their support before, during, and after the extended absences from home which were necessary to complete the background research for the discussion papers and Chapter I that were needed to bring this process to fruition.

Boediono
Walter W. McMahon
Don Adams

Jakarta, 1992

I

25 Year Education Goals for Economic and Social Development in Indonesia Executive Summary

Boediono, Walter W. McMahon and Don Adams

Improvement in the quality of life and ability of the Indonesian people is a major national goal in Indonesia as it seeks to join the Pacific Rim countries in fast per capita economic growth and continuing reductions in poverty.

These 25 Year Education Goals have emerged through an extensive, nation-wide, prolonged and intensive consultative process, described in the preface, which has been interdependent with the underlying research. The broader Goals have been drafted by the National Task Force, drawing on these consultations. The research, whose implications are drawn together in this Executive Summary in Chapter I, reflects the goals defined by the Team. It focuses also on the nation's desire for development, the quantitative implications of the major education goals, and the feasibility of these goals in relation to the current state of the education system and the economy.

The starting points for the quantitative expressions of all enrollment, quality, equity, and efficiency goals throughout this document are the actual enrollment levels and actual state of affairs as of now, not the Repelita V targets. Table 3 in the Appendix to this Chapter, for example, starts with actual enrollments at the beginning of 1992, and then proceeds with the estimates of other 25 Year Goals and of their economic feasibility (Tables I.2, I.3, and I.4). All are in constant 1991 prices. The prices can be converted to the current prices in any future year when the inflation rate becomes known by simple multiplication (e.g., by 1.09 if it is 9%). In a similar fashion, the goals stated do not depend upon the accomplishment of Repelita V Targets but instead are projections from actual levels that could be refined if new information should become available.

The Education Goals for access, equity, and quality are consistent with the framework of the Indonesian Constitution and the National Education Law, and seek to advance the Law's objectives. The 1945 Constitution (articles 5 and 31) and the National Education System Law of November 2, 1989, set up the structure of the education system and charge it with developing the ability and improving the quality of life of the Indonesian People (article 3). This law also charges the education system with elevating the intellectual life, encouraging religious values, high morality and social responsibility (article 4), and with providing for the equal right of every citizen to obtain an education (article 5). Given "improving the quality of the Indonesian people" through education as the major national goal for the next 25 Years, the more specific Education Goals in this chapter define realistic quantitative achievement levels within this constitutional and legal framework as a means of advancing the Constitution's and the Education Law's objectives.

There have been remarkable achievements in the Indonesian education system during the first 25 Year Plan, far surpassing those in sub-Saharan Africa and South Central Asia, for example, where raw unimproved labor and rapid population growth are predominant. These achievements include:

- Universal primary education, with access rising from 50% in 1968 to a 91% net enrollment rate today.
- A four-fold increase in secondary education, rising from 10% net enrollment in 1968 to 41% today. This only falls slightly short of the targets set in Repelita IV and V.
- Dramatic expansion of higher education, from very few institutions in 1968 to about 800 today.
- Slower population growth, largely because of more women educated beyond 9th grade, contributing both to lower fertility rates and a higher per capita standard of living.
- Some reduction in inequality, with Gini coefficients falling from .33 to .32 in the 1980s.

But looking to the future, some needs are obvious:

- The quality of education is inadequate, which is a disadvantage in competition with Malaysia and Thailand,
- Equity for all has not been attained, with high dropout rates for many in the rural areas and only 62% nationwide in 1989/90 finishing grade 6, and entering grade 7,
- Access is still quite limited to junior and senior secondary schools, with many schools having very short days and many children without textbooks,
- Efficiency is a problem in many areas, with low absorbative capacity, high repetition rates, insufficient access to modern laboratories in the colleges, teacher pay not reaching the poorest schools, and textbooks not delivered in remote areas.

These limitations contribute to the inadequate education and training of the labor force and of Indonesian people, which has become the weak point of the nation's capacity to develop. The evidence for this is developed below. Better quality education at all levels and universal junior and senior secondary education are badly needed, for example, to increase economic productivity and the capacities to learn on the job as well as to use new knowledge which results in more effective producers, consumers, and citizens. Indirectly, education, by laying the foundation for lifelong learning, will encourage individuals and groups to create and explore new cultural, social, and technical frontiers and to seek fresh solutions to Indonesia's problems.

This long term education plan seeks to analyze the ways Indonesian education can most efficiently, equitably, and realistically contribute to national development. Beyond the nationwide input discussed above, it is based on the analysis of Indonesian data on labor market earnings, unemployment rates, and educational costs that reveal the relative contribution of different levels and types of education to economic growth and to continued reductions in inequality. This education plan also reflects the results of conclusions reached in many discussions and national conferences in 1990-92, as mentioned above, and of the experience of the Pacific Rim countries with respect to how they financed their improvement of education before they started their fast growth. It also reflects the body of international and Indonesian research on the sources of educational quality and effective schools.

Progress toward attainment of the education and social goals will require a major national effort. This includes working toward these goals, as well as a sustained effort in overcoming the obstacles. But the attainment of specific education goals to "Improve the ability and quality of life of the Indonesian People" will be well worth the effort. Progress toward this goal can be expected to contribute significantly not only to rising standards of living and equity, but also to better health through improved knowledge and development of the complete Indonesian person. In combination, these offer Indonesians a bright future.

Finally, the 25 Year Education Plan, whose quantitative goals are summarized in Table I.2 below, suggest specific 25 year education goals consistent with an efficient overall investment strategy that is also realistic in terms of the means of financing to achieve the nation's goals (See Tables I.3 and I.4 below).

The goals go beyond those in the first 25 Year Plan in that they stress improvements in the quality of education at all levels, greater equality of educational opportunity at all levels, and increased internal and external efficiency in the education system. Two realistic goals for example, are the attainment of **universal senior secondary education** by 2013, as well as **greater access to much better quality higher education.** These are shown to be similar to the experience of the Pacific Rim countries prior to their take off into very fast per capita growth.

I. EDUCATION, ECONOMIC, AND SOCIAL DEVELOPMENT

Indonesia's future looks quite promising. Universal education through grade 6 has been achieved and there have been other remarkable achievements in education in the first 25 years. But low per capita income (of $500/year) and high inequality in incomes (Gini Coef. = .32) show what remains to be done. To provide for growth, Indonesia is now investing a high 30.17% of its GNP in physical capital, a percentage similar to that since 1969 in Japan and Korea, and the highest among the ASEAN countries (except for Singapore). But Indonesia's investment in education is very low, at 2.95% of GNP for the *Central* Government's Investment, including Home Affairs (or a total by all levels of 3.98% of GNP, see Chapter IX). This is low in relation to the nations on the Pacific Rim, and the lowest in ASEAN where the average percentage invested by the Central Government alone is 4.2% of GNP. In these other nations *some* of the expenditure designated by the IMF as "local" comes from the Central Government just as in Indonesia.

Inadequate quality of the Indonesian labor force is one result, involving limited capacities to learn on the job and to use the new technologies on a widespread basis. It is now the primary obstacle to faster economic growth. There is evidence of this in that this high rate of investment in physical capital and low rate of investment in human capital is resulting in *slowing growth over the last 25 years* (see Chapter VIII), and diminishing returns to investment in physical capital with its lower average real rates of return, given the lack of sufficient education and skills.

Education and the Economy: The Evidence

There is also other evidence of this in the Indonesian data. The real rates of return to investment in basic education in rural areas are estimated to be 27%, in urban primary are 11-13% and in urban secondary education are 11-16% throughout the 1986-90 period, whereas the **real** rates of return to investment in physical capital now average only 9.4% . This reflects the fact that *private markets are failing to produce sufficient amounts or quality of basic education and training,* especially in the rural areas. This is largely because parents cannot easily borrow enough from banks to finance education, even though the real rates of return corrected for inflation are higher than the alternative uses for these funds. To fill this gap, cost benefit calculations can use the market signals on wage rates and educational production costs (just as well as any private firm can) to find improvements conducive to growth in the overall system, and to indicate the most efficient investment strategy.

Overall, Indonesia needs to *cut back public investment and privatize in those areas where markets work well,* such as in the parastatal industries where productivity is currently very low (see Abas Gozali's thesis). But there is need to *increase the rate of public* (and private) *investment where markets work poorly,* and this is especially in investment in people as a very strategic area where real rates of return are high.

As the educational system improves and expands, there is discussion in Indonesia of unemployment among secondary school graduates. But this matter is of limited concern when four important facts are considered.

- *First*, it is shown (see McMahon and Boediono, 1992, and Chapter II) that the "educated unemployment" in Indonesia is temporary and a matter of excessive job search time as students leave secondary schools and colleges. The job markets at the primary and junior secondary school levels are tight. The high 35-40% unemployment right after graduation for secondary school and college graduates fall sharply to 3% and below after age 26. Furthermore, *under*employment is *much* higher among those with *less* education than it is for high school and college graduates, especially in the rural areas.
- *Second*, the chapter on Technology and Education develops recent international evidence that shows that as technology is transferred to Indonesia and reasonably high rates of investment in physical capital continue, it is the demand for workers with better and more education that can be expected to grow the most rapidly (see Chapter V).
- *Third*, some unemployment at the secondary school leaving age restrains wage growth at this level, which stimulates exports. Malaysia and Indonesia are in the best position to benefit as the jobs requiring skilled labor shift south. Malaysia has been investing over 20% of its Central Government budget in education since 1972 (compared to Indonesia's 10%), and many jobs are now moving south to Malaysia and Thailand from Japan and Korea.
- *Fourth*, all of the fast growing Pacific Rim countries followed a strategy of expanding both junior and senior secondary education at a rapid pace at earlier stages in their development, as is developed further in the Boediono-Adams chapter (Chapter IV), and in the data appendix (Chapter IX, Table III). But now, later, the senior secondary level job markets are currently very tight in Japan, Korea, Taiwan, and Hong Kong.

Equity with a more equitable distribution of income is also a major national goal in Indonesia, both as a part of Pancasila, the national philosophy, and in the drafts of GBHN, 1993, #3. Within education currently, about one-third of all primary and junior secondary school students however have no textbooks, mostly in the poor areas, and the lowest 25% of the primary schools nationwide have from 45 to 100 pupils per teacher. (See Theisen, Hughes, and Spector (1990), Nielsen and Somerset (1991), and Linda Dove (1991) referenced in Chapter II.) Improvement in quality in the low income (type A) and fast growing (type B) areas will greatly reduce the dropout and repetition rates. This improvement in equity is essential to raising the overall average quality of education in the nation. In spite of inequality between rural and urban schools, there is evidence to the effect that inequality in the income distribution has fallen in Indonesia during the 1980s (Gini coef. from .33 to .32). A key reason cited by the World Bank (1990) and discussed in Chapter II below is Indonesia's attainment of universal primary education with important impacts on productivity in the rural areas, and on the capacity of children from low income families to enter the labor force.

Education and Social and Cultural Development

Education is an integral part of the rapid social and cultural changes taking place in Indonesia. The extent of education's positive contribution to this process depends on the early recognition of the nature and scope of such changes and on the effectiveness of the educational system. Given its own history, the trends of other newly industrialized countries, and the globalization of technology, ideas, and institutions, Indonesia over the next 25 years will experience some or all of the following changes: linguistic, ethnic and cultural differences; new roles and relationships within the family; wider intergenerational differences in attitudes and preferences; increased social and physical mobility; new

patterns of organizational and individual behavior resulting from new technology; and the exploration of youth of many nontraditional values (see Chapter IV).

Some conditions and changes potentially could have either a positive or a negative impact on individual lives and on society. An effective formal and nonformal educational system, for example, can promote intergroup parity, develop shared appreciations, bring home and school together, increase community participation in addressing common concerns, and teach individuals to become employable and to anticipate and cope with an uncertain future.

A major objective of the 25 Year Plan is that Indonesian education during the plan's implementation increasingly should acquire the characteristics of effective educational systems as identified by international and Indonesian research. Specific action plans should be developed focusing on effective instruction, effective teacher and staff development, effective management, reducing low absorbative capacity, and developing effective equipment and facilities (see Chapter VI).

Education and Demographic Change

The results of the 1990 Census in Indonesia show both that fertility has been declining faster than earlier predicted, and that mortality has been declining somewhat slower (see Chapter VII). The latter probably reflects the widespread poverty that is still, unfortunately, a characteristic of the Indonesian economy. Both represent a challenge and also an opportunity for education, and for economic development in Indonesia.

The challenge has two major parts, both for education and economic development strategy. The first, a largely quantitative challenge, concerns meeting the rising demand, especially for secondary and higher education. Total numbers of school-age children are already at their peak at primary school ages, and close to it for junior secondary school ages (at which total numbers in the year 2000 will be lower than in 1995) (see Table 3 in Appendix to Chapter I). Peak numbers at senior secondary and tertiary ages will occur early in the 21st century. However, experience (particularly in other Asian countries) suggests strongly that one consequence of declining average family size is often an explosive growth in demand for higher levels of education, as families substitute quality for quantity by investing more in each of fewer children. Relatively low average incomes, and achievement of near universality at lower levels of schooling, tend to exacerbate this tendency as families have higher earnings and seek the competitive edge for their children that above-average education confers. Thus it is likely that demand for places at senior secondary and tertiary institutions, those with by far the highest unit costs, will increase very rapidly over the next 25 years. The challenge will be to meet this demand at reasonable cost levels, and with financing mechanisms that will be perceived as equitable.

The second challenge is more of a qualitative one, although with quantitative roots. Already in 1991, among those aged 20 to 24 in the labor force, the median education was just beyond primary school and 48% of men and 39% of women *of that age* had completed junior secondary school or higher levels of education. The educational qualifications of new entrants to the labor force are escalating, at the same time as the labor force participation rates of women are also increasing.

However, only about 27% of the Indonesian labor force holds wage-paying jobs; apart from less than 1% who are employers, the other 72% plus are self-employed or unpaid family workers (see Chapter VII). Currently, approximately four new entrants enter the labor force for each worker who exits, and the age distribution of wage employees is younger than that of the labor force in general. It follows that unless the structure of the labor force (in terms of status) changes very much more quickly than it has in the past, increasing proportions of the more educated (those with junior secondary schooling or more) will have to earn their living in self-employment in service industries and unpaid family labor, whereas they have been used to the expectation of securing wage jobs. That this is already happening is indicated by the educational characteristics of the unemployed defined narrowly, and not including the *under* employed. The challenge to education is to prepare young people for

productive activity in the economy whatever their status, rather than only as instruction-following wage or salary employees, which latter is the traditional tendency of the school system in Indonesia.

At higher levels, it is particularly noteworthy that as recently as 1987/88, three-quarters of all economically-active tertiary graduates in Indonesia were civil servants. With the rapid growth of tertiary enrollments, and the constraints on the growth of the public sector, the orientation of higher education must clearly change from the public to the private sector, as college graduates enter business, industry, engineering, and agri-business (see Chapter III).

But these challenges are matched by magnificent opportunities. Because of the demographic transition that is occurring, the conventionally-defined dependency ratio [(population aged under 15 years and over 64 years)/(population aged 15 to 64)] in Indonesia is falling, will continue to fall monotonically until probably about the year 2020, and is unlikely to reach the 1985 level again until the latter half of the 21st century. With female labor force participation rates rising as well, this implies that an increasing fraction of the population will be economically active throughout the 25 year plan period.

So if labor productivity can be maintained, there is the opportunity for growth in output per person from this source alone.

As technological change and education improve labor productivity, growth of output per person will be even faster (see Chapter II). But the average educational attainments of the labor force, as already suggested above, will be increasing very rapidly in the near future. Those exiting the labor force have median education of less than primary school for men, and none at all for women. If the real rates of return to education, both in wage employment and in other labor force roles can be maintained into the future, as they are likely to if the quality of education improves and technology transfers to Indonesia, then the prospects for rapid growth of output per person in Indonesia should be very good.

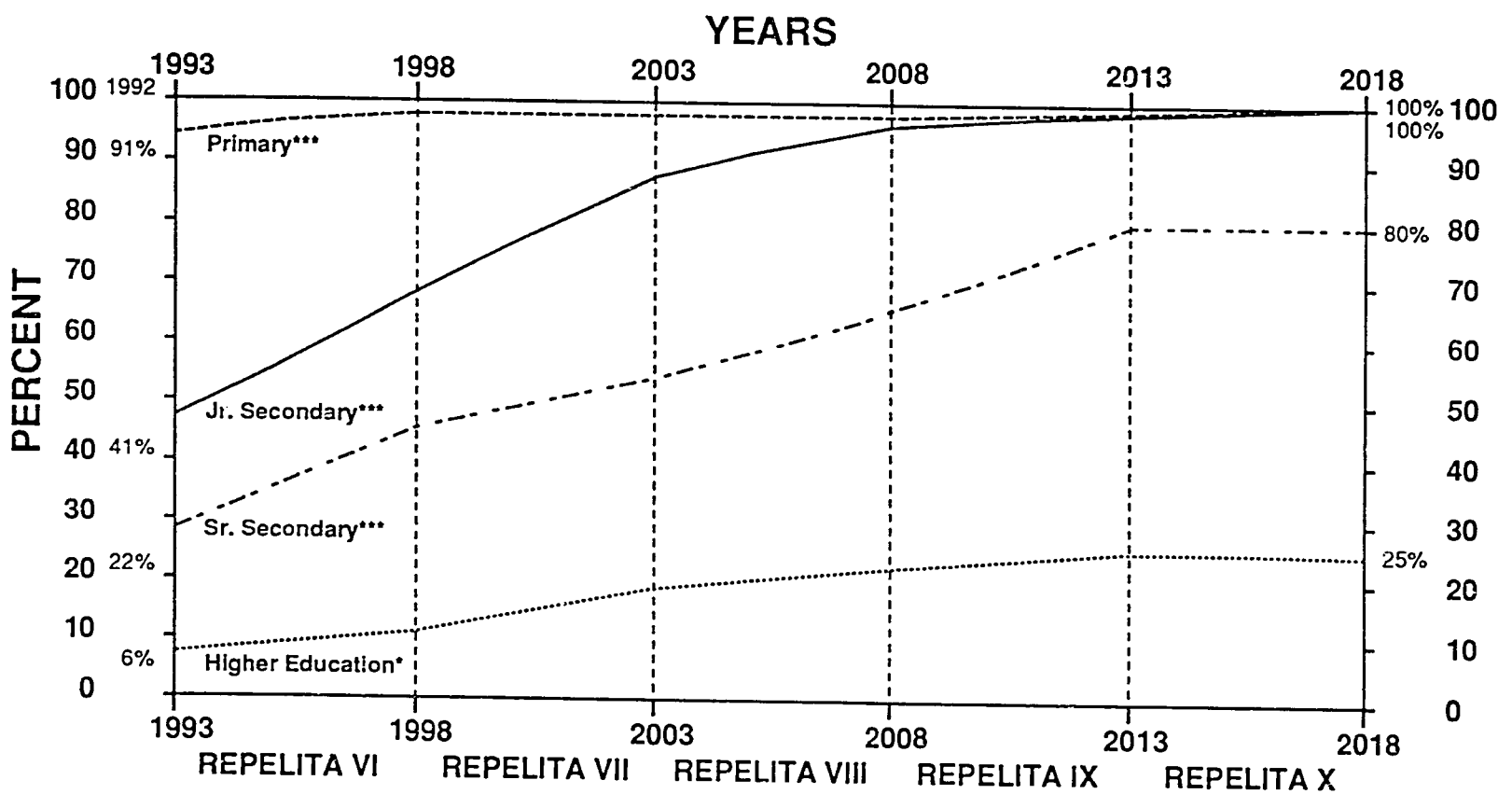
Finally, the prospect that total numbers of primary age children will be falling throughout the planning period provides an opportunity to improve the quality of the entire education system by improving the quality of the primary school sector on which it is based. Although initial enrollment is not quite universal, if repetition can be reduced, total numbers in primary school will not increase even if full primary schooling becomes universal in the next few years (see Table 3 in the Appendix to Chapter I). This implies that, with rising income per head, it should be possible to increase resources per pupil-year while also improving the equality of educational opportunity. This will reduce repetition and dropout and improve the students flowing into the secondary schools. This is an opportunity to put the entire education system into a virtuous circle in which the schools produce more graduates for each pupil-year of instruction delivered (increasing their efficiency) and simultaneously impart more useful skills and knowledge each year to each pupil (improving school quality). This is a wonderful opportunity.

II. 25 YEAR EDUCATION GOALS

Twenty-five Year Education Goals for improvements in *access, equity, quality* , and *efficiency* also reflect an efficient investment strategy based on the cost/effectiveness criteria discussed in Chapter II. The access goals are illustrated in Figure I.1. The emphasis on equity for all contained in the National Education Law, the National philosophy (Pancasila, GBHN, 1993) and Minister Hasan's speech of January 20, 1992, quality, and efficiency goals are also reflected below in both Table I.1, and Table I.2.

The attainment of each goal is phased in up to the time shown by the black bar following each line in Table I.1, after which its attainment is sustained at this level up through 2018. The cost of the attainment of each goal is shown in the rows of Table I.2 (the basis for which are explained in the Appendix). The means of financing their attainment are discussed later.

Figure I.1
25 Year Education Goals
Access to Good Quality Education
Net Enrollment Rates



*** ACCOMPLISHED VIA:

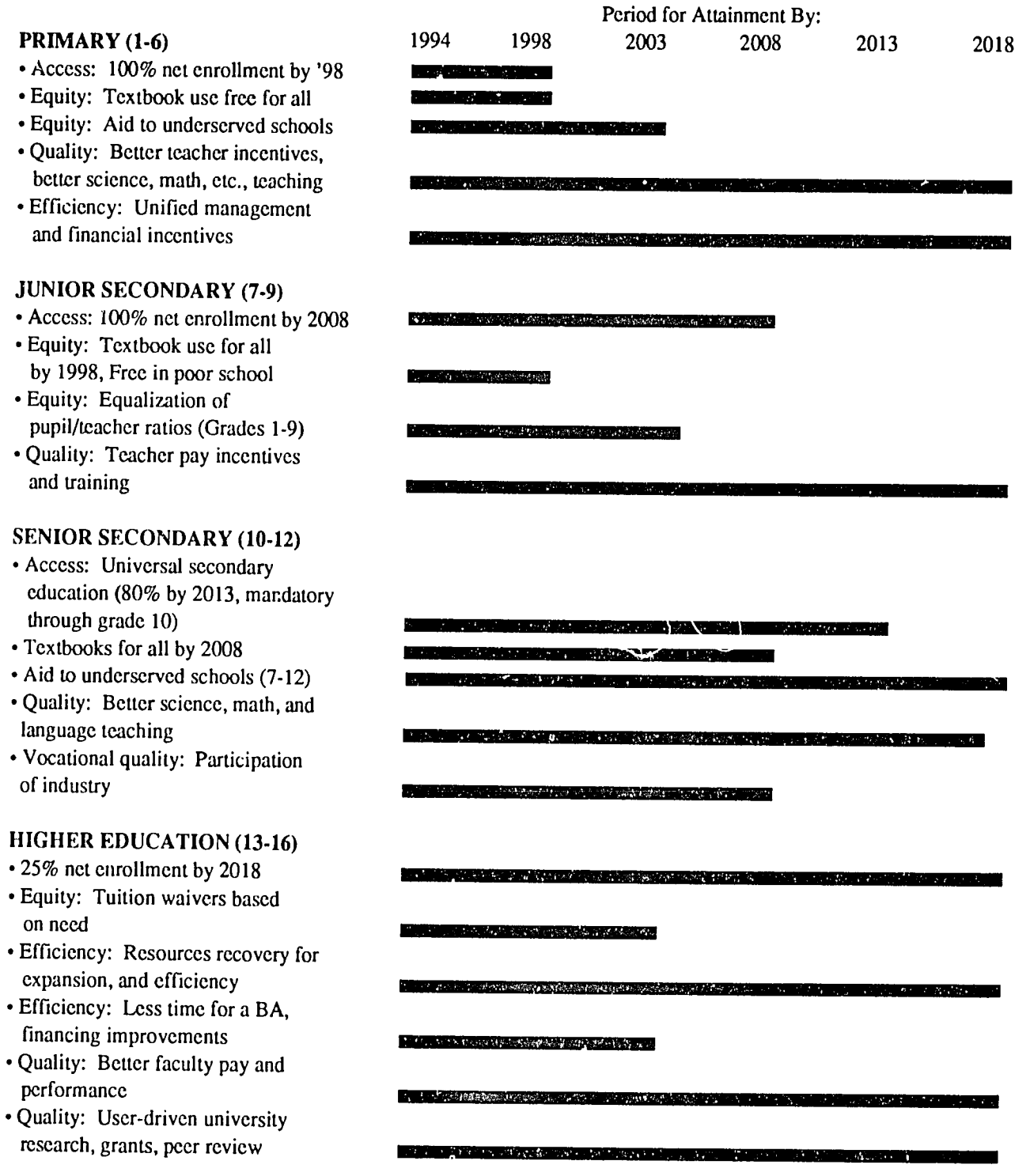
1. Free Use of School Textbooks
2. Lower Pupil/Teacher Ratios in Poor Districts
3. Aid to Under-served Schools
4. Better Quality

* ACCOMPLISHED VIA:

Greater Efficiency (Finish BA in 4 years, not 7)
Resource Recovery Via Tuition, Better Quality

Table I.1 *

25 Year Policy Intervention Goals for Economic and Social Development Phased in During the Period Shown by the Bar, and Then Sustained at that Level



*The bars in Table I.1 indicate the estimated length of time necessary for full achievement of targets.

Table I.2
25 Year Development Education Goals: Low Population Growth Scenario
Estimates of Financing Needs, in Billions of Rupiah at 1991 Prices

		Enrollment, and Annual Investment Required[c]				
		In 1998	2003	2008	2013	2018
PRIMARY EDUCATION						
• Access:	100% Net Enrollment Rate by 1998 (Now 91% Incl. Islamic but Not Paket-A)[c]	29,446,400	30,384,100	29,953,000	28,998,800	28,527,600
	Total investment, at constant (Rp. 91,405) cost/student (Bil. Rp.)[c]	2,692	2,777	2,737	2,651	2,608
• Equity:	Textbooks for all by 1998 (Bil. Rp.)	74	75	75	75	74
	Equalize Pupils Per Teacher by 1998 (Bil. Rp.)	0	0	0	0	0
	Aid to Underserved Schools, and New School - Aid Formula	450	700	800	800	950
• Quality:	Teacher Training and Pay Incentives (Bil. Rp.) Incl. Improved Administration	1,200	1,950	3,000	3,960	4,950
	SUBTOTAL (Bil. Rp.)	4,416	5,502	6,613	7,486	8,582
JUNIOR SECONDARY EDUCATION						
• Access:	100% Transition Rate By 2003, and 100% Net Enrollment Rate by 2008[c]	9,267,695	11,239,873	12,894,593	12,492,774	11,844,097
	Total investment at constant (Rp. 124,311) cost/student (Bil. Rp.) plus more Bldgs. in 93-8.	1,500	1,397	1,603	1,553	1,472
• Equity:	Textbooks for all by 1998	39	47	54	52	49
	Aid to Underserved Schools; equity in aid formula	500	700	800	1,000	1,000
• Quality:	Teacher Pay Incentives (Bil. Rp.)	1,300	1,950	2,600	3,300	4,350
	New National Curriculum (Bil. Rp.), Improved Science, Math, Language Instruction	50	150	250	350	450
	SUBTOTAL (Bil. Rp.)	3,339	4,244	5,317	6,255	7,321
SENIOR SECONDARY EDUCATION						
• Access:	80% Net Enrollment Rate by 2013, 1991:21.4%[c]	5,887,022	7,099,394	8,731,150	10,228,674	9,759,816
	Total investment at constant (Rp. 204,748) cost/student (Bil. Rp.)[c]	1,025	1,454	1,788	2,094	1,998
• Equity:	Free Use of Textbooks (Bil. Rp.)	40	50	60	70	80
	Aid to Underserved Schools; and Equity in the Aid Formula	200	600	1,100	1,310	1,520
• Quality:	Improved Science, Math, Language Teaching	161	211	276	276	273
	Teacher Pay Incentives (Bil. Rp.)	725	1,600	2,300	3,100	4,000
	Vocational/Private Industry Partnerships	20	40	60	100	100
	SUBTOTAL (Bil. Rp.)	2,171	3,919	5,584	6,950	7,971
HIGHER EDUCATION						
• Access:	25% Net Enrollment Rate by 2018, 1991:5.77%[c]	3,567,229	4,395,532	5,123,992	5,939,142	6,686,843
	Total investment at constant (Rp. 461,591) cost/student (Bil. Rp.):[c]	1,647	2,029	2,365	2,741	3,087
• Equity:	Costs (Bil. Rp.), Tuition Waivers Based on Need Analysis[a] (10% of Students)	226	338	473	640	854
	Strengthened Provincial Universities (Bil. Rp.)	300	450	950	1,500	2,000
• Quality:	Better Faculty Salary Incentives (Bil. Rp.)	900	1,750	2,250	2,750	3,032
	User-Driven Research Grants (Bil. Rp.)	100	200	500	800	1,582
	Improved Science Instruction SUBTOTAL (Bil. Rp.)	3,173	4,767	6,528	8,431	10,565

Table I.2 (continued)

	Enrollment, and Annual Investment Required[c]				
	In 1998	2003	2008	2013	2018
NONFORMAL EDUCATION					
• Education for illiterates (Bil. Rp.), plus job training	200	300	400	500	500
TOTAL DIRECT INVESTMENT REQUIRED					
• (Bil. Rp.):	13,299	18,732	24,442	29,622	34,939
TOTAL AMOUNT AVAILABLE					
• (Bil. Rp in constant 1991 Prices)[b] If GNP Grows at 5%/Yr. See Table I.4.	12,700	20,000	29,400	41,900	54,100

Notes

a. Tuition waivers and need-based grants are *more* than offset by increased tuition revenue.

b. Assumes GNP grows at 5%/year in real terms.

c. Enrollment at each level here is the gross enrollment including under and over age enrollment, enrollment in the Madrasah schools and enrollment in the private schools and private universities. Taken from Table 3 in the appendix to the executive summary (Chapter I).

d. This is the 1991 net enrollment rate of persons age 19-24. The gross enrollment rate is 10.3% but this includes 974,342 over age students in 1991.

New Education Goals of Quality, Equity, and Efficiency

The Education Goals for the Second 25 Year Development Plan shown in specific terms in Table 1.2 are **new in relation to the first 25 Year Development goals** in that they emphasize improved:

- Quality
- Equity, and
- Efficiency.

They build upon the first 25 years by also providing for continuing expansion of

- Access at all levels.

This access needs to be to education of **good quality**, that is **equitable**, and **efficient**. These concepts, which apply at all education levels in Tables I.1 and I.2 include the following :

- **Quality** improvements include improved teacher training; improved teaching in math, all of the sciences, and language; good quality textbooks and teaching materials that are available to all at primary and secondary levels; teacher pay incentives and career paths; improved classrooms; new curricula; and higher achievement outcomes at all education levels. Improvements in inputs to improve educational effectiveness and quality are provided for in the budget scenario in Table I.2, and are discussed further below.

- **Equity** for all, means greater educational opportunity for children from low income families and rural areas, but without sacrificing quality in the better schools. This is feasible and will implement the National Education Law (Articles 5-7) through aid to underserved schools, textbooks use available to all children from lower income families at no cost, and financing methods discussed below and provided for in the budget scenario in Table I.2 at all education levels.

- **Efficiency** means improvements in internal efficiency within the schools, using efficient rates of expansion of investment that considers benefit/cost criteria, and greater external efficiency in the way students relate to job markets and to the needs for Indonesian social development. Internal efficiency would be improved by lower degree completion times, school financing incentives that promote high attendance and longer days and more student time-on-task; unification of primary school management now divided between MHA and MOEC, more efficient direct payment of teachers by check, payment for private textbook delivery by check; some educational management decision decentralization; and other efficiencies.

These goals of major improvements in quality, equity, and efficiency overlap somewhat in meaning, and mutually exclusive definitions of each are not possible. All of them however, relate to access.

Access, as the term is used here, refers to enrollments at each educational level. As shown in Figure I.1, in 1991 the current *net enrollment rate* (the percent of children and youth from the relevant age cohort who are enrolled in school) for primary education is 91 percent; for junior secondary schools, 41 percent; and senior secondary schools, 22 percent; and for higher education, 6 percent. (The gross enrollment rate in higher education is much larger because of the over-age enrollments

shown in Table 3 of the appendix to this chapter). Efficiency criteria in the form of rates of return at the junior secondary, senior secondary and higher education levels are likely to remain relatively high given the educated labor needs of the new technologies and the expansion of demand at these levels (See Chapter V). These rates of return warrant expansion of access even if quality levels remain the same.

Access targets for the 25 Year Plan are suggested in Figure I.1 and Table I.1, and are spelled out in quantitative terms in the first line for primary, secondary, and higher education respectively in Table I.2, including the investment requirements to achieve these goals.

- **These goals at the primary level include reaching a net enrollment rate of 100% by 1998**, and reducing the 38% who currently do not begin 7th grade, which is higher in the rural areas.
- At the junior secondary level, access goals include reaching a **100% net transition rate by 2003**, which involves increasing the current net enrollment rate of 41% to 100% by 2008, as shown in Table 4 of the appendix to this chapter. **At the senior secondary level** the access goals are for an 80% net enrollment rate by 2003, where it would flatten out as shown in Figure 1.1.
- **Finally in higher education, the net enrollment rate would rise to 25% in 2018** from the current 5.77% (which does not include the very large over age enrollments). This means about a 7% **gross** enrollment rate currently compared to 30% in Japan (held constant at that level since 1978), 37% in South Korea, 7% in Malaysia, about 15% or more in Taiwan and Hongkong, and 16% in Thailand. Perhaps Malaysia and Thailand will be near a 25% net enrollment rate by 2018 (See the data in Chapter IX).

Efficiency, equity, and quality at each level of access are concepts that are meaningful. But they do overlap at some points, so further clarification is needed.

Efficiency is a ratio of effectiveness (or quality) **in relation to cost**. Effectiveness, benefits, and quality in contrast are absolute measures. But Effectiveness/Cost and Benefit/Cost measures are **ratios** that measure **efficiency**. Rates of return are one type of a benefit/cost ratio that takes returns to education **over time** into account, and hence they are one important measure of efficiency. Anything that increases effectiveness, such as better school achievement, or better quality, without increasing cost also increases efficiency. Management and implementation in ways that stress efficiency are discussed in a separate section below.

Equity refers to the **distribution** of education and is concerned with equality of educational opportunity. Children from poor and rural areas currently tend to be under represented in school populations at every level. This condition is of considerable concern because the distribution of many of the goods and services of society depends on earnings later which reflect the distribution of education. Consequently, equity considerations have been in the forefront of many national policies in Indonesia as mentioned above and they are one part of the educational financing policies of all of the industrial nations and of the fastest growing Pacific Rim nations (see Chapter II). Improved quality (textbooks, teachers, etc) in the poorest schools also improve equity if it reduces the inequality in the **distribution** of these school inputs, and hence in the distribution of school outcomes.

Improvements in equity can result from special Central Government aid to the poorest schools as additional resources become available **without** reducing the quality in the better-served schools. The specific actions provided for in Table I.2 in primary education include: provision of free use of textbooks for all students, especially in the poorest districts, equalization of the number of pupils per teacher by sending new teachers to schools that have high pupil teacher ratios, and other aids to underserved schools (the poorest 10 percent of the schools). The Government has already made the

decision to double the salary of primary and junior secondary teachers in the poorest schools and remote regions, a needed change that will also aid access. Recommendations for the junior and senior secondary schools in this long-range plan include provision of free use of school textbooks, aid to underserved schools, and eventually an improved objective resource allocation (school aid) formula that provides both for efficiency, quality, and equity. At the Higher Education level proposed improvements involving equity during the next 25 years focus on tuition waivers based on objective need analysis standards for students from low income families who are qualified for admission to college, strengthening of provincial universities, and revised admission and accreditation standards. Targets for equity are found in Table I.1 and the costs associated with their achievement are found in Table I.2.

Quality improvements which are emphasized in this 25 Year Plan is a concept for which several definitions may be found. It refers here primarily to student achievement, employability and productivity of graduates, as well as contributions to the graduates' quality of life. The many school input and process variables contributing to student achievement mentioned above are analyzed further in Chapter VI. Some investments such as good textbooks for all students make more cost effective contributions to learning than do others. Concern for improved educational quality has been expressed in all the seminars and conferences related to the development of the 25 Year Educational Plan. Specific actions to improve quality at the primary and junior secondary level shown in Table I.2 include pay incentives to attract and hold better teachers, and an upgrading of teacher education, particularly in science, mathematics and language. At the senior secondary level in addition to an instructional focus on science, mathematics and language, industrial involvement in partnership arrangements with the schools is a means of improving VOTEC equipment and the quality of the education through access to newer technologies, while at the same time lowering the tax costs. In higher education, three types of investment in quality improvements are provided for in Table I.2: curriculum improvements leading to better employability; better faculty training, pay, and performance incentives; and expansion of user-driven research grants to individual faculty on a project by project basis based on peer review procedures to enable faculty to stay up to date in their fields and to enable Indonesia to train its own PhD's. These improvements in quality are also identified in Table I.1 and the supporting costs are shown in Table I.2.

Primary Education (Table 1.2)

- Access: An extension of opportunity to study that attains a 100% net enrollment rate in elementary school by 1998 (GBHN 1993 #6). There may be some double counting in the enrollment totals since some students are enrolled in more then one type of school. The steps that follow are necessary to reduce the dropout and repetition rates. See Table 3, Appendix to Chapter I for enrollments. The data refer to actual enrollments in 1992, not Repelita V targets.

- Improved Equity: Equalization of pupils per teacher, and free use of textbooks, especially in all low income and rural schools by 1998, at the relatively low cost of 74 bil. Rp. (see Table I.2). Elimination of dropouts in rural and in poor urban areas (GBHN, 1993, #6). The public financing of use of textbooks **makes possible privatization of textbook production and delivery**, with curriculum center approval of content to ensure quality and with private firms assisting in serving the needs. Textbook vouchers could be sent directly to local principals, include delivery of approved books, and require delivery to remote areas to be

counter-signed by the principal before the textbook company can be reimbursed.

- Improved Quality : Improvements in the pre-service and in service training of primary school teachers, including adequate pay incentives to attract and retain the able, high quality teachers by 2008 (GBHN 1993, #5). Improved administration of the schools which requires that teachers have only one boss. This probably means they must be paid by MOEC rather than Home Affairs as per the public directive (PP6), and directly by check by 1998 to eliminate the diversion of funds and improve administration of the pay rolls. A unified financing system would increase the capacity of the school administration to improve the primary schools. Improved IKIPs and improved science, math, and language teaching.

Junior Secondary Education (Table 1.2)

- **Access:** 90 percent net enroliment rate by 1998, 100% transition rate by 2003, (Repelita VI), and 100 percent net enrollment rate by 2008. This expansion is illustrated in Figure 1, and the transition and net enrollment rates for each year are shown in Table 3 and compared in Table 4 in the Appendix to this chapter.

- **Equity:** Textbooks for all by 1998, during which time private textbook companies could gear up for production *and delivery* of textbooks approved by the curriculum centers *to the local school* where they would receive the vouchers for the textbooks enabling them to claim reimbursement. Free use of textbooks for all primary and junior secondary children from low income families, urban and rural, by 1998 (Repelita VI).

- **Equity:** Aid to underserved schools. This program, supported by the Government and the World Bank, is targeted at the moment to reach only the poorest 10% of the primary schools. It could be extended to the junior secondary level and eventually gradually be folded into a new National school-aid formula (resource allocation model) as the latter is developed.

- **Quality:** Teacher pay incentives, to attract, retain, and provide incentives for better training. Teachers paid by check. Better math, physical, social, and life science teachers and language teachers through better in-service training and better IKIPs.

- **Quality:** National implementation of the new National Curriculum, by 1988 (Repelita VI); improved quality of laboratory and classroom facilities, and other quality and effectiveness improvements discussed above.

Senior Secondary Education (Table 1.2)

- **Access:** An 80 percent gross school enrollment rate by 2013 (See Figure 1 and appendix). Korea and Taiwan both went from 48% to 92% in 17 years.) If there should be more unemployment in this group it would lower the relative wage and increase export competitiveness, leading to faster growth of employer demand.

- **Equity:** A financial resource allocation formula by 2003 that provides a guaranteed minimum expenditure per pupil and also stresses important aspects of efficiency (e.g. attendance, time - on - task). Textbooks for all in grades 10-12 by 2013, including free use

of books by all lower income families, mandatory completion of grade 10 by 2013.

- **Quality:** Improved language, mathematics, and science teaching that forms an intellectual attitude that appreciates science and an ability to participate in technological development (see Chapter V below and GBHN, 1993, #5). Better labs. Better teacher pay incentives for additional training, retention and recruitment, salaries paid by check for accountability; career paths for teachers.

- **Senior Secondary Vocational:** Increased participation by private business and industry through shared instruction, apprenticeships, and internships appropriate to technological change and adaptation. The current 434,000 Rp. public cost per student, including 213,000 Rp. for equipment in STM's can be reduced as this type of vocational training is done more through vocational apprenceships with private industrial firms using their equipment. The quality of instruction also can be improved through access to the newer, market-oriented technnologies used in firms. Job-search time at completion can be reduced because many apprentices will be kept on by firms.

Higher Education (Table 1.2)

- **Expanded Access:** Raising net enrollment rates from the current level to 25% by 2018. Expansion of the private universities and their systematic accreditation has a significant role in meeting this goal as well and is included in the enrollment totals. Decentralization and increased autonomy for the public institutions; accreditation of the private (and public) colleges (GBHN, 1993, #7). Increased efficiency via large reductions in the number of over-age students, in spite of a growing Masters and Ph D enrollment, as the result of gross and net enrollment are shown in detail in the appendix to this Chapter, Table 3. which also reflects a reduction in the length of degree programs encouraged by higher tuition.

- **Greater Equity:** Tuition waivers only for students from lower income families, based on financial need analysis. Establishment of a new National Financial Need Analysis System by contracts to private firms such as the American College Testing Program (ACT) or College Board (CEEB) that do this in the U.S. Strengthening of the Provincial Universities. Some two-year community colleges close to students' homes. Reform of admission standards to use honest ranks in the high school class and lesser weight on test scores (e.g., 20%) to improve both the prediction of success in college and in jobs later as well as access by residents of the Provinces who will return to aid economic development there.

- **Improved Quality:** Access to modern science and computer laboratories Greater efficiency (e.g., finishing four year degrees in four years instead of 7, use of research and teaching assistants to facilitate the capacity of faculty to update their skills, (See Chapter V). Resource recovery through tuition that rises from the current ratio of about 15% costs in the public universities to 30% by 1998, rising gradually to cover 50% of direct costs by 2018. This can be used to provide better salary incentives to attract and retain higher quality faculty, to finance continuing expansion, and to encourage shorter degree programs. Improved education in the physical sciences, life sciences, social sciences, language, enginering, business, and agri business areas is shown in Table I.2 and greater use of user-driven research financed by government and by industry at universities to help faculty and students stay up-to-date in all fields (Chapter V, GBHN, 1993, #7). Greater industry participation in

the finance of applied research at the universities (User-driver). Faculty incentives would be facilitated by separation of faculty pay scales from the civil service. See the Appendix to this chapter for the basis for estimated amounts.

Non-formal Education (Table 1.2)

- Non-school education for illiterates augmented by job training for those with limited skills who are now in the labor force to reduce unemployment and raise their productive ability. (Draft GBHN, 1993, #8).

These access and equity goals are discussed in much greater detail in Chapter II and III, sciences and math quality goals in Chapter V, quality and implementation methods in Chapter VI, and human resource development strategies in relation to the competition from other nations in Chapters IV and VIII.

III. EDUCATIONAL MANAGEMENT AND IMPLEMENTATION OF GOALS

The specification of goals and targets represents a major step in the process of planning the educational future. Implementing the goals is an equally great challenge. Indonesia has many highly skilled educational administrators within an experienced educational bureaucracy. Nevertheless, the size and complexity of the suggested improvements in access, equity, quality and efficiency will place new and heavy demands on educational management and require that special attention be given to implementation planning.

The translation of goals into programs and projects which determines absorbative capacity involves definition of the responsibilities of each level of the educational bureaucracy. Which decisions should remain centralized, which should become decentralized and with which goals can the private sector best help (e.g., textbooks production, VOTEC internships, accreditation of private colleges, etc.)? Although there can be no easy answer to this question, the central level will need to be involved in the allocation of funds, and the management of large scale, complex operations such as purchase and distributions of equipment. Central authorities also may be expected to play a major role in defining the general direction for educational change, monitoring resource flows, ensuring adequate inputs, and as necessary, mobilizing national commitment.

However, the ability of central policy makers to affect directly what happens inside the schools can be greatly enhanced by effective local school and university management. Reliance on centralized management specifiying quantities and program delivery may overestimate the capability of the central Government to control implementation efficiently and underestimate the need for local adaptation. For effective implementation, local level involvement may be needed in the more detailed proposing and planning for new programs and in the mobilization of teacher and parent participation . If decentralization in Indonesian Education proceeds as planned it may be assumed that increasingly the Kabupaten, Kecamatan, the individual school, and the University Rectors and Vice Rectors will accept more responsibility for management of resources to adapt to local needs. Successful management and implementation of the proposed reforms in Indonesia at a minimum call for additional responsibility and resources to be transferred to the school level, development of improved upward communication, and attempts at creation of participatory decision making processes involving, as appropriate, teachers, community members, and parents. The considerable uncertainty surrounding major educational changes and reforms requires administrative flexibility and local administrators must not only he well trained but also assume responsibility while feeling able to take risks and make mistakes.

The center can assist the local level by providing opportunities for management training and providing technical assistance in the development of simple monitoring and evaluation procedures. Principals and school didtrict administrators for example, are not yet well prepared for strong management roles and specific task-oriented, external technical expertise will be needed. The long range goal is to increase the autonomy and independent responsibility of the individual school and create an administrative and management structure in which all levels contribute creatively to the evolvement of an increasingly effective educational system.

IV. FINANCING THE ATTAINMENT OF 25 YEAR EDUCATION GOALS

Attainment of all these goals also will require adequate resources. Without realistic estimates of the cost of attaining each and realistic means of financing, the goals are relatively meaningless. The substantial community participation that is involved in the partnership that is inherent between the government, parents, and students in the means of financing their attainment is shown in Table I.3.

The Central Government's commitment is shown as rising from the current 3.0% of GNP in 1991 (2.15% if Home Affairs expenditures for primary teachers are not included) to level out at 5% of GNP in 2013 and 2018. This induces an enormous amount of private saving and investment in human capital formulation largely in the form of earnings and consumption forgone by parents as they allow their children to invest their time in further schooling rather than work at home or in agricultural production. Parents instead spend their own resources for the child's food, clothing, housing and transportation estimated at 19% of GNP in 1998 plus .5% of GNP for fees. This is a total far larger than the investment by all levels of government of 4.52% of GNP in that year. Parents are willing to, and do, make enormous sacrifices for their children and their children's future.

For this important reason, and the desire to attain universal basic education and not merely drive the poor children out of the schools, additional school fees are **not** proposed at primary or junior secondary levels. The parental contributions however to direct costs are an important available means of financing higher education where the objective is not to attain universal education and the ability to pay does exist. Tuition as a source of resource recovery is proposed to rise to .3% of GNP in 1998, and steadily to cover 50-60% of direct costs at public universities, or to .7% of GNP in 2018 coupled with need-based grants (in Table I.2) from students from low income families.

The increase in public investment by the Central Government to 3.5% of GNP by 1998 seems reasonable, and conservative, in light of this. It is also below the 4.3% currently being invested on the average by central governments in East Asia, or the 6% in industrial countries. The gradual increase to 5% of GNP by 2018 induces further increases in private saving and investment by parents, as described above. If net enrollment rates in secondary education are capped at 80% in 2013, the private saving and investment by parents, students, and firms in education would be likely not to continue to rise as a percent of GNP but to move toward about 17.8% of GNP in 2018 as shown in Table I.3. But the public investment by the central government of 5% of GNP by 2018 would still be well below the current 6% average for all industrial countries, as shown at the bottom of Table I.3.

Reform of the Provincial and Local tax system is needed over the next 25 years to increase community participation in finance and decision making, perhaps considering the independent school districts used in industrial countries and in an increasing number of developing countries. This would permit local Kabupaten to participate in the financing of the schools based on local votes to adjust the amount spent on education. Increased school fees charged to parents who send their children to school are not a viable means of financing schools at the primary and junior secondary level because it drives the poor children out of schools. Financial need analysis used to waive tuition for students in college based on need is not feasible with millions of semi literate parents at the K-12 levels. Also, the huge economic burdens borne by these K-12 parents already are often overlooked.

Table I.3
Means Of Financing Education Goals

MEANS OF FINANCING	Second 25 YDP, Amount Per Year, in: 1991	1998	2003	2008	2013	2018
• **GNP** (1991 Prices, Tril Rp.)	188.1	265.2	338.4	431.8	550.9	703.0
• **Public** (% of GNP):						
Central Gov't Incl. MOEC and Home Affairs	3.0 %	3.5%	4.0%	4.5%	5.0%	5.0%
Central Govt (MOEC only)[a]	2.15%	2.7%	3.2%	3.7%	4.2%	4.2%
Provincial and Local	1.02%	1.02%	1.5%	1.8%	2.0%	2.0%
Total Public Investment:	4.02%	4.52%	5.5%	6.3%	7.0%	7.0%
• **Private** (% of GNP):						
Parents: Foregone Earnings[b]		19%	20%	20%	18%	16%[b]
Tril. Rp.		52.4	61.1	67.8	68.7	69.3
Parents:						
Tuition (Higher Ed only)		.3%	.4%	.5%	.6%	.7%
BP3 (G10-12)(Ed. Sec. Rev p.280-6)		.2%	.2%	.2%	.2%	.2%
Firms: VOTEC Internships, etc.		.05%	.1%	.2%	.3%	.4%
Students: Higher Ed.:						
Loans, Work/Study, Research & Teaching Assistantships		.1%	.2%	.3%	.4%	.5%
Total Private Investment:[b]		19.6%	20.9%	21.2%	19.5%	17.8%
• **Central** Govt. Investment as % of GNP			1989	2018		
Asia		4.3%	P.M.			
All Developing Countries (UNESCO)		4.0%	P.M.			
All Developed Countries		6.0%	P.M.			
Indonesia		3.0%	5.0%			
All Developing Countries (Mingat-Tan)		3.7%	P.M.			

Notes
a.This assumes that Home Affairs continues to pay the salaries of Primary school teachers.
b.This declines because senior secondary school net enrollment rates were capped in 2013 at 80%.

Privatization will also assist in other ways. Private universities will be strengthened through accreditation, with parents bearing most of the costs of their continuing expansion. *Students* can also assist in financing higher education through expanded work-study programs, student loans, and half-time research and teaching assistantship service. *Private business firms* have particularly important new roles in the production and delivery of textbooks and in assisting with vocational training in the secondary schools through part-time internships. Firms also can assist through much closer relationships with the Colleges of Engineering, Agri-Business, Business Administration, and college and secondary school placement officers.

V. FEASIBILITY OF 25 YEAR EDUCATION GOALS

The attainment of the 25 Year Education Goals in Table I.2 will take a major financing effort through this public/private partnership. It will also take continuing effort to improve the educational management, efficiency, and absorbative (i.e., implementation) capacity of the education system as discussed above. But with this effort as a percent of GNP, which is modest by East Asian standards, and conservative in relation to where these other ratios are likely to be in the future, the resources available during Repelita VI and over the next 25 years are more than adequite to meet the nation's education goals.

The comparison in Table I.4 shows that the improved access. equity, quality, and efficiency goals for the last year of Repelita VI (1998) will require 13.3 trillion Rupiah (in 1991 prices). With the Central Government and community participation contributing 4.8% of GNP, and using 5% growth in real GNP, this will fully cover the direct costs. In future years, the growth in GNP and the modest increases in the effort as a percent of GNP that is proposed will generate 54.1 trillion Rupiah by 2018, considerably more than the 34.7 trillion required to meet the education goals. If real GNP should grow more slowly at 4% per year the total amount available still is more than adequate, but only after 2003. So by this comparison, the nation's 25 year Education Goals are feasible, and attainable.

VI. CONCLUSION

Improving the Ability and Quality of Life of the Indonesian People through education is the declared primary Indonesian National objective for the Second 25 Year Development Plan and the most pressing national need. This summary Chapter and the appendix to this Chapter, make the *means of its achievement through education specific* in terms of 25 Year Education Goals. In relation to the first 25 Year Development Plan, the goals provide for continuing extension of access, but are new in stressing improvements in the quality of education at all levels, equity for all, and improvements in the efficiency of the system. Attainment of such goals is needed for achieving *faster per capita economic growth*, greater pupil equity in education for the *reduction of poverty*, and for achieving Indonesian cultural and social development.

These 25 Year Education goals represents an *efficient* investment strategy that is also consistent with equity assuming all three of the interdependent policy thrusts are pursued simultaneously. Education is an investment, because increased access, equity and quality all require expenditures and all yield returns in the future. Education yields higher real rates of return on the average in fact than further increases in investment in physical capital. It is a development strategy (growth with equity) that has been successfully pursued by the Pacific Rim nations. These points have been developed briefly in this summary, and are developed more fully in Chapter II. The specific 25 Year Education goals in Table I.2 also require means of financing their attainment, such as those summarized in Table I.3 above, and Table I.4 shows these goals to be feasible.

Table I.4
Feasibility Of 25 Year Education Goals
in Trillions of Rupiah for one year, and in Percent of GNP(%)

	1998	2003	2008	2013	2018
GNP, (Tril Rp, in Constant 1991 Prices, 5% Growth/Year):	265.2	338.4	431.8	550.9	703.0
4% Growth/Year :	253.5	309.3	377.3	460.3	561.6
EDUCATION EXPENDITURE AS A PERCENT OF GNP, DIRECT COSTS ONLY:					
Central Gov, (MOEC only)	2.7%	3.2%	3.7%	4.2%	4.2%
Home Affairs	.8%	.8%	.8%	.8%	.8%
Provincial Local BP3	1.02%	1.5%	1.8%	2.0%	2.0%
Parents (Higher Ed.Tuition)	.3%	.4%	.5%	.6%	.7%
TOTAL (Incl. Parents)	4.8%	5.9%	6.8%	7.6%	7.7%
TOTAL AMT. AVAILABLE (Tril.Rp,1991 Prices, 5% Growth)	12.7	20.0	29.4	41.9	54.1%
TOTAL AMT. AVAILABLE (Tril.Rp,1991 Prices, 4% Growth)	12.2	18.2	25.6	35.0	43.2

AMOUNTS NEEDED TO ACHIEVE 25 YEAR EDUCATION GOALS (from Table 1.2)

TOTAL AMT. NEEDED IN FINAL YR: (Tril.Rp,1991, Prices)	13.3 Rep.VI	18.2 Rep.VII	24.0 Rep.VIII	29.3 Rep.IX	34.7 Rep.X
PRIMARY					
ACCESS	2.7	2.8	2.8	2.6	2.6
EQUITY	.5	.7	.8	.9	1.0
QUALITY	1.2	2.0	3.0	4.0	5.0
TOTAL	4.4	5.5	6.6	7.5	8.6
JR. SECONDARY					
ACCESS	1.5	1.4	1.6	1.5	1.5
EQUITY	.5	.7	.8	1.0	1.0
QUALITY	1.3	2.1	2.9	3.7	4.8
TOTAL	3.3	4.2	5.3	6.2	7.3
SR. SECONDARY					
ACCESS	1.0	1.5	1.8	2.1	2.0
EQUITY	.2	.6	1.2	1.4	1.6
QUALITY	1.0	1.8	2.6	3.5	4.4
TOTAL	2.2	3.9	5.6	7.0	8.0
HIGHER EDUCATION					
ACCESS	1.6	2.0	2.3	2.7	3.1
EQUITY	.5	.8	1.4	2.1	2.8
QUALITY	1.0	2.0	2.8	3.6	4.6
TOTAL	3.1	4.8	6.5	8.4	10.6
NON FORMAL	.2	.3	.4	.5	.5
GRAND TOTAL DIRECT COST	13.3	18.7	24.4	29.6	34.9

The globalization of the Indonesian economy faces the Indonesia's educational system with great challenges. But it also offers enormous opportunities. The importance of human resource development is such that Indonesia's future depends vitally upon it. This will require a major effort, and a much larger investment in education than at present. But the prize of much *higher standards of living, greater equality, better health* (as the result of better education), and *rapid social and cultural development* are well worth the effort, and also within reach.

Specific Attainable 25 Year Education And Quality Of Human Life Goals

In summary are:

- Universal Junior Secondary Education by 2008, (100% Transition Rates by 2003),
- Universal Senior Secondary Education by 2013,
- Greater Equality of Educational Opportunity for All by 2008,
- Indonesian Self Suffiency in Training Most of Its Own PhDs by 2013,
- Improved Efficiency Throughout the System, and
- Greatly Improved Quality of Instruction at all levels in all of the physical, life, and social sciences, math, language, and applied areas.

Given a renewed commitment to quality, efficiency, and equity in education, and a sufficient national will to make the investment in education required, there is good reason to think that Indonesia's social and economic future looks very bright.

APPENDIX TO CHAPTER I

EXPLANATION AND ASSUMPTIONS UNDERLYING TABLE I.2 THE LOW POPULATION GROWTH SCENARIO

I. Population And Enrollment Projections

The school age population is based on **Projection of Indonesian Population: 1990-2020,** Demographic Institute, Jakarta, January 1991 (p. 13). The reasons for these access goals as they relate to growth and equity are discussed in Chapter II, Table II.5; changing economic structure, Chapter III; changing technology, Chapter V; internal efficiency, Chapter VI; and demographic change, Chapter VII.

The *net* enrollment rates are shown in line 2, Table 3 below, and the total (i.e., gross) enrollment projections in line 8 Table 3 and in Table I.2 in the text. These total enrollments are the product of the school age population times the net enrollment rates, (which include the enrollment in the Islamic schools) plus the over-age under age, which includes the repeaters. The total enrollment at all levels includes enrollment in the religious schools and also in the private schools and colleges, but not in the special schools (Non-formal PAKET-A, Schools for Handicapped PLB, or small schools).

At the primary level, enrollments are identical to the Pusat Informatika Balitbang Dikbud actual enrollments in the primary schools plus enrollment in the religious (Madrasah) schools. They differ from the net enrollment rates in Repelita V which are future goals or projections. The 91% enrollment rate in 1991 involves some double counting because some students go to both schools. In 1989/90 62% finished primary school. Moving to eliminate these drop outs before completion of grade 6 by 1998, trend extrapolation of transition rates then determine the remaining enrollments through 2018.

At the junior secondary level and at the senior secondary level enrollments are as shown in Table 3 below. The table shows at each level: *School Age Population* (Demographic Institute), *Net Enrollment Ratio (NER), plus under and over age enrollments* declining (this includes repetition), plus religious schools. *This equals Total Enrollment* (Bottom line).

The Policy Intervention Goals embedded in these enrollment estimates are shown in Table 1.

Further detail on the Junior Secondary Transition Rates compared to the Enrollment Rates appear in Table 4 below.

The repetition rate at each year is projected to gradually decline at each level by the Demographic Institute. In primary school, it declines from 10% in 1990 to 4% in 2020; in junior secondary school, it declines from 1.25% in 1990 to 0% in 2015. At the senior high school level, since the repetition rate has already been very low, it is not taken into consideration in projecting gross enrollments. At higher education levels it is based on the current 7 years taken to complete a 4 year degree declining to 5 years.

Table 1
Policy Interventions

Primary: 100% Net Enrollment Rate without double counting by 1998, increasing the % who complete primary school from the current 62% to 100%. This will require policy interventions to improve equity and quality in rural areas.

Jr.Sec: 100% Transition Rate by 2003, or 90% Transition Rate in 1998. This would be followed by a 100% net enrollment rate in 2008.

As specified in Repelita VI goals:

	Transition Rate	*Net Enrollment*
1990	62.19 %	37.13 %
1993	72.62 %	47.60 %
1998	90.0 %	65.07 %
2003	100.0 %	82.53 %
2008	100.0 %	100.0 %
2013	100.0 %	100.0 %
2018	100.0 %	100.0 %

Senior Secondary: 80% NER by 2013

Higher Education: 25% Net Enrollment Rate by 2018

Increased efficiency is expected as higher education tuition approaches 50% of direct costs, resulting in a reduction of the 7 years currently taken to complete a 4 year degree. This finances a larger increase in the net enrollment rates for this group. Note that overage/underage enrollment at these goals are attained falls, in spite of the increase in Masters and PhD students (who are"overage"). The number are the same as those projected by the DG of Higher Education up through 1993, but then the total does not increase as fast because increased efficiency. (See Table 3).

Table 2
Enrollment Projections

Primary School:

The net enrollment rate is at 93.7% in 1993 in Table 3 since the 99.7% goal of Repelita is not being attained. The enrollment projection for each year after 1998 follows the demographic estimates closely, (plus over and underage enrollment):

1998	2003	2008	2013	2018
29,446,400	30,384,141	29,953,017	28,998,750	28,527,555

Junior Secondary School:

The net enrollment rate in 1993 is 47.6% (Table 3). A 100% net enrollment rate is projected for 2008 where the enrollment projection equals gross full enrollment that year of 12,894,593. So there is a 21% growth rate between 1998 and 2003, and a 14% growth rate from 2003-2008:

1988	2003	2008	2013	2018
9,267,695	11,239,873	12,894, 593	12,492,774	11,844,097

Senior Secondary School:

The net enrollment rate in 1993 is 26.73% (Table 3). With the policy intervention proposed, an 80% net enrollment rate is projected for 2013. Therefore,

1998	2003	2008	2013	2018
5,887,022	7,099,394	8,731,150	10,228,674	9,759,816

Higher Education:

Increased efficiency as tuition approaches 50% of direct costs should result in a reduction of the 7 years currently taken to complete a 4 year degree, partially financing an increase in the net enrollment rates to 25% by 2018 **for this age group.** Total enrollments with this increase in efficiency would be:

1998	2003	2008	2013	2018
3,567,229	4,395,532	5,123,992	5,939,142	6,686,843

Table 3
Enrollment Projections: Primary, Jr. Secondary, Sr. Secondary, and Higher
1991–2008

A. Enrolment Projection of Primary School

Variable	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Population 7-12	25.885.800	25.703.200	25.557.900	25.452.800	25.390.300	25.361.700	25.356.900	25.365.000	25.409.200	25.458.100	25.501.000	25.524.000	25.508.200	25.475.000
NER 7-12	91,00%	92,35%	93,71%	95,07%	96,42%	97,78%	99,06%	100,00%	100,00%	100,00%	100,00%	100,00%	100,00%	100,00%
Enrol 7-12	23.556.100	23.736.905	23.950.900	24.197.900	24.481.300	24.798.700	25.118.300	25.365.000	25.409.200	25.458.100	25.501.000	25.524.000	25.508.200	25.475.000
Under+over age	5.899.500	5.586.995	5.307.400	4.913.000	4.510.800	4.214.400	4.086.900	4.081.400	4.338.800	4.537.985	4.685.450	4.829.061	4.875.941	4.907.920
Repetition	2.682.887	2.670.496	2.664.131	2.650.325	2.639.131	2.640.668	2.657.779	2.679.357	2.706.800	2.729.374	2.746.695	2.761.855	2.764.683	2.764.572
Tot Enrolment PS	26.267.300	26.189.400	26.169.900	26.076.500	26.007.900	26.064.200	26.274.100	26.528.300	26.800.000	27.023.500	27.195.000	27.345.100	27.373.100	27.372.000
Islamic Enrol	3.188.300	3.134.500	3.088.400	3.034.400	2.984.200	2.948.900	2.931.100	2.918.100	2.948.000	2.972.585	2.991.450	3.007.961	3.011.041	3.010.920
Tot Enrolment	29.455.600	29.323.900	29.258.300	29.110.900	28.992.100	29.013.100	29.205.200	29.446.400	29.748.000	29.996.085	30.186.450	30.353.061	30.384.141	30.382.920
Unit cost Rp.91,405 (bil. Rp.)	2.692	2.680	2.674	2.661	2.650	2.652	2.670	2.692	2.719	2.742	2.759	2.774	2.777	2.777

B. Enrolment Projection of Junior Secondary School

Variable	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Population 13-15	12.981.151	13.090.556	13.093.603	13.023.622	12.925.238	12.818.355	12.721.371	12.646.904	12.609.225	12.574.384	12.571.796	12.591.524	12.630.287	12.656.934
NER 13-15	40,62%	44,11%	47,60%	51,10%	54,59%	58,08%	61,58%	65,07%	68,56%	72,06%	75,55%	79,04%	82,53%	86,03%
Enrol 13-15	5.272.813	5.774.506	6.233.209	6.654.810	7.056.017	7.445.413	7.833.438	8.229.340	8.645.263	9.060.598	9.497.866	9.957.593	10.424.407	10.888.507
Under+over age	1.564.704	1.379.072	1.254.849	1.181.062	1.129.477	1.113.546	1.097.291	1.038.355	1.000.021	961.680	948.356	905.545	815.466	749.599
Repetition	68.375	71.536	74.881	78.359	81.855	85.590	89.307	92.677	96.453	100.223	104.462	108.581	112.399	116.381
Tot Enrolment JSS	6.050.900	6.330.600	6.626.600	6.934.400	7.243.800	7.574.300	7.903.300	8.201.500	8.521.400	8.844.400	9.211.500	9.564.300	9.884.700	10.222.600
Islamic Enrol	786.617	822.978	861.458	901.472	941.694	984.659	1.027.429	1.066.195	1.123.884	1.177.878	1.234.723	1.293.837	1.355.173	1.415.506
Tot Enrolment	6.837.517	7.153.578	7.488.058	7.835.872	8.185.494	8.558.959	8.930.729	9.267.695	9.645.284	10.022.278	10.446.223	10.858.137	11.239.873	11.638.106
Unit cost Rp.124,311 (bil.Rp.)	850	889	931	974	1.018	1.064	1.110	1.152	1.199	1.246	1.299	1.350	1.397	1.447

Table 3 (continued)

A. Enrolment Projection of Primary School

2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
25.395.300	25.300.500	25.169.900	24.998.800	24.781.600	24.517.500	24.252.200	24.014.200	23.829.600	23.701.500	23.629.200	23.570.800	23.496.400	23.376.300
100,00%	100,00%	100,00%	100,00%	100,00%	100,00%	100,00%	100,00%	100,00%	100,00%	100,00%	100,00%	100,00%	100,00%
25.395.300	25.300.500	25.169.900	24.998.800	24.781.600	24.517.500	24.252.200	24.014.200	23.829.600	23.701.500	23.629.200	23.570.800	23.496.400	23.376.300
4.932.897	4.940.007	4.947.952	4.954.217	4.982.273	5.038.026	5.095.978	5.142.059	5.169.150	5.175.039	5.153.322	5.134.022	5.130.500	5.151.255
2.759.593	2.751.614	2.740.453	2.725.455	2.708.244	2.689.287	2.670.420	2.652.957	2.638.625	2.627.505	2.618.950	2.611.880	2.604.790	2.595.751
27.322.700	27.243.700	27.133.200	26.984.700	26.814.300	26.626.600	26.439.800	26.266.900	26.125.000	26.014.900	25.930.200	25.860.200	25.790.000	25.700.500
3.005.497	2.996.807	2.984.652	2.968.317	2.949.573	2.928.926	2.908.378	2.889.359	2.873.750	2.861.639	2.852.322	2.844.622	2.836.900	2.827.055
30.328.197	30.240.507	30.117.852	29.953.017	29.763.873	29.555.526	29.348.178	29.156.259	28.998.750	28.876.539	28.782.522	28.704.822	28.626.900	28.527.555
2.772	2.764	2.753	2.738	2.721	2.702	2.683	2.665	2.651	2.639	2.631	2.624	2.617	2.608

B. Enrolment Projection of Junior Secondary School

2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
12.687.429	12.714.442	12.726.389	12.716.098	12.689.548	12.658.942	12.613.880	12.540.514	12.426.722	12.285.921	12.128.872	11.980.646	11.869.548	11.815.363
89,52%	93,01%	96,51%	100,00%	100,00%	100,00%	100,00%	100,00%	100,00%	100,00%	100,00%	100,00%	100,00%	100,00%
11.357.914	11.826.211	12.281.856	12.716.098	12.689.548	12.658.942	12.613.880	12.540.514	12.426.722	12.285.921	12.128.872	11.980.646	11.869.548	11.815.363
694.415	635.497	489.685	178.495	128.993	101.521	80.424	77.653	66.052	52.549	49.882	36.038	34.793	28.734
120.523	124.617	127.715	128.946	128.185	127.605	126.943	126.182	124.928	123.385	121.788	120.167	119.043	118.441
10.575.800	10.924.300	11.174.900	11.241.500	11.168 900	11.114.800	11.054.500	10.987.900	10.877.300	10.741.300	10.602.000	10.459.200	10.361.300	10.308.100
1.476.529	1.537.407	1.596.641	1.653.093	1.649.641	1.645.662	1.639.804	1.630.267	1.615.474	1.597.170	1.576.753	1.557.484	1.543.041	1.535.997
12.052.329	12.461.707	12.771.541	12.894.593	12.818.541	12.760.462	12.694.304	12.618.167	12.492.774	12.338.470	12.178.753	12.016.684	11.904.341	11.844.097
1.498	1.549	1.588	1.603	1.593	1.586	1.578	1.569	1.553	1.534	1.514	1.494	1.480	1.472

Table 3 (continued)

C. Enrolment Projection of Senior Secondary School

Variable	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Population 16-18	12.258.687	12.501.717	12.727.165	12.918.004	13.031.580	13.032.124	12.959.938	12.853.750	12.743.798	12.664.891	12.605.236	12.575.587	12.553.828	12.549.932
NER 16-18	21,40%	24,06%	26,73%	29,39%	32,06%	34,72%	37,38%	40,05%	42,71%	45,37%	48,04%	50,70%	53,36%	56,03%
Enrol 16-18	2.623.509	3.008.514	3.401.766	3.796.855	4.177.344	4.524.640	4.844.776	5.147.450	5.442.859	5.746.498	6.055.181	6.375.900	6.699.249	7.031.447
Under+over age	1.669.361	1.555.206	1.313.960	1.137.406	1.013.050	909.790	765.147	739.572	490.484	469.874	473.660	411.207	400.145	375.605
Repetition	42.588	45.275	46.783	48.951	51.492	53.913	55.654	58.403	58.898	61.704	64.804	67.361	70.458	73.508
Tot Enrol SSS	4.258.800	4.527.500	4.678.300	4.895.100	5.149.200	5.391.300	5.565.400	5.840.300	5.889.800	6.170.400	6.480.400	6.736.100	7.045.800	7.350.800
Islamic Enrol	34.070	36.220	37.426	39.161	41.194	43.130	44.523	46.722	43.543	45.972	48.441	51.007	53.594	56.252
Tot Enrol	4.292.870	4.563.720	4.715.726	4.934.261	5.190.394	5.434.430	5.609.923	5.887.022	5.933.343	6.216.372	6.528.841	6.787.107	7.099.394	7.407.052
Unit cost Rp.204,748 (bil.Rp.)	879	934	966	1.010	1.063	1.113	1.149	1.205	1.215	1.273	1.337	1.390	1.454	1.517

D. Enrolment Projection of Higher Education

Variable	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Population 19-24	21.301.353	21.981.545	22.668.822	23.321.879	23.922.582	24.471.518	24.942.421	25.301.045	25.534.638	25.657.293	25.661.248	25.559.928	25.411.307	25.258.094
NER 19-24	5,77%	6,48%	7,19%	7,90%	8,62%	9,33%	10,04%	10,75%	11,47%	12,18%	12,89%	13,60%	14,32%	15,03%
Enrol 19-24	1.228.658	1.424.465	1.630.472	1.843.564	2.061.449	2.283.062	2.504.658	2.720.889	2.927.892	3.124.713	3.307.979	3.476.980	3.637.767	3.795.746
Under+over age	974.342	946.235	929.586	912.936	896.287	879.637	862.990	846.340	829.690	813.040	793.570	775.565	757.765	739.550
Tot Enrolment	2.203.000	2.370.700	2.560.058	2.756.500	2.957.736	3.162.699	3.367.648	3.567.229	3.757.582	3.937.753	4.101.549	4.252.545	4.395.532	4.535.296
Unit cost Rp.461,591 (bil.Rp.)	1.017	1.094	1.182	1.272	1.365	1.460	1.554	1.647	1.734	1.818	1.893	1.963	2.029	2.093

Table 3 (continued)

C. Enrolment Projection of Senior Secondary School

2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
12.556.352	12.573.783	12.606.392	12.644.015	12.674.607	12.690.081	12.679.087	12.652.380	12.620.931	12.579.352	12.509.359	12.394.882	12.252.684	12.096.268
58,69%	61,35%	64,02%	66,68%	69,35%	72,01%	74,67%	77,34%	80,00%	80,00%	80,00%	80,00%	80,00%	80,00%
7.369.493	7.714.636	8.070.425	8.431.294	8.789.292	9.138.033	9.467.834	9.784.898	10.096.745	10.063.481	10.007.487	9.915.906	9.802.148	9.677.014
341.263	333.081	310.238	299.856	222.522	208.471	199.109	179.781	131.929	100.227	91.973	90.821	84.269	82.802
76.518	79.860	83.161	86.637	89.415	92.734	95.912	98.864	101.479	100.832	100.194	99.274	98.080	96.824
7.651.800	7.986.000	8.316.100	8.663.700	8.941.500	9.273.400	9.591.200	9.886.400	10.147.900	10.083.200	10.019.400	9.927.400	9.808.000	9.682.400
58.956	61.717	64.563	67.450	70.314	73.104	75.743	78.279	80.774	80.508	80.060	79.327	78.417	77.416
7.710.756	8.047.717	8.380.663	8.731.150	9.011.814	9.346.504	9.666.943	9.964.679	10.228.674	10.163.708	10.099.460	10.006.727	9.886.417	9.759.816
1.579	1.648	1.716	1.788	1.845	1.914	1.979	2.040	2.094	2.081	2.068	2.049	2.024	1.998

D. Enrolment Projection of Higher Education

2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
25.139.558	25.043.728	24.987.331	24.971.473	24.982.312	25.005.594	25.042.596	25.094.429	25.145.080	25.177.502	25.186.464	25.170.678	25.121.513	25.027.373
15,74%	16,45%	17,16%	17,88%	18,59%	19,30%	20,01%	20,73%	21,44%	22,15%	22,86%	23,58%	24,29%	25,00%
3.957.001	4.120.303	4.289.008	4.464.157	4.644.044	4.826.486	5.012.005	5.201.126	5.390.732	5.577.021	5.758.409	5.934.090	6.101.438	6.256.843
720.090	700.950	680.592	659.835	639.295	628.110	609.760	580.780	548.410	519.620	498.236	477.365	457.010	430.000
4.677.091	4.821.253	4.969.600	5.123.992	5.283.339	5.454.596	5.621.765	5.781.906	5.939.142	6.096.641	6.256.645	6.411.455	6.558.448	6.686.843
2.159	2.225	2.294	2.365	2.439	2.518	2.595	2.669	2.741	2.814	2.888	2.959	3.027	3.087

Table 4
Transition Rates Compared To Net Enrollment Rates

PROYEKSI LULUSAN SD, MURID BARU TINGKAT I, DAN MURID PER TINGKAT
JENIS SEKOLAH SLTP (Termasuk Madrasah Tsanawiyah)
TAHUN 1989/90 -- 2018
INDONESIA

JUNIOR SECONDARY

Tahun	Lulusan SD	Murid Baru Tk.1	Murid Tk. 1	Murid Tk. 2	Murid Tk. 3	Jumlah SLTP	Madrasah Tsanawiyah	Jumlah	% Transition Rate	Net Enrollment Rate (Tab.3
1989	3,355.7	1,970.3	1,997.2	1,905.2	1,847.0	5,749.4	747.4	6,496.8	58.71	
1990	3,336.6	2,075.0	2,101.9	1,924.8	1,840.8	5,867.5	762.8	6,630.3	62.19	37.13
1991	3,250.5	2,134.5	2,162.4	2,026.7	1,861.8	6,050.9	786.6	6,837.5	65.67	40.62
1992	3,257.9	2,252.6	2,281.0	2,087.7	1,962.0	6,330.6	823.0	7,153.6	69.14	44.11
1993	3,263.3	2,369.7	2,399.3	2,203.7	2,023.6	6,626.6	861.5	7,488.1	72.62	47.60
1994	3,410.8	2,595.5	2,626.2	2,320.3	2,138.0	7,084.4	921.0	8,005.4	76.09	51.10
1995	3,476.3	2,766.1	2,799.4	2,540.9	2,253.5	7,593.8	987.2	8,581.0	79.57	54.59
1996	3,453.6	2,868.1	2,903.1	2,711.6	2,469.6	8,084.3	1,051.0	9,135.3	83.05	58.08
1997	3,378.9	2,923.6	2,959.4	2,815.4	2,638.6	8,413.3	1,093.7	9,507.0	86.52	61.58
1998	3,388.7	3,049.8	3,085.9	2,872.9	2,742.7	8,701.5	1,131.2	9,832.7	90.00	65.07
1999	3,411.3	3,138.4	3,176.0	2,995.7	2,799.7	8,971.4	1,166.3	10,137.7	92.00	65.56
2000	3,459.7	3,252.1	3,290.7	3,084.2	2,919.5	9,294.4	1,208.3	10,502.7	94.00	72.06
2001	3,509.3	3,368.9	3,408.9	3,196.0	3,006.7	9,611.5	1,249.5	10,861.0	96.00	75.55
2002	3,566.7	3,495.4	3,536.7	3,311.5	3,116.2	9,964.3	1,295.4	11,259.7	98.00	79.04
2003	3,616.2	3,616.2	3,659.0	3,436.3	3,229.4	10,324.7	1,342.2	11,666.9	100.00	82.53
2004	3,670.7	3,670.7	3,714.9	3,556.0	3,351.7	10,622.6	1,380.9	12,003.5	100.00	86.03
2005	3,700.0	3,700.0	3,744.8	3,611.8	3,469.2	10,825.8	1,407.4	12,233.2	100.00	89.52
2006	3,712.4	3,712.4	3,757.5	3,641.9	3,524.8	10,924.3	1,420.2	12,344.5	100.00	93.01
2007	3,719.5	3,719.5	3,764.6	3,655.2	3,555.1	10,974.9	1,426.7	12,401.6	100.00	96.51
2008	3,724.5	3,724.5	3,769.7	3,662.9	3,568.9	11,001.5	1,430.2	12,431.7	100.00	100.00
2009	3,727.4	3,727.4	3,772.6	3,668.7	3,577.6	11,018.9	1,432.5	12,451.4	100.00	100.00
2010	3,723.0	3,723.0	3,768.2	3,672.3	3,584.4	11,024.8	1,433.2	12,458.0	100.00	100.00
2011	3,711.7	3,711.7	3,756.7	3,668.8	3,589.0	11,014.5	1,431.9	12,446.4	100.00	100.00
2012	3,697.8	3,697.8	3,742.6	3,658.5	3,586.8	10,987.9	1,428.4	12,416.3	100.00	100.00
2013	3,679.4	3,679.4	3,723.9	3,645.5	3,577.8	10,947.3	1,423.1	12,370.4	100.00	100.00
2014	3,653.0	3,653.0	3,697.2	3,628.1	3,566.0	10,891.3	1,415.9	12,307.2	100.00	100.00
2015	3,630.4	3,630.4	3,674.3	3,602.9	3,549.8	10,827.0	1,407.5	12,234.5	100.00	100.00
2016	3,608.4	3,608.4	3,651.9	3,581.3	3,526.0	10,759.2	1,398.7	12,157.9	100.00	100.00
2017	3,592.3	3,592.3	3,635.5	3,560.2	3,505.6	10,701.3	1,391.2	12,092.5	100.00	100.00
2018	3,584.5	3,584.5	3,627.4	3,544.9	3,485.7	10,658.1	1,385.5	12,043.6	100.00	100.00

II. Cost Per Student in 1991 Rupiah

Enrollment for 1988 (from *Repelita V*): (These are projections. The new actual data is in Table 3 for 1991, and is very close):

Primary :	30.1 Million
Jun. Sec.:	6.68 Million
Sen. Sec.:	4.147 Million
Hi. Educ.:	1.6 Million

Total Education Expenditure: 4213 Billion

Unit Cost Ratio (*Sector Review*, p. 6-83):	Primary:	1.00
	Jun. Sec.:	1.36
	Sen. Sec.:	2.24
	Hi. Educ.:	5.05

Suppose cost per primary student for 1988 is X, then
[30.1*X+6.68*(1.36*X)+4.147*(2.24*X)+1.6*(5.05*x)] = 4213
X=0.000074495 Billion Rp. = 74,495 RP

So: Cost per Jun. Sec. Student:74,495*1.36=101,313

Cost per Sen. Sec. Student:74,495*2.24=166,869
Cost per Hi. Educ. Student:74,495*5.05=376,199
Inflation Rate (1988-1991):1.056*1.061*1.095=1.227

So: Estimated Cost per Primary Student for 1991: 91,405 Rp.
Cost per Jun. Sec. Student for 1991:124,311 Rp.
Cost per Sen. Sec. Student for 1991:204,748 Rp.
Cost per Hi. Educ. Student for 1991:461,596 Rp.

For comparison, costs of STM's in 1991 were 464,632 Rp. per student, of which 216,000 Rp. is for equipment. SMA's do not have the equipment costs, and generally are lower cost than STM's.

III. Total Cost Each Year Equals Cost/Student Multiplied By Enrollment In That Year

For Example: Total Cost of Primary Schooling in 1998 is
29,446,400 * 91,405 = 2,692 Billion Rupiah

IV. Total Cost Of Free Use Of Textbooks For All Students. Total costs are small in relation to the other school and foregone earnings costs (see Tables I.2 and I.3 in the text.)

The book would be loaned to the student at the begining of the year, and returned at the end of the year, or if lost, paid for by the student.

Primary Level:	Each book costs 1,500 Rp Each book lasts 3 years Each student needs the use of 5 books since there are 5 courses at each grade
So:	Cost for free use of textbooks = Enrollment * 1,500 x 5/3
Jun. Sec. Level:	Each book costs 3,000 Rp for 7 courses, and lasts 5 years
So:	Cost for free use of textbooks = Enrollment * 3,000 x 7/5
Sen. Sec. Level:	Each book costs 5,000 Rp for 7 courses, and lasts 5 years 20% students need free use of textbooks;
So:	Cost for textbook = Enrollment * 20% * 5,000 x 7/5
Hi. Educ. Level:	No free use of textbooks, except in libraries.

These books could be approved by the curriculum centers, produced and delivered by private firms to the school principal who could then sign vouchers that could be cashed by the firm at a bank. Free use of textbooks is very cost effective (i.e., low cost relative to the high increase of the learning that occurs) and is needed if universal education is to be attained. They are a very small part of the total costs as can be seen.

V. Equalize Pupils Per Teacher:

Cost = 0 Rp., because new teachers would be sent to those schools with many pupils per teacher, and not to the other schools. New teachers will need to be recruited in the rural areas to which they would return.

VI. Teacher Incentives

A)Salary Base

Base Salary Scheme (1986) is obtained from McMahon, Millot, and Eng's *Sector Review (1986):*

Primary School :	p. 2-258
Jun. Sec. School :	p. 2-273
Sen. Sec. School:	p. 2-273
Hi. Educ:	p. 9-8

Teacher's Salary at 1991 Constant Rupiah:

Base Salary * (5 Years Inflation Factor)
Inflation Factor = 1.092*1.093*1.056*1.061*1.095=1.464

So:	Primary School :	1,422,492*1.464=2,082,528
	Jun. Sec. School :	1,513,884*1.464=2,216,326
	Sen. Sec. School :	1,780,224*1.464=2,606,248
	Higher Educ. :	1,912,400*1,464=2,799,812

These nationwide overages could be refined, of course, but for this purpose are sufficient.

- According to the *Sector Review*, salary for higher education is the weighted average salary for TA, Lecturer, Associate Professor, and Professor at the ratio of 1:2:3:4

- The decision has been made to double primary school teachers salaries in the rural and more remote underserved areas. This is a step badly needed and has been provided for in the Budget in Table 1.3. Beyond this, there is a 5% annual salary increase <u>in real terms</u> proposed for junior secondary and senior secondary school teachers, and a 6% annual increase in real terms proposed for higher education faculty. Both can be used to enhance quality by relating them to better training, to retention of the best teachers, and to recruitment of able students to become teachers. A portion of this could be made contingent in the case of university faculty on publication in refereed journals to keep skills up to date, and on full time attention to the primary job.

B) Projection For The Total Number of Teachers Needed At Each Level

At the Primary Level, there is PTR of 23 in 1993 proposed to stay at 23 until 2018. Therefore

Primary Teacher's Needed:	1993	1,272,000
	1998	1,280,000
	2003	1,321,000
	2008	1,302,300
	2013	1,260,810
	2018	1,240,320

At the Junior Secondary Level, there is a PTR of 20 in 1993 proposed to remain constant to 2018. Therefore

Jun. Sec. Teacher's Needed:	1993	374,402
	1998	463,384
	2003	561,993
	2008	644,729
	2013	624,638
	2018	592,204

At the Senior Secondary Level, there is a PTR of 20 in 1993 proposed to remain constant to 2018. Therefore

Sen. Sec. Teacher's Needed:	1993	235,786
	1998	294,351
	2003	354,969
	2008	436,557
	2013	511,433
	2018	487,990

At the Higher Education Level, the 1993 PTR of 25 is proposed to decline to 15 by 2018.

Hi. Educ. Teacher's Needed:	1993	25	50,229
	1998	23	103,132
	2003	21	159,505
	2008	19	223,845
	2013	17	311,384
	2018	15	418,391

C) Incentives

Teacher's incentives at each year = (increased base salary-base salary, in constant 1991 Rupiah) * Number of Teachers.

For Example: Primary Teachers' Incentives in 1998:
(2,561,247-2,082,528)*1,280,000 = 612.7 Billion Rupiah

VII. Improved Physical, Life, and Social Science, Math, and Language Teaching

At the primary level: There is an allocation of from 100 to 500 Bil. Rupiah per year for better teacher training. At the Junior Secondary Level: There is an allocation of 50 Billion Rupiah for Each Year, related to additional training.

At the Senior Secondary Level: There is an amount equal to 10% of the total student cost allocated in this area, and related to additional training.

VIII. Resource Recovery in Higher Education from Tuition

With the proposed increase in enrollments and in per capita incomes, resource recovery is projected through increased tuition increases from 15% of public university costs currently to 30% of the direct cost at public universities by 1998, to 35% in 2003, 40% in 2008, 45% in 2013, and to 50% in 2018. Note that need based grants also increase as part of the higher education budget so that qualified students from poor families are not excluded. The resources recovered through tuition increases however are about three times or more of the amounts needed to cover these need-based tuition waivers and grants.

IX. User-Driven Research Grants

The estimate of the amount needed is based on the experience in the U.S., Japan, West Germany, France, and England with the investment in non-defense basic R&D as a percent of GNP that is **performed at Universities.** Based on the data from *Science & Engineering Indicators,* 1991 Edition, U.S. National Science Board (Table 4–27, p. 342):

Table 5
Government Financed R & D Performed at Universities

Country	*Year*	*Expenditure on R&D as % of of GNP*	*Percent R&D Performed by Universities*
Japan	1989	3.0%	18%
U.S.	1989	1.9%	14%
W. Germany	1989	2.8%	14%
U.K.	1989	1.6%	14%
France	1989	1.8%	14%

In U.S., for example, 1.6% of GNP is spent on R&D needed by various government departments, of

which 14% is performed in Universities (ibid., p. 343). So if 2.5% of GNP is the public R&D expenditure in Indonesia, with 14% of this basic research performed in Universities, then:

GNP * 2.50% * 14% = User-Driven Research Grants to Universities. Public expenditure for research needed by the Ministries (e.g., on population programs, health research, or economic development) is user-driven, just as is research needed by private business firms. Public subsidies to private firms for applied research and development, however, should always require the firm to contribute over 50% of the cost of the R&D.

This system of peer-group review of basic faculty research to be funded, project by project, has been started by the D.G. of Higher Education in 1991. But by the end of Repelita VI (1998) it is still low in Table I.2 because the peer group review process that is needed in the various other Ministries and the practice of using the universities rather than the government-supported research institutes has not yet been put in place.

X. Nonformal Education

Taking inflationary factors into consideration, the nonformal education budget was about 36 Billion Rupiah in 1991. So the nonformal education budget for literacy training only is proposed as increasing in the first years of the 25 year plan. It then decreases as the number of illiterates in the labor force declines due to retirement and death.

The Non-Formal Education Budget in 1991/92 is:

Development Budget (90/91)	:	12,664,535,000
Routine Budget (91/92)	:	23,716,433,000
Total	:	36,380,968,000

However, Non-Formal Education soon will include many of the job training courses conducted by other Ministries, and hence the budget shown in Table I.2 starts to accommodate this.

XI. Private Foregone Earnings

These are large private costs of education borne by parents. They are obtained by using foregone earnings per student at each education level, growing at 2.5% per year to allow for productivity growth, and then multiplied by enrollment at each year. Forgone earnings are small or zero for grades 1-5, but large at grade 6 in rural areas, which explains why there are many drop outs at this age. See McMahon and Boediono, *Market Signals and Labor Market Analysis: A New View of Manpower Supplies and Demand in Indonesia*, p. 29 for detailed methods and data on foregone earnings (which include children's food, clothing, housing, and transportation costs) invested by the parents.

II

The Basis for Expansion and Improvement of Education: Efficient Contributions to Growth and Equity

Boediono and Walter W. McMahon

ABSTRACT

This paper presents evidence from Indonesian data for 1982-1990 that shows that an efficient investment strategy including significant investment in education contributes to economic growth. Marginal social rates of return, a key economic criterion, are high for improved basic education in rural areas, where real rates of return are 27%, and for expansion of all secondary education where returns are 11-14%. Real rates of return to investment in physical capital have fallen to an average of 9.4%. This suggests diminishing returns to physical capital alone, when combined with an inadequately trained labor force, given the high 30% of GNP being invested in physical capital formation compared to 2.95% of GNP invested in education (by the Central Government). This education investment rate is shown to be low among all ASEAN and Pacific Rim nations.

This paper also discusses evidence from Indonesian data that shows that inequality has fallen slightly during the 1980's, due partly to the expansion of basic schooling and partly to the Government's support of progress in agriculture. But inequality still remains high in Indonesia in relation to the new industrializing countries of Asia. The relation of investment in education at different levels to inequality in earnings later and to intergenerational mobility is discussed.

25 Year Education Goals suggested by this analysis are:

- Expanded Access: universal senior secondary education with 80% net enrollment rates by 2013, and 25% net enrollment rates in higher education by 2018.
- Improved Quality: improved teacher and faculty pay incentives, effectiveness, and training; VOTEC/Industry partnerships; and better science instruction.
- Greater Equity (and quality): school textbooks available for all through grade 10; equalization of pupil-teacher ratios; and college tuition waivers for qualified students based on need.
- Greater Efficiency, for example, through less time to complete BA degrees; new resource allocation formulas that stress maintaining attendance in grades 1-12; and greater parental involvement and community participation.

II

The Basis for Expansion and Improvement of Education: Efficient Contributions to Growth and Equity

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A primary determinant of Indonesia's future will be its success in developing its primary resource, its people. The question is how to do this as effectively as possible so that education and other forms of investment make their maximum contribution to achieving faster growth, as well as equity for all. The latter requires providing good quality education to the rural and urban poor as a key means of continuing the reduction of poverty.

The achievements of education in Indonesia during the first 25 Year plan that is now ending are truly impressive. They include:

- Achievement of universal primary education, with access rising from a net enrollment rate of 50% in 1968 to 91% today,
- A fourfold increase in secondary education, rising from a 10% net enrollment rate in 1968 to 41% at the junior secondary level and 21% at the senior secondary level today,
- Dramatic expansion of higher education, from a very few institutions in 1968 to over 800 today,
- Essentially co-equal education of women,
- Lower and falling population growth rates due in large part to falling fertility rates as more women secure education beyond 9th grade,
- Rising productivity in agriculture, aided by the increased education of farmers, and
- Falling inequality in the income distribution, due in part to the extension of universal primary education (and government policies aiding agriculture).

But in spite of these accomplishments, problems do remain:

- The Quality of education has suffered, at all levels,
- Equity for all has not been achieved, with inequality still high (Gini = .32) in relation to the newly industrializing countries of Asia,
- Efficiency of the education system is not ideal, with college students taking too long to finish and to find jobs, some inefficiencies in the capacity to manage the primary schools and in the payment of teachers, some external efficiencies in employment, and some schools with insufficient books in the poorer schools.

Quality, equity, and *efficiency* are all a part of access. If the access is not to education of *good quality*, that is *equitable to all*, and also *efficient*, then the resources invested in education are not contributing as much to growth in Indonesia and to the reduction of poverty that they otherwise could.

These therefore are the three themes suggested for human resource development through education in the new 25 Year Development Plan: *quality, equity,* and *efficiency*. They are new emphases in relation to the first 25 Year Development Plan, given the new needs that now exist. Both however have in common a continuing expansion of *access* to education as a contributing factor to Indonesia's economic growth, and reduced inequality, but now with these additional dimensions.

Improvements in quality cost money, just as do improvements in equity, and the expansion of access. Some of these improvements can be financed through improvements in efficiency. But not all. Additional resources will be needed. The question to be addressed in this chapter is this: Will the net gain from the resources invested be greater by expanding enrollments (access), or by investing these same resources in improving quality, or is the net payoff to growth higher to both than the returns to growth from alternative investment of these funds in physical capital accumulation? And what about equity? Does investment in reducing the 38% of children who do not currently finish 6th grade also have a high economic return and contribute efficiently to growth?

To anticipate our conclusion, there is good evidence that increased investment in education in Indonesia has a very good payoff in relation to alternative uses of the funds (e.g., average rates of return to investment in physical capital). The evidence related to equity (e.g., expanding access to rural education through grade 9) is again that the growth payoff is relatively large, and improving education in the poorest areas does not have to be defended on humanitarian grounds alone. The evidence on the net return to improving quality in Indonesia is more limited, and much of it is anecdotal. But overall we do conclude that investment in improving the *quality* of education, as well as improving equity and access, all have a better payoff than do alternative investments, and thereby contribute efficiently not only to faster per capita economic growth but also to reduced inequality. This therefore offers an objective basis for the new themes of *quality, equity,* and *efficiency* supplementing continuing expansion of access over the next 25 years.

This chapter considers some of the worldwide research, as well as the Indonesian data, on these points.

I. THE CONTRIBUTION OF EDUCATION TO GROWTH: APPROACHES TO MEASUREMENT

There are basically two approaches available for appraising the contribution of education to economic growth in Indonesia, and elsewhere. The first is the production function approach where output, and growth of output (preferably in per capita terms) are related to inputs such as machinery per worker, hours of labor, quality or education of that labor, and technology. All of the latter require investment: investment in plant and equipment, investment in education, and investment in R&D and technology transfer. This production function approach underlies growth accounting, pioneered by Edward Denison (1984), as well as regression methods of estimating production functions from the data. No growth accounting type studies have been done for Indonesia from which the contribution of education to improving the quality of the labor force could be distilled. However a few production function type studies have been done that include the education of the workers both at the microeconomic level of individual firms (e.g., Harris and Wheeler, 1991) or individual farms (e.g., Lockheed, 1987), and also at the macroeconomic production function level (e.g., Rony Bishry, 1991). The decomposition of a production function to get the "contribution of education to growth" has the limitation that the result depends on how much has been invested in education; if the investment made (at the limit) is zero, then even though the rate of return on each Rupiah invested is extremely high, the product of these which is the contribution to growth is zero. Nevertheless, the production function approach offers some very useful insights that will be reflected in the discussion that follows.

The second basic approach involves estimating social rates of return to the investment made in education at each level. This has the advantages over simple marginal productivities of each input of discounting to present value a stream of expected future marginal productivities, and thereby taking the time dimension into account, as well as resulting in a rate that can be compared directly to rates of return on investment in physical capital. These rates of return have been computed from microeconomic earnings data for Indonesia both by the direct method and by the Mincer earnings function method (e.g., McMahon and Boediono, 1991), and from production functions (e.g., Lockheed,

1987 and Psacharopoulos and Woodhall, 1987, p. 49). All social rates of return cited here are *marginal* rates of return to a *level* of education (e.g., to 6 years of primary, or to 3 years of junior secondary, etc.). As such they do take into account the complementarity over the life-cycle, or "option-value" of the lower levels in the sense that completion of the lower level is necessary, or a joint product, for completion of the higher level and the returns it produces. The contribution at the earlier level is taken into account by use of the foregone earnings costs, which assumes that the student in question would have earned an amount equal to the average of the earnings of a person of the same age, sex, (and race) who left school at the end of the prior level. This is not a perfect measure of what he or she could have earned, and hence not a perfect separation of the complementarity, as a basis for making efficient allocations of funds invested in education to each level. But it is market-based, and there are not good alternatives that meet the test of meaningful economic efficiency criteria. Social rates of return must be used only with judgment also applied, but when so used, they do reveal a lot about where the larger contributions to economic growth are coming from.

Evidence In Indonesia

Considering basic education first, is the goal of attaining a 100% net enrollment rate in both primary and junior secondary education by 2008, while simultaneously improving its quality and equity, a wise investment for Indonesia, given the resources that it will take?

The evidence is that basic education is currently an excellent investment in Indonesia, as revealed by current social rates of return. It is likely to stay so as globalization proceeds (see Chapter V).

At the primary level, the best estimates available are that the real rate of return to improving rural basic education by making the investment in textbooks, in teacher-pay supplements for teaching in remote areas (recently approved), and in accessible classrooms is about 27% (see Lockheed, 1987). It is likely to be lower than 27% in "non-modernizing" agricultural environments such as those in Irian Jaya and the east islands. But if globalization affects these areas eventually, this is likely to change (see Chapter V below, and T. W. Schultz, 1975, cited there).

This suggests that these kinds of improvements in the *quality* and *equity* of education in grades 1-9 to reduce dropouts in the poorer rural (and urban) areas can reasonably be expected to make an efficient contribution to economic growth, as well as to reduced inequality. To this must be added the known side effects from the education of women in improving health and reducing population growth rates. (See McMahon in Psacharopoulos, ed., 1987, p. 129 for a survey of the research.)

At the junior secondary level in urban areas, the evidence relevant to moving from the current 1991-2 41% net enrollment rates to 100% net transition rates by 2003 and 100% net enrollment rates by 2008 (see Chapter I above Table I.2 and Appendix to Chapter I Tables 3 and 4) is that this also yields a very good *real* social rate of return. It has held steady at 13-14% from 1986 to 1990 as shown in Table II.1. (The 1982 rates shown include earnings from all jobs, rather than just the first job, and therefore are a bit higher.) This is a very respectable return to expansion (and improvement in quality) at this level. It is well above the average 1985-1990 9.4 percent real rate of return to investment in physical capital, also shown in Table II.1. The 22 percent nominal interest rates in 1991, less the 12.1 percent current inflation rate, gives a 9.9 percent real rate of return for 1991, but this fluctuates some from year to year.

Table II.1 and Table II.2 offer very strong evidence that these returns to investment in both basic education and in senior secondary general education are not only high, but are also available throughout the regions, and *not* just in Jakarta. Returns to investment in senior secondary vocational education are somewhat lower overall and falling relative to senior secondary general (Table II.1). But they are particularly high in West Java, Centra Java, and East Java, although generally lower elsewhere, as shown in Table II.2.

In 1987 40 percent of the labor force in Indonesia still had less than a 6 year primary school education. This is a serious limitation to achieving faster per capita growth and to further reductions in the population growth rate (see Figure II.1). Furthermore the rate of expansion of junior secondary education in Repelita V is not sufficient to attain universal secondary education through 9th grade by 1993. Current *net enrollment* rate in junior secondary is only 41% (see Table 3, Appendix to Chapter I). However, declaration of the intent to do so is a very positive, economically efficient, and equitable step forward.

Table II.1
Real Rates of Return to Investment in Education and in Physical Capital

	Nationwide, Male and Female				
RUPIAH INVESTED IN:	**1982**	**1986**	**1988**	**1989**	**1990**
URBAN EDUCATION[a]					
Primary and Under	13%	16%	13%	4%	
Junior Secondary General	17%	14%	13%	14%	
Senior Secondary General	22%	16%	13%	11%	
Senior Secondary Vocational	16%	15%	10%	6%	
Academy (3 years)	13%	10%	12%	5%	
University (4 years)	11%	7%	6%	5%	
RURAL EDUCATIONAL[b]					
Basic Educ. Through Grade 9	27%	27%	27%	27%	
PHYSICAL CAPITAL INVESTMENT					
Real Rate of Return, 1982-90 Average	9.4%	9.4%	9.4%	9.4%	9.4%
Real Interest Rates	.8%	9%	14.1%	13.2%	9.9%
EXHIBIT					
Inflation Rate	9.7%	9.2%	5.6%	6.1%	12.1%
Nominal Interest Rates	10.5%	18.2%	19.7%	19.3%	22%

Notes and Sources:

a. 1982 education returns are higher (and more accurate than for 1986) because earnings for "all jobs" are reported in SUSENAS 1982. The SAKERNAS 1986, 1988, and 1989 sources report earnings on the first job only, but do reveal a decline at primary, senior secondary vocational, and academy levels from 1986-1989.

b. Lockheed (1987). See also Psacharopoulos (1985), pp. 48-9 for the similar wet rice cultures of Malaysia and Thailand. Farmers are removed from the SAKERNAS-SUSENAS survey since their money earnings understate the total value of their physical output.

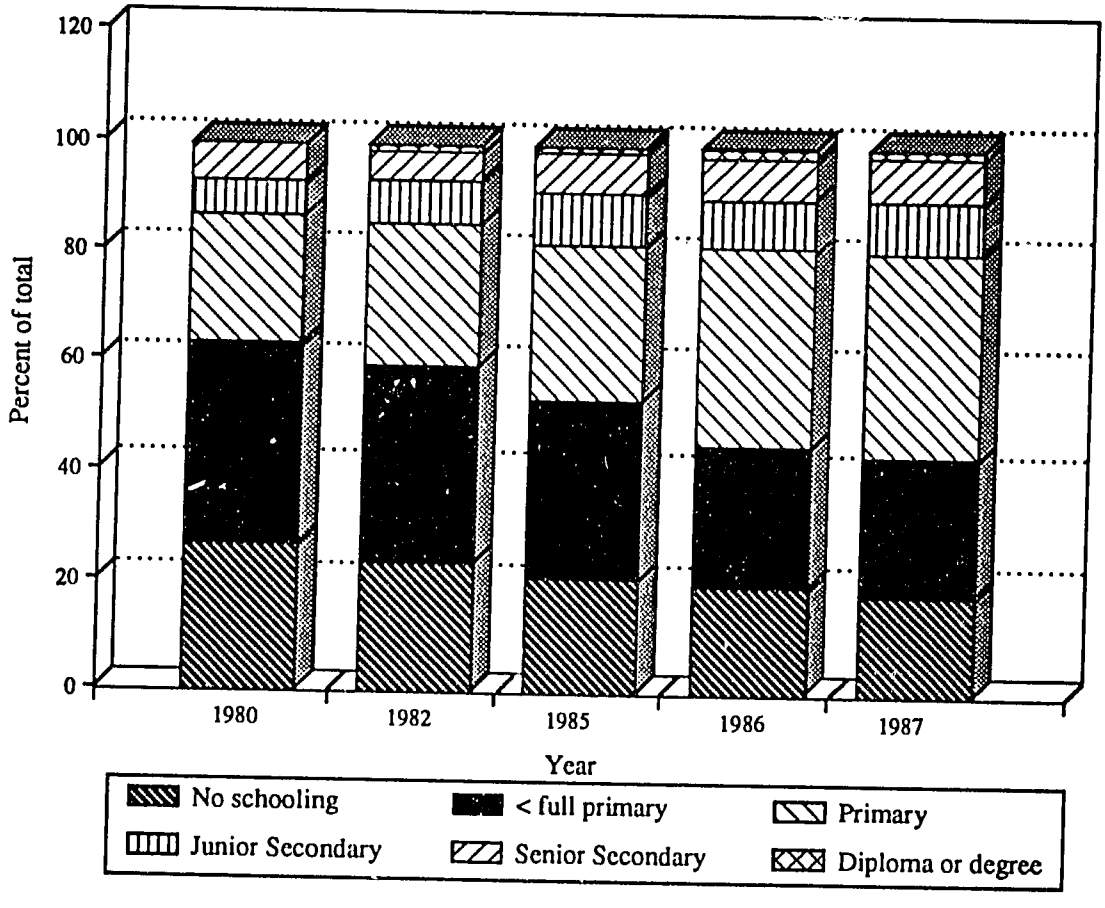
Table II.2
Real Rates of Return by Region/All Urban Workers (M+F)

Level of Education	Jakarta				West Java				Central Java			
	1982	1986	1988	1989	1982	1986	1988	1989	1982	1986	1988	1989
Primary & Below	0.17	0.17	0.16	0.07	0.15	0.17	0.14	0.02	0.12	0.16	0.17	-0.01
Junior Secondary	0.23	0.10	0.24	0.10	0.13	0.15	0.11	0.18	0.25	0.13	0.12	0.20
Senior Sec. Gen.	0.28	0.19	0.10	0.08	0.21	0.13	0.12	0.13	0.31	0.17	0.12	0.10
Senior Sec. Voc.	0.08	0.20	0.07	0.05	0.15	0.18	0.09	0.08	0.11	0.16	0.09	0.08
Academy (3 Years)	0.30	0.07	0.11	0.03	0.14	0.13	0.08	0.11	0.09	0.10	0.09	0.08
University	0.18	0.11	0.07	0.02	0.10	0.09	0.06	0.08	0.08	0.05	0.09	0.05

Level of Education	Yogyakarta				East Java				Sumatera			
	1982	1986	1988	1989	1982	1986	1988	1989	1982	1986	1988	1989
Primary & Below	0.12	0.15	0.17	0.04	0.12	0.18	0.10	0.04	0.25	0.16	0.13	0.04
Junior Secondary	0.17	0.18	0.15	0.10	0.18	0.14	0.13	0.19	0.18	0.13	0.12	0.16
Senior Sec. Gen.	0.29	0.15	0.08	0.12	0.29	0.13	0.12	0.12	0.11	0.14	0.10	0.10
Senior Sec. Voc.	0.13	0.10	0.11	0.09	0.10	0.09	0.08	0.09	0.10	0.14	0.06	0.07
Academy (3 Years)	0.10	0.09	0.05	0.08	0.10	0.12	0.05	0.08	0.14	0.14	0.03	0.07
University	0.13	0.09	0.04	0.05	0.20	0.04	0.04	0.06	0.10	0.08	0.03	0.05

Level of Education	Kalimantan				Sulawesi				Other Islands			
	1982	1986	1988	1989	1982	1986	1988	1989	1982	1986	1988	1989
Primary & Below	0.12	0.18	0.22	0.08	0.13	0.18	0.13	0.07	0.17	0.14	0.13	0.11
Junior Secondary	0.15	0.12	0.08	0.09	0.10	0.15	0.15	0.13	0.12	0.17	0.07	0.21
Senior Sec. Gen	0.17	0.17	0.13	0.05	0.15	0.13	0.06	0.08	0.23	0.21	0.09	0.12
Senior Sec. Voc.	0.09	0.10	0.05	0.06	0.08	0.15	0.08	0.06	0.17	0.19	N/A	0.06
Academy (3 Years)	0.11	0.06	N/A	0.05	0.06	0.09	0.09	0.02	0.16	0.16	N/A	0.11
University	0.08	0.05	N/A	0.04	0.09	0.10	0.03	0.02	0.12	0.06	N/A	0.03

Figure II.I
Educational Attainment
of the Labor Force, in Percent



What needs to be done next as developed in Chapter V on the implications of technical change, as well as based on the data in Table II.1 is to also move toward universal senior secondary education. All of this will require expanding the rate of investment by the Central Government steadily and fairly quickly from 3 percent to 4 percent of GNP (and from 10 to 18 percent of the total government budget). The designs for implementation need continuing effort and attention. But this will be necessary to achieve the goal of 100 percent *of each age cohort* by 2008. This is especially true if the education is to be of reasonably good quality, and reach the more remote rural areas and lower income provinces. Research in other countries shows that the declaration of Compulsory Basic Education is largely meaningless unless there are the necessary budgetary commitments needed to reduce the drop out rate, by means of policy interventions designed to improve quality and equity.

Senior Secondary Schools also need to expand considerably. To achieve an 80% net enrollment rate in senior secondary education by 2013 will also require a major policy intervention and a design to overcome implementation problems. In the case of higher education, additional resource recovery and improvements in efficiency should help to finance expansion and improvements in quality. In addition to the commitment of the Central Government, consideration also needs to be given to incentives to local Kabupaten to increase their local support for the schools both to supplement the central support for the primary and secondary schools and to permit further decentralization of decisions. There is a Presidential Decree that permits local Kabupatens to vote local property taxes for local education. But it is not being utilized. In the U.S. and Japan, it is not only the schools, but also the health district, sanitary district, road repair and other local units where local voters can change the millage rates, which are then combined into one tax rate. Perhaps the Presidential decree needs to be made more specific so that local tax funds will be appropriated specifically for schools, sewage, and other units where there are local elections by the taxpayers. The Central Government also needs to provide not only additional matching financial incentives directly to those localities that tax themselves, but also proportionately larger National grants to the lower income Kabupatens. This might start to get the Decree utilized because the schools tend to be the most popular with the voters.

Higher education also badly needs to improve quality. But quality improvements and expansion can be financed in part with expansion of the private universities, greater efficiency in the public institutions (e.g., 4 years rather than 6 to complete a BA, use of RAs, TAs, and work study), and more resource recovery from parents through public university tuition and fees. This resource recovery will have to be accompanied by more systematic nationwide financial need analysis with tuition waivers to intellectually qualified college entrants from low income families as tuitions continue to rise. Otherwise the latter group will merely be driven out, and a valuable national resource wasted.

II. EDUCATION, INEQUITY, AND POVERTY REDUCTION

More education alone contributes little or nothing to the reduction of inequality. But *who gets the education* is very important. If the basic education were distributed more equally to the poor rural areas and the poorer regions, this could potentially make an enormous contribution to reducing inequality and reducing poverty.

There is currently, for example, an enormous variation in the number of pupils per teacher (100 in some of the underserved areas, and 8 pupils per teacher in other schools), and a lack of textbooks (which are a very cheap and cost effective resource), in many of the poorer schools. See Nielsen and Sommerset (1991) and Theisen, Hughes, and Spector (1990). The government has recently made the decision to approximately double the salaries of teachers in primary and junior secondary schools who serve in the poorest and most remote areas. This is an extremely important step toward correcting this problem. The whole local infrastructure is important: access to credit by small enterprises, the local roads, harbors for export, health, sanitation, and basic education.

The international evidence is that where access to good quality basic education is widespread, the size of the middle class grows and after some time has passed, inequality diminishes. (See G. Psacharopoulos, ed., *Economics of Education: Research and Studies*, 1987, pp. 261-6.) Widespread access to good quality *basic* education through grade 9 is vital to the continuing reduction of inequality and to reduction of poverty. However to reduce inequality in the income distribution later, Knight and Sabot (1990) found in their in-depth study that inequality was reduced more in Kenya from 1960 to 1990 where access was expanded to secondary education than in Tanzania where it was not. Those few in Tanzania that were allowed access to secondary education based on the "manpower requirements" approach used there earned scarcity rents later, leading to greater inequality. They also found that intergenerational mobility (and intergenerational equity) were very limited in both places by the tightly restricted access to higher education and the lack of need-based grants. The international evidence is that investment in *higher* education in general *increases* inequality, at least up to the point where a high percentage of each age group are going to college, as in Japan, Korea, and the United States.

In Indonesia the degree of inequality has been diminishing, slowly, and also poverty has fallen, according to the recent World Bank (1990) *Poverty Assessment and Strategy Report*. Indonesia has been somewhat successful in this matter therefore in recent years, and also apparently firmly set on a course of per capita economic growth accompanied by declining inequality. This is similar to the successful pattern in this regard achieved by Japan, South Korea, Taiwan, Hong Kong, and Singapore (see McMahon 1987, "Education and Industrialization," Part IV).

Table III.3 shows the Gini coefficients for Indonesia, as well as the percent of total income received by each cumulative 10 percent of the population (i.e., the Lorenz curve). This shows that inequality declined from 1984 to 1987 from a Gini of .33 to .329 in the urban population, and from .293 to .277 within the rural population. Overall, inequality declined from 1984 to 1987 from a Gini of .331 to .321, and the percent of total income received by the lowest 10 percent increased from 3.40 to 3.78 percent of total income. There is still at least 30 million people in Indonesia in serious poverty experiencing inadequate caloric intake, high infant mortality, and all of the other symptoms (ibid., p. viii). Of these, disproportionately large percentages of the poor are in agriculture (32.3%) and are illiterate (38.9%). In fact, of those in poverty, over 75 percent either have no schooling, (34.6%) or did not complete primary school (40.8%).

The World Bank (1990, p. 18) attributes Indonesia's success thus far in reducing poverty and inequality to

(1) *The Government's policies in support of the agricultural sector*, which experienced rapid growth in the 70's and 80's.

(2) *The Government's investment in primary schools*, and the achievement of virtually universal primary education. This is in sharp contrast to Pakistan, Nepal, and most of Sub-Saharan Africa which are lagging far behind this educational achievement, and where there is no evidence that poverty has declined.

(3) *Adjustment to the external shocks of the 80's* in ways that avoided excessive cuts in poverty-related expenditure, and also included deregulation and reduction of monopoly elements.

Table II.3
Lorenz Curves and Gini Coefficients for Indonesia
Urban, Rural, and Nationwide, 1984 and 1987

Poorest Percent of Population	Cumulative Percentage of Total Expenditures[a] Urban 1984	Urban 1987	Rural 1984	Rural 1987	Total 1984	Total 1987
10	3.23	3.46	3.77	4.26	3.40	3.78
20	7.88	8.15	8.99	9.81	8.14	8.77
30	13.54	13.84	15.18	16.21	13.82	14.59
40	20.15	20.54	22.25	23.42	20.42	21.20
50	37.76	28.05	30.28	31.46	27.97	28.73
60	36.46	36.74	39.35	40.44	36.62	37.27
70	46.51	46.81	49.65	50.59	46.57	47.10
80	58.38	58.69	61.50	62.25	58.40	58.76
90	73.47	73.58	76.06	76.42	73.31	73.48
100	100.00	100.00	100.00	100.00	100.00	100.00
Gini[b]	0.333	0.329	0.293	0.27	0.331	0.321
Gini[c]					0.330	0.322

Notes:
a. The Lorenz Curve is based on the deflated SUSENAS expenditure data and differs slightly from that obtained at nominal prices.
b. Based on real expenditures.
c. Based on nominal expenditures.

Source: World Bank staff calculations from 1984 and 1987 SUSENAS surveys; see Ravallion and Huppi, 1989. *Pengeluaran Untuk Konsumsi Penduduk Indonesia 1987*, Book 1 (Expenditure for Consumption in Indonesia 1987), CBS, January 1989.

As a strategy for the future, the conclusion of this chapter with respect to equity is essentially the same as that of the World Bank (1990, p. 75) which says:

> In Indonesia as elsewhere, education can play a key role in reducing poverty over the long term, both indirectly through improving the productivity and efficiency of the work force in general which will lead to faster rates of economic growth, and directly through inculcating the poor with the skills necessary to raise their productivity and hence their employability and their incomes.

III. SPECIFIC PROPOSED 25 YEAR GOALS

The path of sustained high per capita economic growth accompanied by continuing reductions in inequality (GBHN, #3-5, p. 24, and Pancilisa) requires deliberate investment policies to improve the quality of the Indonesian people through improving the quality, equity, and efficiency of education as discussed above.

These can now be summarized as proposed goals for the new 25 Year Development Plan, 1994-2018. Since improvements in the quality of education at all levels, and expansion of equity and access will require additional investment, the improvements in efficiency and the additional financial commitment required to do this will also be considered.

It is notable that all of the Pacific Rim countries expanded secondary education rapidly and improved the quality of their education systems prior to their "take off" into fast per capita income growth. This is discussed in a later chapter by Boediono and Adams (1991). The comparison of enrollment rates is summarized in Table II.4 below based on International Monetary Fund data shown in detail for 1960-1989 in the Appendix (Chapter IX, Tables 1 and 3) and discussed further in Chapter VIII. It shows that in all cases 56-82 percent of the secondary school age groups were enrolled in secondary schools in these Pacific Rim countries in the 60's and 70's, compared to only 45.5 percent gross enrollment rate (and 34% net enrollment rate) in Indonesia currently. Labor markets in these Pacific Rim countries at the senior secondary graduate level apart from cyclical fluctuations are currently very tight, in spite of the large expansion of secondary education there. This investment in improving the quality of their people through education has required a financial investment of 16 percent to 27 percent of their government budgets in all cases, compared to 13.76 percent in Indonesia currently. The latter 13.76% includes the investment made by the Ministry of Home Affairs as it pays primary school teachers, but does not include the relatively smaller expenditures for education by the Ministry of Religion or Ministry of Labor since they are not included for the other countries.

Table II.4
Secondary Enrollment Ratios, and Investment Effort, at "Take Off"

Country	Near "Take-Off" Yr.	Enrollment Rates Primary (Net)	Enrollment Rates Secondary (Gross)	Investment in Educ. as % of Gov't Exp.	
Japan	1965	100%	82%	26.6%	(1971)
Singapore	1972	100%	72%	15.7%	(1972)
Korea	1975	100%	56%	17.1%	(1973)
Taiwan[a]	1975	100%	66%	18%	(1983)
Hong Kong	1977	100%	56%	N.A.	
Malaysia	1987	100%	59%	20%	(1987)
Indonesia[b]	1992	92%	45.5%	13.76%	(1988)

Notes:
a. Source: Kuo, Rania, and Fei (1981, p. 40).
b. Source: Chapter IX (Data Appendix), Table I.

In more specific terms, goals for the next 25 Year Development Plan discussed above and in the GBHN 1993 drafts are offered in Table II.5 along with some estimates of the financing requirements. They are:

PRIMARY EDUCATION (See Appendix to Chapter II for estimated costs of each component and for explanation of the basis for these estimates.)

- **Access:** An extension of opportunity to study that attains a 100% net enrollment ratio in elementary school by 1998 (GBHN 1993 #6).
- **Improved Equity:** Dramatically increased salaries for primary teachers in the remote and low income areas. Equalization of pupils per teacher, and free use of school-owned textbooks for all by 1998; Table 5 elimination of dropouts in rural and in poor urban areas) (GBHN, 1993, #6). This support for free use of textbooks includes privatization of textbook production which should help to improve the quality and variety of textbooks available, while improving delivery of the vast numbers required. Books could be paid for by check, including the cost of delivery, after they are delivered.
- **Improved Quality:** Improvements in the training of primary school teachers, including adequate pay incentives to attract and retain the able, high quality teachers by 2008 (GBHN 1993, #5). This is needed to provide incentives for teacher training to upgrade skills. (See Table II.5 for estimated costs, and Appendix.)

SECONDARY EDUCATION

- **Access:** Universal Secondary Education by 2013 consisting of:

Junior Secondary through grade 9 with a 100% transition rate by 2003, and close to a 100 percent net enrollment rate by 2008 (see Repelita V, GBHN 1993 #6, the analysis above, and the Data Appendix, Chapter IX, Table III).

Senior Secondary through grade 12 with a 80 percent net school enrollment rate by 2013. (Korea and Taiwan both went from 48% to 92% in 17 years.) If there should be more unemployment in this group it would lower the relative wage and increase export competitiveness.

Senior Secondary Vocational: Increased participation by private business and industry through shared instruction, apprenticeships, and internships appropriate to technological change and adaptation. Privatization of some apprenticeship programs, with school/industry partnerships.

- **Improved Equity:** A new financial resource allocation formula that provides a guaranteed minimum expenditure per pupil. Free use of school textbooks for all junior and senior secondary school children.
- **Improved Quality:** Improved language, mathematics, and science teaching to form an intellectual attitude that stresses rational thought, problem solving, and appreciates science, while developing an ability to participate in technological development and continuing change (see Chapter V below and GBHN 1993 #5). Teacher pay incentives are also badly needed, since many secondary school teachers appear to be moonlighting. (See Table II.5 for Rupiah estimates, and Appendix to Chapter II for the basis for the estimates.)

Table II.5
25 Year Development Education Goals: High Population Growth Scenario
Estimates of Financing Needs, in Billions of Rupiah at 1991 Prices

		Enrollment and Annual Investment Required[c]				
PRIMARY EDUCATION		**In 1998**	**2003**	**2008**	**2013**	**2018**
Access:	100% Net Enrollment Rate by 1998 (Now 91% Incl. Islamic but Not Paket-A)[c]	29,446,400	30,384,100	29,953,000	28,998,800	28,527,600
	Total investment, at constant (Rp. 91,405) cost/student (Bil. Rp.)[c]	2,692	2,777	2,737	2,651	2,608
Equity:	Textbooks for all by 1998 (Bil. Rp.)	74	75	75	75	74
	Equalize Pupils Per Teacher by 1998 (Bil. Rp.)	0	0	0	0	0
	Aid to Underserved Schools, New School-Aid Formula	450	700	800	800	950
Quality:	Teacher Training and Pay Incentives (Bil. Rp.)	1,200	1,950	3,000	3,960	4,950
	Improved Administration					
	SUBTOTAL (Bil. Rp.)	4,416	5,502	6,613	7,486	8,582
JUNIOR SECONDARY EDUCATION						
Access:	100% Transition Rate by 2003, and 100% Net Enrollment Rate by 2008[c]	9,267,695	11,239,873	12,894,593	12,492,774	11,844,097
	Total investment at constant (Rp. 124,311) cost/student (Bil. Rp.) plus more Bldgs. in 93-8	1,500	1,397	1,603	1,553	1,472
Equity:	Textbooks for all by 1998	39	47	54	52	49
	Aid to Underserved Schools; equity in aid formula	500	700	800	1,000	1,000
Quality:	Teacher Pay Incentives (Bil. Rp.)	1,300	1,950	2,600	3,300	4,350
	New National Curriculum (Bil. Rp)., Improved Science, Math, Language Instruction	50	150	250	350	450
	SUBTOTAL (Bil. Rp.)	3,339	4,244	5,317	6,255	7,321
SENIOR SECONDARY EDUCATION						
Access:	80% Net Enrollment Rate by 2013, 1991: 21.4%[c]	5,887,022	7,099,394	8,731,150	10,228,674	9,759,816
	Total investment at constant (Rp. 204,748) cost/student (Bil. Rp.)[c]	1,025	1,454	1,788	2,094	1,998
Equity:	Free Use of Textbooks (Bil. Rp.)	40	50	60	70	80
	Aid to Underserved Schools; Equity in the Aid Formula	200	600	1,100	1,310	1,520
Quality:	Improved Science, Math, Language Teaching	161	211	276	276	273
	Teacher Pay Incentives (Bil. Rp.)	725	1,600	2,300	3,100	4,000
	Vocational/Private Industry Partnerships	20	40	60	100	100
	SUBTOTAL (Bil. Rp.)	2,171	3,919	5,584	6,950	7,971
HIGHER EDUCATION						
Access:	25% Net Enrollment Rate by 2018, 1991: 5.77%[c]	3,567,229	4,395,532	5,123,992	5,939,142	6,686,843
	Total investment at constant (Rp. 461,591) cost/student (Bil. Rp.):[c]	1,647	2,029	2,365	2,741	3,087
Equity:	Costs (Bil. Rp.), Tuition Waivers Based on Need Analysis[a] (10% of Students)	226	338	473	640	854
	Strengthened Provincial Universities (Bil. Rp.)	300	450	950	1,500	2,000
Quality:	Better Faculty Salary Incentives (Bil. Rp.)	900	1,750	2,250	2,750	3,032
	User-Driven Research Grants (Bil. Rp.)	100	200	500	800	1,582
	Improved Science Instruction					
	SUBTOTAL (Bil. Rp.)	3,173	4,767	6,528	8,431	10,565

Table II. 5 (Continued)

	Enrollment and Annual Investment Required[c]				
	In 1998	2003	2008	2013	2018
NONFORMAL EDUCATION					
Education for illiterates (Bil. Rp)., plus job training	200	300	400	500	500
TOTAL DIRECT INVESTMENT REQUIRED					
(Bil. Rp.)	13,299	18,732	24,442	29,622	34,939
TOTAL AMOUNT AVAILABLE					
(Bil. Rp. in constant 1991 Prices)[b] If GNP Grows at 5%/Yr. See Table 1.4.	12,700	20,000	29,400	41,900	54,100

Notes:
[a.]Tuition waivers and need-based grants are *more* than offset by increased tuition revenue.
[b.]Assumes GNP grows at 5%/year in real terms.
[c.]Enrollment at each level here is the gross enrollment including, under and over age enrollment, and enrollment in the Madrasah schools. Taken from Table 3 in the Appendix to the executive summary (Chapeter 1).
[d.]This is the 1991 net enrollment rate of persons age 19-24. The gross enrollment rate is 10.3% but this includes 974,342 and over age students in 1991.

HIGHER EDUCATION

- **Expanded Access:** Raising net enrollment rates from the current approximately 6.5 percent in 1992 of this age group toward a 25 percent *net* enrollment ratio by 2018. (Enrollment rates in Japan and Korea are currently 30% and 37%, respectively.) Decentralization and increased autonomy based on accreditation (GBHN, 1993, #7) permitting the private sector to accommodate a significant part of the enrollment increase.
- **Improved Efficiency.** Reduction in average enrollment for 4 year bachelors degree programs, which reduces costs and permits greater expansion of *net* enrollments, increased resource recovery from parents and students.
- **Greater Equity:** Tuition waivers only for students from lower income families, based on a new national computerized financial need analysis system done by private contractors such as ACT or CEEB. Strengthening of the Provincial Universities, and greater access to college for young people in the Provinces. Some two year community colleges close to student's homes.
- **Improved Quality:** The greater efficiency facilitated by greater resource recovery mentioned above can be one means of financing better salary incentives to attract and retain higher quality faculty. (See projected amounts of private resource recovery in higher education in the third line from the bottom in Table II.5, and the explanation in the Appendix.) Improved science education.

  Greater use of user-driven research performed at universities and financed by government as well as private industry. This helps faculty and students stay up-to-date in all fields. (Chapter V, GBHN 1993 #7) It will be necessary as Indonesia begins to train its own Ph.D.'s in the Indonesian Universities in research methods.

NON-FORMAL EDUCATION (See Table II.5.)

- Non-school education for illiterates and those with limited skills who are now 40% of the labor force (See Figure II.1 above) to reduce unemployment and raise their productive ability. (Draft GBHN, 1993, #8).

IV. THE BALANCE BETWEEN INVESTMENT IN HUMAN AND PHYSICAL CAPITAL

This investment in growth, equity, and the quality of education requires cost effectiveness and good quality with compensation for the inability of poor areas to mobilize local resources. But it also requires an appropriate balance between rates of investment in physical capital and in human resource development.

High rates of investment in physical capital without adequate investment in human capital, as well as lack of availability of human capital management and production skills by small and medium sized enterprises in the provincial villages and towns leads to diminishing returns to the investment in physical capital.

Indonesia is at a stage in the balance between industry and agriculture where if appropriate policies are followed, a take off into faster *real per capita* growth accompanied by continuing reductions in the inequality in the income distribution appears to be a realistic and achievable goal. Efficiency and equity are not in conflict and there is not a trade-off between efficiency and equity normally stressed by economists in the special case of investment in the education of children. But appropriate policies must be followed. Education is a necessary condition (although not a sufficient condition) for faster growth during the next 25 years, since it is complementary not only with physical capital but also with technology (see Chapter V). An equitable distribution of access to good quality basic education is also a necessary condition to the reduction of poverty and the continuing reduction of inequality, and hence to attaining rising living standards for all.

Indonesia has a choice. Its rate of investment in physical capital has moved upward aggressively from 11.7 percent of GNP in 1969 (Repelita I) to 30.17 percent of GNP currently (at least as of the end of Repelita IV), second only to Singapore in ASEAN (see Chapter VIII, Table IV.3). But Indonesia's rate of investment in education which is necessary to support the industrialization and to provide equity has been very modest. At 13.76 percent of the Central Government's budget in 1988 (Table II.4), it is at the low end of all ASEAN and Pacific Rim countries, where the overall average is 18.6 percent (see Figure II.2, below, and Chapter IX, Table 1).

As a percent of GNP, Central Government expenditure is nowhere near as low as Pakistan. But at 2.95 percent of GNP in 1988 (Including Home Affairs primary school teachers pay) the rate of educational investment by the Central Government is still low among ASEAN and Pacific Rim countries, where the average is 4.2 percent (see Figure II.3, below and Chapter IX, Table 1, for other years). This rate of investment in education is only about three-fourths of the 4 percent of GNP invested by Japan in *1960 at the time of Japan's takeoff into fast growth,* about three-fourths of the 4.01 percent invested by the Central Government in Thailand in 1982 and about half the rate of Central Government investment in education in Malaysia in the *1972-1975 period* (see Chapter IX, Table I). When South Korea took off into fast per capita growth in the early 1960's, the Ministry of Education's budget was 2.6 percent of GNP and 15.2 percent of total government expenditure, compared to 2.95% and 13.76% in Indonesia). This however greatly underestimates Korea's actual investment, because independent investment by the Provinces, local governments, and by private households is considerably larger in Korea in most years than the investment made in education by those lower levels in Indonesia. Within countries where there is considerable local autonomy, lower income regions tend to spend a larger percentage of their GNP, not a smaller percentage, on education. Voters tend to vote to tax themselves more if most of the revenue raised is to be used to improve the quality and access to education. Private education tends to grow more rapidly when public schools of good quality are not

Figure II.2
Central Government Expenditure on Education
(Inc. H. AFF) as % Total Government Expenditure

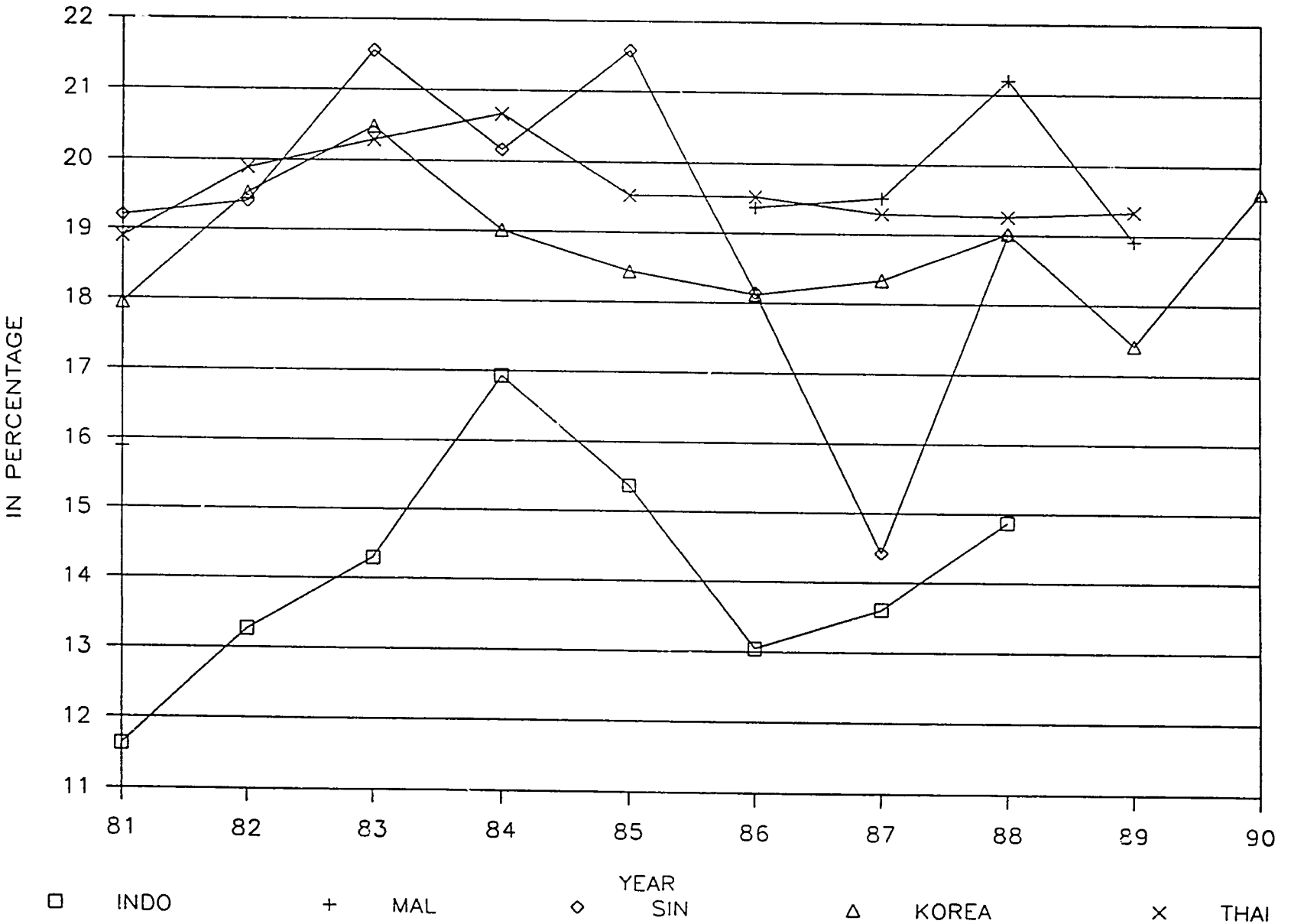
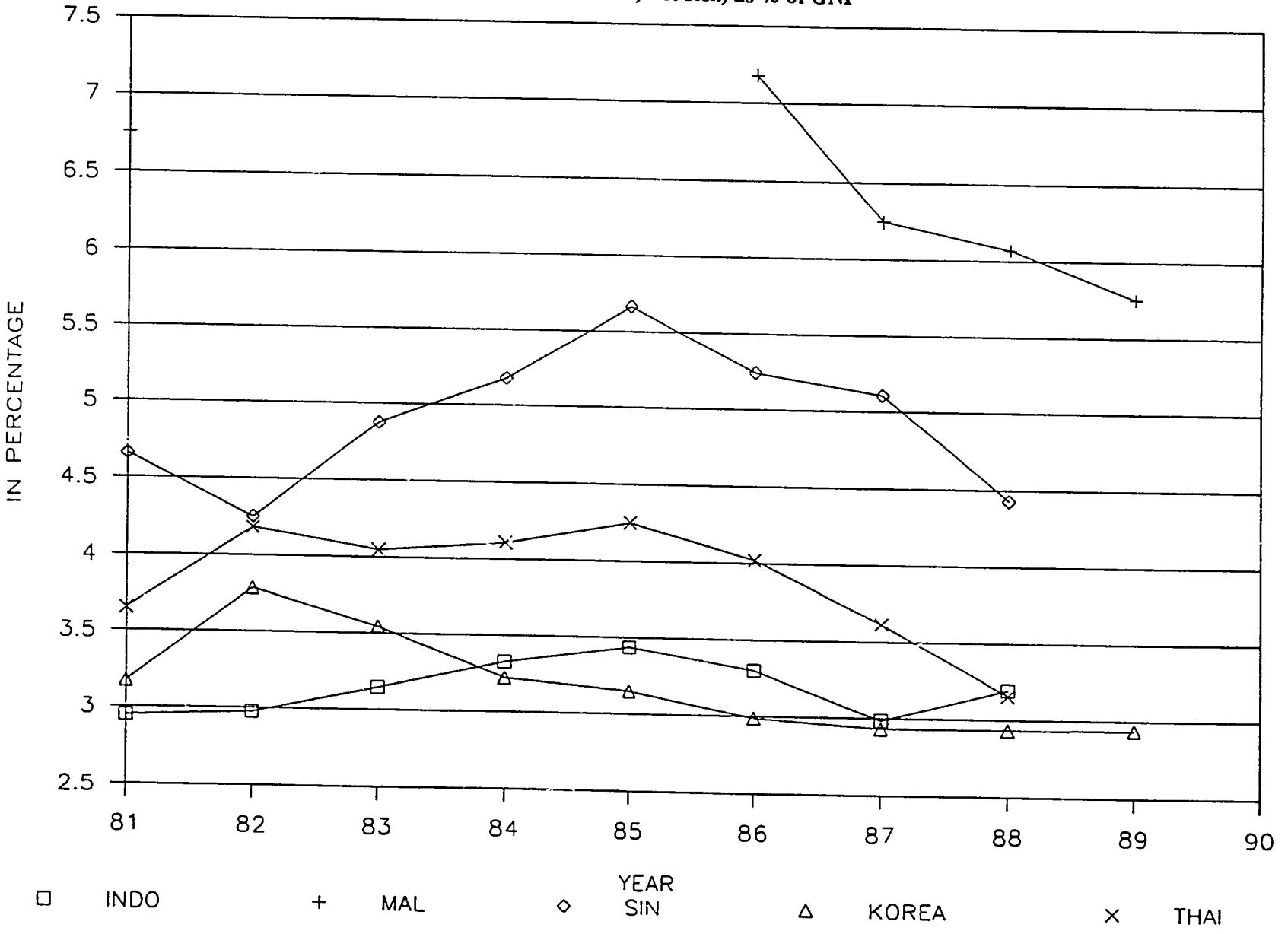


Figure II.3
Central Government Expenditure on Education
(Incl. H. AFF., Not Rel.) as % of GNP



available, which is also evidence that education is one of the most popular public (and private) goods.

Examples of countries that have chosen a physical capital intensive route to industrialization without adequate investment in development of the necessary human resources are presented in an earlier background paper (W. McMahon, 1987, pp. 13-17). A common result of this is the pattern described by the Kuznets inverse "U." It describes *increasing* inequality in the income distribution at first, due in part to low labor absorption rates in the physical capital intensive sectors. There is a polarization of the "modern" and "traditional" sectors, and capital goods that cannot be operated effectively given the lack of adequately educated labor. This results in diminishing returns to further investment in physical capital and growth that is slower than it could otherwise be. However, seven of the nine fastest growing countries in the world (1965-1985) including all along the Pacific Rim have simultaneously and for sometime in the past invested over 4 percent of their GNP in education as well as 26 percent or so in physical capital. This combination has resulted in growth with equity (although export-oriented growth strategies similar to that recently adopted in Indonesia, and peaceful market-oriented environments with limited defense burdens have also contributed both to fast growth and to reduced inequiality). Indonesia seems to have started successfully on this path.

V. SUMMARY

The path of sustained high per capita economic growth accompanied by continuing reductions in inequality (GBHN, #3-5, p. 24) requires deliberate policies involving human resource development. The proposed 25 year goals consistent with this growth strategy are summarized in Table II.5 above. Important to the implementation of these goals is an increased rate of investment in education to 4 percent of Indonesia's GNP to lay the foundation for "takeoff," and simultaneous development of implementation plans.

The basis for this significant increase in the Government's financial commitment to the improvement in the quality of life and abilities of the Indonesian People is that this is what has worked in the Pacific Rim countries and Malaysia just prior to their "takeoff." The basis is also the high real rates of return to investment in education currently seen in Indonesian data in relation to lower real rates of return to the alternatives.

This provides the necessary rationale for achieving 100% net enrollment rates in junior secondary education by 2008 (100% transition rates by 2003), and for extension of good quality basic education more widely to the remote regions. This would also support a continuing expansion toward universal senior secondary education with a 80 percent participation rate by 2008, and a much needed improvement in the quality of higher education. The latter could be financed in part by greater resource recovery from parents at this level based on differences in their individual ability to pay, plus accreditation of private colleges who would help to expand access.

If these broader goals and the means necessary to their attainment are generally adopted, their implementation will require policy intervention. But then in the next 25 years the human resource base, with improved *quality, equity,* and *efficiency* in education, would be created in the labor force and in the society that offers Indonesia a very bright future.

APPENDIX TO CHAPTER II

EXPLANATION AND ASSUMPTIONS UNDERLYING TABLE II.5

I. Population And Enrollment Projections

The school age population is based on **Projection of the Indonesian Population: 1990-2020,** Demographic Institute, Jakarta, January 1991 (p. 13).

The *net* enrollment rates are shown in line 2, Table 3 below, and the total (i.e., gross) enrollment projections in line 8 Table 3 and in Table II.5 in the text. These total enrollments are the product of the school age population times the net enrollment rates, (which include the enrollment in the Islamic schools) plus the over-age under age, which includes the repeaters. The total enrollment at all levels includes enrollment in the religious schools and also in the private schools and colleges, but not in the special schools (Non-formal PAKET-A, Schools for the Handicapped PLB, and small schools).

At the primary level, enrollments are identical to the Pusat Informatika Balitbang Dikbud actual enrollments in the primary schools plus enrollment in the religious (Madrasah) schools. They differ from the net enrollment rates in Repelita V which are future goals or projections. 91% enrollment rate in 1991 involves some double counting because some students go to both schools. In 1989/90 62% finished primary school. Moving to eliminate these drop outs before completion of grade 6 by 1998, trend extrapolation of transition rates then determine the remaining enrollments through 2018.

At the junior secondary level and at the senior secondary level enrollments are as shown in Table 3 below. The table shows at each level: *School Age Population* (Demographic Institute), *Net Enrollment Ratio (NER), plus under and over age enrollments* declining (this includes repetition), plus religious schools. *This equals Total Enrollment* (Bottom line).

Table 1
Policy Interventions (Implementation Plans) Required

The Policy Intervention Goals embedded in these enrollment estimates are:

Primary: 100% Net Enrollment Rate without double counting by 1998, increasing the % who complete primary school from the current 62% to 100%.

Jr.Sec: 100% Transition Rate by 2003, or 90% Transition Rate in 1998. This would be followed by a 100% net enrollment rate in 2008.

As specified in Repelita VI goals:

	Transition Rate	Net Enrollment Rate
1990	62.19 %	37.13 %
1993	72.62 %	47.60 %
1998	90.0 %	65.07 %
2003	100.0 %	82.53 %
2008	100.0 %	100.0 %
2013	100.0 %	100.0 %
2018	100.0 %	100.0 %

Senior Secondary: 80% NER by 2013

Higher Education: 25% Net Enrollment Rate by 2018

Increased efficiency is expected as higher education tuition approaches 50% of direct costs, resulting in a reduction of the 7 years currently taken to complete a 4 year degree. This finances a larger increase in the net enrollment rates for this group. Note that overage/underage enrollment as these goals are attained falls, in spite of the increase in Masters and PhD students (who are"overage"). The number are the same as those projected by the DG of Higher Education up through 1993, but then the total does not increase as fast because of increased efficiency. (See Table 3).

The repetition rate at each year is projected to gradually decline at each level by the Demographic Institute. In primary school, it declines from 10% in 1990 to 4% in 2020; in junior secondary school, it declines from 1.25% in 1990 to 0% in 2015. At the senior high school level, since the repetition rate has already been very low, it is not taken into consideration in projecting gross enrollments. At higher education levels it is based on the current 7 years taken to complete a 4 year degree declining to 5 years.

Further detail on the Junior Secondary Transition Rates compared to the Enrollment Rates appear in Table 4 below.

Table 2
Projections

Enrollment projections for primary school:

The net enrollment rate is at 93.7% in 1993 Table 3 since the 99.7% goal of Repelita is not being attained. The enrollment projection for each year after 1998 follows the demographic estimates closely, (plus over and underage enrollment):

1998	2003	2008	2013	2018
29,446,400	30,384,141	29,953,017	28,998,750	28,527,555

Junior Secondary School:

The net enrollment rate in 1993 is 47,6% (Table 3). A 100% net enrollment rate is projected for 2008 where the enrollment projection equals gross full enrollment that year of 9,267,695. So there is a 21% growth rate between 1998 and 2003, and a 14% growth rate from 2003-2008:

1988	2003	2008	2013	2018
9,267,695	11,239,873	12,894, 593	12,492,774	11,844,097

Senior Secondary School:

The net enrollment rate in 1993 is 26.73% (Table 3). With the policy intervention proposed, an 80% net enrollment rate is projected for 2013. Therefore,

1998	2003	2008	2013	2018
5,887,022	7,099,394	8,731,150	10,228,674	9,759,816

Higher Education:

Increased efficiency as tuition approaches 50% of direct costs should result in a reduction of the 7 years currently taken to complete a 4 year degree, partially financing an increase in the net enrollment rates to 25% by 2018 **for this age group.** Total enrollments with this increase in efficiency would be:

1998	2003	2008	2013	2018
3,567,229	4,395,532	5,123,992	5,939,142	6,686,843

Table 3
Enrollment Projections: Primary, Jr. Secondary, Sr. Secondary, and Higher
1991–2008

A. Enrolment Projection of Primary School

Variable	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Population 7-12	25.885.800	25.703.200	25.557.900	25.452.800	25.390.300	25.361.700	25.356.900	25.365.000	25.409.200	25.458.100	25.501.000	25.524.000	25.508.200	25.475.000
NER 7-12	91,00%	92,35%	93,71%	95,07%	96,42%	97,78%	99,06%	100,00%	100,00%	100,00%	100,00%	100,00%	100,00%	100,00%
Enrol 7-12	23.556.100	23.736.905	23.950.900	24.197.900	24.481.300	24.798.700	25.118.300	25.365.000	25.409.200	25.458.100	25.501.000	25.524.000	25.508.200	25.475.000
Undertover age	5.899.500	5.586.995	5.307.400	4.913.000	4.510.800	4.214.400	4.086.900	4.081.400	4.338.800	4.537.985	4.685.450	4.829.061	4.875.941	4.907.920
Repetition	2.682.887	2.670.496	2.664.131	2.650.325	2.639.131	2.640.668	2.657.779	2.679.357	2.706.800	2.729.374	2.746.695	2.761.855	2.764.683	2.764.572
Tot Enrolment PS	26.267.300	26.189.400	26.169.900	26.076.500	26.007.900	26.064.200	26.274.100	26.528.300	26.800.000	27.023.500	27.195.000	27.345.100	27.373.100	27.372.000
Islamic Enrol	3.188.300	3.134.500	3.088.400	3.034.400	2.984.200	2.948.900	2.931.100	2.918.100	2.948.000	2.972.585	2.991.450	3.007.961	3.011.041	3.010.920
Tot Enrolment	29.455.600	29.323.900	29.258.300	29.110.900	28.992.100	29.013.100	29.205.200	29.446.400	29.748.000	29.996.035	30.186.450	30.353.061	30.384.141	30.382.920
Unit cost Rp.91,405 (bil. Rp.)	2.692	2.680	2.674	2.661	2.650	2.652	2.670	2.692	2.719	2.742	2.759	2.774	2.777	2.777

B. Enrolment Projection of Junior Secondary School

Variable	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Population 13-15	12.981.151	13.090.556	13.093.603	13.023.622	12.925.238	12.818.355	12.721.371	12.646.904	12.609.225	12.574.384	12.571.796	12.591.524	12.630.287	12.656.934
NER 13-15	40,62%	44,11%	47,60%	51,10%	54,59%	58,08%	61,58%	65,07%	68,56%	72,06%	75,55%	79,04%	82,53%	86,03%
Enrol 13-15	5.272.813	5.774.506	6.233.209	6.654.810	7.056.017	7.445.413	7.833.438	8.229.340	8.645.263	9.060.598	9.497.866	9.952.593	10.424.407	10.888.507
Undertover age	1.564.704	1.379.072	1.254.849	1.181.062	1.129.477	1.113.546	1.097.291	1.038.355	1.000.021	961.680	948.356	905.545	815.466	749.599
Repetition	68.375	71.536	74.881	78.359	81.855	85.590	89.307	92.677	96.453	100.223	104.462	108.581	112.399	116.381
Tot Enrolment JSS	6.050.900	6.330.600	6.626.600	6.934.400	7.243.800	7.574.300	7.903.300	8.201.500	8.521.400	8.844.400	9.211.500	9.564.300	9.884.700	10.222.600
Islamic Enrol	786.617	822.978	861.458	901.472	941.694	984.659	1.027.429	1.066.195	1.123.884	1.177.878	1.234.723	1.293.837	1.355.173	1.415.506
Tot Enrolment	6.837.517	7.153.578	7.488.058	7.835.872	8.185.494	8.558.959	8.930.729	9.267.695	9.645.284	10.022.278	10.446.223	10.858.137	11.239.873	11.638.106
Unit cost Rp.124,311 (bil.Rp.)	850	889	931	974	1.018	1.064	1.110	1.152	1.199	1.246	1.299	1.350	1.397	1.447

Table 3 (continued)

A. Enrolment Projection of Primary School

2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
25.395.300	25.300.500	25.169.900	24.998.800	24.781.600	24.517.500	24.252.200	24.014.200	23.829.600	23.701.500	23.629.200	23.570.800	23.496.400	23.376.300
100,00%	100,00%	100,00%	100,00%	100,00%	100,00%	100,00%	100,00%	100,00%	100,00%	100,00%	100,00%	100,00%	100,00%
25.395.300	25.300.500	25.169.900	24.998.800	24.781.600	24.517.500	24.252.200	24.014.200	23.829.600	23.701.500	23.629.200	23.570.800	23.496.400	23.376.300
4.932.897	4.940.007	4.947.952	4.954.217	4.982.273	5.038.026	5.095.978	5.142.059	5.169.150	5.175.039	5.153.322	5.134.022	5.130.500	5.151.255
2.759.593	2.751.614	2.740.453	2.725.455	2.708.244	2.689.287	2.670.420	2.652.957	2.638.625	2.627.505	2.618.950	2.611.880	2.604.790	2.595.751
27.322.700	27.243.700	27.133.200	26.984.700	26.814.300	26.626.600	26.439.800	26.266.900	26.125.000	26.014.900	25.930.200	25.860.200	25.790.000	25.700.500
3.005.497	2.996.807	2.984.652	2.968.317	2.949.573	2.928.926	2.908.378	2.889.359	2.873.750	2.861.639	2.852.322	2.844.622	2.836.900	2.827.055
30.328.197	30.240.507	30.117.852	29.953.017	29.763.873	29.555.526	29.348.178	29.156.259	28.993.750	28.876.539	28.782.522	28.704.822	28.626.900	28.527.555
2.772	2.764	2.753	2.738	2.721	2.702	2.683	2.665	2.651	2.639	2.631	2.624	2.617	2.608

B. Enrolment Projection of Junior Secondary School

2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
12.687.429	12.714.442	12.726.389	12.716.098	12.689.548	12.658.942	12.613.880	12.540.514	12.426.722	12.285.921	12.128.872	11.980.646	11.869.548	11.815.363
89,52%	93,01%	96,51%	100,00%	100,00%	100,00%	100,00%	100,00%	100,00%	100,00%	100,00%	100,00%	100,00%	100,00%
11.357.914	11.826.211	12.281.856	12.716.098	12.689.548	12.658.942	12.613.880	12.540.514	12.426.722	12.285.921	12.128.872	11.980.646	11.869.548	11.815.363
694.415	635.497	489.685	178.495	128.993	101.521	80.424	77.653	66.052	52.549	49.882	36.038	34.793	28.734
120.523	124.617	127.715	128.946	128.185	127.605	126.943	126.182	124.928	123.385	121.788	120.167	119.043	118.441
10.575.800	10.924.300	11.174.900	11.241.500	11.168.900	11.114.800	11.054.500	10.987.900	10.877.300	10.741.300	10.602.000	10.459.200	10.361.300	10.308.100
1.476.529	1.537.407	1.596.641	1.653.093	1.649.641	1.645.662	1.639.804	1.630.267	1.615.474	1.597.170	1.576.753	1.557.484	1.543.041	1.535.997
12.052.329	12.461.707	12.771.541	12.894.593	12.818.541	12.760.462	12.694.304	12.618.167	12.492.774	12.338.470	12.178.753	12.016.684	11.904.341	11.844.097
1.498	1.549	1.588	1.603	1.593	1.586	1.578	1.569	1.553	1.534	1.514	1.494	1.480	1.472

Table 3 (continued)

C. Enrolment Projection of Senior Secondary School

Variable	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Population 16-18	12.258.687	12.501.717	12.727.165	12.918.004	13.031.580	13.032.124	12.959.938	12.853.750	12.743.798	12.664.891	12.605.236	12.575.587	12.553.828	12.549.932
NER 16-18	21,40%	24,06%	26,73%	29,39%	32,06%	34,72%	37,38%	40,05%	42,71%	45,37%	48,04%	50,70%	53,36%	56,03%
Enrol 16-18	2.623.509	3.008.514	3.401.766	3.796.855	4.177.344	4.524.640	4.844.776	5.147.450	5.442.859	5.746.498	6.055.181	6.375.900	6.699.249	7.031.447
Under+over age	1.669.361	1.555.206	1.313.960	1.137.406	1.013.050	909.790	765.147	739.572	490.484	469.874	473.660	411.207	400.145	375.605
Repetition	42.588	45.275	46.783	48.951	51.492	53.913	55.654	58.403	58.896	61.704	64.804	67.361	70.458	73.508
Tot Enrol SSS	4.258.800	4.527.500	4.678.300	4.895.100	5.149.200	5.391.300	5.565.400	5.840.300	5.889.900	6.170.400	6.480.400	6.736.100	7.045.800	7.350.800
Islamic Enrol	34.070	36.220	37.426	39.161	41.194	43.130	44.523	46.722	43.543	45.972	48.441	51.007	53.594	56.252
Tot Enrol	4.292.870	4.563.720	4.715.726	4.934.261	5.190.394	5.434.430	5.609.923	5.887.022	5.933.343	6.216.372	6.528.841	6.787.107	7.099.394	7.407.052
Unit cost Rp.204,748 (bil.Rp.)	879	934	966	1.010	1.063	1.113	1.149	1.205	1.215	1.273	1.337	1.390	1.454	1.517

D. Enrolment Projection of Higher Education

Variable	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Population 19-24	21.301.353	21.981.545	22.668.822	23.321.879	23.922.582	24.471.518	24.942.421	25.301.045	25.534.638	25.657.293	25.661.248	25.559.928	25.411.307	25.258.094
NER 19-24	5,77%	6,48%	7,19%	7,90%	8,62%	9,33%	10,04%	10,75%	11,47%	12,18%	12,89%	13,60%	14,32%	15,03%
Enrol 19-24	1.228.658	1.424.465	1.630.472	1.843.564	2.061.449	2.283.062	2.504.658	2.720.889	2.927.892	3.124.713	3.307.979	3.476.980	3.637.767	3.795.746
Under+over age	974.342	946.235	929.586	912.936	896.287	879.637	862.990	846.340	829.690	813.040	793.570	775.565	757.765	739.550
Tot Enrolment	2.203.000	2.370.700	2.560.058	2.756.500	2.957.736	3.162.699	3.367.648	3.567.229	3.757.582	3.937.753	4.101.549	4.252.545	4.395.532	4.535.296
Unit cost Rp.461,591 (bil.Rp.)	1.017	1.094	1.182	1.272	1.365	1.460	1.554	1.647	1.734	1.818	1.893	1.963	2.029	2.093

Table 3 (continued)

C. Enrolment Projection of Senior Secondary School

2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
12.556.352	12.573.783	12.606.392	12.644.015	12.674.607	12.690.081	12.679.087	12.652.380	12.620.931	12.579.352	12.509.359	12.394.882	12.252.684	12.096.268
58,69%	61,35%	64,02%	66,68%	69,35%	72,01%	74,67%	77,34%	80,00%	80,00%	80,00%	80,00%	80,00%	80,00%
7.369.493	7.714.636	8.070.425	8.431.294	8.789.292	9.138.033	9.467.834	9.784.898	10.096.745	10.063.481	10.007.487	9.915.906	9.802.148	9.677.014
341.263	333.081	310.238	299.856	222.522	208.471	199.109	179.781	131.929	100.227	91.973	90.821	84.269	82.802
76.518	79.860	83.161	86.637	89.415	92.734	95.912	98.864	101.479	100.832	100.194	99.274	98.080	96.824
7.651.800	7.986.000	8.316.100	8.663.700	8.941.500	9.273.400	9.591.200	9.886.400	10.147.900	10.083.200	10.019.400	9.927.400	9.808.000	9.682.400
58.956	61.717	64.563	67.450	70.314	73.104	75.743	78.279	80.774	80.508	80.060	79.327	78.417	77.416
7.710.756	8.047.717	8.380.663	8.731.150	9.011.814	9.346.504	9.666.943	9.964.679	10.228.674	10.163.708	10.099.460	10.006.727	9.886.417	9.759.816
1.579	1.648	1.716	1.788	1.845	1.914	1.979	2.040	2.094	2.081	2.068	2.049	2.024	1.998

D. Enrolment Projection of Higher Education

2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
25.139.558	25.043.728	24.987.331	24.971.473	24.982.312	25.005.594	25.042.596	25.094.429	25.145.080	25.177.502	25.186.464	25.170.678	25.121.513	25.027.373
15,74%	16,45%	17,16%	17,88%	18,59%	19,30%	20,01%	20,73%	21,44%	22,15%	22,86%	23,58%	24,29%	25,00%
3.957.001	4.120.303	4.289.008	4.464.157	4.644.044	4.826.486	5.012.005	5.201.126	5.390.732	5.577.021	5.758.409	5.934.090	6.101.438	6.256.843
720.090	700.950	680.592	659.835	639.295	628.110	609.760	580.780	548.410	519.620	498.236	477.365	457.010	430.000
4.677.091	4.821.253	4.969.600	5.123.992	5.283.339	5.454.596	5.621.765	5.781.906	5.939.142	6.096.641	6.256.645	6.411.455	6.558.448	6.686.843
2.159	2.225	2.294	2.365	2.439	2.518	2.595	2.669	2.741	2.814	2.888	2.959	3.027	3.087

Table 4
Transition Rates Compared to Net Enrollment Rates

PROYEKSI LULUSAN SD, MURID BARU TINGKAT I, DAN MURID PER TINGKAT
JENIS SEKOLAH SLTP (Termasuk Madrasah Tsanawiyah)
TAHUN 1989/90 -- 2018
INDONESIA

JUNIOR SECONDARY

Tahun	Lulusan SD	Murid Baru Tk.1	Murid Tk. 1	Murid Tk. 2	Murid Tk. 3	Jumlah SLTP	Madrasah Tsanawiyah	Jumlah	% Transition Rate	Net Enrollment Rate (Tab.3
1989	3,355.7	1,970.3	1,997.2	1,905.2	1,847.0	5,749.4	747.4	6,496.8	58.71	
1990	3,336.6	2,075.0	2,101.9	1,924.8	1,840.8	5,867.5	762.8	6,630.3	62.19	37.13
1991	3,250.5	2,134.5	2,162.4	2,026.7	1,861.8	6,050.9	786.6	6,837.5	65.67	40.62
1992	3,257.9	2,252.6	2,281.0	2,087.7	1,962.0	6,330.6	823.0	7,153.6	69.14	44.11
1993	3,263.3	2,369.7	2,399.3	2,203.7	2,023.6	6,626.6	861.5	7,488.1	72.62	47.60
1994	3,410.8	2,595.5	2,626.2	2,320.3	2,138.0	7,084.4	921.0	8,005.4	76.09	51.10
1995	3,476.3	2,766.1	2,799.4	2,540.9	2,253.5	7,593.8	987.2	8,581.0	79.57	54.59
1996	3,453.6	2,868.1	2,903.1	2,711.6	2,469.6	8,084.3	1,051.0	9,135.3	83.05	58.08
1997	3,378.9	2,923.6	2,959.4	2,815.4	2,638.6	8,413.3	1,093.7	9,507.0	86.52	61.58
1998	3,388.7	3,049.8	3,085.9	2,872.9	2,742.7	8,701.5	1,131.2	9,832.7	90.00	65.07
1999	3,411.3	3,138.4	3,176.0	2,995.7	2,799.7	8,971.4	1,166.3	10,137.7	92.00	65.56
2000	3,459.7	3,252.1	3,290.7	3,084.2	2,919.5	9,294.4	1,208.3	10,502.7	94.00	72.06
2001	3,509.3	3,368.9	3,408.9	3,196.0	3,006.7	9,611.5	1,249.5	10,861.0	96.00	75.55
2002	3,566.7	3,495.4	3,536.7	3,311.5	3,116.2	9,964.3	1,295.4	11,259.7	98.00	79.04
2003	3,616.2	3,616.2	3,659.0	3,436.3	3,229.4	10,324.7	1,342.2	11,666.9	100.00	82.53
2004	3,670.7	3,670.7	3,714.9	3,556.0	3,351.7	10,622.6	1,380.9	12,003.5	100.00	86.03
2005	3,700.0	3,700.0	3,744.8	3,611.8	3,469.2	10,825.8	1,407.4	12,233.2	100.00	89.52
2006	3,712.4	3,712.4	3,757.5	3,641.9	3,524.8	10,924.3	1,420.2	12,344.5	100.00	93.01
2007	3,719.5	3,719.5	3,764.6	3,655.2	3,555.1	10,974.9	1,426.7	12,401.6	100.00	96.51
2008	3,724.5	3,724.5	3,769.7	3,662.9	3,568.9	11,001.5	1,430.2	12,431.7	100.00	100.00
2009	3,727.4	3,727.4	3,772.6	3,668.7	3,577.6	11,018.9	1,432.5	12,451.4	100.00	100.00
2010	3,723.0	3,723.0	3,768.2	3,672.3	3,584.4	11,024.8	1,433.2	12,458.0	100.00	100.00
2011	3,711.7	3,711.7	3,756.7	3,668.8	3,589.0	11,014.5	1,431.9	12,446.4	100.00	100.00
2012	3,697.8	3,697.8	3,742.6	3,658.5	3,586.8	10,987.9	1,428.4	12,416.3	100.00	100.00
2013	3,679.4	3,679.4	3,723.9	3,645.5	3,577.8	10,947.3	1,423.1	12,370.4	100.00	100.00
2014	3,653.0	3,653.0	3,697.2	3,628.1	3,566.0	10,891.3	1,415.9	12,307.2	100.00	100.00
2015	3,630.4	3,630.4	3,674.3	3,602.9	3,549.8	10,827.0	1,407.5	12,234.5	100.00	100.00
2016	3,608.4	3,608.4	3,651.9	3,581.3	3,526.0	10,759.2	1,398.7	12,157.9	100.00	100.00
2017	3,592.3	3,592.3	3,635.5	3,560.2	3,505.6	10,701.3	1,391.2	12,092.5	100.00	100.00
2018	3,584.5	3,584.5	3,627.4	3,544.9	3,485.7	10,658.1	1,385.5	12,043.6	100.00	100.00

II. Cost Per Student in 1991 Rupiah

Enrollment for 1988 published in *Repelita V* are projections. The new data on enrollment is in Table 3 for 1991, but is very close to that published in Repelita V:

Primary :	30.1 Million
Jun. Sec.:	6.68 Million
Sen. Sec.:	4.147 Million
Hi. Educ.:	1.6 Million

Total Education Expenditure: 4213 Billion

Unit Cost Ratio (*Sector Review*, p. 6-83):	Primary:	1.00
	Jun. Sec.:	1.36
	Sen. Sec.:	2.24
	Hi. Educ.:	5.05

Suppose cost per primary student for 1988 is X, then
[30.1*X+6.68*(1.36*X)+4.147*(2.24*X)+1.6*(5.05*x)] = 4213
X=0.000074495 Billion Rp. = 74,495 RP

So:Cost per Jun. Sec. Student: 74,495*1.36 = 101,313

Cost per Sen. Sec. Student: 74,495*2.24 =166,869
Cost per Hi. Educ. Student: 74,495*5.05 =376,199
Inflation Rate (1988-1991): 1.056*1.061*1.095 = 1.227

So:Cost per Primary Student for 1991: 91,405 Rp.
Cost per Jun. Sec. Student for 1991: 124,311 Rp.
Cost per Sen. Sec. Student for 1991: 204,748 Rp.
Cost per Hi. Educ. Student for 1991: 461,596 Rp.

For comparison, costs of STM's in 1991 were 464,632 Rp. per student, of which 216,000 Rp. is for equipment. SMA's do not have the equipment costs, and generally are lower cost than STM's.

III. Total Cost Each Year Equals Cost/Student Multiplied By Enrollment In That Year

For Example: Total Cost of Primary Schooling in 1998 is
29,446,400 * 91,405 = 2,692 Billion Rupiah

IV. Textbooks For All Students except at the senior Secondary level are estimated, since their total costs are so small in relation to the other school and foregone earnings costs (see Table I.5 in the text.)

The book would be loaned to the student at the begining of the year, and returned at the end of the year, or if lost, paid for by the student. Some schools in higher-income areas will continue to be permitted to collect user fees for books.

Primary Level:	Each book costs 1,500 RP;
	Each book lasts 3 years
	Each student needs the use of 5 books since
	there are 5 courses at each grade
So:	Cost for free use of textbooks = Enrollment * 1,500 x 5/3
Jun. Sec. Level:	Each book costs 3,000 Rp; 7 courses and lasts 5 years
So:	Cost for free use of textbooks = Enrollment * 3,000 x 7/5
Sen. Sec. Level:	Each book costs 5,000 Rp; 7 courses and lasts 5 years
	20% students need free use of textbooks;
So:	Cost for textbook = Enrollment * 20% * 5,000 x 7/5
Hi. Educ. Level:	No free use of textbooks, except in libraries. Students buy their own books

These books could be approved by the curriculum centers, produced and delivered by private firms to the school principal who could then sign vouchers that could be cashed by the firm at a bank. Free textbooks are very cost effective and also are needed if universal education is to be attained. They are a very small part of the total costs as can be seen.

V. Equalize Pupils Per Teacher:

Cost = 0 Rp., because new teachers would be sent to those schools with many pupils per teacher, and not to the other schools. New teachers will need to be recruited in the rural areas to which they would return.

VI. Teacher Incentives

A) Salary Base

Base Salary Scheme (1986) is obtained from McMahon, Millot, and Eng's Sector Review (1986):

Primary School :	p. 2-258
Jun. Sec. School :	p. 2-273
Sen. Sec. School:	p. 2-273
Hi. Educ:	p. 9-8

Teacher's Salary at 1991 Constant Rupiah:

Base Salary * (5 Years Inflation Factor)
Inflation Factor = 1.092*1.093*1.056*1.061*1.095 = 1.464

So:	Primary School :	1,422,492*1.464 = 2,082,528
	Jun. Sec. School :	1,513,884*1.464 = 2,216,326
	Sen. Sec. School:	1,780,224*1.464 = 2,606,248
	Higher Educ.:	1,912,400*1,464 = 2,799,812

These **nationwide averages** could be refined, of course, but for **this purpose** are sufficient.

- According to the *Sector Review*, salary for higher education is the weighted average salary for TA, Lecturer, Associate Professor, and Professor at the ratio of 1:2:3:4

- The decision has been made to double primary school teachers salaries in the rural and more remote underserved areas. This is a step badly needed and has been provided for in the Budget in Table 1.5. Beyond this, there is a 5% annual salary increase **in real terms** proposed for, junior secondary and senior secondary school teachers, and a 6% annual increase in real terms proposed for higher education faculty. Both can be used to enhance quality by relating them to better training, to retention of the best teachers, and to recruitment of able students to become teachers. A portion of this could be made contingent in the case of university faculty on publication in refereed journals to keep skills up to date, and on full time attention to the primary job without moonlighting.

B) Projection For The Total Number of Teachers Needed At Each Level

At the Primary Level, there is a pupil-teacher ratio (PTR) of 23 in 1993, proposed to stay at 23 until 2018. Therefore:

Primary Teacher's Needed:	1993	1,272,000
	1998	1,280,000
	2003	1,321,000
	2008	1,302,300
	2013	1,260,810
	2018	1,240,320

At the Junior Secondary Level, there is a PTR of 20 in 1993 proposed to remain constant to 2018. Therefore

Jun. Sec. Teacher's Needed:	1993	374,402
	1998	463,384
	2003	561,993
	2008	644,729
	2013	624,638
	2018	592,204

At the Senior Secondary Level, there is a PTR of 20 in 1993 proposed to remain constant to 2018. Therefore

Sen. Sec. Teacher's Needed:	1993	235,786
	1998	294,351
	2003	354,969
	2008	436,557
	2013	511,433
	2018	487,990

At the Higher Education Level, the 1993 PTR of 25 is proposed to decline to 15 by 2018.

Hi. Educ. Teacher's Needed:	1993	25	50,229
	1998	23	103,132
	2003	21	159,505
	2008	19	223,845
	2013	17	311,384
	2018	15	418,391

C) Incentives

Teacher's incentives at each year = (increased base salary-base salary, in constant 1991 Rupiah) * Number of Teachers.

For Example: Primary Teachers' Incentives in 1998:
(2,561,247-2,082,528)*1,280,000 = 612.7 Billion Rupiah

VII. Improved Physical, Life, and Social Science, Math, and Language Teaching

At the primary level: There is an allocation of from 100 to 500 Bil. Rupiah per year for better teacher training and better books. At the Junior Secondary Level: There is an allocation of 50 Billion Rupiah for Each Year, related to additional training.

At the Senior Secondary Level: There is an amount equal to 10% of the total student cost allocated in this area, and related to additional training.

VIII. Resource Recovery in Higher Education from Tuition

With the proposed increase in enrollments and in per capita incomes, resource recovery is projected through increased tuition from 15% of public university costs currently to 30% of the direct cost at public universities by 1998, to 35% in 2003, 40% in 2008, 45% in 2013, and to 50% in 2018. Note that need based grants also increase as part of the higher education budget so that qualified students from poor families are not excluded. The resources recovered through tuition increases however are about three times or more of the amounts needed to cover these need-based tuition waivers and grants.

IX. User-Driven Research Grants

The estimate of the amount needed is based on the experience in the U.S., Japan, West Germany, and England, with investment in non-defense basic R&D as a percent of GNP that is **performed at Universities**. Based on the data from *Science & Engineering Indicators*, 1991, U.S. National Science Board (p. 342-343):

Country	*Year*	*Expenditure on R&D as % of of GNP*
Japan	1989	3.0 %
U.S.	1989	1.9 %
W. Germany	1989	2.8 %
U.K.	1989	1.6 %

In U.S., 14% of this expenditure on R&D is performed in 1989 in Universities (ibid., p. 343). So if 2.5% of GNP were the public R&D expenditure in Indonesia, with 9% of this basic research performed in Universities, then:

GNP * 2.50% * 9% = User-Driven Research Grants to Universities Public expenditure for research (e.g. population or economics)needed by the Ministries is user-driven, as is research needed by private business firms. Public subsidies to private firms for research and development however should always require the firm to contribute over 50% of the cost of the R&D.
2018
Univ. R&D 1,582

This system of peer-group review of basic faculty research to be funded, project by project, has been started by the D.G. of Higher Education in 1991. But by the end of Repelita VI (1998) it is still low in Table II.5 because the peer group review process that is needed in the various other Ministries (perhaps with BPPT taking a lead) has not yet been put in place.

X. Nonformal Education

Taking inflationary factors into consideration, the nonformal education budget was about 36 Billion Rupiah in 1991. So the nonformal education budget for literacy training only is proposed as increasing in the first years of the 25 year plan. It then decreases as the number of illiterates in the labor force declines due to retirement and death.

The Non-Formal Education Budget in 1991/92 is:

Development Budget (90/91)	:	12,664,535,000
Routine Budget (91/92)	:	23,716,433,000
Total	:	36,380,968,000

Soon Non Formal Education will include many of the job training courses conducted by other Ministries, and hence the budget shown in Table II.5 starts to accommodate this.

XI. Private Foregone Earnings

These are large private costs of education borne by parents. They are obtained by using foregone earnings per student at each education level, growing at 2.5% per year to allow for productivity growth, and then multiplied by enrollment at each year. Forgone earnings are small or zero for grades 1-5, but large at grade 6 in rural areas, which explains many drop outs at this age. See McMahon and Boediono, *Market Signals and Labor Market Analysis: A New View of Manpower Supplies and*

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III

Education, Structural Change, and Investment in Indonesia

Boediono and Walter W. McMahon

ABSTRACT

This paper is concerned with structural change, its implications for education, and its relation to productivity growth, as distinguished from the level of investment and the rate of return to each type of investment within each industry which were the focus of Chapter II.

As surplus underemployed labor now in agriculture is absorbed into higher productivity industrial uses, average productivity rises. But this is seen as a result of investment, rather than a cause. Investment in human capital and physical capital in agriculture releases labor and also raises productivity there, while investment in industry expands the need for educated workers so that both types of investment raise productivity there. Also, investment in education facilitates the transition for surplus rural labor into more productive urban employments. Reducing investment and privatizing parastatals where markets work better and productivity is low, while increasing investment in people, is another type of structural change that raises overall productivity.

Data on reductions in the percentage of GDP arising in agriculture and on the growth of industry from 1970-1989 are compared for Asian nations. They reveal that Indonesia is about where Korea was in 1975, where Malaysia was in 1979, and where Thailand was in 1985. Pakistan will not reach Indonesia's current structure until about 2010.

25 Year Education Goals that this and related data in this paper suggest include:

- More rapid expansion of Engineering and Business Administration Colleges, and strengthening of agri-business in the Colleges of Agriculture, based on the predictability of structural change (see Korea, Fig. 6).
- Industry is well served by junior secondary and senior secondary general education as evidenced by their high rates of return in industrial employment (e.g., better learning on the job and job mobility).
- VOTEC STM and Commercial Schools are also a good investment in most (but not all) Provinces, although their rapid expansion during Repelita IV has led to diminishing returns. VOTEC training is essential to providing trained cadres. But as skilled workers become increasingly available in firms, private firm apprenticeships in partnership with the STM's using the newer market-driven technologies become increasingly attractive possibilities.
- Non-formal and other job training programs with industry can help to re-equip some of the surplus labor being released from agriculture that has already left school.

III

Education, Structural Change, and Investment in Indonesia

Boediono and Walter W. McMahon

This paper is concerned with the sources of longer term economic growth and development in Indonesia with special attention to the critical role of education in this process.

These sources of growth lie largely in (1)the *level of investment* improving human capital skills, in deepening physical capital, and in adapting technical knowledge employed *within* each industry, times (2) the *rate of return* to each of these types of investment. But the sources of labor productivity growth also include *structural change* as surplus labor in agriculture and other low productivity uses is absorbed and used where its productivity is higher, such as in agri-business, manufacturing, and in the structural shifts to export industries. Education plays a second major role by increasing the efficiency of this structural change that is also critical to "take off" into faster growth. These contributions of education to per capita economic growth are considered more specifically in Part 1 of this paper, whereas the relation of education to structural change is given detailed attention in Part 2.

The most important focus for development planning both for deepening human capital per worker within each industry and in facilitating efficient structural change over time between industries is the *returns* to education. The measurement and evaluation of these returns based on the past experience of other successful developing countries, and on current research on the returns to investment in education in Indonesia, is central to the specification of the production functions in medium term macrodynamic models (e.g., McMahon, 1992, Boediono and McMahon, 1992, Wheeler et al., 1989). This focus on returns is also important in the establishment of those long-term development goals and supportive policies that are the most appropriate for providing a foundation for faster per capita growth accompanied by continuing reductions in poverty. (See Chapter II.).

The way in which the returns to education become a part of macrodynamic models is determined by the fact that education is inherently an *investment*, just like any investment in physical capital. It embodies new capacities to learn and other human capital skills that are productive. In particular, it embodies and permits the use of a body of knowledge concerning modern production techniques and the organization of production developed in the industrialized nations, allowing the dissemination of technical progress in Indonesia that is a major engine of economic growth. The acquisition and application of this knowledge is governed largely by whether the population has acquired traits and motivations associated with formal schooling, assuming that the schooling includes rational, secular subjects stressing development of reading, writing, math, language, analytical and problem solving skills. In the words of Richard Easterlin (1981, p 1) in his Presidential Address to the Economic History Association, "Since World War II, modern mass education systems have been established almost everywhere, (facilitating the spread of technology) and (shortly thereafter), the spread of modern economic growth has noticeably accelerated."

In the specification of macroeconomic models reflecting how these medium-term and longer-term development processes work, an adequate specification of the production functions that deals with the sources of growth from the supply side requires that the quality of labor and investment in technology be included separately and explicitly. Specifically, the inputs need to include physical

capital stocks, raw labor (employment), human capital created by investment in education (the quality of labor), and knowledge capital created by investment in technology transfer, the latter two with lags of about 10 years. Separate production functions for industry and agriculture, each containing employment, then accomodate the structural shifts of employmeny out of agriculture and structural shifts due to export growth. This can be converted to output *growth per worker*, by taking the logs, subtracting employment (raw labor) from both sides, differentiating with respect to time, and dividing through by GNP. Per capita growth then is seen to depend on the *percent of GNP invested* in physical capital, in education, and in R&D, each multiplied by their marginal products (which can be converted to real rates of return), as well as the sources related to structural shifts. Chenery's (1986, p. 29) specifications are inadequate to the extent that they fail to include investment in human capital as a percent of GNP explicitly, and instead lump it with the inputs of raw unimproved labor *which usually are found to have a negative relation to per capita growth.* This treatment is sometimes found because the data was inadequate, or when the disaggregation by industry is not mindful of the need to include the education and R&D variables although the have been found to be highly significant in the major studies of inter-industry differences in productivity growth by Kendrick (1984), and by Wheeler et al. (1990).

Structural sources also are a factor, whether or not the production functions are disaggregated by sector, as the structure of demand changes. Growth of export demand shifts labor into export industries, where if the surplus labor in agriculture is absorbed, it is more productive. And as the demand for manufactured goods has a higher income elasticity than the demand for food, the agricultural sector's output grows more slowly, and surplus labor in agriculture will continually need to shift into industry and services, where again it is more productive. Since the growth of labor productivity in all sectors makes Indonesia's exports more competitive on world markets, investment in education and in the quality of labor also contributes to the growth of exports.

I. EDUCATION AND GROWTH

Rates of Investment and Rates of Return

Successful long-term development in Indonesia therefore depends very heavily on further development of the creative capacities and productivity of the huge Indonesian labor force, which would be greatly aided by a *higher rate of investment* in good quality education. The current rate of direct investment could be nearly doubled to about 6% of GNP needed to achieve a more efficient balance with the current 30.17% of GNP currently being invested in physical capital (see Chapter II.). Although the rate of investment in education and in physical capital are direct inputs in the production function, where the rate of public investment is low, as it is for education (3%), even though the rates of return are quite high, the total contribution to growth remains much lower than it could be.

A higher 5% of GNP invested in education would be similar to the strategy that has been followed successfully by Japan, South Korea, Taiwan, Hong Kong, and Singapore, just prior to their take off into fast growth (based on Table 1, Chapter IX). The productivity of human capitol is also evident in the usefulness of the large post-war human capital endowments of Germany, Japan, and Israel following the destruction of their physical capital stocks during World War II. But most important, it is also consistent with the relatively high real rates of return available on investment in basic education in Indonesia (urban and rural averaging about 16% in 1989; see Table II.1). These show that education is in short supply relative to the lower current real rates of return to investment in physical capital in Indonesia averaging about 10% when corrected for inflation (i.e., nominal interest rates in August 1990 were 22% which when corrected for the 12.02% inflation rate yield a 10% real rate of return). This is consistent with the finding by Wheeler et al. (1990) whose evidence for individual firms on the sources of productivity growth leads to their conclusion that there is

overinvestment in physical capital (and diminishing returns) in Indonesia in relation to relative underinvestment in human capital.

But *structural change*, in addition to the absolute rates of investment in human and physical capital, also contributes to the productivity growth essential to "take off." Education enables the *structural change* that is an inevitable part of industrialization to occur *efficiently*. In particular, each new generation of labor needs to continue to be transferred from low productivity uses, such as in agriculture where there is a surplus, to higher productivity uses. This transfer in the experience of other countries has normally been to agri-business employments and small and medium-sized enterprises (SME's) *in the provincial towns first*, rather than immediate direct moves from agriculture to the larger industries in urban centers. But this requires support for education and for economic development out in the regions. The structural shifts of surplus labor out of agriculture also involves moves to export-oriented industries and services which also absorb this surplus labor raising its productivity.

But the per capita income growth that occurs also has important feedback implications for the structure and planning of education. Two structural changes have particular long-term significance. *First*, the system must adapt to serving the large and growing private sector's non-agricultural and non-civil service employment needs (see Part 2 below). And *second*, as increasing percentages of women complete 9th grade, fertility rates and net population growth rates fall further. This reduces the need for building so many new primary schools, and reduces this source of strain on the education budget (see Chapter VII).

But it is the cause and effect relation from investment in education to structural change and productivity growth that is most relevant to "take off" and is the more important central focus.

Rates of Investment v. Structural Shifts

It is impossible to measure precisely the portion of the growth in productivity that is due to higher rates of investment in human and physical capital and the portion that is due to structural shifts of excess labor out of agriculture and into higher productivity manufacturing, services, and export industries. The main problem is that they are closely related, overlapping, processes. *More investment* in both human and physical capital means more total capital per worker, but it simultaneously generates structural change and larger percentages of GNP arising in physical capital intensive industry and in the more human capital intensive services.

Some approximate measures are available based on regressions covering 15-80 low-middle income developing countries that explain growth as dependent on both rates of investment and structural shifts. The most interesting regression is the one by Otani and Villanueva (1989) shown in Table III.1 because it seeks to explain *per capita* growth, or "take off," and because it includes investment in education as a percent of GNP as one of the explanatory variables. Here investment in physical capital and investment in education are both significant, with investment in physical capital accounting for about 60% of the growth and investment in education for a little under half of that, or about 25% of the growth in productivity and living standards, as suggested by the Betas. Growth of exports, a structural factor, accounts for an additional approximately 25%. Export growth is marginally significant, although investment in physical and human capital could be said to raise labor productivity which makes exports more competitive. (This is the strategy Japan has pursued so successfully, for example.) It is important to notice that population growth or the growth of raw unimproved labor makes a *negative* contribution to the growth of living standards. This has also been found to be true by McMahon (1988) and others when studying both the poorer nations of Africa and industrialized nations like the U.S. Investment in the education of women contributes to a slowdown in population growth (as developed further below), so the contribution of education to *per capita* growth is larger than the 25% mentioned above as the result of this additional effect. Together these

rates of investment and structural factors explain 88% of the "take off" into faster per capita growth in Otani's regressions.

The second and third regressions in Table III.1 for 19 industrializing countries by Chenery (1970) and Feder (1983, as cited in Chenery et al., 1986, p. 29) are less interesting because they are for earlier years, and do not separate out investment in education which improves the quality of labor from changes in its quantity. But they report findings that are consistent with the statements made above. That is, both investment in physical capital and increased labor inputs (quality and quantity) are clearly significant determinants of aggregate growth in real GDP, as is the growth of exports. Feder's regression also finds the structural shift of labor out of agriculture as well as the growth of exports to be a significant factor. These investments in inputs, and structural shifts, account for 81% of the growth.

The last regression in Table III.1 for 80 developing countries by Spratt, Crouch, and Cebeddu (1990, p. 15) also finds investment in physical capital as a percent of GNP over the preceding 20-year period and the primary school enrollment ratio lagged 20 years to be significant determinants of labor

Table III.1
Sources of Economic Growth
(t-statistic in parentheses below coefficient: Beta Coef. in brackets)
*** = Significant at 10% level or above**

	Equilibrium (and Supply Side) Sources of Growth			Structural Sources (and Demand Oriented)		
Countries and Dependent Variable	Phys. Capital Invest. Ratio	Invest. In Educ. as % of Gov. Exp.	Growth of Raw Labor	Growth of Exports	Labor Shifts From Agric.	R2
	IK/Y	IH/G	n	e	A	
For 15 Mid-Income Economies: Otani (1989, p. 16) Growth of Real GDP/Cap.	.41 (3.03) (.64)	.10 (2.02) (.29)	.1.34 (1.86) (-.24)	.14 (1.39) (.27)		.88
For 19 Semi-industrial Economies: Chenery (1986, p. 29) Growth of Real GDP	IK/Y .08*	Labor Inputs Quantity and Quality 1.09*		Growth of Exports .37	Labor Shifts From Agric.	R2 .84
Semi-Industrial Feder (1986, p. 29)	.11*	.74*		.23*	.90*	.81
For 80 Developing Countries Spratt Crouch (1990, p. 15):	IK/Y	Enroll. Ratio Primary (t-20)	Enroll. Ratio Secondary (t-20)	% Labor Force in Agric. (t-5)	Lag. Labor Productivity (t-20)	R2
Labor Productivity	5.49 (3.35)	.011 (1.98)	-.014 (1.27)	-.023 (3.25)	.097 (6.63)	.74

Sources:
1. Otani, Ichiro, and Villanueva, (1989) "Determinants of Long Term Growth in Developing Countries", Table 3, p. 16
2. Chenery, Elkington, and Sims, (1970) in Chenery et al (1986, p. 29)
3. Feder, for 1964-73, in Chenery et al, (1986, p. 29)

productivity. The structural effect of a larger percentage of the labor force in agriculture, and the percent underemployed as shown by Indonesian data (McMahon and Boediono, 1989, p. 20), has the expected negative relation to total productivity.

II. EDUCATION AND STRUCTURAL CHANGE IN INDONESIA

Structural shifts relating to the transfer of labor resources out of agriculture into industry and the absorption of underemployed rural labor by export industries are clearly significant potential sources of per capita economic growth in Indonesia, even though in relation to the rates of investment in physical and human capital they cannot be expected to explain more than about 25% of total labor productivity growth as shown by these regressions. Specifically, the transfer of labor out of agriculture where its productivity is low (401,000 rupiah per year in 1987 measured in constant 1980 prices) into manufacturing and services where its productivity is four times higher (1,660,000 and 1,150,000 rupiah per year, respectively) will raise average productivity. (Data from Chapter IX Triaswati and McMahon, 1990, Table II, which contains more detailed data over time.) But here education has an important role in providing the literacy, language (which provides access to technical knowledge from other countries), numeracy, and capacities to learn on the job later. Entry level vocational skills make it possible for this surplus agricultural labor to be absorbed by agri-business industries or services in the provincial towns, especially if there is investment in small and medium-sized enterprises there. This raises the average labor productivity of those workers left in agriculture because those workers who remain have more capital per worker and more land to work with. New investment in the education of the future farmers who remain and in new capital goods and agricultural technologies tend to raise agriculture productivity further. Productivity per worker in Indonesia has grown since 1976 by 48% in agriculture (4.3% per year) and by 75% in manufacturing (6.8% per year). (See Triaswati and McMahon, Chapter IX, 1990, Table II.) Both are quite respectable labor productivity growth records. The continuing investment in basic education of farmers through 9th grade including VOTEC technologies and investment in agricultural capital goods and technologies is a key means by which Indonesia has attained food self-sufficiency. This balanced development of agriculture and industry is stressed by Repelita V and by the GBHN (pp. 24 and 29).

Engel's law however based on the lower income elasticity of demand for food products in relation to manufactured goods and services means that the demand for agricultural output will not grow as fast as the rest of the economy. The extension of agricultural technology, more capital goods per worker, and better education of farmers furthermore means rising productivity per worker in agriculture. These two forces combine to make the movement of additional labor out of agriculture into agri-business and services inevitable.

Education for agri-business serves such industries as grain storage and sales, tractor and fertilizer sales, hybrid seed businesses, veterinary medicine, food production, and transport. For assimilation into these industries, bookkeeping, marketing, financing, production, and human resource development skills are needed as well as basic mathematics, language, and management skills. This kind of education at the junior secondary and senior secondary levels should provide for the growth of small and medium-sized firms in the provincial towns that both have high labor absorption rates and also are a major engine of economic growth in the nation.

The Basis for Investment in Education and for Long Term Planning

The evidence about the returns to education in Indonesia to be developed more specifically in what follows provides a key basis for the planning of education. It relates to (1) *the structure* of Indonesian industry and the changes from agriculture to agri-business, manufacturing, and services that can reasonably be expected, (2) *the returns to education* within each of these sectors relative to the overall relative real rates of return to physical capital, (3) *the effect on population growth rates* and

hence on per capita economic growth, and (4) *the wider dissemination of economic growth* to the regions. It is these *returns to education*, or *outcomes* (relative in each case to the costs), that are the main reasons for supporting education, and for its contribution to "take off." They therefore need to be a central focus for educational planning.

Structural Change. Indonesia at the beginning of 1988 had 23% of its GNP arising in agriculture, 36% in industry, and 40% in services (see Figure III.1). The pattern of decline in agriculture's share from 33% in 1970 to 23% currently is typical of the countries in ASEAN, South Asia, the Pacific Rim, and of the U.S. as will be seen. The share of services has risen to 40% of GNP, a level typical of all the countries shown, although it is somewhat higher (60%) in Japan, Singapore, and the U.S. where services have become very human capital intensive. Industry's share has not grown in Indonesia, fluctuating at around 36% of GDP. But although this is a bit below that ratio in South Korea, Malaysia, and Japan, it is quite typical of the other countries such as the Philippines, Thailand, Singapore, and the United States. Figure III.2 shows that this relatively constant 36% "industry" percentage share conceals a rising share of manufacturing from 8% of GDP in 1970 to 17% by 1988.

These percentage shares of GDP in Indonesia in agriculture, industry, and services are roughly the same as they were in the U.S. in 1910 (Figure III.1), in Japan pre-World War II (Figure III.2) and in Singapore right after World War II (Figure III.6). *They are virtually identical to the percentage shares of agriculture and industry in Korea in 1975 (Figure III.7), in Malaysia in 1979 (Figure III.4), in the Philippines in 1988 (Figure III.5), and in the Thailand in 1985 (Figure III.8).* Extrapolating current trends, Pakistan should approach these structural shares by 2010 (Figure III.11), and India also by about the year 2010 (Figure III.12). There are low current growth rates of investment in industry and in human capital in Pakistan and high population growth rates there.

The years in which these structural shares and per capita incomes were (or will be) similar to Indonesia in 1989 are summarized in Table III.2.

During the next 25 years, based on the experience of others, Indonesia can expect the percentage shares of GNP and education levels needed to change approximately as follows:

(1) **Services: to remain approximately constant at 48% of GNP,** growing at the same rate as GNP grows.

But education levels within most service industry job classifications (e.g., accountants, nurses, MD's, teachers, banking, law, and the management of business services), and the productivity of each worker can be expected to increase, based on the experience of other Pacific Rim countries.

As shown in Table III.2, the *percent* of service workers with a secondary school education can be expected to increase by 4.1% for each 10% increase nationwide in real GNP per capita, and the *percent* with university degrees can be expected to increase by 6.2% for each 10% increase in real GNP per capita. This effect was stressed by McMahon, Millot, and Eng in the *Sector Review* (1986, pp. 2-117 through 2-121). It is also strongly supported by the further work on other Pacific Rim countries by Andrews (1990) that is summarized in Table III.3.

(2) **Agriculture: to decline from 23% to about 9% of GNP in 25 years** (see Figures 4 and 6).

But again education levels in agriculture will increase significantly. The *percent* of primary school graduates should increase by about 1.4%, and the percent of secondary school graduates in agriculture by 33.1%! The percent of university graduates (where there are currently very few) can be expected to increase by 49.1% for each 10% increase in overall real GNP/cap based on the experience of the Pacific Rim countries. (See Table III.3.)

(3) **Manufacturing, trade and other industries** can be expected to increase from 36% of GNP to about 40% (see Figures III.1 and III.3).

Figure III.1
Indonesia: Structure of GDP as a Percentage of Total GDP, 1970-89

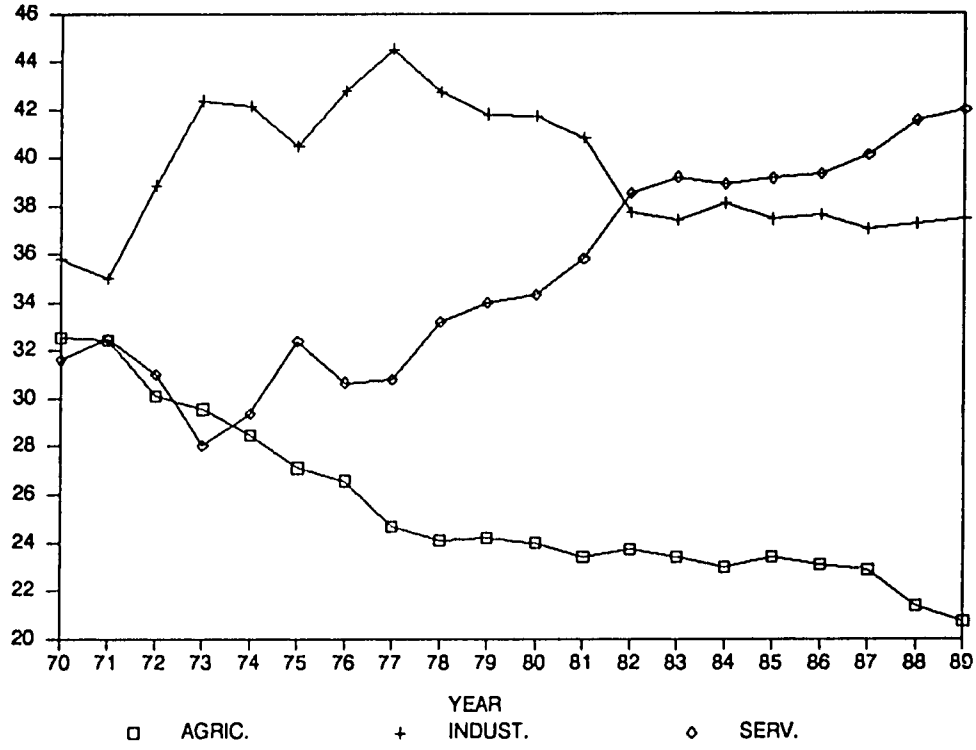

Figure III.2
Japan: Structure of GDP as a Percentage of Total GDP, 1970-1989

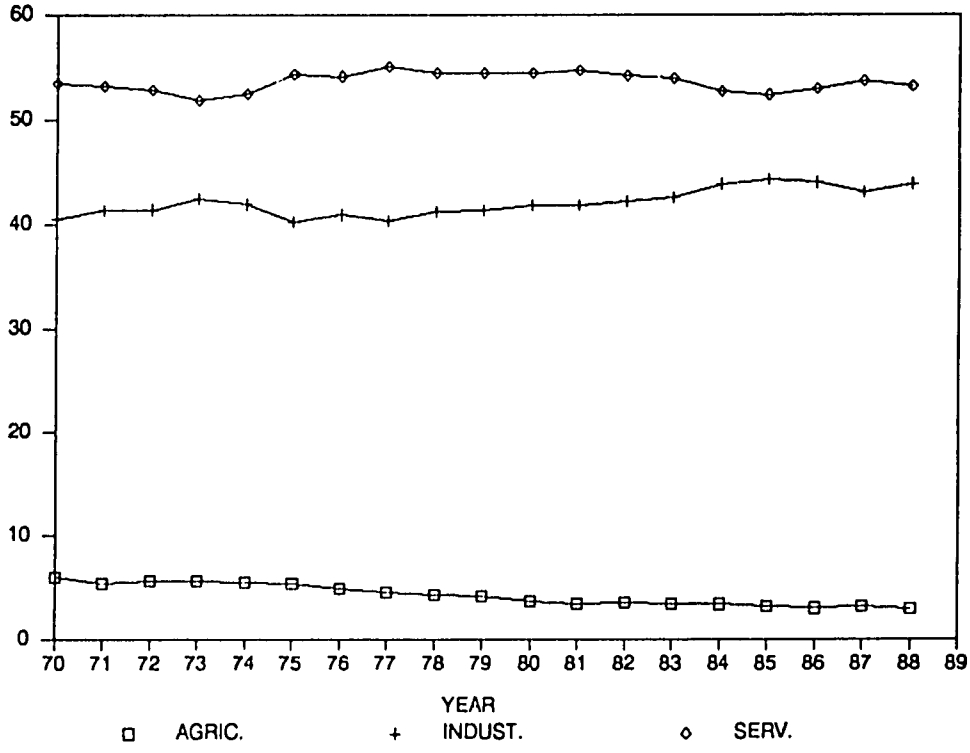

Figure III.3
Manufacturing Growth in The Distribution of GDP, Indonesia

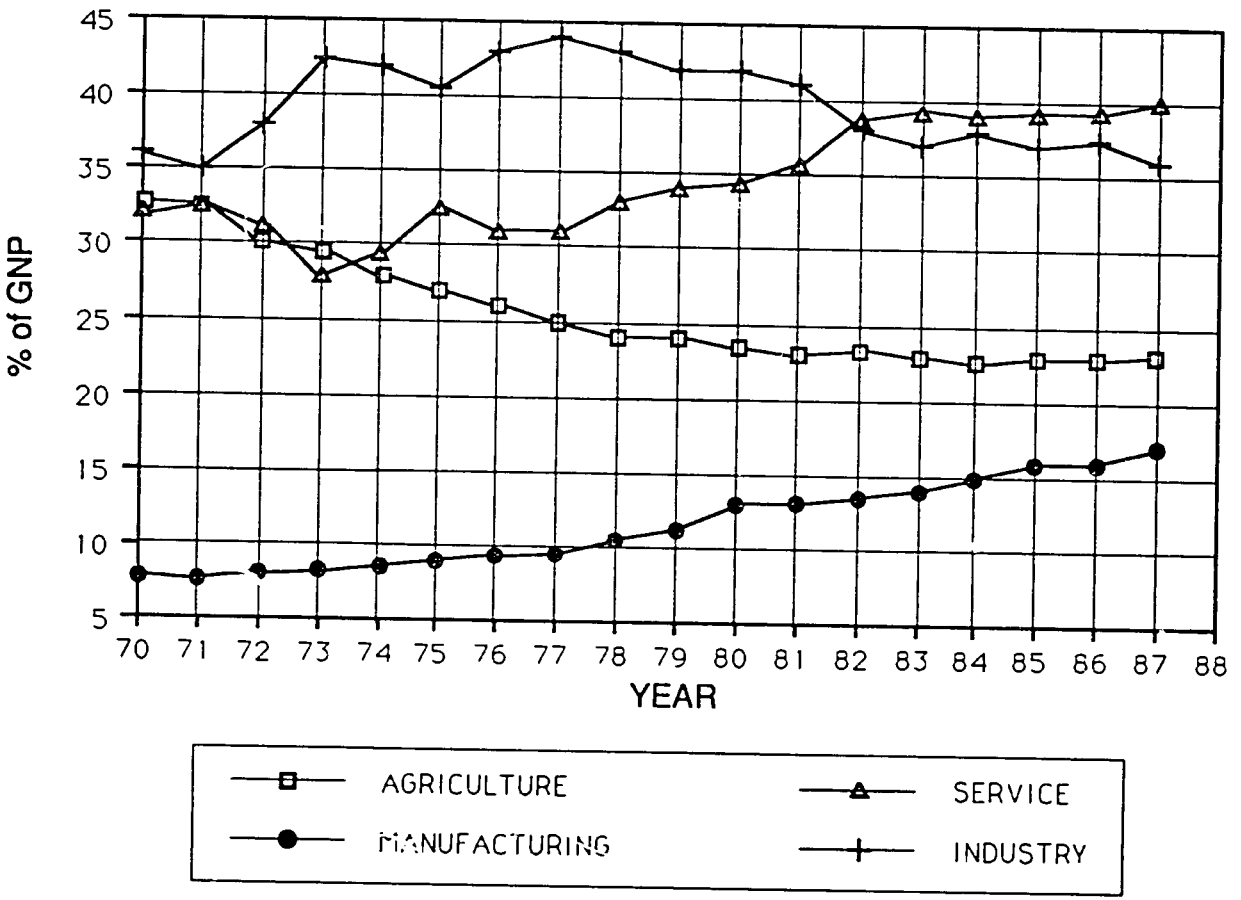

Figure III.4
Malaysia: Structure of GDP as a Percentage of Total GDP, 1970-89

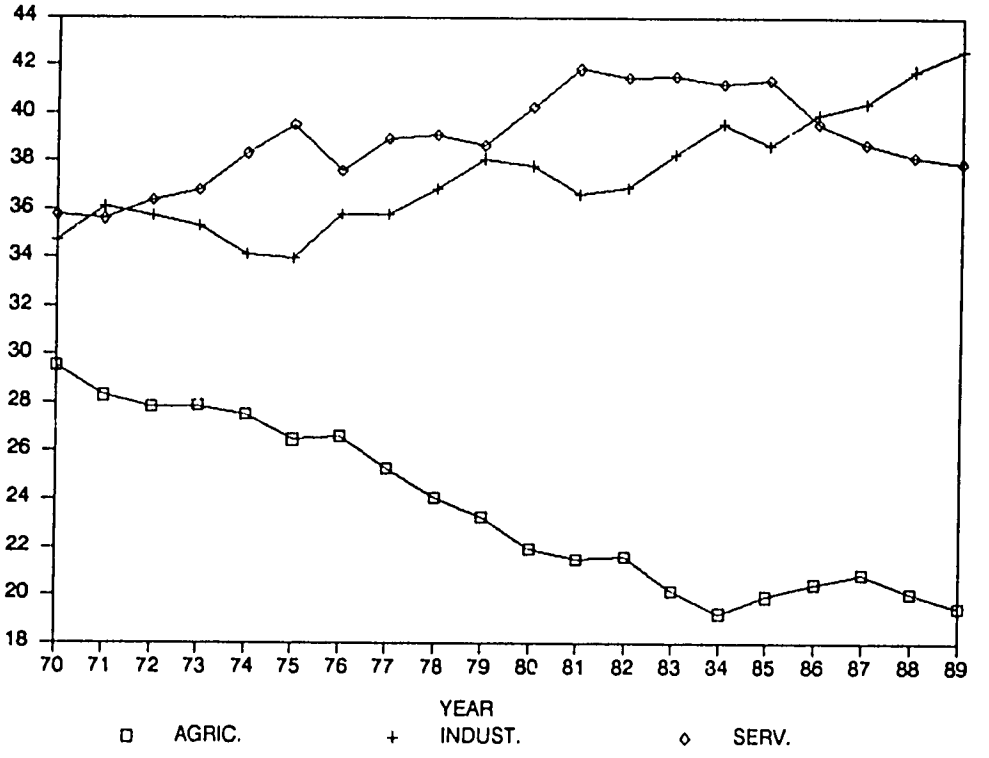

Figure III.5
Philippines: Structure of GDP as a Percentage of Total GDP, 1970-89

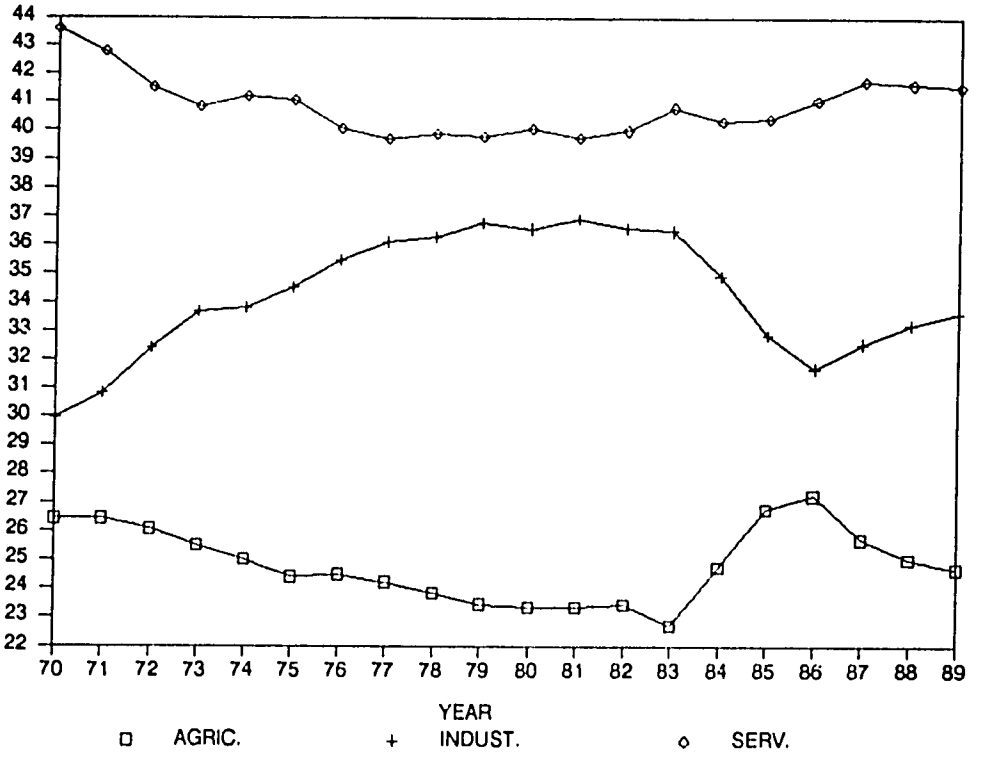

Figure III.6
Singapore: Structure of GDP as a Percentage of Total GDP, 1970-89

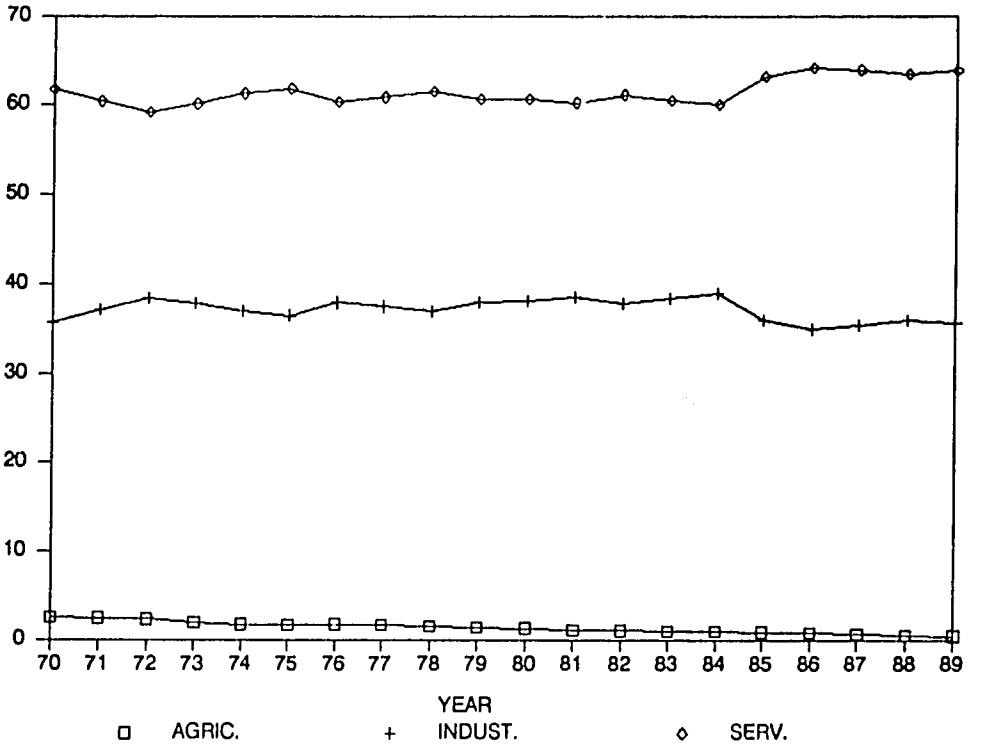

Figure III.7
South Korea: Structure of GDP as a Percentage of Total GDP, 1970-89

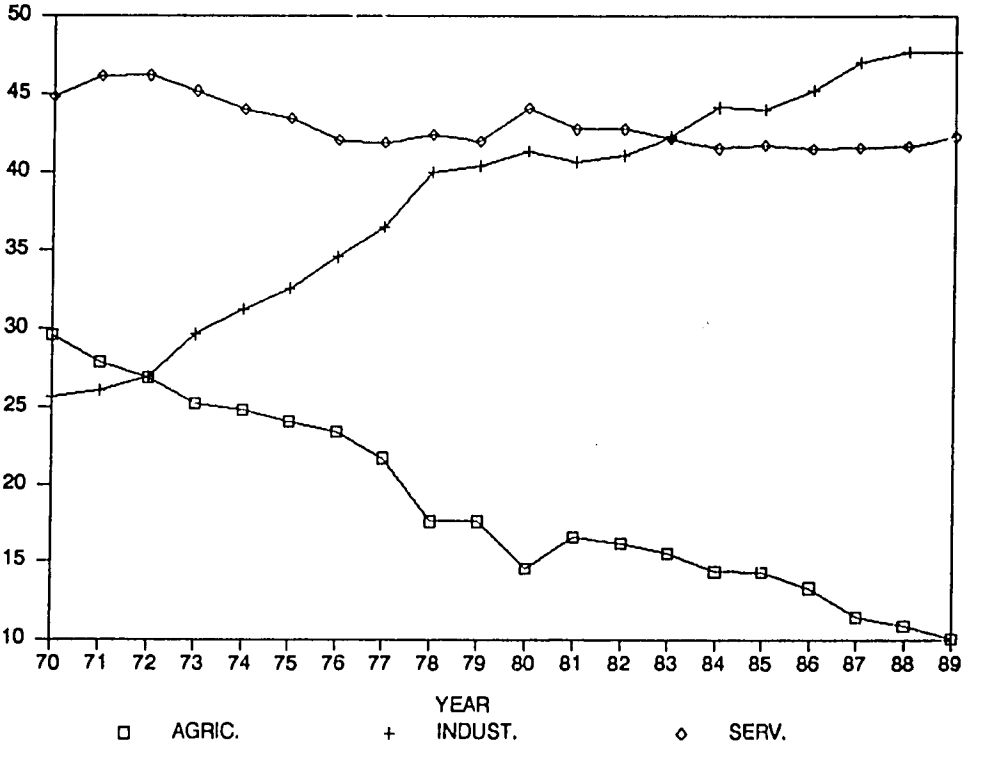

Figure III.8
Thailand: Structure of GDP as a Percentage of Total GDP, 1970-89

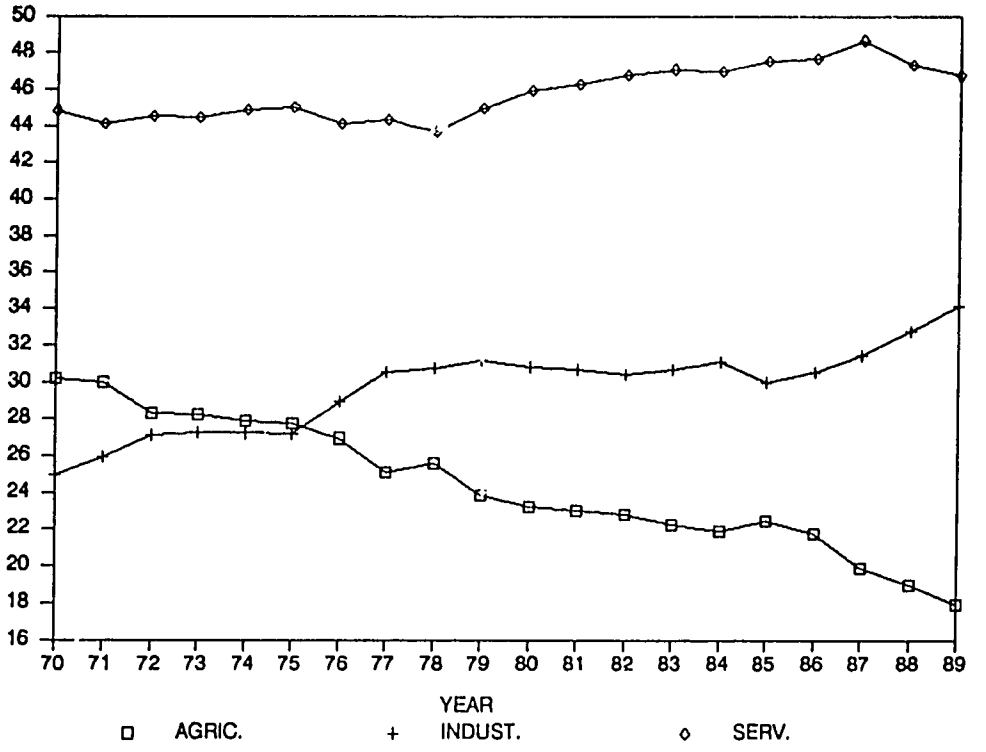

Figure III.9
U.S.A.: Structure of GDP as a Percentage of Total GDP, 1970-89

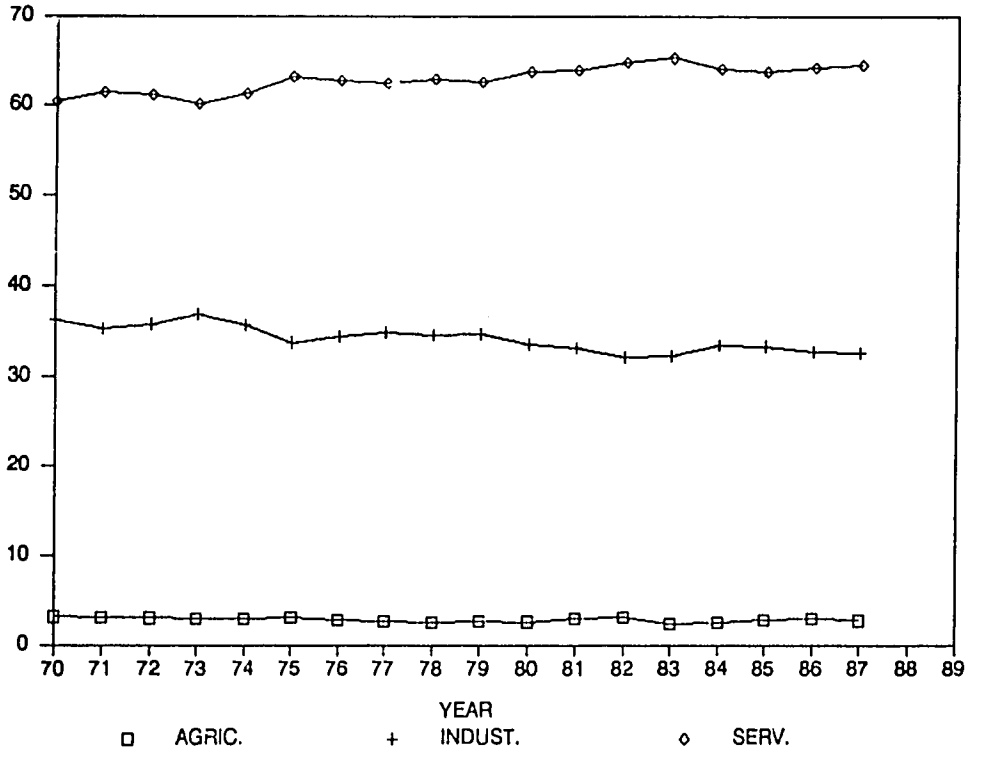

Figure III.10
Thailand: Structure of GDP in Constant 1980 Prices, 1970-87

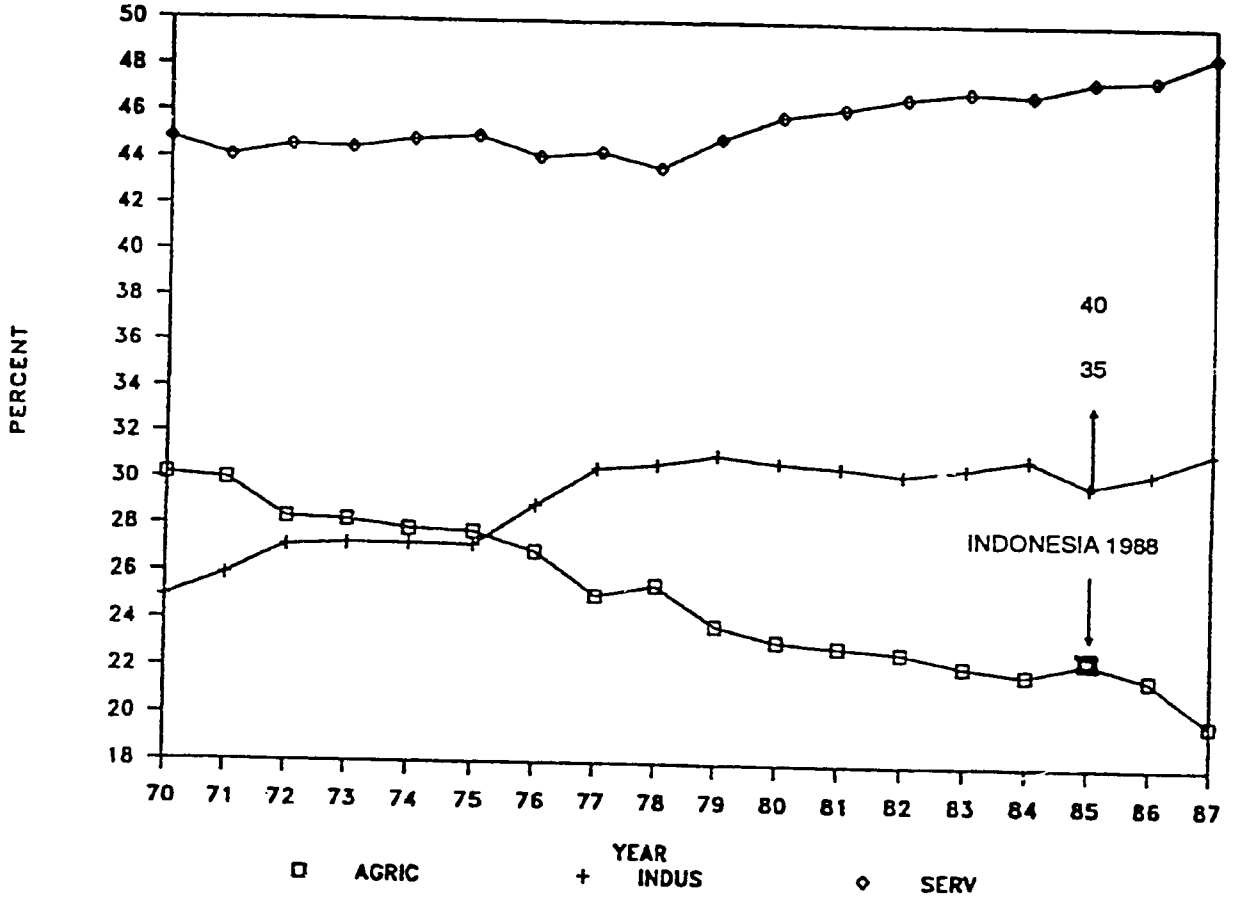

Figure III.11
Pakistan: Structure of GDP in Constant 1980 Prices, 1970-87

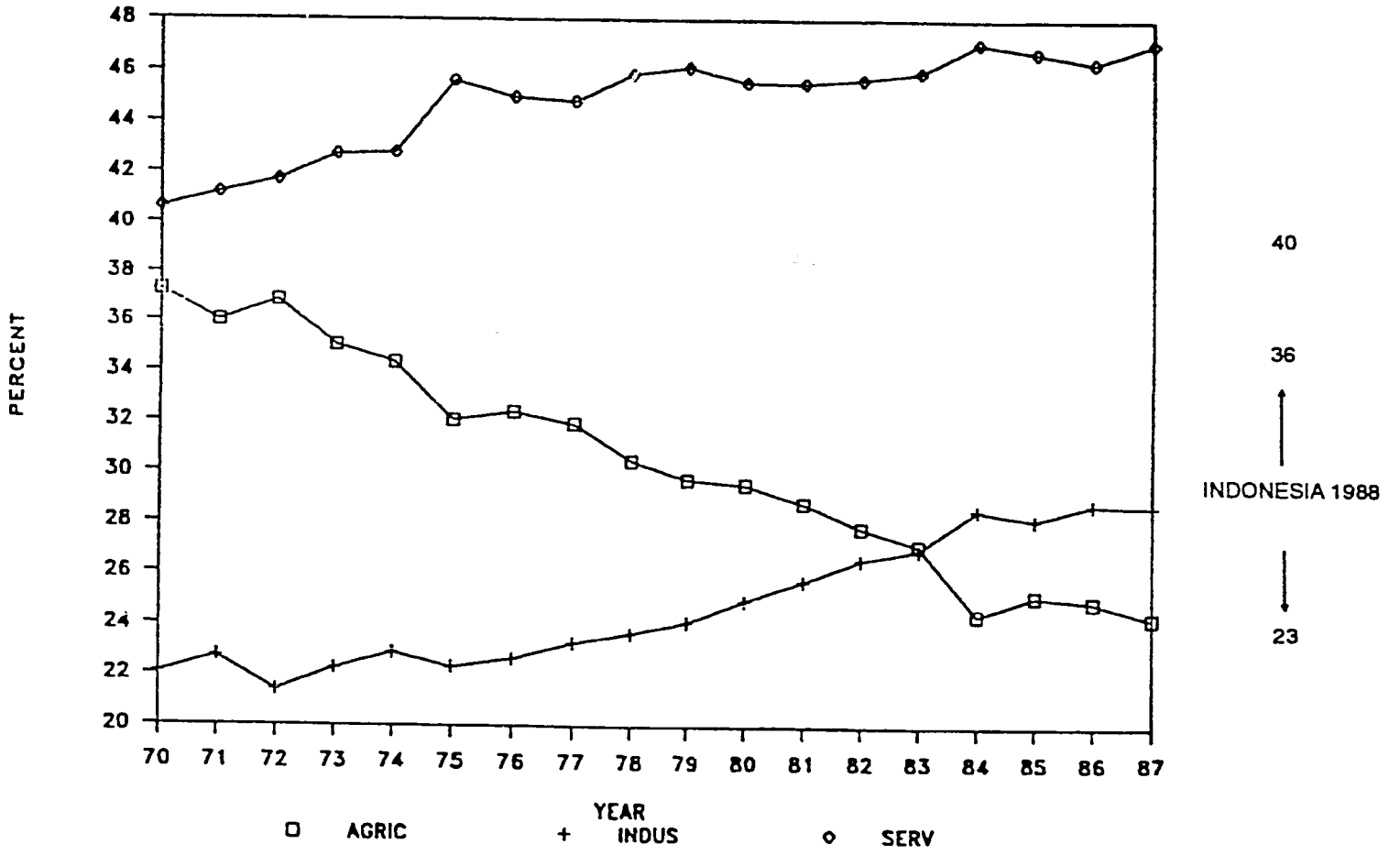

Figure III.12
India: Structure of GDP in Constant 1980 Prices, 1970-87

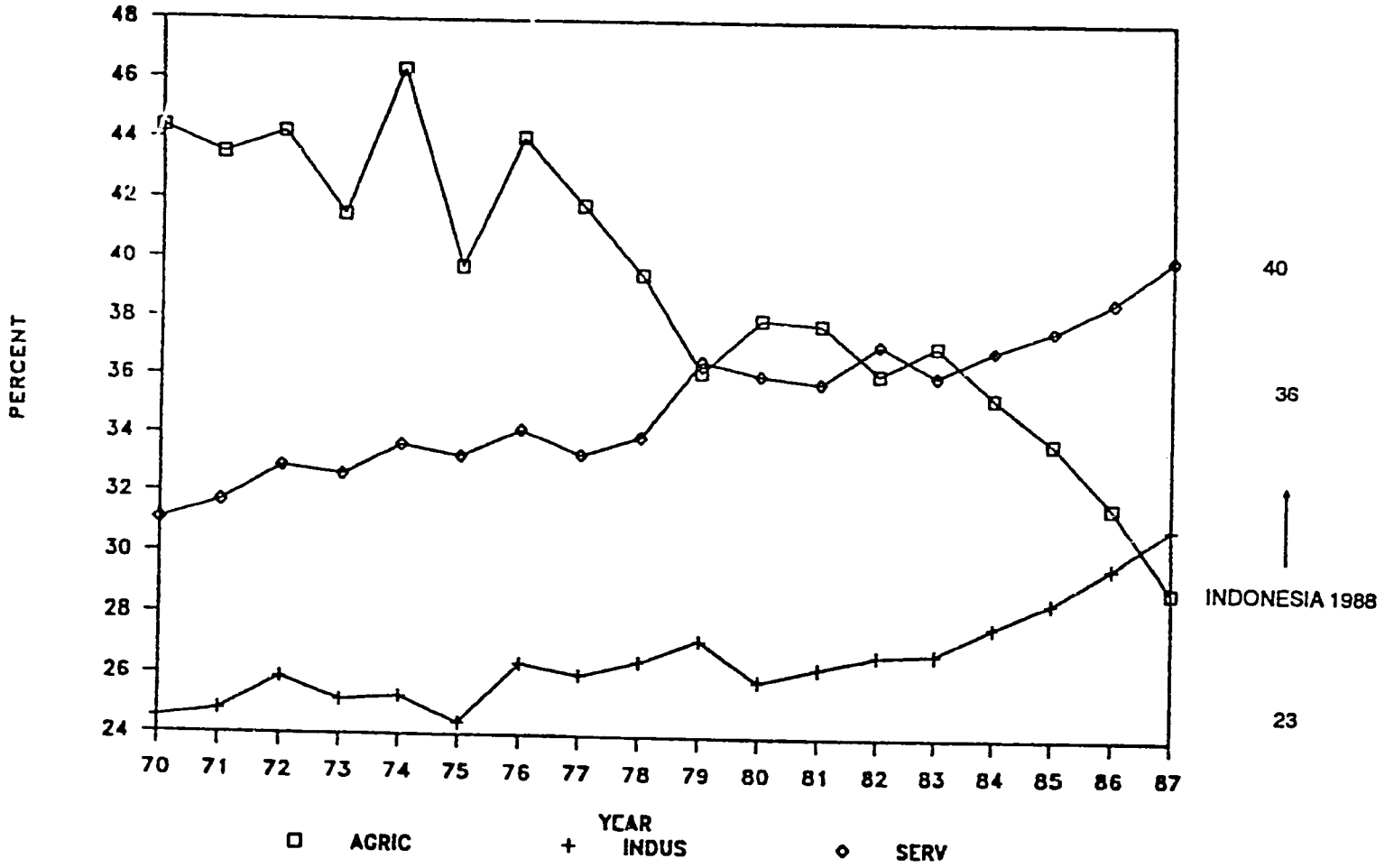

Table III.2
Structural Distribution and Level of GNP
Years Similar to Indonesia's Current Structure

	Percent of GNP Arising In				Real GNP/capita[2]	
	Year	Agriculture	Industry	Services	At Take Off Year	1989
Indonesia	1989	23%	36%	40%		$500
	Take Off Year					
USA	1910	23%	36%	48%		18,530
Japan	1955-1960				1,200	15,760
Singapore	1946					7,940
S. Korea	1975	24%	34%	44%	1,059	2,690
Malaysia	1979	23%	37%	39%	1,158	1,810
Thailand	1985	23%	30%	47%	782	850
Phillipines	1988	24%	33%	43%	(600)	590
Pakistan	2010	23%	34%	42%	(600)	350
India	2010	23%	36%	40%	(600)	300

Sectoral Sources of Growth
When Near Indonesia's Current Level of GNP/Capita

	Year	Agriculture	Light Ind.	Heavy Ind.	Services	GNP/Cap. in 1987 $ US
Japan	1914-1935	16%	16.8%	10.7%	56.5%	$609
	(1955-1960)	4.5%	9%	27.2%	59.3%	$1.150
S. Korea	1953-1973	16.3%	21.4%	16.9%	45.4%	575
Taiwan	1961-1966	17.4%	12.4%	18.9%	51.3%	531

Sources:
1. N. Triaswati and W. McMahon, Ch. IX, Table II.
2. In 1989 $US from the World Bank (1990). Earlier years converted to 1989 $US from Spratt, Crouch, and Cubedu (1990)
3. From Chenery et al. (1986, p.77)

Table III.3
Percent Increases in Needs for Educated Labor
For Each 10% Increase in Real GNP per Capita
Sector-Wide Groupings; Estimates for 1994-2018

(Not to be applied to individual job classifications because of educational upgrading with each)

Level of Schooling Completed	Percentage Change in Labor "Requirements"				
	Services	Agri.	Manuf.	Trade	Other
Primary School Drop-Outs	-13.4%	-.5%	-.4%	-.4%	-.3%
Primary School Completers	.2%	1.4%	.1%	.3%	.3%
Secondary School Grads	4.1%	33.1%*	14.4%	14.8%	11.5%
University Level	6.2%	49.1%	20.9%	60.9%	11.2%

Source: Andrews (1990, pp. 21-25)

*There are currently very few secondary school or university graduates in agriculture or trade, so these are large percentage increases on a small base. These percentage increases should all be interpreted as based on the current employment in that sector.

These elasticities are based on Indonesian GNP per capita and employment by sector in 1985. For purposes of estimating "requirements" they should be applied using current rates of GNP growth and current levels of employment.

But education levels required in these industries and within each job classification can be expected to increase by large absolute and by large percentage amounts! There is less need for illiterates here, as in the other sectors and little additional need for those who do not go beyond primary school (see Table III.3). But there are large (approximately 14%) increases in the *percent* of secondary school graduates needed for each 10% increase in real GNP per capita nationwide! And the increases in the *percent of University graduates* needed range from 11.2% in "Other" industries (consisting of mining, construction, and transportation) to 20.9% in manufacturing to 60.9% increases in the percent of University graduates among those employed in trade.

This upgrading of the education levels as development occurs means that the education industry matrices based only on Indonesia's past experience, even when the technical coefficients are dynamic, fail to fully capture the upgrading in education levels at the junior secondary and senior secondary levels needed for development. They appear to have led to enormous errors in the past in the true labor requirements. As mentioned above, this problem was pointed out in the Education Sector Review (McMahon, Millot, and Eng, 1986, pp. 2-117 to 2-121), and also by McMahon and Boediono (1989, pp. 7-10) based on the rate of return evidence reflecting the job market signals in Indonesia in 1982, 1986, and 1987, and also on Korea's experience. This "filtering down" effect as those with secondary education displace persons in job classifications that earlier called only for primary schooling was found to lead to higher productivity in the lower level jobs by Knight and Sabot's (1990) important recent study. This effect is also strongly supported by additional research at the Research Triangle Institute based on the experience in a larger number of Pacific Rim countries. It clarifies the problem in using the "manpower requirements" approach based on fixed technical coefficients and historical data.

III. EDUCATION AND INVESTMENT IN INDONESIA

Although structural change effects from demand shifts may account for up to 25% of total productivity growth, as was developed in Table III.1 above, they do not consider the relative efficiency of investment in education within each industry which can increase the important contributions of education to *productivity growth* within each industry from the *supply side*. Structural shifts alone fail to consider the market forces reflecting the opportunity *cost* of the various alternatives, and the growth bottlenecks that emerge along the way. They do not consider the fact that Indonesia's growth path and industry structure may not be identical to that which was experienced in the past by the Pacific Rim countries. By copying their experience too rigidly, growth opportunities will be missed. That is, the education-industry coefficients reported above in Table III.3 that are based on the efficiency of the Pacific Rim countries should help to reduce the large errors made when basing projected needs on past utilization of labor in Indonesia which tends to perpetuate the current inadequacies. Furthermore, a vitally important consideration in educational planning is the contribution that investment in education makes to productivity from the supply side. This is revealed by the benefits of the investment made in education in relation to the costs. As Indonesia develops along somewhat different paths than Pacific Rim countries and responds to new opportunities, these opportunities will be revealed by the labor market signals in the annual SAKERNAS data. These are important efficiency considerations and can be ignored only at the cost of a lower per capita growth rate than would otherwise have been possible.

The Rates of Return to Education in Indonesia by Sector

The contribution of each rupiah invested in education to economic growth is summarized by the social rates of return available to investment in education at different levels and of different types in Indonesia are summarized in Tables III.4 for 1982 and III.5 for 1982 through 1989. They require that thoughtful judgment be used. But they do provide important information about where investment in education should be increased the most rapidly to contribute the most to growth of earnings per person employed (Dennisons' NIPPE). The various levels of education are interdependent, of course. The rates of return are the *marginal* rates to each education level based on the earnings of those who quit at that level. The implicit assumption is that the option-value of that level to those students who go on is equal to what they could have earned if they had quit at that level, a labor market based opportunity cost that provides a basis for separating the interdependence between these levels and is unlikely to be improved upon for this purpose. Those social rates of return also can be used to diagnose problems, and thereby raise the cost effectiveness further of each type of education. As Table III.5 shows, the rate of return did not change much for secondary education from 1987 through 1989, remaining at about 11-14% overall, the same as the returns to investment at the primary level in 1982. The Mincer earnings function used by McMahon and Bishry (1990, pp. 23-4) cannot take the rather large difference in institutional costs between the primary and higher education levels into account as does the direct calculation of the pure internal rates of return in Table III.4 and III.5. So the somewhat higher social rates of return to primary education and lower rates of return to higher education in Table III.4 are more accurate, since the differences in institutional costs are considerable.

Table III.4 suggests that industry, consisting broadly of small business and manufacturing, is served very well by the completion of primary education (with rates of return reaching 35% to 40%!), and by junior secondary general education (13% to 20%). The returns to the education of males at least through senior secondary general education are enormous, 36% to 49%, (although the sample is small). This suggests how seriously the manpower requirements forecasts based on past utilization of workers at these levels (and showing projected surpluses) have been in error. (The unemployment statistics that ignore job-search time and also ignore the much higher underemployment rates in the rural areas can also be misleading.)

Table III.4
Social Rate of Return
by Level of Education and Type Employment (a)

Level of Education	Industry			Services			Agriculture	
	All Occup-Average	Small Busi-ness	Indus-try	Civil Service	Mili-tary	Gov Non-Civil Service	Self Emp.	Farming (b)
Some Primary (M)	.17	0.14	0.16	-0.02	0.52	0.04	0.21	.27
Some Primary (F)	.12	0.16	0.26	0.06		0.11	0.09	.27
Primary (M)	.19	0.13	0.35	0.17	0.37	0.11	0.15	.27
Primary (F)	.17	0.14	0.40	0.12		0.14	0.10	.27
Junior Sec. Gen. (M)	.12	0.20	0.13	0.10	0.03	0.11	0.15	.27
Junior Sec. Gen. (F)	.23	0.19				N.A.	0.15	.27
Junior Sec. Voc. (M)	.11	0.19	0.07	0.09	N.A.	0.11	0.15	N.A.
Junior Sec. Voc. (F)	.13	0.14		0.07		0.04	0.18	
Senior Sec. Gen. (M)	.23	0.36	0.49	0.10	0.17	0.14	0.19	N.A.
Senior Sec. Gen. (F)	.25	-0.01		0.07		0.23	0.08	
Senior Sec. Voc. (M)	.19	0.80	0.01	0.05	0.04	0.20	0.14	N.A.
Senior Sec. Voc. (F)	.04			0.03		0.07	-0.02	
Teachers Sec. (M)	.23	0.36	0.50	0.10	0.17	0.15	0.20	N.A.
Teachers Sec. (F)	.10	-0.08		0.07		0.23	0.07	
Com Tng. (M)	.24	0.37	0.51	0.10	0.17	0.16	0.20	N.A.
Com. Tng. (F)	.17	0.24			0.07	0.24	0.08	
Academy (M)	.15	-0.03		0.12		0.18	0.12	N.A.
Academy (F)	.11			0.06		0.14	0.13	
University (M)	.10		0.06	0.11		0.11	0.09	N.A.
University (F)	.11			0.04			0.13	

Source: McMahan, Millot, and Eng, (1986, p. 2-222).
a) Blank if insufficient observations in the cell to compute a rate of return.
b) Does not reflect non-market income-in-kind for farmers or homemakers. So this column is based on studies of the net contribution of each additional year of basic education to agricultural output measured in bushels of rice or corn after controlling for other inputs. Many studies are summarized by Lockheed (1988).

Table III.5
Social Rate of Return to Education
1982, 1988, and 1989

	All Jobs		Main Job Only
	1982	1987	1989
Primary	13%	13%	4%
Junior Secondary	17%	13%	14%
Senior Secondary General	22%	13%	11%
Senior Secondary Vocational	16%	10%	6%
University (a)	11%	6%	5%

Source: McMahon and Boediono (1991, p. 17)
a) Primary rates are a bit lower and Higher Education rates a bit higher than above when using the Mincer earnings function method since it does not allow for the large difference in institutional costs per student as between basic education and higher education.

For graduates entering **small business**, all types of senior secondary vocational education (STM's, commercial high schools, and teacher training) yield a very good return, averaging 34%. With respect to the STM's, the 19% average return across all types of employment for males seems more reasonable than the high 80% in small business and low 1% in industry. This difference is suggestive, however, and warrants further investigation. Perhaps it is because the STM curriculum is better adapted to the needs of small business than to the modern technical requirements of the larger industries, or perhaps it is because of the nature of the job placement activities (or lack thereof) by job counsellors within the schools. Technical curricula are costly, and a third possibility is that the number of students in them in certain localities may not be large enough to reach enrollments that are cost effective There is additional evidence on their cost effectiveness in each region by McMahon, Jung, and, Boediono (1990) that can be used to determine why some locations and some types of schools are working well as a guide to corrective action (e.g., a cross tab by very detailed job specifications might be revealing and would be possible in the 1982 data). Engineering colleges are the counterpart of the STM's at the college level and as the industrial sector in Indonesia can be expected to grow (see Figures III.1-12), these fields at all levels also need to grow.

Business and industry is also well served by the commercial high schools, even though their quality is low, (rates of return of 37% to 51% for males, and 24% for females). This is not significantly higher than the returns to senior secondary general education. But these subjects make an extremely important contribution to the growth of small and medium-sized enterprises throughout the regions, which provide competition to the larger firms and thereby restrain monopoly price increases and inflation. Colleges of Business Administration are their counterpart at the college level, and both can be expected to grow as the industrial sector of the economy grows more rapidly than the economy as a whole.

Services include those provided by the government civil service, government non-civil service employees, and the self-employed (as well as some other services included within the small business category). Here again, the returns to basic education are substantial. The military pays best for those with a primary education or less. Beyond this, the returns to education at all higher levels are quite respectable almost everywhere, although somewhat lower at all levels in the civil service (which

includes large numbers of teachers), and considerably higher among government employees not in the civil service and among the self-employed.

Agriculture is primarily served by primary education and junior secondary education, often in addition with terminal courses in vocational agriculture. Earnings cannot be used to measure rates of return to education in agriculture because much of the product does not pass through the market or get recorded. Also, agricultural prices are sometimes artificially depressed, and it is necessary to control for other inputs. But the best estimates that can be made using microeconomic data and farm production functions to explain output differences in physical quantities find real rates of return to be about 27%, as suggested above (see Lockheed, 1987). Colleges of Agriculture are the counterpart of the vocational agriculture curricula in the secondary schools.

Junior secondary general education for farm children (many of whom will leave the farm), vocational agriculture courses in the terminal year (for those who do not), and Colleges of Agriculture who extend their research results and technology to the local schools and directly to farmers have a vital continuing role in improving agricultural technology and raising productivity in agriculture. This is important to maintaining food self-sufficiency in Indonesia. Junior secondary education facilitates adaptation to agri-business employments in the provincial towns for the many who will inevitably continue to leave farming.

The percentage rate of change in "needs" based on the Pacific Rim data is shown in Table III.6, Col. 7. The rank order of the percentage increments in investment needed then can be compared more easily to the rank order of the rates of return (as inMcMahon and Boediono 1992b, Table 10, Cols. 6-8) to provide a guide as to how fast the rates of investment should increase. This should help to bring into even sharper focus the contribution of the anticipated growth of demand for education by employers in relation to the contribution each type of education to labor productivity growth in Indonesia.

Rates of return have fallen somewhat from 1987 to 1989. Those cannot be compared directly to those for 1982 since the 1982 data measures earnings from all jobs, whereas 1987 and 1989 do not. But the decline has been mostly for the primary, vocational and university levels, and has left rates of return at the secondary levels essentially unchanged.

IV. Summary Of Conclusions

The worldwide spread of modern economic growth as developed in Chapter V below has depended chiefly on the diffusion of a body of knowledge concerning new production techniques and the organization of production. The acquisition of these techniques and the capacity to learn them and apply them on the job has been governed largely by the prior development of the pervasive and enduring effects of knowledge, of receptivity to new knowledge, and of the motivations acquired through formal schooling.

The limited spread of modern economic growth before World War II has been due primarily to political, ideological and economic conditions that limited the expansion of mass schooling, as well as by limited saving and investment in physical capital. Since World War II modern mass education systems have been established almost everywhere, but at different dates. Following this, the spread of modern economic growth has noticeably accelerated. [See Richard Easterlin's (1981) Presidential Address to the Economic History Association, "Why Isn't the Whole World Developed?"]

Table III.6
Needs For Educated Labor
And Potential Contribution of Education to Labor Productivity

(Percent increases demanded are expressed for each 10% increase in real GNP/capita, and also as a percent of workers at that Education level employed in that industry)

Level (1)	Basic Education 1-6 7 8 9 (2)	Senior Secondary 10 11 12 (3)	University BA 13 14 15 16 (4)	University MA PHD 17-20 (5)	Employing Industry (6)	Percent Increase (Demanded) (7)	Rate of Return (Productivity) (8)
University	General Reading		Liberal Arts	Vocational Specialization at Terminal Years	Services	6.2%	1986 7 to 10%
BA, MA, PhD	Writing Language Math Soc. Science Phys. Science		Education Agriculture Engineering Bus. Adm. LA, Engr. etc.		Agric. Manuf. Trade SME's Other	49.1% 20.9% 60.9% 11.2%	
Senior Secondary General	General	Ag. STM Com.	Senior Sec. School		Agri. Bus. "Other" Services	(14%) 11.5% 4.1%	1986 16%
Senior Secondary VOTEC	General	VOTEC-Ag. STM Commercial	Completers		Agric. Manuf. Trade	33.1% 14.4% 14.8%	1986 14%
Junior Secondary General	General	9 Ag. STM Com		Basic Ed. Completers (1-9)	Services Agric. Manuf. Trade	NA NA NA NA	1986 27% Other: 16%
Primary	General		Primary School Completers		Services Agric. Manuf. Trade/Other	.2% 1.4% .1% .3%	1986 27% Other 14%
Illiterate	General		Primary School Drop-Outs		Agric. Mfg. + Trade Services Other	-.5% -.4% -13.4% -.3%	Under-employed

Sources:
a) Andrews (1990, pp. 21-25) and Table 3 above
b) McMahon and Boediono (1990, Tables 1-3) and Table 4 above. For breakdown at academic (3 year) and university levels by Field and by eventual occupation see McMahon and Bishry (1990, Table 4, p. 25)

The sources of economic growth within each industry, in Indonesia developed specifically in this paper include the contributions of all investment including the rate of investment in education as a percent of GNP to *productivity growth from the supply side* , as well as by the contributions made by structural change. The former, shown here to account for perhaps 75% of the per capita growth, depends on the *rate of investment in education* (which in Indonesia is low in relation to ASEAN and needs to be raised to about 4% of GNP as a basis for take off), and *investment in physical capital* (which is already large at 30.17% of GNP currently in Indonesia, the highest in ASEAN). Labor productivity growth also depends on investment in R&D and technology transfer (which is a relatively low .26% of GNP in Indonesia compared to .34% to .75% in Thailand, Singapore, and India). These contributions to productivity growth from the supply side also depend on the *real social rates of return to each rupiah invested in human and physical capital.* Based on the most recent data, these returns are relatively high for education, currently 14% for the investment needed for achieving universal basic education, and about 27% for improving the quality of the education of farmers in rural areas. Although investment in physical capital is much larger in absolute terms (and hence it contributes more to growth), the *real private rate of return per rupiah* invested is a considerably smaller 9.4% overall (when the approximately 20% nominal interest rates are corrected for the current 10% inflation rate). (If taxes approximately equal subsidies of various kinds, the social rate of return would then be equal to the private rate.) This suggests considerable underinvestment in education relative to physical capital in Indonesia

The structural sources of growth in Indonesia include primarily the transfer of surplus labor out of agriculture into industry and into services where its productivity is higher and into export industries which can also help to absorb this surplus labor. Growth of demand for industrial output and for exports can therefore help to raise overall average labor productivity on a per capita basis. The best estimate that can be made suggests that these *structural* sources account for only about 25% of the growth rate. They nevertheless are a significant factor. Education furthermore has a truly major role in facilitating the transfer and employability of this surplus, poorly educated, agricultural labor to agri-business enterprises in the provincial towns, to export industries, and to other growth industries. Curricula therefore that help rural children to relocate to agri-business industries in the Provincial towns, to small and medium-sized enterprises (SME's), and to export and growth industries are likely to be particularly helpful.

General education facilitates learning on the job, and adapting to change later. But one or two vocational courses in the junior secondary general schools in the last year or two before leaving school could be helpful in motivating students as to the relevance of the other subjects. (See Table III.4 which summarizes the rates of return to vocational education by type of industry.)

Structural change has implications for the planning of the structure of education. Based on the analyses of the use of educated labor in the Pacific Rim countries in each industry as they began to develop by Andrews (1990), large increases in the number trained at the secondary and college levels should continue to be needed in Industry, Agriculture and Trade, with implications for the continuing growth of Colleges of Engineering, Agriculture, and Business Administration. Indonesia needs to be able to respond to new conditions as they arise, however. For more direct evidence, the real rates of return do reflect the contribution to per capita earnings growth (National Income Per Person Employed, or NIPPE) which is closely related to productivity.

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IV

A Global Analysis of Education, Social, and Economic Change in Industrializing Societies

Boediono and Don Adams

ABSTRACT

This paper focuses on the experience of newly industrializing countries (NICs) as they achieve economic growth, expand their educational systems, attempt to improve their quality of life, and struggle with the social and cultural consequences of these changes. Three basic questions are addressed: (1) What are the distinguishing educational and socioeconomic features of NICs? (2) How does education relate to the social, cultural and individual changes associated with rapid industrialization? (3) What policies and strategies are suggested by the experience of these countries that are worthy of consideration by nations such as Indonesia entering a period of rapid growth and change?

The NICs examined exhibit several characteristics different from the total population of developing countries. Educationally, this sample of countries, when compared to developed countries in general, has shown higher literacy, higher enrollment ratios, higher internal efficiency, higher educational expenditures, and more intra country and intra gender equity in educational attainment. In terms of economic and social change, again in comparison with the general population of developing countries, the sample has experienced more rapid economic growth, attained more equitable distribution of wealth, achieved higher levels of quality of life, acquired more "modern" individual attitudes and social behavior, and enjoyed more extensive political and civil rights.

Six tentative general policies and strategies are identified which appear to have been useful to the NICs and may be worthy of consideration for other countries at the economic "take-off" stage.

(1) All NICs committed themselves during the pre "take-off" and "take-off" stages to increasing rural productivity and reducing rural poverty, improving family health and nutrition, and building a well developed basic and mass education system as a foundation for human resource development.

(2) A number of promising innovations and experiments were offered in advanced education, including new selection devices, multiple academic track systems, and alternative "second chance" systems.

(3) Several policies were employed in order to reduce educational inequities, including preschool education, free education and student aid, lottery systems in student selection, special incentives for females, life long education, reform of teacher education, and extracurricular activities.

(4) The governments of several NICs acted both as regulators and as advocates of preferred educational programs, often encouraging private provision of education.

(5) In NICs with linguistic, ethnic and cultural divisions education provided opportunities for symbolic expression of group identity, legitimated both assimilation and group autonomy policies, and created leaders for the various groups.

(6) As industrialization proceeded most NICs moved away from rigid centralized, detailed educational planning toward a more flexible, participatory form of management.

IV

A Global Analysis of Education, Social, and Economic Change in Industrializing Societies

Boediono and Don Adams

INTRODUCTION

The body of this paper focusses on the experience of newly industrializing countries as they achieve economic growth, expand their educational systems, attempt to improve their quality of life, and struggle with the social consequences of these changes. An attempt has been made to use a variety of national level indicators and national or subnational case materials. The many limitations of macro educational indicators will be made explicit in context. Case studies of the particular country in question are crucial for understanding the context and meaning of the phenomenon being examined. Unfortunately such studies are limited in number, varied in quality and rarely allow comparison over time.

Basically three questions are addressed: (1) What are the distinguishing educational and socioeconomic features of the group of countries being studied? (2) How does education relate to the social, cultural and individual changes associated with rapid industrialization? (3) What policies and strategies are suggested by the experience of these countries that are worthy of consideration by nations entering a period of rapid growth and change?

I. CHARACTERISTICS OF NEWLY INDUSTRIALIZING COUNTRIES

The sample of countries used in this study was chosen on the basis of rapid economic growth over the three decades (1960-1990). It should be noted that the industrial transformation of our sample of countries often did not follow the pattern of development of Western Europe. The European experience of an industrialization process, with industry moving from the primary to the secondary and then to the tertiary sector, has been assumed by many theorists of development to represent the only model which countries follow. Several of the NICs have had large service sectors throughout the period of economic growth.

Indeed some of our sample, even during the process of industrialization, acquired certain characteristics often associated with post industrial societies. The Pacific Rim countries in particular showed signs of becoming high tech information societies. Singapore by 1980 had one-third of its work force employed in information related occupations. Thus although industrialization may be the most distinguishing feature of our sample, the service sector and the information sector are highly significant.

Newly Industrialized Countries (NICs)

For the purposes of this research, a NIC is defined as a country which, over the past three decades, has seen its economy experience moderate growth, a period of superlative growth, and a

continuance of rapid or modest growth. In other words, NICs have economies which exhibit a "take-off" period followed by sustained growth. It should be noted that the term "take-off" as used here is not synonymous in meaning with the well-known middle phase of Rostow's stages of economic growth (Rostow, 1960). However, the principles employed in this work mirror those of Rostow closely. The identification of stages of growth and the basic propositions about economic growth include the propositions that (1) each stage of national development is unique, and (2) there are meaningful generalizations to be made about each stage.

Sample Identification

The sample of countries used in this analysis are those countries which can be identified as NICs over the 1960-1990 period. A preliminary list of candidates was chosen on the basis of their demonstration of sustained growth (as measured by GNP per capita in current US dollars) from 1968-1988. In essence, countries were chosen which had gone from Less Developed Country (LDC) status (according to the *Dictionary of Development* ,Welsh and Butorin, 1990, countries with GNP per capita under $500) to Developing Country status (over $500 GNP per capita) and which had also experienced significant continued growth. Rather than concentrate solely on GNP per capita as measured in terms of US dollars, investigation of real growth was deemed essential. By observing real changes in per-capita GNP measured in terms of the home currency a more accurate picture of actual growth became apparent. After screening out countries about which insufficient data were available, the final list of countries included: Brazil, Greece, Hong Kong, Israel, Korea, Malaysia, Singapore, Thailand, Turkey, Tunisia, and Yugoslavia. Indonesia, a country entering the take-off stage, was included for comparison purposes. Taiwan, a country which has experienced extremely rapid growth is reluctantly excluded from some analyses because of insufficient data (see Figures 1.1 – 1.12). The sources for data in these figures and tables, unless otherwise specified, are UN publications and World Tables published by the World Bank.

Analysis of NICs

After sample identification, the next task was the identification of the growth stages. By observing the GNP per capita growth rates, clear patterns of economic growth emerged. The take-off stage, as defined, should exhibit a significant, long-term increase in aggregate economic performance relative to the prior period. No precise change in growth patterns was established. However, the doubling of prior growth rates served as a guideline.

Table IV.1 illustrates the time periods which were derived from the growth data. The mean span of the take-off period for the NICs was 12.5 years with a range of 8 years (Tunisia) minimum and 22 years (Korea) maximum. The average annual GNP per capita growth rates are given in Table IV.1. As can be seen, the group accomplished a significant increase in the rate of growth (from 4.87% to 8.86%).

Intra group patterns appear within our sample. Pacific Rim countries in terms of amount of growth and duration of the take-off stage form a distinct subset. As shown in Table IV.2 the growth rates experienced by the Pacific Rim nations exceeded those of the others throughout time period being examined. During the pre take-off stage the Asian countries bettered the remainder of our sample by approximately 50%. This gap was reduced, however, during the take-off stage to nearly 22%. On the other hand, the Asian nations far outperformed the other NICs in the post take-off stage.

Figure IV.1
Brazil – Real GNP/Capita

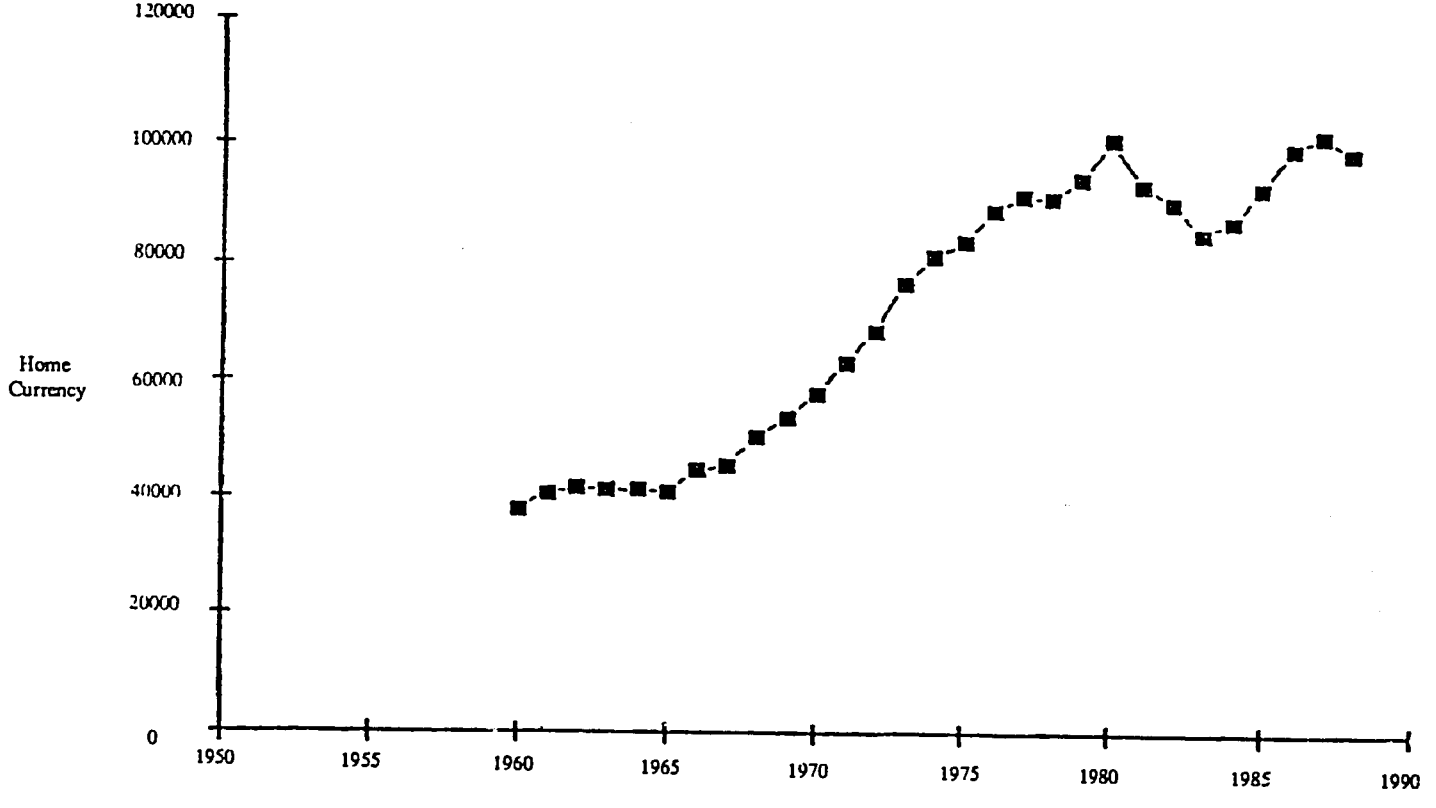


Figure IV.2
Greece – Real GNP/Capita

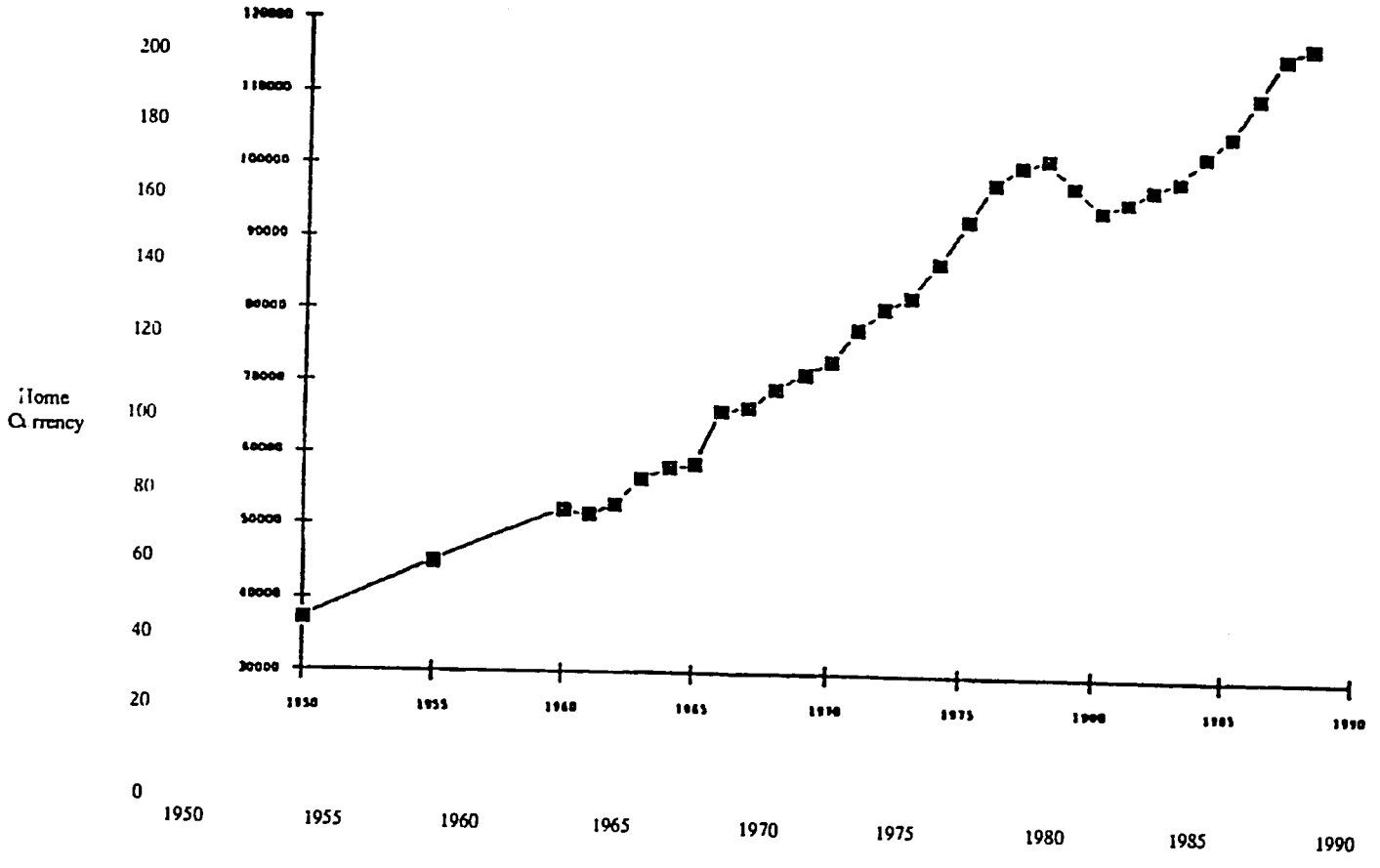


Figure IV.3
Hong Kong – Real GNP/Capita

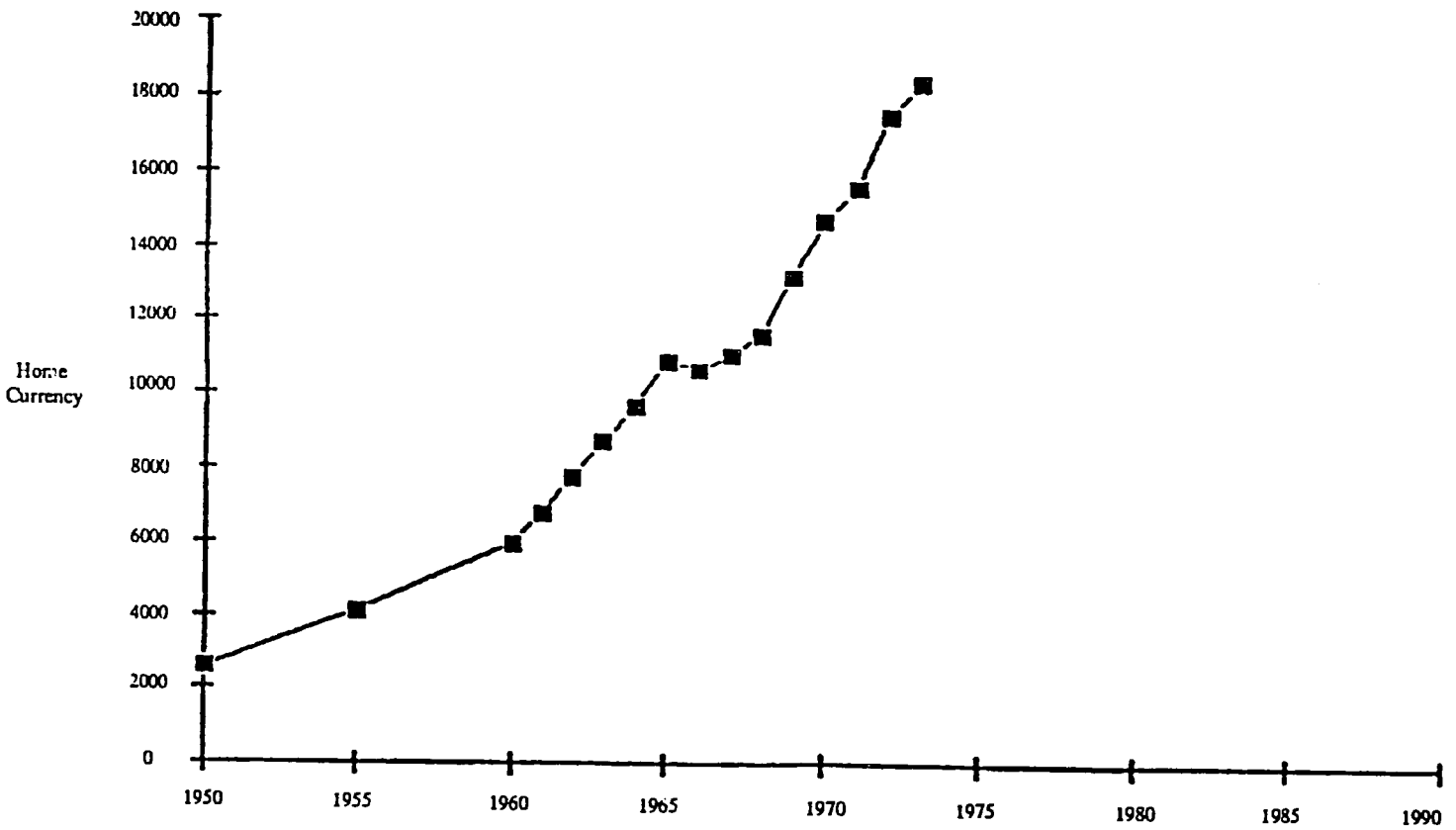


Figure IV.4
Indonesia – Real GNP/Capita

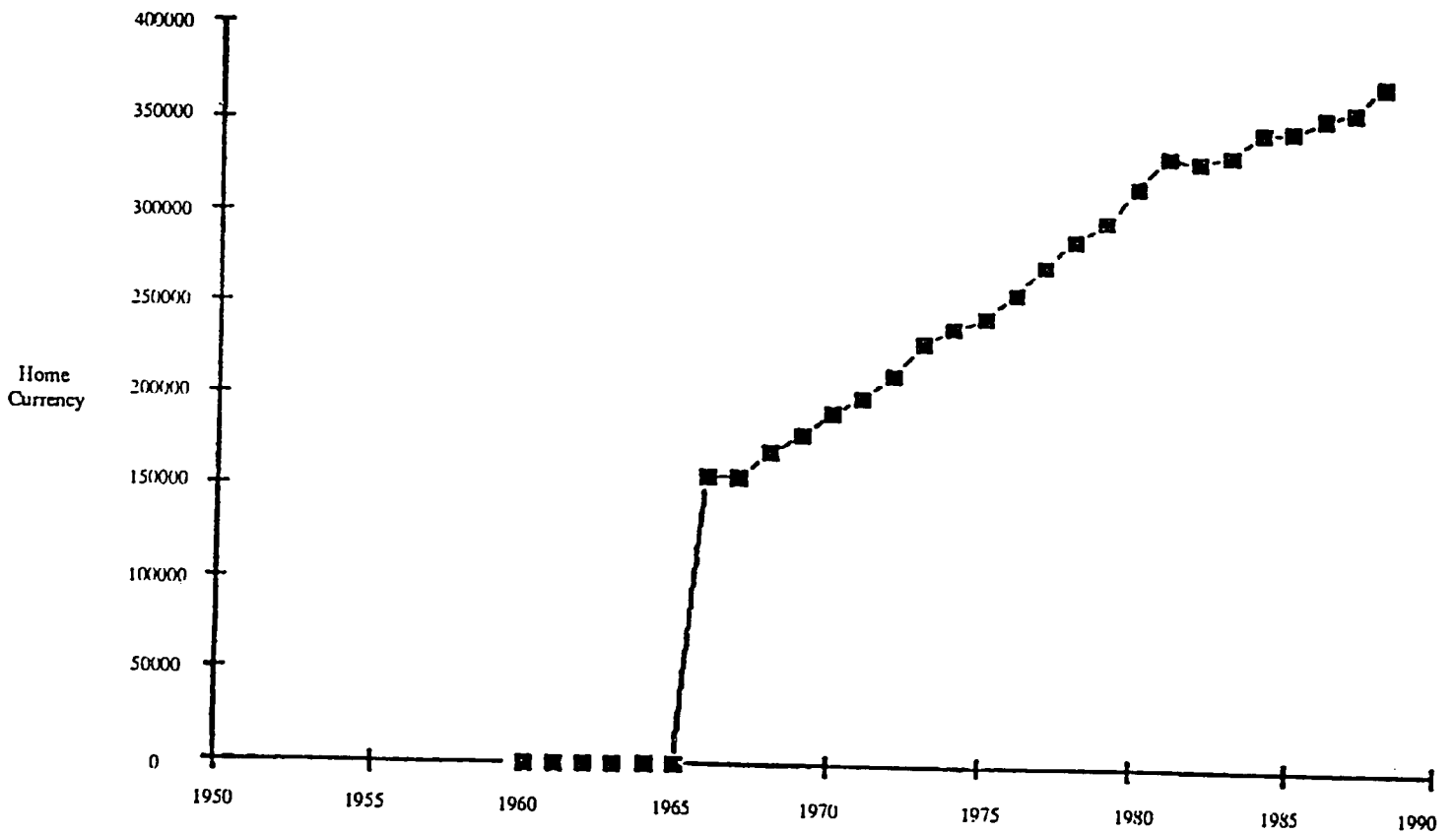


Figure IV.5
Israel – Real GNP/Capita

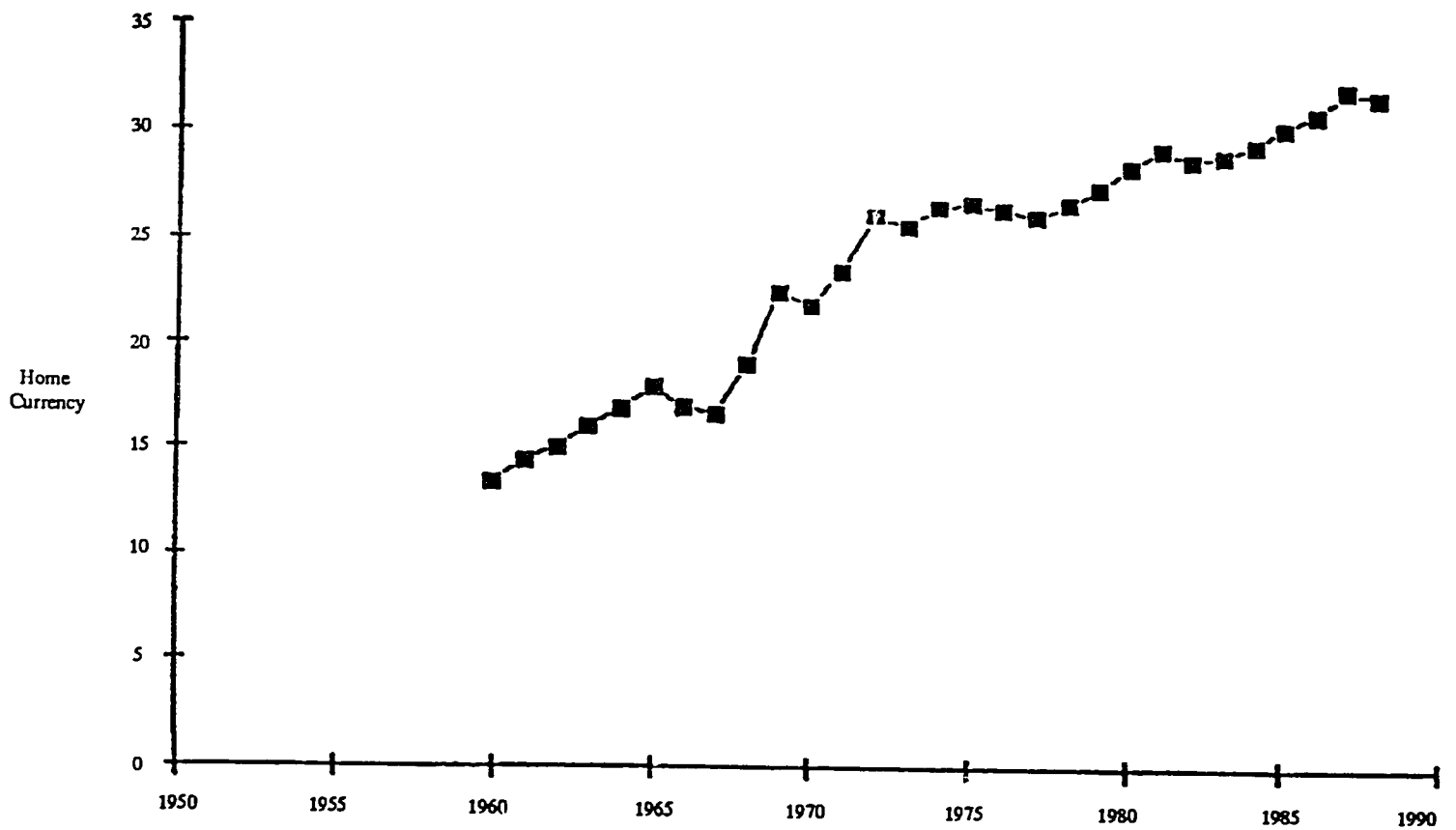


Figure IV.6
South Korea – Real GNP/Capita

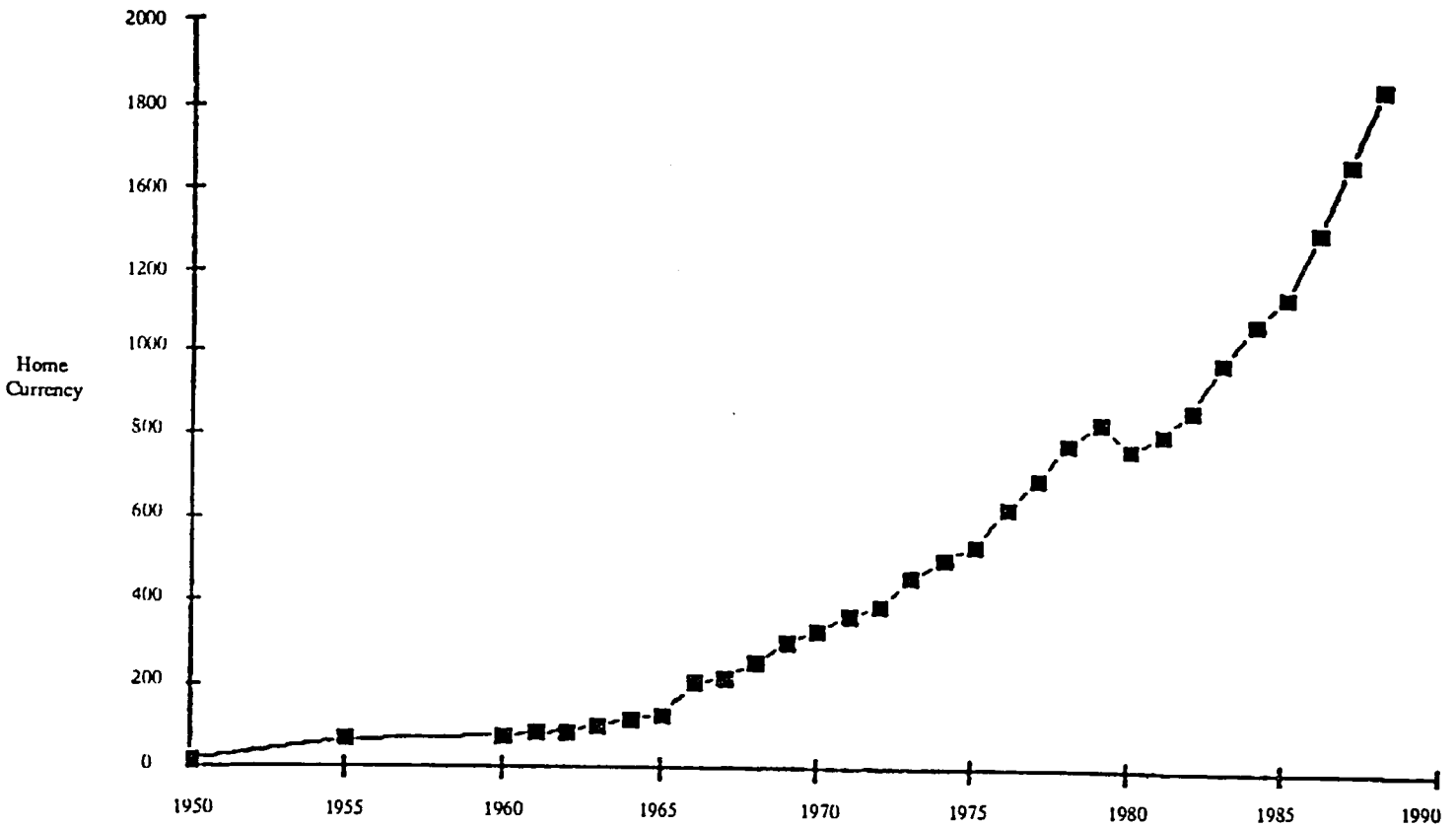


Figure IV.7
Malaysia – Real GNP/Capita

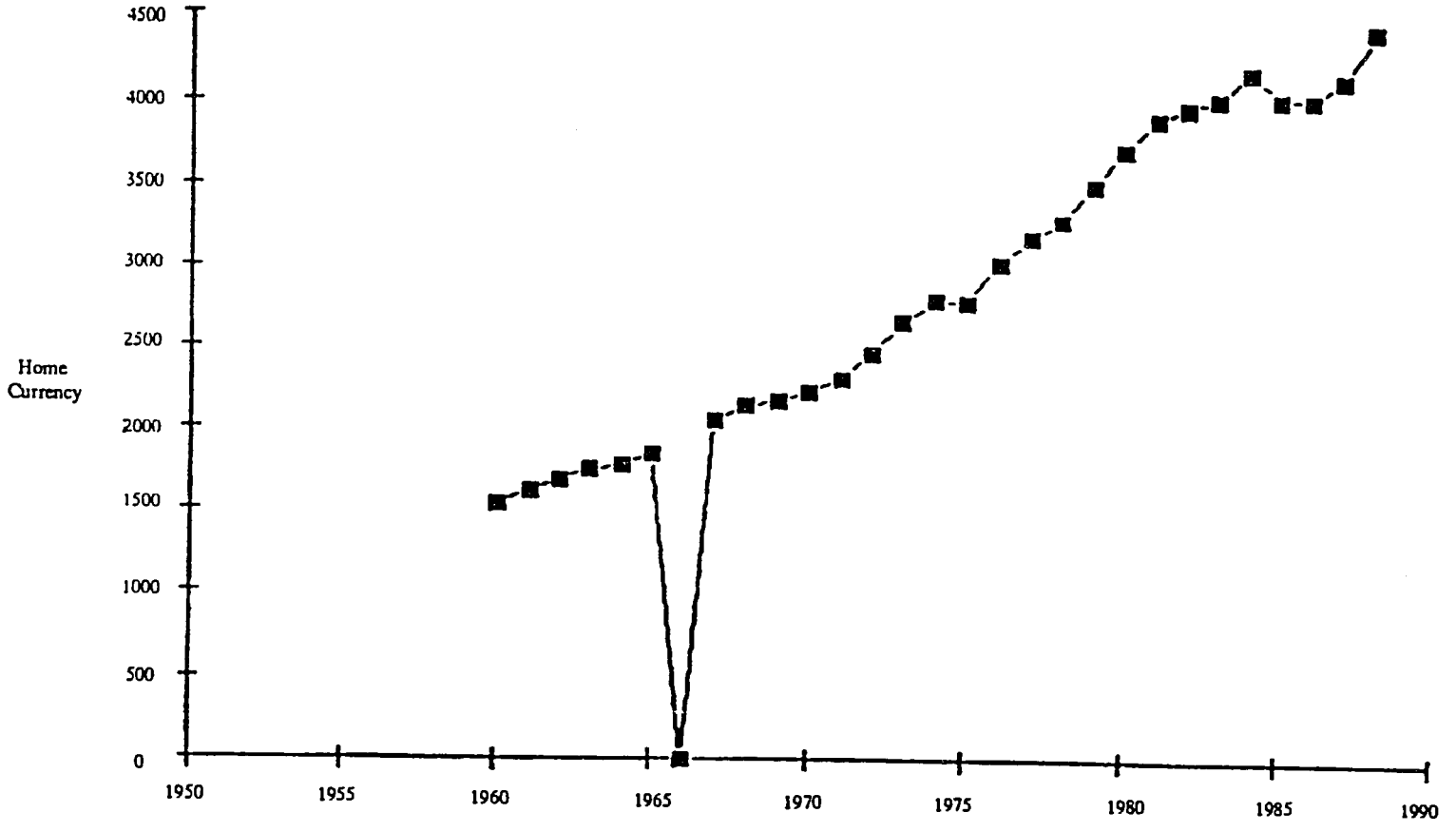


Figure IV.8
Singapore – Real GNP/Capita

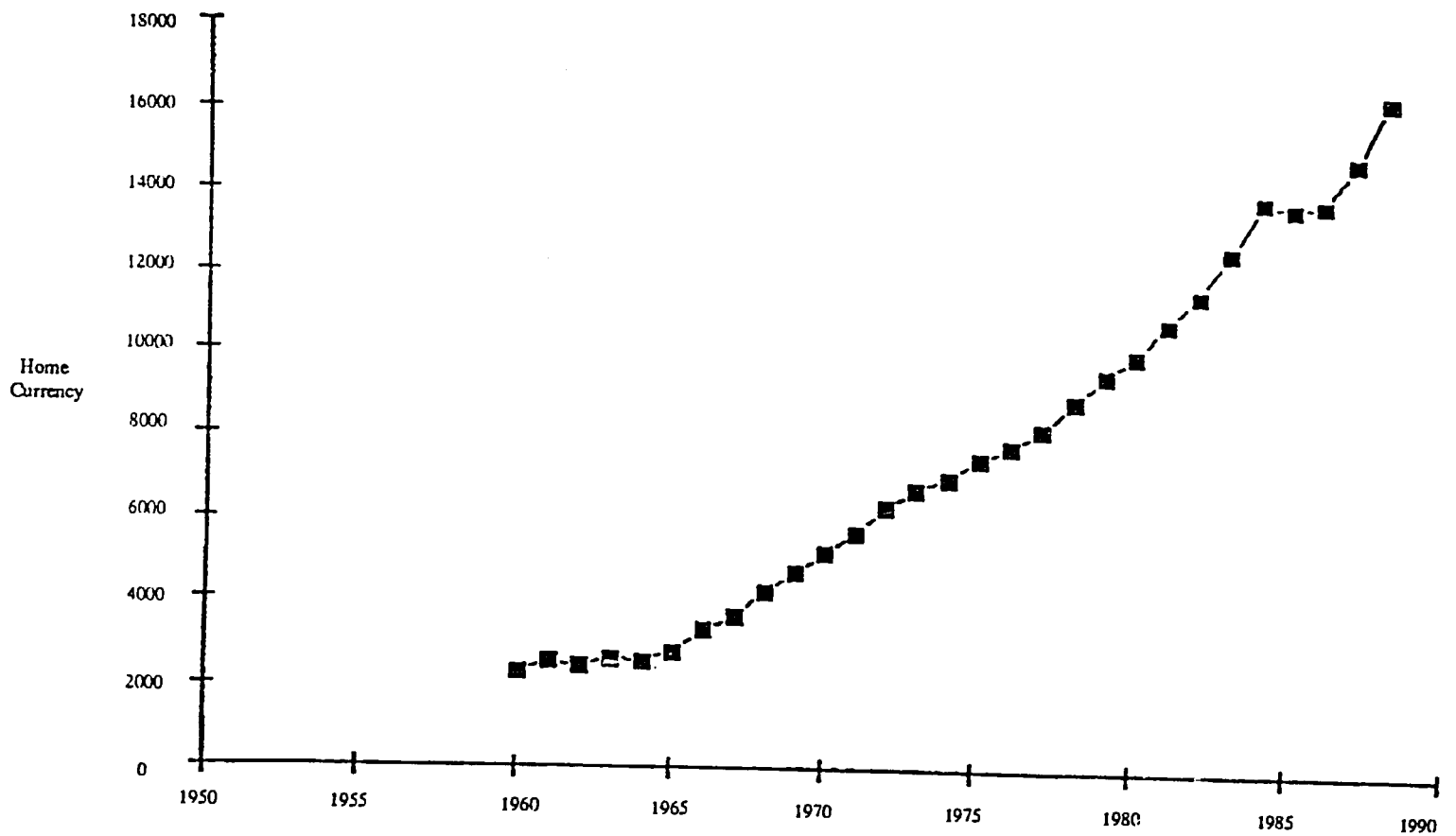


Figure IV.9
Thailand – Real GNP/Capita

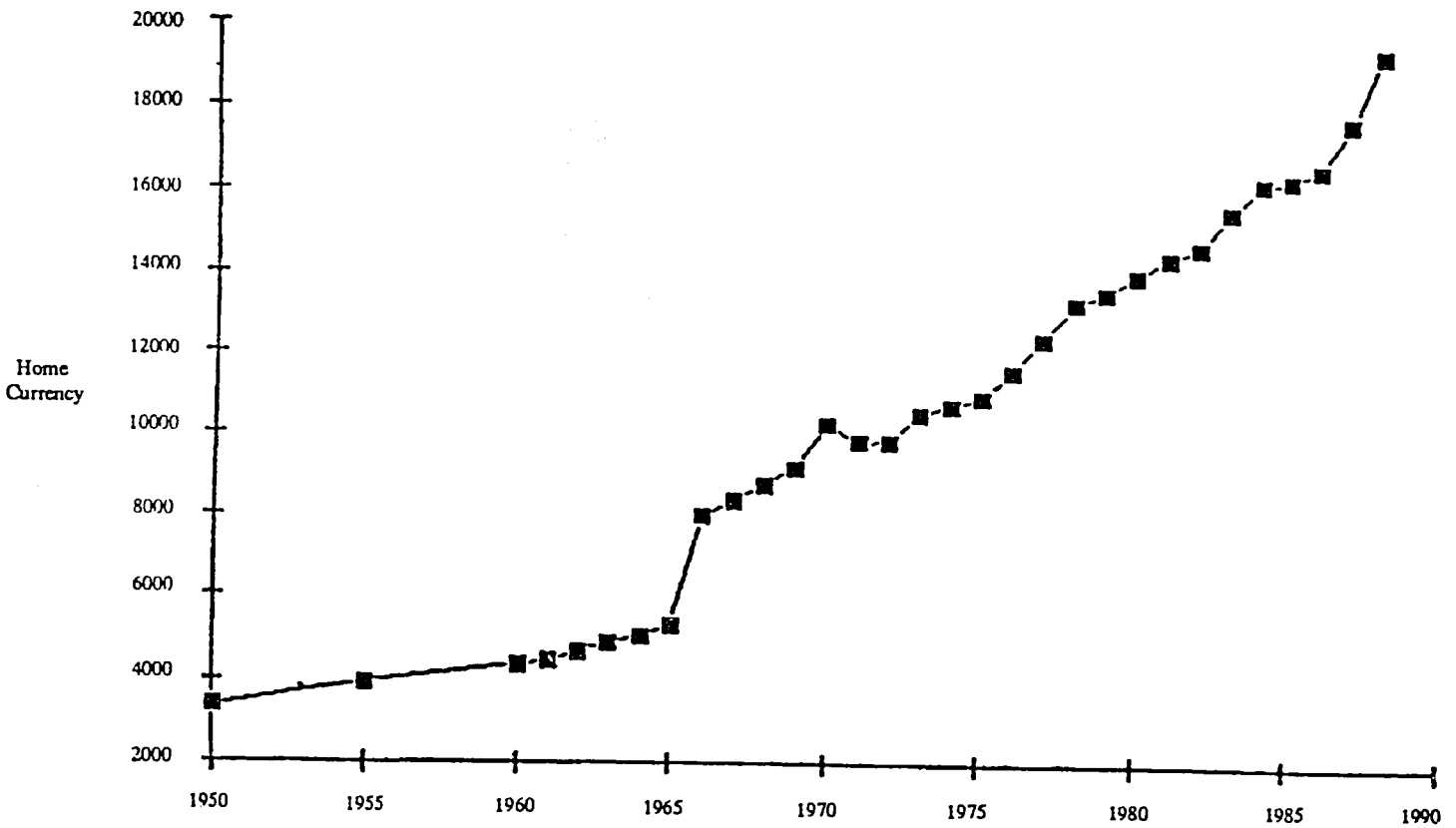


Figure IV.10
Tunesia – Real GNP/Capita

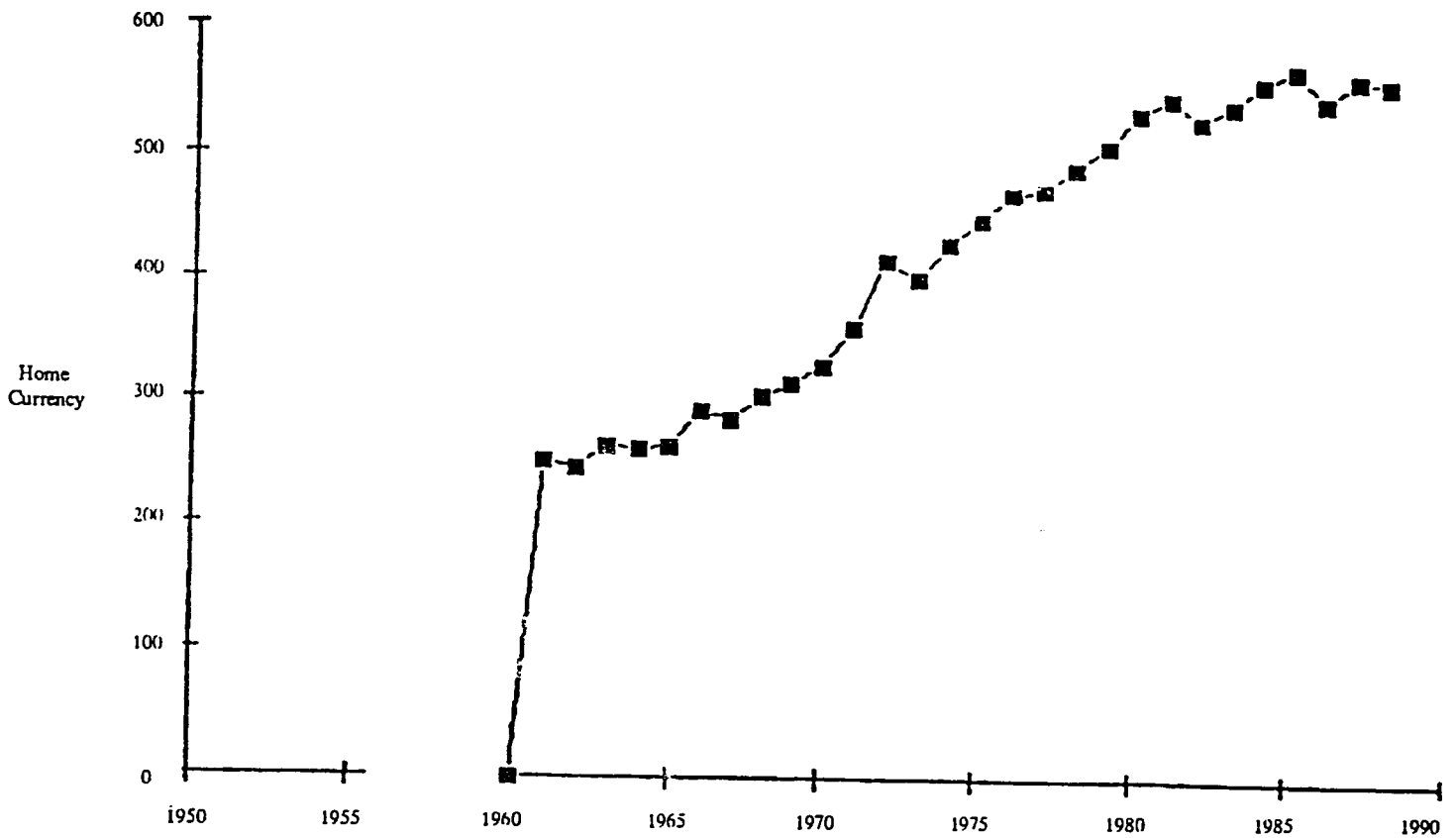


Figure IV.11
Turkey – Real GNP/Capita

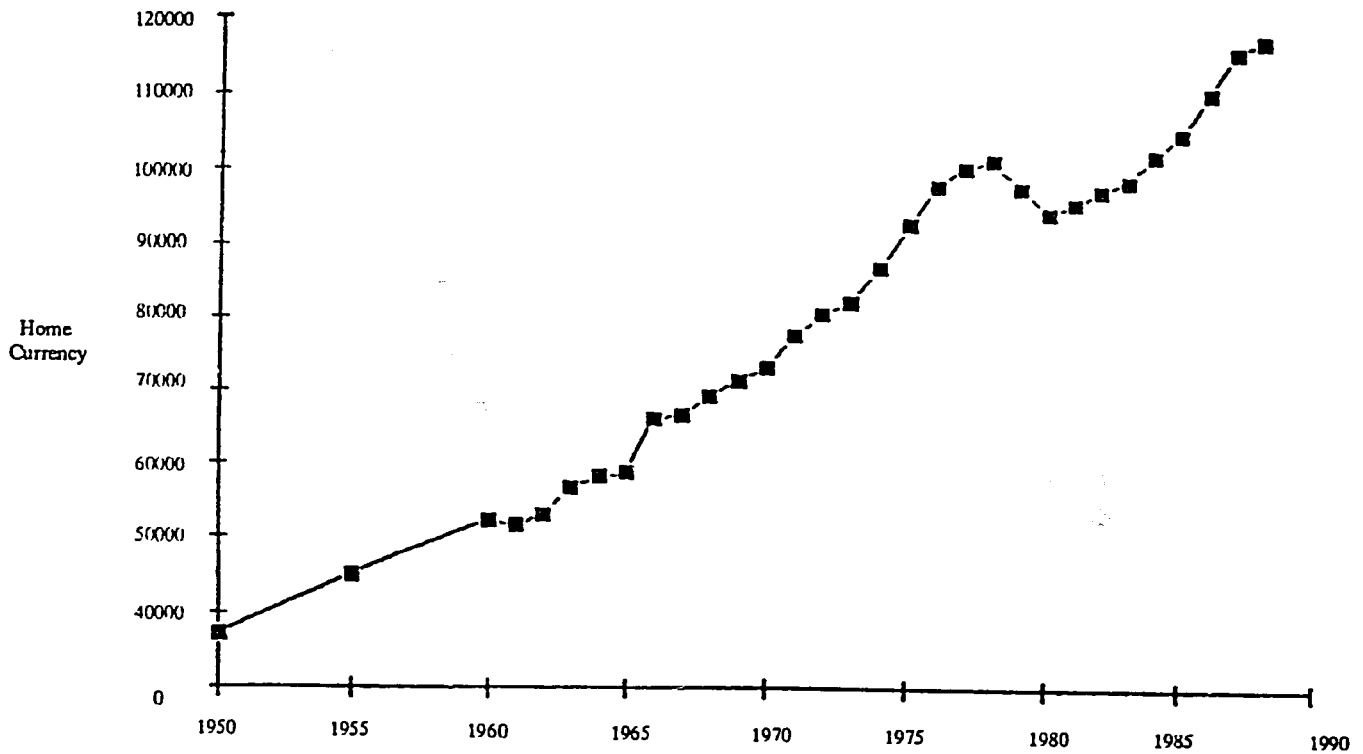


Figure IV.12
Yugoslavia – Real GNP/Capita

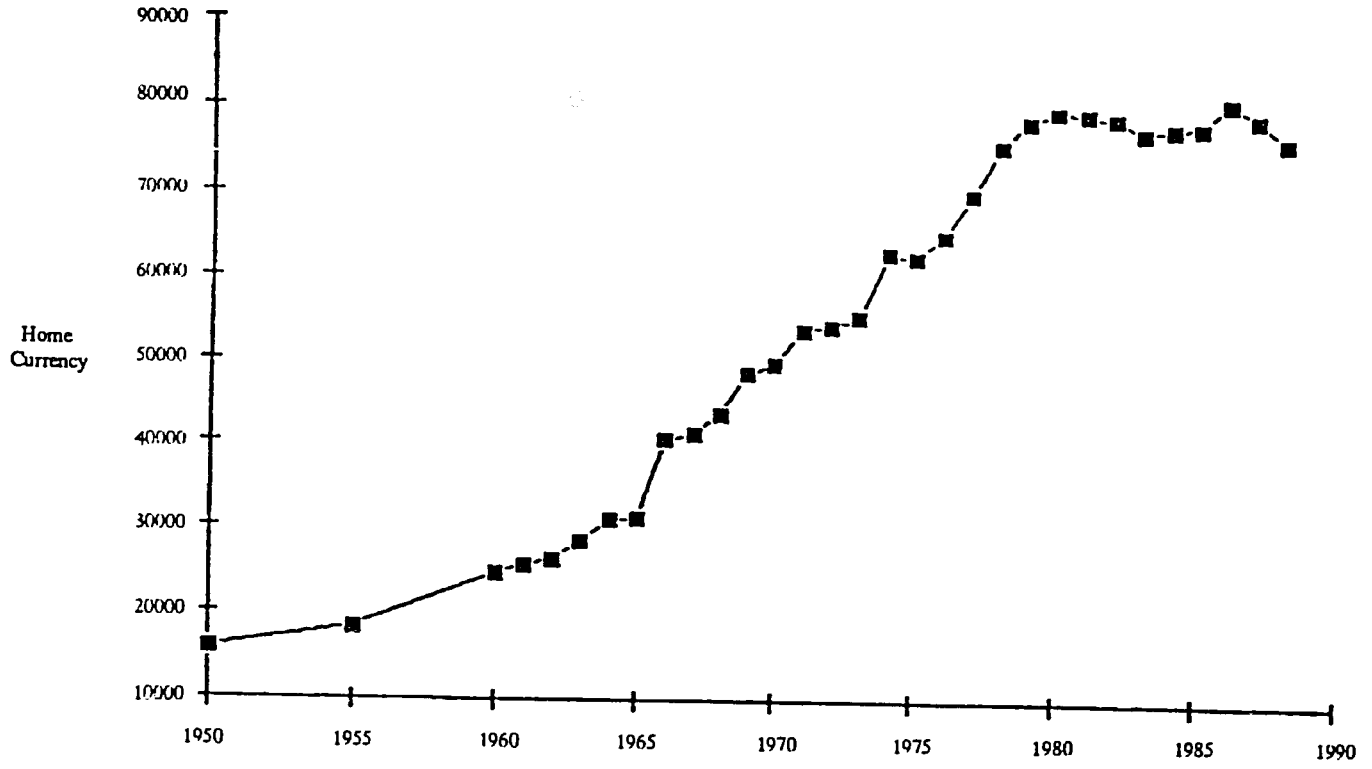


Table IV.1
Growth Periods

COUNTRIES	Pre-Take Off	Take-Off	Post Take-Off
Brazil	1961-65	1966-76	1979-88
Greece	Pre 1967	1968-78	1973-88
Hong Kong	Pre 1960	1961-73	Post 1974
Indonesia	1967-88		
Israel	Pre 1960	1961-72	1982-88
Malaysia	1961-71	1972-81	1985-88
Singapore	1961-64	1965-84	1979-88
South Korea	1961-65	1966-88	
Thailand	1961-65	1966-78	1977-88
Tunisia	1961-67	1968-76	1977-88
Turkey	1961-65	1966-76	1979-88
Yugoslavia	1961-62	1963-78	1977-88
MEAN		12.5 Yrs.	

Table IV.2
Average Annual Per Capita Growth Rates by Region

COUNTRIES	Pre Take-Off	Take-Off	Post Take-Off
ASIAN			
Hong Kong		6.71%	1.87%
Indonesia	4.08%		4.34%
Malaysia	3.47%	5.47%	
Singapore	2.82%	8.86%	
South Korea	3.62%	7.94%	
Thailand	4.04%	7.98%	
MEAN	3.61%	7.39%	3.11%
OTHER			
Brazil	1.71%	7.40%	0.98%
Greece		5.20%	0.50%
Israel		5.95%	1.27%
Tunisia	2.37%	5.81%	1.52%
Turkey	2.39%	4.87%	1.56%
Yugoslavia	3.18%	7.14%	0.12%
MEAN	2.41%	6.06%	0.99%

II. EXPANSION AND DEVELOPMENT OF EDUCATIONAL SYSTEMS

No single factor or theory can account for the expansion and growth of education. Rising expectations of the citizenry concomitant with development include education, not only as a means for social mobility, but increasingly as a "right of citizenship," provide a primary motivation for expansion of primary education and, subsequently for higher educational levels. Other popular explanations relate educational expansion to economic growth, industrialization, and urbanization. The "needs" of economic development are said to demand a more highly educated populace which, in turn, increase income levels allowing people to buy more education. A third set of explanations recognizes the global economic and cultural context and views educational change as a resultant of influences associated with continuing trade, technology transfer, and international knowledge exchanges. A fourth set of explanations focuses on the internal dynamics of the system itself. It has been argued that educational systems change over time according to certain regularities of system behavior. This growth is not uniform but rather relates to the benefits and costs associated with attainment of a given educational level and, more importantly, to the perceived utility of additional schooling. Although often argued as unique, these various explanations are not necessarily mutually exclusive. It would seem that both the provision of education, the demand for education, and the interrelationships of these two processes contribute to the explanation of educational growth.

The NICs in general adopted mass education and strong literacy programs earlier than most developing countries. Sections 2.1 and 2.2 below examine the patterns of educational growth and development of our sample and, to the extent possible, make comparisons with educational changes in other groups of countries.

Examination of Educational Growth In Our Sample

An examination of the enrollment ratios by educational level of our sample of rapidly industrializing countries consistently shows highly developed primary levels prior to the "take-off" period. Enrollment ratios at the second level for our sample vary widely during each stage of industrial development. Enrollment ratios at the third level show the greatest range and although not shown in the accompaying data, display the greatest disparities between males and females (see Table IV.3 ; Figures IV.13-16).

A number of scholars have described undesirable consequences resulting from rapid educational expansion including: the escalation of educational expenditures; increasing "wastage"; longer periods of unemployment for school graduates; and the out migration of labor. Some observers have argued that rapid educational expansion because of its drain on resources leads to slower economic growth, creating only a few prestigious and well paid positions in the labor force. Moreover, when everyone has completed a given level of education that level no longer has any bearing upon job entry, placement and security. As a consequence, this argument continues, students are pressured to seek ever higher credentials in order to distinguish themselves from those who have graduated from lower educational levels.

These dangerous consequences of rapid educational expansion in general were not experienced in our set of countries. Apparently high rates of economic growth and expanding employment opportunities for blue collar, white collar and professional workers adequately absorbed the growing educated population. Moreover, there is evidence that status as well as employment was often a goal of those seeking advanced education.

Table IV.3
Total Enrollment by Stages of Development: Means and Ranges (%).

		1st Level		2nd Level		3rd Level	
Pre Take Off	Mean Range		95.53		30.76		5.45
	Lower Limit		72.00		12.00		1.54
		Brazil	1965	Thailand	1965	Thailand	1965
	Upper Limit		118.00		52.00		10.91
		Indonesia	1988	Greece	1965	Israel	1960
Take Off	Mean Range		99.91		44.42		9.52
	Lower Limit		81.00		17.00		2.02
		Thailand	1970	Thailand	1970	Thailand	1970
	Upper Limit		120.00		76.00		20.04
		Hong Kong	1970	Yugoslavia	1975	Israel	1965
Post Take Off	Mean Range		103.25		66.25		18.83
	Lower Limit		94.00		34.00		6.70
		Yugoslavia	1988	Brazil	1980	Malaysia	1988
	Upper Limit		117.00		95.00		37.70
		Turkey	-87	Greece	1986	Korea	1989

SOURCES:
1960-70 data from *UNESCO Statistical Yearbook*, 1976.
1975-80 data from *UNESCO Statistical Yearbook*, 1989.
1984-89 data from *UNESCO Statistical Yearbook*, 1990.

Figure IV.13
Total Enrollment Rations by Levels and Stages of Development

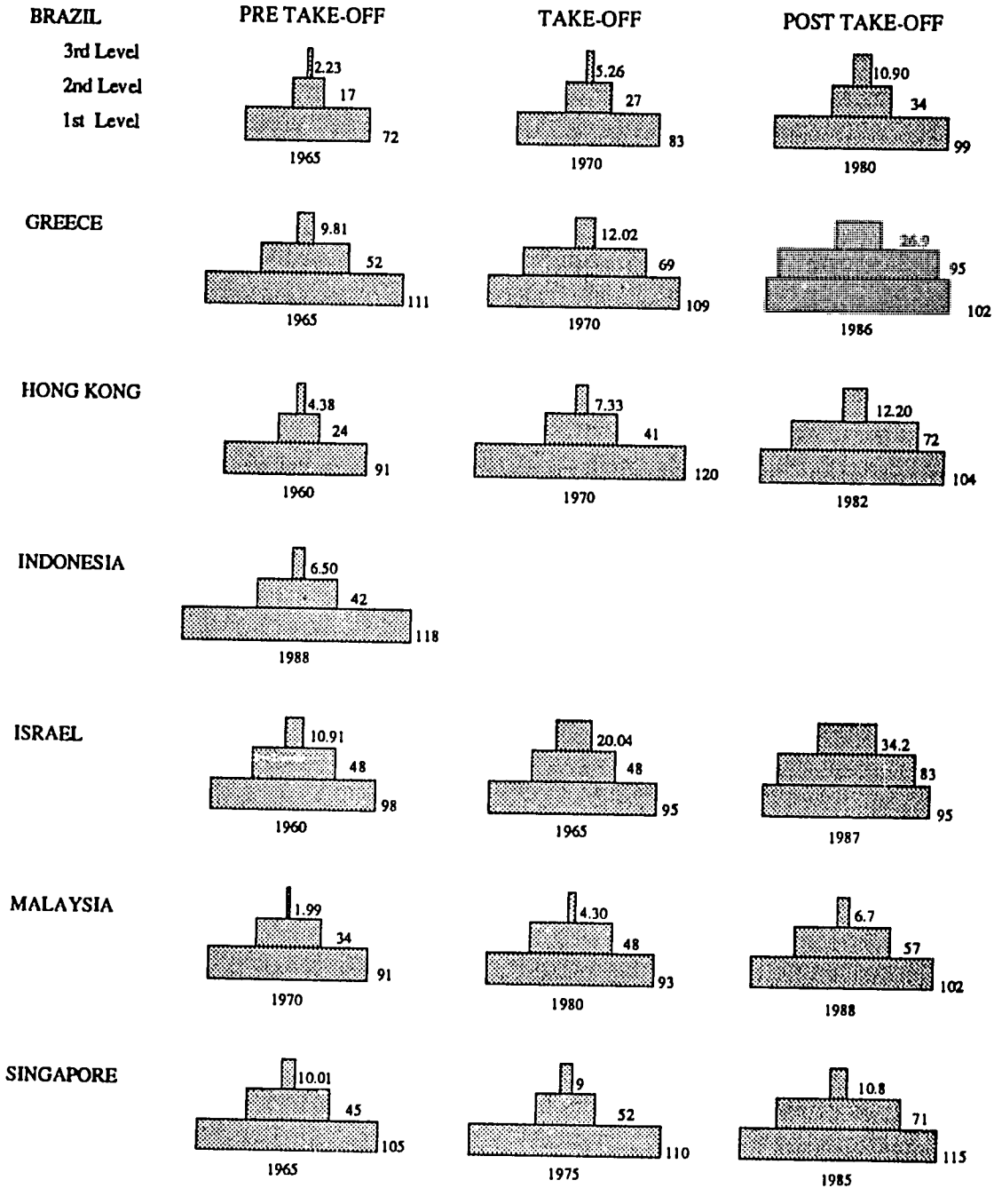


Figure IV.13 (continued)

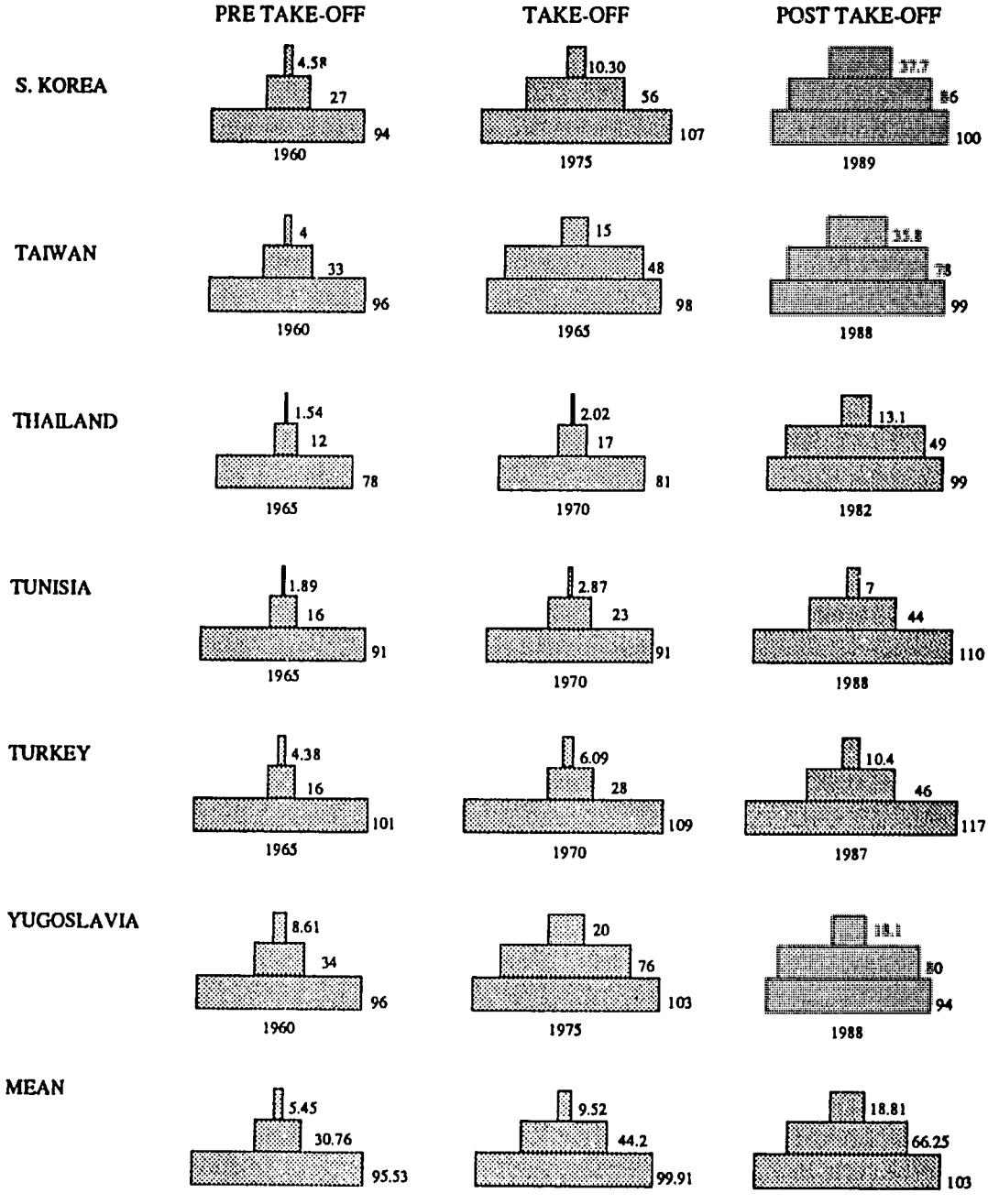


Figure IV.14
Total Enrollment Ratios by Stages of Development: Pre Take-Off

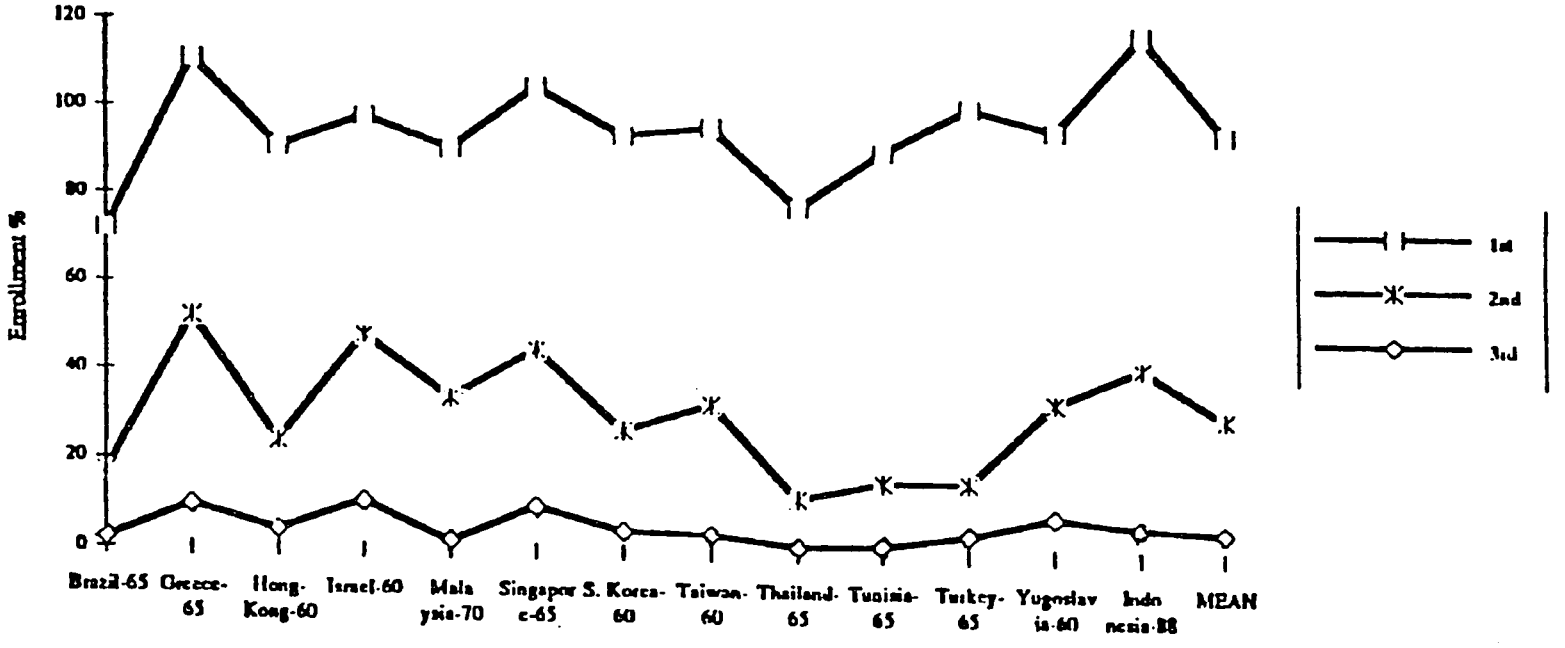


Figure IV.15
Total Enrollment Ratios by Stages of Development: Take-Off

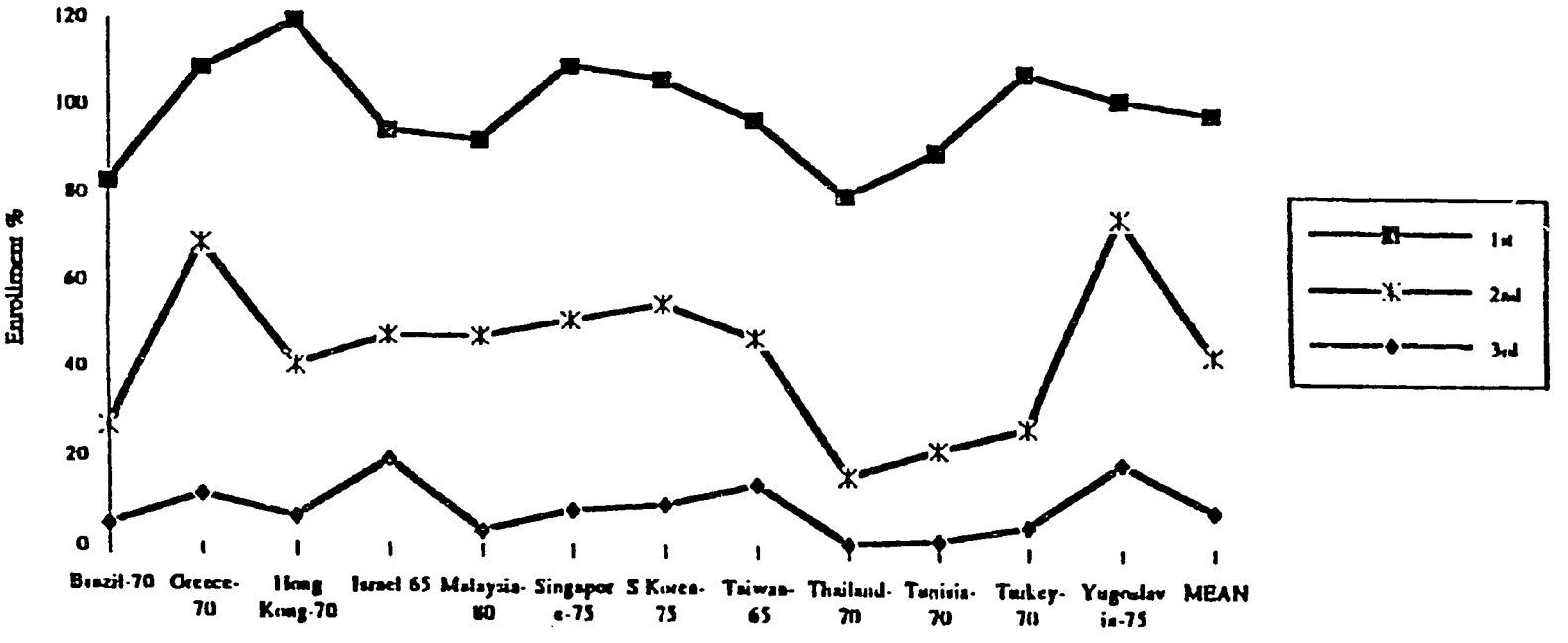
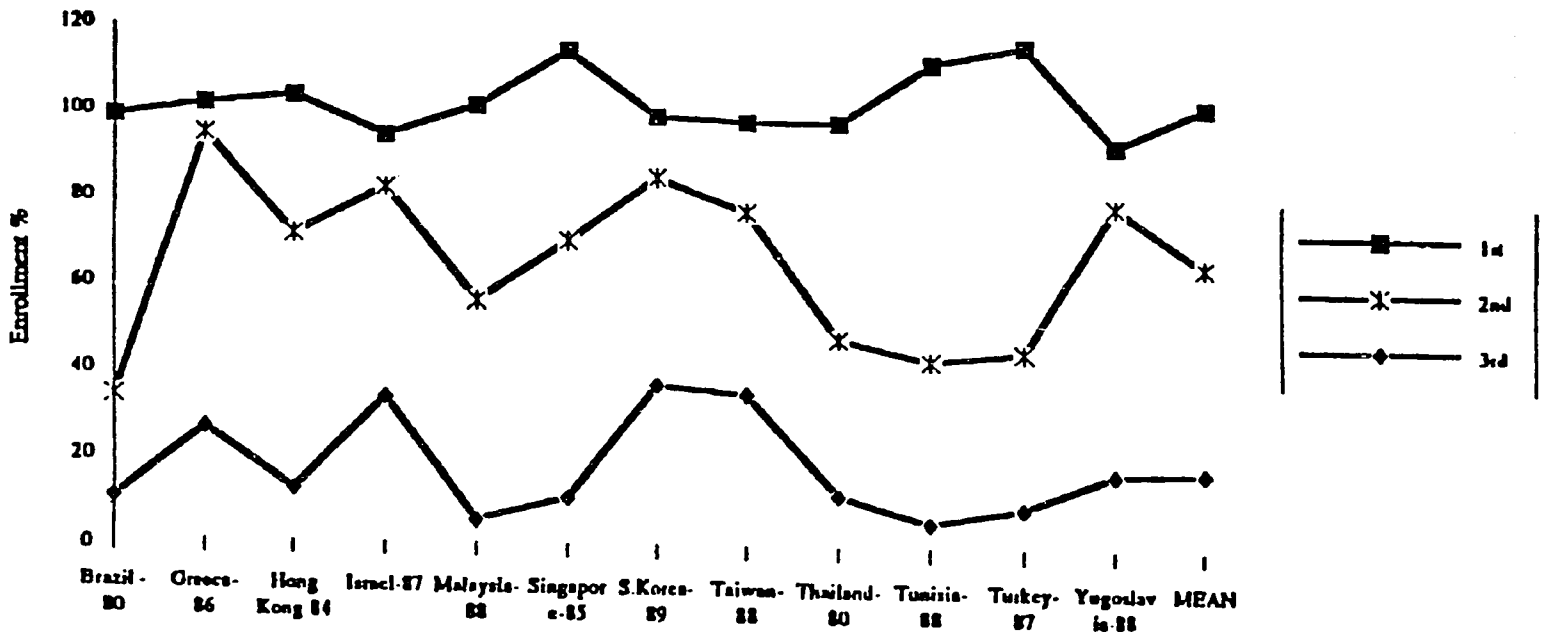


Figure IV.16
Total Enrollment Ratios by Stages of Development: Post Take-Off



Some International Comparisons of Educational Expansion in NICs and Developing Countries

Some distinct differences may be noted between educational growth patterns in our sample and the general population of developing countries. At the secondary level the countries in our sample have a much higher average – a mean enrollment ratio (e/r) of approximately 30% compared with 15% for the general population of developing countries and 17% [1960] for the whole group of "middle income" countries (as defined by UNESCO). The secondary level in our sample expands at a more rapid rate achieving a level of nearly three times that of the whole group of developing countries – a mean e/r of approximately 66% as compared with 23% for all developing countries and 30.4% for middle income countries. At the higher education level the distinction is even more dramatic. Our sample has a mean e/r of 5.4% during the pre take-off stage in 1960 compared with under 2% for the whole group and 3% for middle income countries. During the post take-off period our sample has a mean e/r of 18.8% as compared with 1986 averages for the whole group of approximately 3% and 9.4% for all middle income countries.

Table IV.4 summarizes some of the general educational similarities and differences between the NICs and developing countries. As can be seen both quantitative and qualitative differences are pronounced.

Table IV.4
Educational Comparisons: LDCs AND NICs

	LDCs	NICs
Literacy	Illiteracy rates falling. Absolute number of illiterates falling.	Illiteracy rates rapidly falling. Absolute number of illiterates greatly decreased.
Schooling	No schooling for half or more of the children. In poorest countries little chance for universal education.	Nearly attained universal primary education by take-off stage.
Quality	Low student achievement compared to western industrialized countries.	Wide range in quality between and within countries. Some countries compete well internationally in student achievement.
Efficiency	Exceedingly inefficient. Repetition rates often over 30%.	Increasingly efficient. Few repeaters at the primary level.
Equity	Highly discriminatory by gender, wealth, and demographics.	Declining gender discrimination; inequality by income and geography reduced.
Finance	Fiscal means stretched to limits. Percent of GNP spent on education declining in some countries.	Fiscal problems persist; but fiscal support continues; voluntary and private contributions expand.

III. EDUCATIONAL EXPENDITURES

The NICs show modest increase in percentage of GNP being spent on education during the 1970s and 1980s (see Table IV.1). The mean public expenditures on education as a percentage of GNP was 2.34% in 1960, 3.3% in 1970, and 4.0% in 1985. However, no clear trend is observable when examining educational expenditure as a percent of total government expenditure (see Table IV.5; Figures IV.17-19).

A breakdown of expenditures by level in our sample generally shows a decrease overtime in the percent of educational expenditure going to primary education. This is to be expected given the growth pattern of the educational system. With the first level of education recording high enrollment ratios even in the pre take-off stage, it is at the second and third levels where the most rapid growth has taken place. Our data bear out this reasoning. The only clear exceptions to this trend are Brazil and Korea. The percentage of education expenditure on the second level in general increased throughout the 1970s, yielding a mean growth of 68.8%. At the tertiary level the percentage increase in government expenditures becomes most dramatic, with several countries in our sample more than doubling the allocated proportion of national expenditures.

While there does exist some distortion when using public expenditure data, such data do provide an adequate indication of educational effort. Educational expenditure as a percent of national output is generally considered to be a reliable indicator of national educational effort. The data in Table III.2 illustrate that the Newly Industrialized Countries have demonstrated an increased effort throughout the three decade period in question. The lone exception to this increased expenditure is Turkey, which remained fairly constant until the mid 1980s. The remaining NICs all show greater effort in the post take-off stage than in the pre take-off. It is also worth noting that the educational effort nationally peaked during or shortly after take-off. This is particularly interesting since these countries, by definition, showed superlative economic growth during this period.

Table IV.5
Educational Expenditure as Percent of GNP

Country	1960	1965	1970	1975	1980	1985
Brazil	2.6	1.4	2.8	3	3.4	3.3
Greece	1.8	2.8	2.1	2	2.2(79)	2.9
Hong Kong	1.5	1.5	3	2.7	2.5	2.8(84)
Indonesia	0.7	-	2.8	2.7	1.9	2(81)
Israel	3	8.7	-	6.7	8.4	6.8
Malaysia	-	-	-	6	6.2	6.6
Singapore	-	-	3	2.9	2.9	-
S. Korea	-	-	4.6	2.2	3.7	4.8
Taiwan	3.3	3.4	-	-	-	5.2(84)
Thailand	2.8	3.7	3.5	3.6	3.3	3.9
Turkey	2.9	2.9	3	2.8	2.7	2.3
Yugoslavia	2.5	4.5	4.9	5.4	5	3.4

SOURCE: UNESCO, (1989). *UNESCO Statistical Yearbook*, Paris.

Figure IV.17
Expenditure for Primary Education as Percent of Total Educational Expenditure

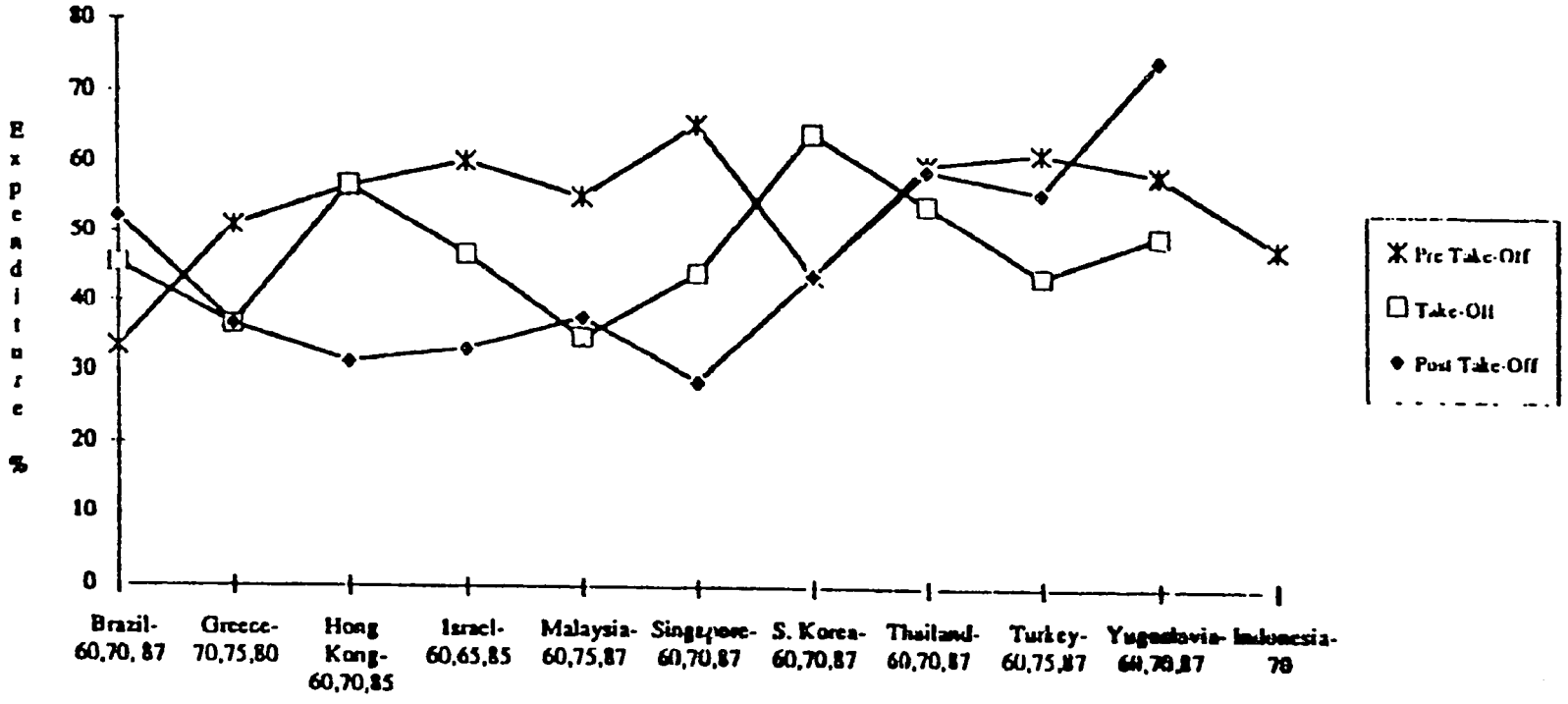


Figure IV.18
Expenditure for Secondary Education as Percent of Total Educational Expenditure

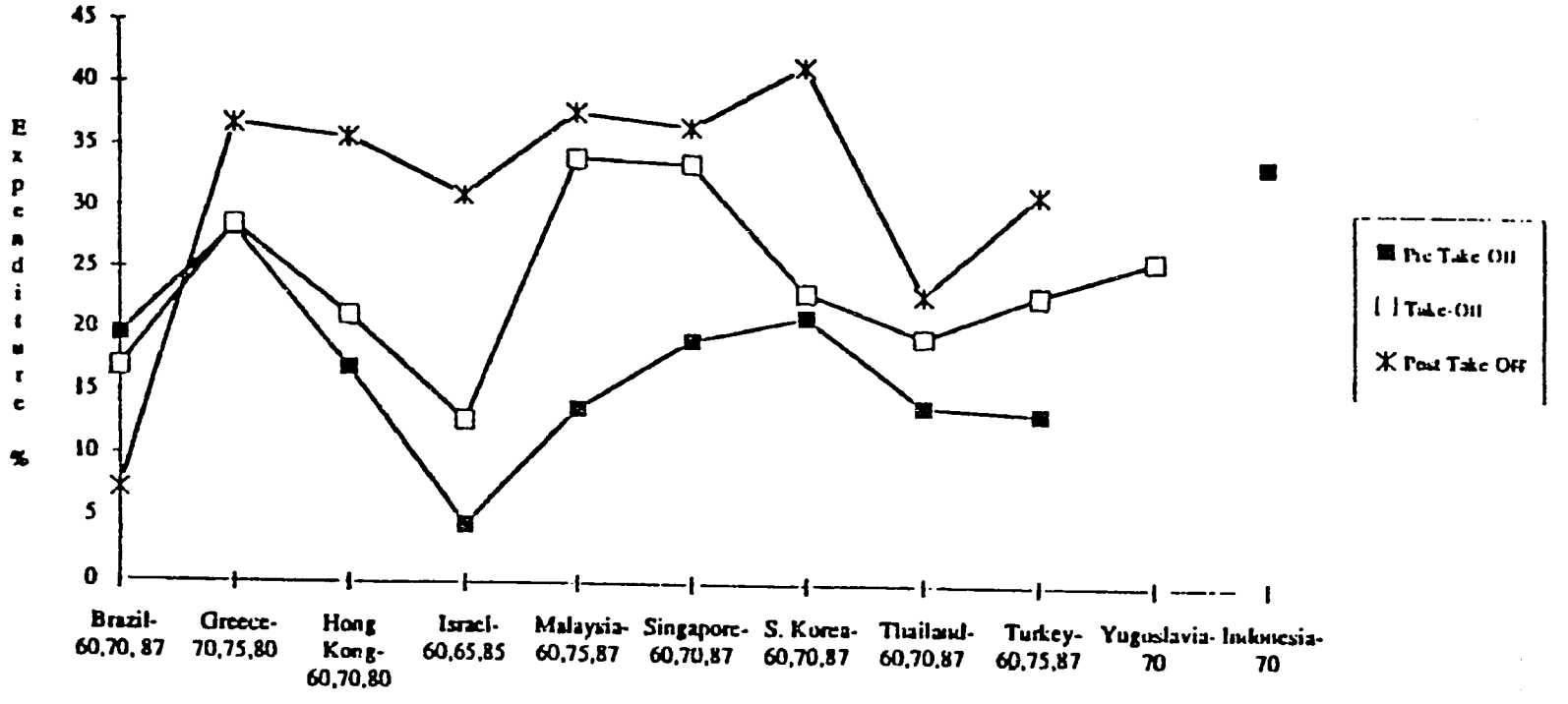
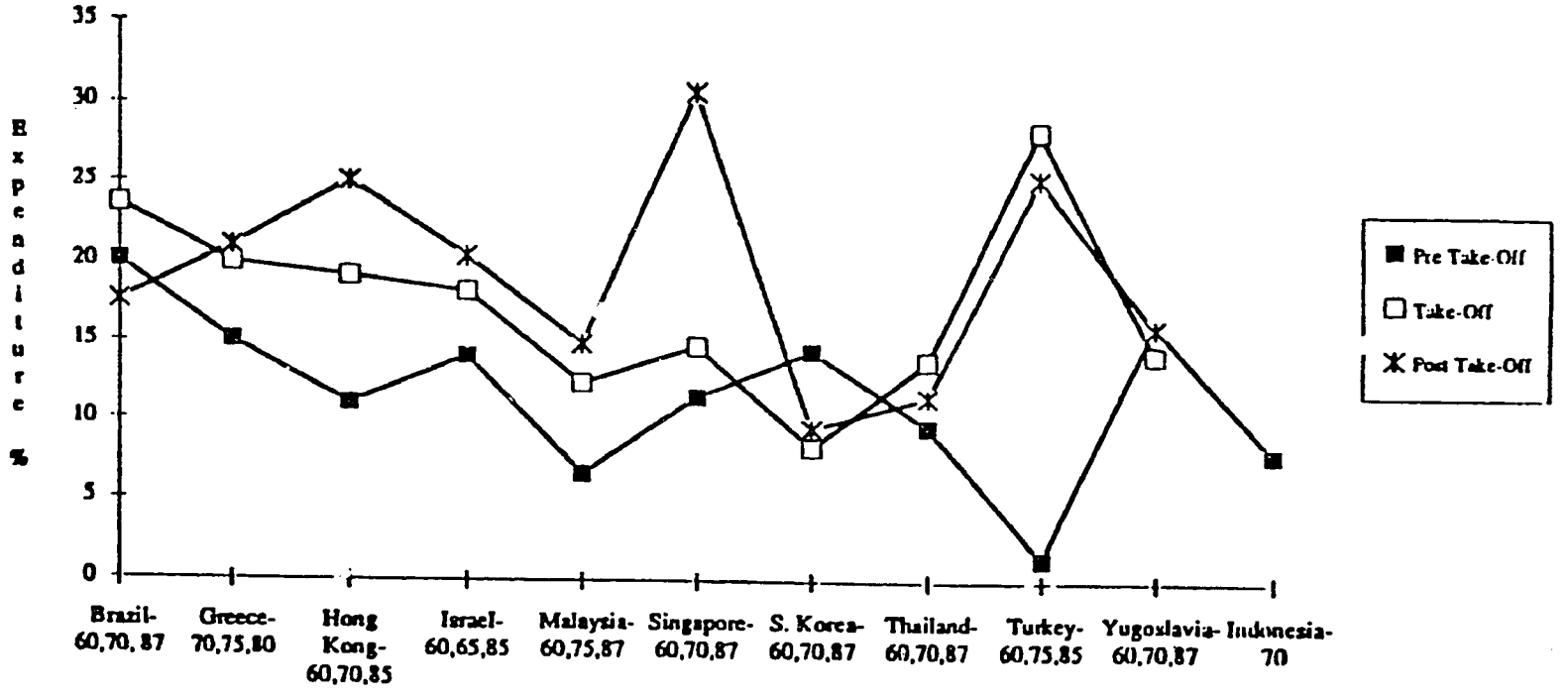


Figure IV.19
Expenditure for Tertiary Education as Percent of Total Educational Expenditure



The data from Table IV.6 show a discernable pattern of educational expenditures as a percentage of total government expenditure. The majority of countries show some decline in expenditure. One country, Thailand, first increased then later decreased its fraction of national budget spent on education. Since the range of values is so small an analysis of means seems inappropriate.

As with other national measures those on governmental educational expenditures must be interpreted with care. Private and voluntary expenditures may be significant but unrecognized in these statistics. It has been estimatedthat in Korea voluntary contributions in the 1970s added to those of the government brought the expenditures to 9% of GNP (Chun, 1991). Also ignored are a wide variety of contributions, payment in kind, free labor and other efforts to support schools which may be made at the local level.

Table IV.6
Educational Expenditure as Percent of Total Government Expenditure

Country	1965	1970	1975	1980	1985
Brazil	11.9	10.8	16	-	17.2
Greece	12.2	9.6	8	8.4(79)	7.5
Hong Kong	-	22.8	20.7	14.6	18.7
Indonesia	-	-	13.1	8.9	9.3
Israel	-	-	7.6	7.3	8.6
Malaysia	-	-	19.3	16.4	16.3
Singapore	-	11.7	8.6	7.3	-
S. Korea	19	24.6	13.9	23.7	28.2
Taiwan	-	21.6	-	-	16.6
Thailand	17.4	19.1	21	20.6	18.5
Turkey	19	13.7	10.5	10.5	-
Yugoslavia	-	-	24.4	32.5	-

SOURCE: UNESCO, (1989). *UNESCO Statistical Yearbook*, Paris.

The NICs in general have been responsive to a number of policies which have been recommended by international agencies and individual researchers to cope with the crisis of financing education in the developing countries (McMahon, ND). Most recommendations have centered around private financing and can be captured in three broad policy options: (1) recovery of costs and reallocation of resources; (2) provision of loans and selective scholarships; and (3) decentralization of management (World Bank, 1986). The first policy above refers to recovering public costs, particularly those of higher education, and reallocating government spending on those educational levels and programs with the highest social returns. Providing student loans and scholarships, again especially in higher education, is an attempt to avoid a selection process biased against lower income students. Options (1) and (2) have been a major component of policy in Korea, Malaysia, Thailand and Greece. Policies of educational decentralization are based on the expectation that community based schooling, public and private, would encourage competition and thereby increase internal and external efficiency.

Several NICs have experimented with various forms of decentralization. Brazil, for example, has delegated the responsibility for financing primary education to state and local governments.

IV. EDUCATION, SOCIAL, POLITICAL AND VALUES CHANGE[1]

Education is linked to a variety of social, political and individual changes which are associated with industrialization. In addition to being a central feature of the contemporary state, education is recognized as an organized network of cognitive and socializing experiences which prepares individuals to act in modern society through its allocation and legitimation of the entire populace in their adult roles. Given its combined institutional and individual effects education emerges as a powerful agent contributing to the transformation of society and to the rate of industrial take-off.

Education, Social and Cultural Change

Although much remains unknown about the mechanisms through which education's influence is spread, basic education, literacy and numeracy are considered essential to the development of cognitive capacities necessary for functioning in modern societies. In addition to cognitive learnings there are attitudinal outcomes of schooling important to social and cultural change.

Modernization theory developed in the 1960s by (Inkeles, 1966) and others hypothesized that individuals acquired certain "modern" attitudes under the influence of schooling and industrializing society. Basically Inkeles' research focussed on attitudes toward new technologies and their application, faith in western science, independence from familial and communal authority, allegiance to institutions of secular authority, values relating to social mobility, beliefs about control of the future, interest in civic and political affairs, and cosmopolitan concerns with events outside the realm of family, community, and kinship group. (Inkeles and Smith, 1974)

A substantial body of empirical research in both developed and developing countries has been generated in support of the claim that schooling contributes to individual modernity. On the basis of this research Inkeles states flatly: "In large-scale complex societies no attribute of the person predicts his attitudes, values,and behavior more consistently or more powerfully than the amount of schooling he has received."

A number of studies of individual modernity have been undertaken within our sample of rapidly industrializing countries. In an earlier study on East Asia the authors described the changes in values associated with increased levels of education. Research in Brazil (Holsinger, 1974) of groups of children having different levels of exposure to schooling showed that the greater the exposure to the school, the higher the score on a test of modernity. Even variations of a few months produced statistically significant results. In a study of the impact of education on individual modernity in Tunisia, Sack found that the quantity of formal schooling, the subject's reported rank in the last year of school he/she attended, overseas experience, and control with the mass media had consistent effects on measures of modernity. Somewhat surprising was the finding that "those individuals coming from families of less educationed parents have somewhat higher modernity scores than individuals whose parents were more educated."

In Turkey students at the secondary level were found to be strongly secular, prefer foreign films, enjoy western music, show higher interest in politics, favor government "by the people," and to profess more liberal views about the role of women to a degree greater than the general Turkish population. As would be expected the students with urban background tend to be more "modern" in

1 The monograph from which this chapter is developed contains a section titled "Education and Quality of Life." However, much of the content of that section is covered in other chapters of this volume and therefore is omitted here.

their views than those from rural areas. Even small amounts of schooling or literacy training have been shown to make a difference in people's behavior. A case study in rural Turkey during that country's pre take-off stage may be roughly representative of changes associated with increases in literacy. (Sacks, 1974; Weiker, 1981)

Research results from Brazil, Tunisia, Israel and a number of Pacific Rim countries indicate that the amount of schooling along with performance in school, but irrespective of the type of school courses, is a powerful influence in the socialization process of modernity. Schools, then, contribute something other than cognitive learning to the modernizing process of individuas. The most common hypotheses concerning the key characteristics of the schooling process are: (1) schooling integrates pupils into large-scale, rationally organized institutions, and (2) schooling confers new status on individuals. With regard to (1) above, education systems may be seen as one of a society's first modern institutions whose intra system relationships tend to stress universalistic values and achievement based norms. Moreover, in support of (2) above, school certificates are usually perceived as automatically bestowing modernity.

There is debate as to how important individual attitudes and values are in national development. Some scholars argue that social structural changes are the only factors fundamental to economic growth and major social change. Whether attitudinal changes are prerequisite for structural change or vice versa may be debated for a long time. In the NICs a number of social, cultural and individual changes appear to be integral to the process of industrialization. White collar middle classes emerged [The Singaporean government in 1987 claimed that Singapore was 80% middle class (Wilkinson, 1988)]. Increasingly changes in social stratification became visible with new attitudes, values and behavior patterns emerging which were different from those held by previous generations. In general the new, better educated groups were more knowledgeable, more cosmopolitan, more politically aware, and made more use of the technology of information and communication. Schooling, professional training and technical knowledge played an increasingly important role economically, culturally, and in affairs of the state.

However, industrialization and economic growth can be a mixed blessing. Unfulfilled expectaions may lead to individaul frustration and group alienation. A study of Tunisian youth in the early 1970s showed that while 49% of their fathers were unskilled or semi-skilled workers not one of the boys expected to follow his father's occupation. Although only 10% of the fathers were white collar workers or professionals, 60% of the sons expected to become professionals. Studies yielding similar, but in East Asian countries less dramatic, results are found throughout our sample.

In every country in our sample criticism has been forthcoming about some of the recent social and cultural changes. Complaints are printed or voiced in the media concerning "imitation of the West," breakdown of "traditional" values, creation of a spiritual vacuum, dissolution of the historical role of the family, the alienation of young from old, and the increase in greed and crime. Some of these interpretations are bulwarked by the academic research of local and international scholars. Although social scientists generally have looked favorably at development efforts, a number have presented arguments in favor of slower growth which would allow better planning to reduce physical congestion, combat crime and avoid dangers to mental health. Economists on the whole appear to be more optimistic regarding the results of economic growth than anthropologists and sociologists.

Education and Political Behavior

The relationship between education and political power which was the main concern of early studies of education and political development persists as an area of interest to researchers and policy makers. The key concepts most often used in relating education to political development are "integration" and "participation." Integration refers to the creation of unity and solidarity, fostering a sense of national identity over and above ethnic, religious, regional or class identity. Participation

refers to broad political mobilization, e.g., voting, and, in more traditional social organizations, to becoming part of the modernization process (Coleman, 1965).

Mass education in contributing to the definition and building of nations classifies people as citizens and establishes their membership in the nation over and above membership in the various subgroups (Meyer, 1980). Education thus creates and expands the assumption of homogeneity, while at the same time, providing "cultural capital," establishing a scholastic "nobility" (e.g., doctors and engineers, administrators and managers, etc.). In societies with a developed mass education system, both masses and elites may be found to perceive more common interests and ideas in the population, and less conflict and diversity.

There is perhaps a tension between the concepts of "nation state" and "nationalism" arising from the fact that nationalism presupposes the image of the nation as a manifest, latent or desired form of collective identity and supports the assumption that the nation-state should be a form of political organization (Giddens, 1985). One definition of nationalism is: "The affiliation of individuals to a set of symbols and beliefs emphasizing community among the members of a political order." (Weiker, 1981, p. 40).

A national educational system must assimilate many of the myths, memories and symbols of the existing ethnic groups and religions; on the other hand, through the introduction of such disciplines as science and mathematics the national culture is linked to the world culture. This tension between the particularistic elements of nationalism and the universalistic potential of international knowledge can be neutralized by conceptualizing a new construct e.g., Pancasila, the national ideology of Indonesia. Thus Pancasilan economics creates "national knowledge."

Both the traditional and the modern ingredients of nationhood have integrative functions to fulfill. If nations and nationalism can be understood as changing mixtures of modern and pre modern elements, then the education system may influence, if not control, the permanent presence of traditions within modernity, while formally reconstructing, reorganizing and expanding the socially defined categories for personnel and of knowledge in a modern society.

Education contributes to political knowledge, alters political behavior, and in general becomes increasingly a criterion for high governmental or political office. Our sample provides several examples of the increasing importance of education to political, governmental, and military leadership as countries begin to industrialize and proceed through the take-off period.

Again, although the evidence of certain educational outcomes is reasonably clear, the precise educational processes leading to these effects is not known. Most studies involve use of system or sector level indicators and examine relationships through correlational or regression analyses. Detailed insights into which school processes transform the attitudes and knowledge of students within given contexts remains somewhat a mystery.

Through cognitive learnings and attitude formation education politicizes, depoliticizes, and increases participation in the civic culture. Given the high economic and educational growth rates in the NICs, an attempt was made to explore briefly the changes in political and civil rights and to compare these changes with the global population of countries (see Table IV.7 and Figures IV.20-21).

The numbers in the tables and figures refer to a ratings index developed to measure the relative freedom allowed in the respective country. Hence, the numbers have no absolute meaning, only comparative. In each scale a rating of (1) is deemed most free and (7) least free. For example, a political electoral process where those elected clearly rule would be rated (1). Ineffectiveness in the process would result in a reduction in rating to (2). Political ratings of (3) through (5) represent successively less effective democratic processes. Nations at (6) do not allow for competitive electoral processes, while those with a (7) rating feel little constraint from public opinion or tradition.

Table IV.7
Political Rights and Civil Rights Index For NICs

COUNTRY	72	74	76	78	80	82	84	86	88
Brazil (P.R.)	5	4	4	4	4	3	3	2	2
(C.R.)	5	4	5	4	3	3	3	2	3
Greece	6	2	2	2	2	1	2	2	2
	6	2	2	2	2	2	2	2	2
Indonesia	5	5	5	5	5	5	5	5	5
	5	5	5	5	5	5	6	6	5
Israel	2	2	2	2	2	2	2	2	2
	3	3	3	2	2	2	2	2	2
Malaysia	2	3	3	3	3	3	3	3	4
	3	3	4	3	4	4	5	5	5
S. Korea	5	5	5	5	5	5	5	4	2
	6	6	6	5	6	6	5	5	3
Singapore	5	5	5	5	5	4	4	4	4
	5	5	5	5	5	5	5	5	5
Taiwan	6	6	5	5	6	5	5	5	5
	5	5	5	4	5	5	5	5	3
Thailand	7	5	6	6	3	3	3	3	3
	5	3	6	4	4	4	4	3	3
Tunisia	6	6	6	6	6	5	5	6	6
	5	5	5	5	5	5	5	5	4
Turkey	3	2	2	2	5	4	3	3	2
	4	3	3	3	5	5	5	4	4
Yugoslavia	6	6	6	6	6	6	6	6	5
	6	6	6	5	5	5	5	5	5
Pol. R. Mean	4.6	4.1	4.1	4.1	4.1	3.7	3.7	3.6	3.4
Civ. E. Mean	4.6	3.9	4.4	4.2	4.2	4.2	4.2	4.0	3.6
Global Pol. R. Mean	4.3	4.4	4.4	4.2	4.1	4.0	4.0	3.9	3.7
Global Civ. R. Mean	4.2	4.1	4.2	4.1	4.1	4.1	4.2	4.1	4.0

(Global data N= 111)
SOURCE:
Gastil, Raymond D. (1989). *Freedom in the World*, Freedom House, New York.
NOTES:
P.R. = Political Rights.
C.R. = Civil Rights.

Figure IV.20
Civil Rights Index

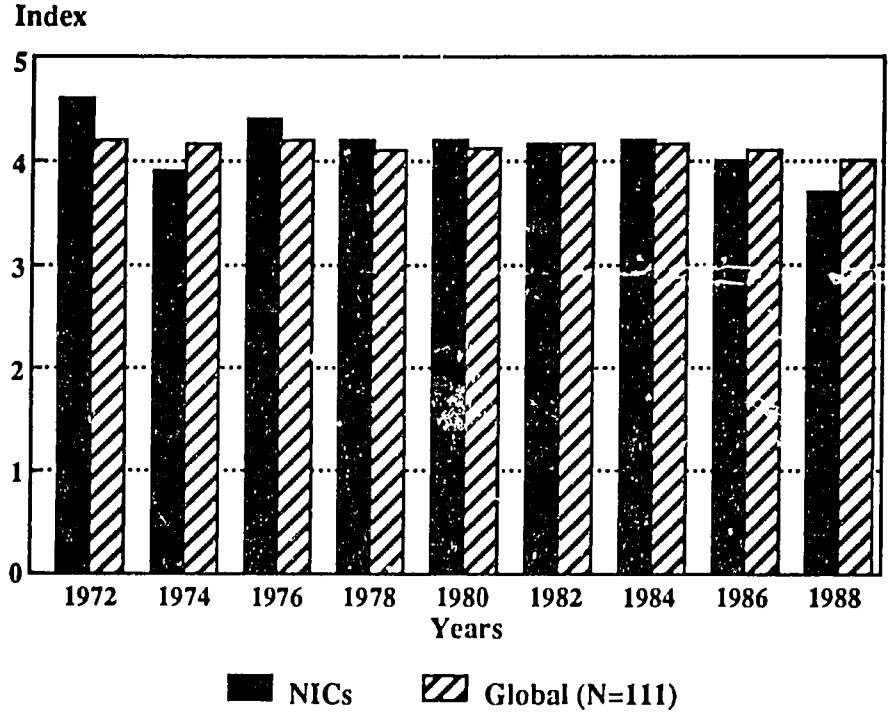
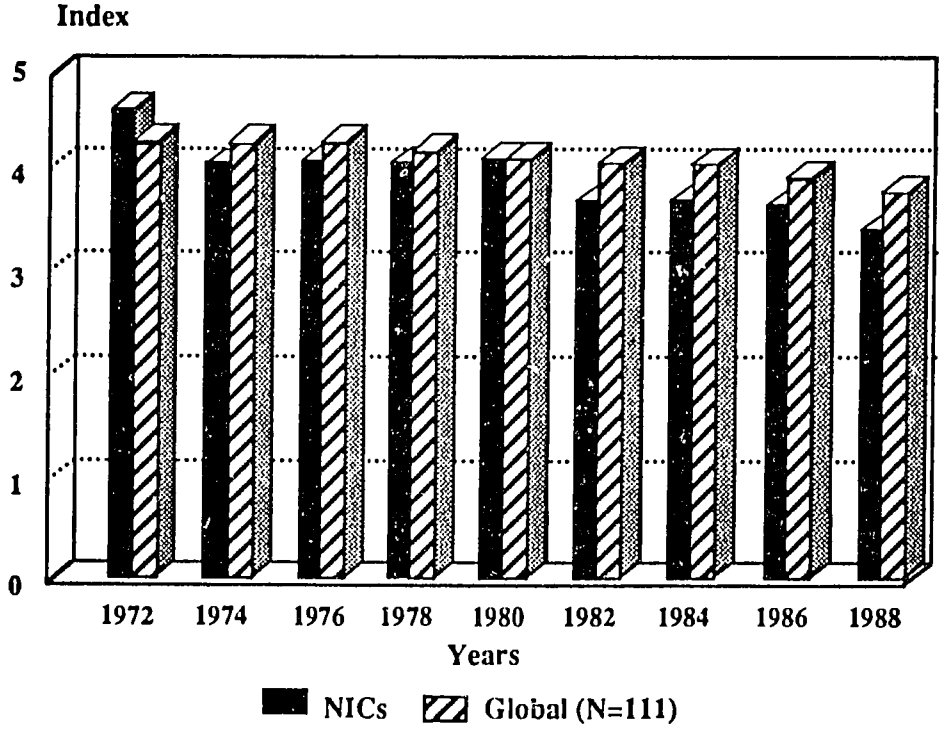


Figure IV.21
Political Rights Index



A similar interpretation applies to the civil rights scale. A rating of (1) indicates an open society where expression of opinion is not suppressed (even when it attempts to affect political change), individuals are protected by the courts, private rights are generally respected throughout the nation's institutions, and citizens feel no threat to voicing their opinions. Movement down from (2) to (7) represents a steady loss of these freedoms.

Data available for the 1970s and 1980s indicate that the individual's freedom in the NICs has increased. This is particularly true for political freedom in Brazil, Greece, Korea and Thailand. The remaining countries, excluding Malaysia, showed little or no change during the period. Malaysia actually saw its political freedom indicator decrease. The average of the NICs showed far greater improvement over time than the global mean. (A 26% reduction for the NICs as compared to a 14.0% decrease globally.)

Less clear patterns are illustrated in terms of the changes in civil rights occurring over the same period. Brazil, Greece and Korea exhibited substantial increases in civil rights while most of the remaining countries either improved slightly or remained constant. Civil rights in Malaysia worsened. As a whole, the NICs show better comparative improvement in the civil rights index than in the political rights. The sample was below the global average in 1972 but by 1988 had reversed this relationship. Also, the average change favored the NICs. (There was a reduction of the civil rights index of 14% for the sample compared to only 4.8% globally.)

Education and Equity

Education directly and indirectly has impact on the distribution of many of the goods and services of society. The distribution of education itself has become a major issue worldwide (Psacharopoulos, 1991). A considerable body of literature exists on 'equality of educational opportunity' and considerable controversy exists over the meaning of this phrase and strategies for its attainment.

Unfortunately much of the literature on education and development does not make careful distinctions in possible meanings of equality and equity. The term 'equal access', which may refer to making resources e.g., facilities, instruction, available to groups or individuals, is used so loosely that it is at best minimally adequate for analysis of equal educational opportunity. The terms 'equal use', 'equal resources' and 'equal results' are only incrementally clearer than 'equal access'. Do students make equal use of a resource simply because they are in the same school or class? Neither equal access nor equal use lend themselves easily to public policy. Although equal resources and equal results are subject to different interpretations, they offer more potential for establishing criteria for equality of educational opportunity.

In general our sample shows increased opportunities for educational access as the nations industrialize. In Turkey, for example in the early 1960s, fewer than three of every hundred primary school students could expect to continue to the lycée. Weiker notes that in the early 1970s 42.6% of the primary school graduates entered a middle school the following year, and in the same year the number of students entering lycées was about 64% of the number middle school graduates the previous year.

However, our sample also shows that inequalities persist in the distribution of education. Ascriptive criteria continue to be significant in determining who receives higher education. In Turkey 1973 data show that the distribution of social backgrounds of those taking the university entrance examination was very different from the distribution of social backgrounds in the country as a whole. A farm child had one/tenth the chance of the child of a merchant to proceed to the university.

Some NICs, e.g., Korea and Taiwan, in income and education distributions are more equitable than several Western European countries. Taiwan, in particular, has decreased income gaps and gender gaps in advanced education. However, gender inequities in the workplace and in education

persist in most NICs. Women in the labor force are on the increase in the Pacific Rim countries and for younger age groups is approaching rates found in the industrialized countries. Yet the stereotypes of "women's work" still persists. And gender inequalities in educational opportunity, particularly in rural areas, remain severe in Turkey and Tunisia.

V. EDUCATION STRATEGIES AND POLICIES

The set of rapidly industrializing countries examined here exhibits several different characteristics from the total population of developing countries. These distinct features are reflected in educational growth and development, economic growth and structural change, social and political values and behavior, quality of life and social and educational policies. Educationally, our sample of countries, when compared to developing countries in general, has shown: higher literacy; higher enrollment ratios; higher internal efficiency; higher expenditures and more intra country and intra gender equity in educational attainment. In terms of economic and social change, again by comparison with the general population of developing countries, our sample on the whole has experienced: more rapid economic growth; attained more equitable distribution of wealth; achieved higher levels of quality of life; acquired more "modern" individual attitudes and social behavior; and enjoyed more extensive political and civil rights.

Strategies and Policies

Educational policies and strategies are very much context based. Experience has repeatedly demonstrated that strategies which are successful in one country may fail badly in another and vice versa. Although any attempt at generalization is risky business, the danger may be worth the effort. The following represent some very tentative general policies and strategies which appear to have been useful to the NICs and may be worthy of consideration for other countries at the take-off stage.

(1.) Important preconditions for educational growth (and perhaps for rapid industrial development) include demonstrated, persistent political commitment to development and at least a minimum level of political stability. In several of the countries of our sample, for example, the state was sufficiently secure and strong to implement significant land reform during the pre take-off stage. (Luis Crouch has noted this condition in his studies.) Demonstrated also in the NICs was early and continuing political support for education in the form of adequate educational financing, enabling laws and competent leadership.

(2.) The complex interaction of individual propensities, schooling, literacy, and new production technologies in economic development remain inadequately understood. Our knowledge of these interrelationships, their timing and their contextual constraints is often insufficient to yield clear policies. Nevertheless, a highly visible national commitment to the provision of, and access to, basic and mass education for all citizens appears to be important during the pre take-off and take-off stages. All NICs committed themselves early on to be a well developed basic education system committed to laying a foundation for human resource development, increasing rural productivity and reducing rural poverty, and improving family health and nutrition. The demonstration of national resolve in our sample was thus reflected in the multiple expectations for education - including the extension of national culture and national language(s), the creation of good citizens and workers, and contributions to the reproduction and distribution of cultural status.

(3.) Advanced education, appropriately relevant and qualitatively acceptable, is crucial to the long term goals of industrializing nations and increasingly integral to individual aspirations. Additionally, advanced education contributes to the effort toward gaining recognition and legitimacy in the larger world system of modern nation states. However, the roles of secondary and higher education are somewhat less clear than those of primary education and the experience of the NICs

suggests that a range of strategies may be followed. No clear direction is provided on major policy issues pertaining to equitable delivery, size, funding, organization, or degree of vocationalization.

The NICs, however, did recognize that expansion and development of secondary education and higher education should not be based on theories justifying expansion of basic expansion. Secondary education, for example, has been found, globally, to have a more significant effect on the distribution of income than primary education. Higher education, in particular, in the NICs has not only allocated individuals to fixed positions but also has created new types of knowledge and specialized social positions, with political and social consequences. The experience of the NICs has demonstrated that flexibility in planning and management competence are required in coping with the pressing demands for levels of access to higher education which may generate unemployable graduates. Although no NIC developed a long term, fully satisfactory policy on higher education, promising innovations and experiments were forthcoming in the form of new selection devices, e.g., lottery system, multiple academic track systems, e.g., colleges, universities; and alternative "second chance" systems. However, the NICs in our study were only partly successful in coping, for example, with the "inverted pyramid syndrome" where students typically want to be lawyers and financiers, when the country "needs" technicians (see Figure IV.22). During the take-off period in particular, the aspirations of students at the secondary and higher education levels tend to focus on professional goals and industrial and agricultural occupations become less attractive. Anticipation of the potential gap between student aspirations and manpower demands allows governments and private sectors the opportunities to adjust incentives and regulate delivery systems to reduce this imbalance.

(4.) Inequities in the distribution of income, education and the other benefits of development can not be ignored over long periods of time. The appropriate strategy for addressing inequalities in educational opportunity depends on the choice among possible conceptualizations of equity. In general, however, to promote more equality of educational opportunity the educational system often must undergo several modes of growth including vertical and horizontal expansion, and differentiation of programs. The NICs used several policy options to reduce educational inequities including; preschool education; free education and student aid; special incentives to females; life long education; reform of teacher education; extra curricular activities; and institutional adjustments in schooling.

(5.) Governmental and administrative competence are clearly important in all stages of educational growth but conditions of competence do not necessarily imply reliance on centralized, detailed national educational planning. Moreover, the appropriate roles of various levels of government may vary over time and context. Two basic choices appear to be available: Basically the government can act as a regulator or as an "illustrator" in contributing to educational reform. As a regulator, government can mandate reforms through laws and policies. The regulatory approach to reform tends to draw on rational and bureaucratic assumptions of how to plan and implement educational change. Under this model certain conditions must be met: the goals must be clear; the relation between inputs and outputs must be known; inputs must be controllable; the tasks of all actors involved must be specified; and the fidelity of the change with the original objective must be measureable.

As an "illustrator" the government can act as an advocate of preferred educational programs and projects. The government can sponsor exemplar technology and innovations. The defined role of the government in educational decisions and in the type of reform under consideration may determine the choice of appropriate model. When the government has few resources or when the reform in question is complex or uncertain the illustrator role may be the only reasonable option.

The governments in our sample countries tended, particularly in the early stages of development, to assume a regulatory function with respect to education. Several at one time or another developed national educational plans. Much of the funding for all levels of education comes from central or provincial governments. Teachers are typically civil servants. Yet the illustrator function also has

been widely practiced, a change growing partly out of the inadequacy of reform flowing from a regulatory approach . In several NICs the private sector has been strongly encouraged to participate as a partner in the provision of education and has received a variety of incentives for doing so. It would seem that the success which governments experienced as contibutors in educational reforms resulted not so much from the creation of elaborate national plans (although these were forthcoming) as in their willingness to be pragmatic in their choice of roles and in their skills at implementation.

(6.) Several of the NICs (e.g., Singapore, Malaysia, Israel) are still learning how to cope with linquisite, ethnic and cultural divisions. Although national policies pertaining to these differences vary greatly, governments and educators have increasingly realized that education has a significant role to play with respect to potential intergroup conflict. Lack of intergroup parity in educational opportunity may itself be a source of dispute. Education also helps to create leaders of the various factions. On the other hand, education, if responsive to group culture and tradition, can provide opportunities for the symbolic expression of group identity. Education through legitimation of an elite and accularation of the masses can assist a policy of assimilation; or, by contrast, educational objectives and programs can be made adaptable and supportive of group autonomy. At minimum, education and development policies can be so designed that intergroup conflict is not increased.

(7.) There is, among the NICs varying levels of dissatisfaction and concern about the loss of traditional values and institutions and the dangers of permissiveness, decadence and individualism. Some governments have been particularity disturbed by displays of "alien" culture by nonconforming youth in their behavior, clothing, music, and "hanging out." Within our sample of countries, Singapore, took the most aggressive actions to stem what the government viewed as amorality among the youth adopting Western values and patterns of behavior. The measures taken in attempts to control the media, education, recreation, and even choice of marriage partner have been considered drastic by many observers. Although this rather extreme attempt at social engineering probably would be unacceptable in many societies, countries now at the take-off stage can become more proactive in considering feasible options if faced with the social and cultural problems common to the NICs in our sample.

(8.) Approaches to educational planning and policy making underwent radical change in many of the NICs in the 1970s and 1980s. As the discussion above indicates, cumulative experience and research are beginning to generate tentative insights about the growth of education and about the linkages between education, social and cultural change. We know somewhat more than we did 20 or 30 years ago (when most NICs were entering the take-off stage) about the outcomes of schooling. Evidence is nearly always, however, limited and usually subject to controversy. Most importantly the extant knowledge often does not add up to a specific strategy for the optimization of educational investments for development. These conditions of uncertainty suggest the wisdom of the movement found in most NICs away from rigid centralized, detailed educational planning toward a more flexible, participatory, form of planning.

Our study of NICs has perhaps underemphasized a persisting question. The most fundamental difficulty with which NICs are struggling pertains to what kind of future society, what basic values, and "way of life" should be chosen for the future. There is currently a profound search for cultural identity and moral integration in many of these countries. Which new patterns of social roles and human relationships are acceptable? What criteria other than historical traditions may help in this choice? Perhaps the most perplexing educational dilemma facing educational policy makers in rapidly developing countries is determining which programs and policies can best educate children and adults for the future and at the same time strengthen rather than weaken their cultural heritage and cultural identity.

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V

Technology and Human Capital Formation: Implications for Indonesia's 25 Year Education Goals

Walter W. McMahon, Rony Bishry, and Moegiadi

ABSTRACT

This chapter considers how technology, which is generally recognized as a very major engine of economic growth, must be disseminated and widely utilized in production processes before it can be effective. It reviews worldwide research on how mass education has preceded effective use of technology in production in the industrial and newly industrializing countires. This research also suggests that as Indonesia is more widely exposed to the newer technologies, the demand for those with more and better quality secondary and higher education can be expected to grow the most rapidly.

This dependence of technology on education for effective use in production implies that the education system is one of the most important policy tools to lever or accelerate the introduction of new production and management technologies and hence accelerate the industrial development process. Although students need to be attracted to good quality education in engineering and the physical sciences at all levels, other fields also use new technologies and contribute to productivity. The life sciences are basic to agricultural technologies, and the social sciences are basic to management, accounting, quality control, and economic decision skills essential to productive private production and public programs alike. Similarly good international language instruction is essential to the effective transfer of technologies.

This analysis, developed further in this chapter, concludes that the requirements for adaptation to changing technologies suggest the following 25 Year Education goals:

- Universal secondary education, stressing modern science, social science, writing/composition, logical presentation, and language instruction to better utilize Indonesia's comparative labor force advantages.
- Use of Ph.D. candidate research and teaching assistants in universities to facilitate technology transfer, apprenticeship-type training, and cost effectiveness.
- Greater government support for user-driven basic and applied research projects based on peer group review at universities to keep faculty up-to-date.
- Greater reliance on market signals to govern public support for private industry research, technology transfer (R&D), and higher level manpower development.

V

Technology and Human Capital Formation: Implications for Indonesia's 25 Year Education Goals

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This chapter reviews worldwide research on the ways in which the spread of mass basic education contributes to the dissemination and productive use of technology and the resulting contribution that is made to faster economic growth. It also considers the implications of globalization and the nature of the effects of the new technologies on the demands for educated labor. Finally it draws these implications together with data for Indonesia to see what they might imply by way of goals for the education system over the next 25 years.

The concept of "modern technologies" used in this chapter is a broad one. That is, it is not limited to physical science and engineering technologies, which are very important, but it also includes the modern technologies necessary to the efficient organization of production and those life sciences and social sciences that use the scientific method for objective, data based, hypothesis testing and problem solving. For example, with 55% of its GNP arising in agriculture, the contribution of the life sciences and agricultural economics to the many technologies used in modern agriculture and in the many small and medium sized enterprises that employ increasing numbers in the provincial towns and villages will continue to be vital indefinitely. Other examples include the skills necessary to organize and manage modern businesses and industry (e.g., accounting, management information systems, quality control, marketing, and finance strategies essential if firms are to survive), the skills necessary to manage and operate effective public programs (e.g., teacher-training, population specialists, economists' use of computers), and the skills necessary in many of the more human-capital intensive services (e.g., medicine, environmental protection, public health). The concept of modern technologies in this chapter also is not limited to a focus on vocational education at the secondary level (STM's), although this also is needed. Instead public/private partnerships are considered as a means of providing exposure to the new technologies (e.g., Wardiman Djojonegoro, 1992), and the kinds of education that equips the student to adapt to the inevitability of continuing technical change as globalization occurs is stressed.

The focus in this chapter therefore is not on technology for its own sake. It is instead on the *efficient use* of technology, and on its interdependence with education, in ways that *increase the rate of economic growth* and social development in Indonesia.

Although this paper looks at the problem from the point of view of the education system and of an economic analysis of the growth process, it is closely related to two other important recent papers dealing with aspects of the topic and (in these aspects) arriving at very similar conclusions. First, Hal Hill (1991) develops the need to strengthen education as a key policy tool for technology policy, as well as the significance of market-based and user-based R&D policies. Wardiman Djojonegoro (1992) presents comparative data revealing the relative shortage of scientists and engineers in Indonesia. He also offers a specific plan for partnership of STM's with industry in technical vocational skill training

based on Germany's successful experience with the Dual System which is very similar to the proposal on this point made in Chapter I above.

Parts I and II are an *introductory survey* of worldwide research by economists that seeks to distil the main ways that technology affects economic growth. Based on the implications of this, Part III suggests a major 25 year education goal. Part IV is an economic analysis of Indonesia's potential *comparative advantage* in labor markets. This is based on Indonesia's remarkable achievements in education to date in that universal primary education already exists, which will soon include universal education through grade 9. Part IV also considers *Indonesia's longer run potential economic advantages by field.* Since specific technologies are hardly predictable, this is confined to past data, and to a forecast of the broader areas of structural change and comparative advantage assuming that Indonesia has not chosen central economic planning but has instead chosen to go the route of a mixed market economy, and export-oriented growth strategy. Based on the implications of this analysis, Part IV suggests a major 25 year goal designed to strengthen the basic sciences and research capabilities in the universities that facilitate flexible adaptation to change, as well as a continuing orientation to market signals for identifying specific technological opportunities as they arise. Part V develops *Indonesia's potentials within higher education for more effective dissemination of technologies to industry, agriculture, and the public sector.* It suggests the importance of research being *user driven,* and being conducted within universities and firms, rather than in isolated research institutes. Part VI *summarizes the conclusions* for potential 25 Year human resource development goals involving higher education.

I. DISSEMINATION OF TECHNOLOGY AND PRODUCTIVITY GROWTH

There is virtually universal acceptance by economists that technical change both through technology transfer and the creation of new technologies is a major engine of economic growth. Using growth accounting methods, Denison (1984, Table 1.1) analyzes the contribution of the *quantity* of education to growth as schooling improves the quality of the labor force. He finds 21.5% of U.S. growth in national income per person employed from 1948-1973 was due to education. He finds about the same positive percentage point contribution from education to growth from 1973 to the present, although there has been a separate negative impact on growth from the 1973 and 1979 oil shocks and the 1981–3 recession. But beyond this, Denison's famous "residual" includes the effects from *embodiment of the new technology,* both in human capital and in physical capital. Most embodiment of technology occurs through formal education and through learning on the job, although the extent to which the latter occurs is known to be highly dependent upon the amount of prior formal education, either general education or VOTEC, assuming that the education teaches literacy, numeracy, rational thought, and is of good quality. By these means, improvements in the quality of education (which are separate from *quantity,* in Denison's estimates above) and technology together account for another 50% of the growth in the U.S. Over even longer run periods, he concludes that the percent of growth attributed to technological change and technology transfer largely through embodiment in human and physical capital is about 40%.

But it is also well known that technologies that are not put into use in production have little economic effect. So the *dissemination* of technologies through education so that they are employed in production, and dissemination through embodiment of technologies in physical capital goods is a major key to improving living standards in all countries, including Indonesia. Structural change also can be important to economic growth, such as the shift to an export-oriented growth strategy. This has a major impact on the selection of the most *efficient* technologies to be used. But much structural change is the *result,* rather than the *cause,* of technical progress. For example, the gradual shift from agriculture to manufacturing results from rising productivity in agriculture due to physical and human capital investment in agriculture, and the absorption of this labor in small and medium sized

enterprises and in industry where there has also been investment in physical capital, with education facilitating the transition. (See Chapter III above.) So the diffusion and employment of new technology made possible by investment in human and physical capital are the basic engines of growth. A gradual inter-sectoral shift from agriculture to industry is one result.

The portion of the diffusion and use of technology to be attributed to education is complicated and impossible to measure with precision. What is known is that physical capital and human capital, both of which "embody" the new technologies, are *complementary* to one another. That is, more physical capital alone, without an educated labor force, merely encounters diminishing returns and will not be effective. (See Kwag and McMahon (1992) and Griliches (1988, pp. 213-220).) This complementarity has very important implications for Indonesia. It means that considerable investment in education is needed to support the investment in physical capital, and so education is a *necessary condition for economic growth.* Otherwise diminishing returns to investment in physical capital sets in, and growth slows.

II. THE EVIDENCE

There are three kinds of evidence relevant to Indonesia of the contribution of technical progress by means of education to economic growth. The first is from the broader experience of developing and newly industrialized countries. The second is from recent research in the U.S. and other industrial countries where the availability of large micro economic data sets is more adequate, but the nature of the effects are nevertheless the same. And the third is from estimates of nested CES production functions for Indonesia and elsewhere that reveal the technical-progress/human-capital complementary, and physical-capital/human-capital complementary, that are the basis for the conclusion that education is a *necessary condition* for growth.

The Developing Countries

Richard Easterlin (1981) in his Presidential address to the Economic History Association on "Why Isn't the Whole World Developed" attributes development to the spread of technology by means of mass basic education, mostly since the end of World War II. He points out that basic technology, such as the invention of farm tractors, has been around for over 100 years. Yet such technologies had little or no impact in the two-thirds of the world that remained poor and underdeveloped prior to World War II. He stresses that the introduction of modern hybrids, fertilizers, and insecticides in agriculture and technology in industrial production depends on the capacity to keep records and to use and maintain machinery that require the mass basic education of many workers. This is less true for improvements in health for example, since one or two Ph.D. specialists plus mass vaccinations and water purification techniques require only a few highly trained people with unskilled helpers. He stresses that the kind of basic education required to use the new technologies cannot consist only of rote memorization of scriptures (as in Oman), but must stress rational thought and problem solving, together with basic knowledge of science, social science, and at least one western language. He presents a very long sweep of data for many developing countries that shows that following the spread of mass basic education after World War II, growth in those places where education expanded noticeably accelerated.

The Ways Education Contributes to Productivity. Within agriculture, T. W. Shultz (1975) forcefully states and empirically documents the proposition that more educated labor can utilize more effectively the new technology in a rapidly changing environment. He as well as M. E. Lockheed (1987), Finis Welch (1970), and others demonstrate that in "modernizing agricultural environments" where new technologies are available, the rates of return to more basic education for farmers which help them to adapt to these changes are extraordinarily high. Most of Indonesia's agriculture can be characterized as part of such a "modernizing environment," introducing new technologies in hybrid

seeds, fertilizer, animal husbandry, genetics, grain storage, mechanization, insecticides, record keeping, finance, and management. But some parts of Irian Jaya, and the East Islands are still traditional agriculture.

Within industry, where technical change is more rapid as evidenced by larger R&D investment (as a percent of output) or by more rapid productivity growth, the recognition by employers that education is productive is evidenced by the fact that more educated workers are utilized. Using Census data in the U.S. on the educational composition of the labor force in 61 manufacturing industries in 1960, 1970, and 1980, for example, Bartel and Lichtenburg (1987) find that more educated workers were utilized when the age of the equipment is younger. This effect was even stronger in the R&D intensive industries. These results held for younger workers with relatively recent vintages of education; they were not significant for workers above the age of 45.

Indonesia's Potential Comparative Advantage. It is very important that Indonesia utilize and build upon its natural advantages in competition with its neighbors if it is to achieve the highest potential growth. This utilizes the fundamental economic principles of absolute and comparative advantage. Absolute advantage means that it is not advantageous for Siberia or Japan to pour resources into producing oranges or other tropical fruits in which Indonesia and others have an *absolute* advantage. Comparative advantage, however, is even more important in terms of the educational characteristics of the labor force. Japan does not have a *comparative* advantage, and it will be less advantageous as time passes for South Korea and Taiwan, to specialize in producing products that require large relative use of labor that has a *secondary* education. This is true even though they *can* produce these types of products better than others (e.g., electronics assembly, most textiles). But they do not have a *comparative* advantage. Labor at this level of education is already relatively expensive there, and jobs are moving south to Malaysia, Thailand, and Singapore.

A trainable labor force with 12 years of senior secondary general or senior secondary VOTEC education already exists in Malaysia and Singapore so that learning on the job of job-specific skills can occur.

It is important that further economic analysis be made of the nature of Indonesia's comparative advantage with respect to human resource development over the next 25 years. This is because it is a powerful economic principle that does work, and because (underdeveloped) human resources are Indonesia's largest single resource. It is not economically viable for a nation to merely do whatever it wants to do, irrespective of the cost, and relative to the competitive payoff. The price is slow growth (e.g., Burma).

Economic analysis of the labor force in relation to nearby competitors suggests that Indonesia is unique in already having a labor force where about 62% of the new entrants have completed primary education. (Only 27% have completed high school, and only 5.7% have completed a college degree, however.) Many of the countries of South Asia and Sub-Saharan Africa do not have this, but instead have large pools of illiterate, raw, unimproved labor, combined with high population growth rates that place great financial stress on the primary education system. In contrast to Indonesia, therefore, it is unrealistic to think that they can have a labor force with universal primary education, much less secondary, for many years. These nations such as Bangladesh, India, Pakistan, Burma, Cambodia, Nepal, and Sub-Saharan Africa will continue to have a comparative advantage in producing products that require huge amounts of raw labor. It is realistic to conclude that Indonesia, together with Malaysia and Thailand, are in the best position to have a comparative advantage in industries that use labor in this high school graduate (i.e., "middle skill") range in relation to Japan, Korea, and Taiwan, but only if Indonesia improves the quality and increases the quantity of its high school graduates.

With labor with a good secondary education in short supply in Japan, Korea, and Taiwan, money capital is moving from Japan, Korea, and Taiwan to Malaysia, and to some extent to Indonesia where this type of labor in cheaper. This creates many new jobs requiring technical skills; for example,

Malaysia has become the world's largest exporter of air conditioning units. Indonesia's primary human resource comparative advantage therefore relative to the Pacific Rim lies in this middle education range, with a labor force that can adapt to the modern high school level technologies that will continue to change so that the capacity to continue to learn on the job is likely to be more important than specific entry level skills. This is also where its comparative advantage will continue to lie for the foreseeable future.

In Summary. In relation to other developing countries, it can be concluded that the continuing expansion of mass junior secondary and senior secondary education is important for technology transfer to be effective, higher technology jobs to be attracted to Indonesia and not just Malaysia, and hence for Indonesia's 'take-off' into fast growth to occur. As new technologies are introduced, the productivity of younger workers with education that has stressed problem solving and rational thought is increased in "modernizing environments" in agriculture. This advantage also applies in industry where those workers who can learn and use new technologies on the job as the result of basic science, life sciences, and management sciences in school find that the demand for their services is likely to rise the most rapidly (Bartel and Lichtenburg). Indonesia's comparative advantage for the foreseeable future lies in this middle range of labor with both senior secondary general and senior secondary vocational adaptive capacities. Burma, Bangladesh, Cambodia, Pakistan, India, and Nepal are far from the chance of achieving this, but will be in a better position to compete with Indonesia's illiterates. Hence the demand for educated workers at this secondary education level in industry, services, and agriculture is very likely to rise as technology spreads.

The Evidence From Industrial Countries

Much of the specific recent research by economists on the relation of education to technical change is based on U.S. inter-industry microeconomic data, and other evidence comes from research using international comparisons among newly industrializing countries. Its relevance to Indonesia derives from the fact that the nature and direction of the basic effects are virtually certain to be the same in Indonesia as time passes, even though their magnitude will differ.

Effects on the Demand for Workers. The evidence from many sources agrees that the demand for education and training are increased by technological change. This can be introduced by technology transfer (e.g., study abroad), investment in or importation by industry of new machines or methods that embody the new technology (e.g., computers), or investment by firms and/or by the government in basic and applied R&D (e.g., BPPT's strategic industries program, and investment in R&D at universities where the new scientists are being trained).

Studying U.S. Census data for 28 industries, Gill (1988) finds for 1960-79 and for 1970-79 that those industries with the most rapid technical change (as evidenced by Jorgenson's measures of multifactor productivity growth) *increased* their demand for workers with more than high school (12 yrs.). Lillard and Tan (1986) find more on the job training is done by those firms in technologically progressive sectors. Tan (1987) using the Current Population Survey micro data sample finds that long term 1947-73 productivity growth indicating rapid technical change had a *positive* effect that increased in-house training, and a *negative* effect that decreased outside formal vocational school training. This point is also made by Wardiman Djojonegoro (1992). Shorter run effects (1973-79) were different but this was a period during which productivity growth and technical change were beginning to stagnate in the U.S. Jacob Mincer (1988) found for 18 industries from 1968-82 that where technical change is *more* rapid, the proportion of workers with high school education or above is *larger*. His study imposed a number of additional controls, and confirms the preceding results. But he also finds that as technology ages in an industry, fewer educated workers are needed to handle it. All studies addressing the question find that the stimulus that technical change provides to the demand for educated workers is more pronounced for younger workers than for the older workers.

Complementarity Between Human Capital and Technology. Consistent with this finding, technical change is biased toward human capital. That is, it increases the marginal productivity of more educated workers *more* than that of less educated workers, and *raises the hourly wage rate of the educated workers.* This larger increase in the *hourly wage* for graduates entering the technologically progressive industries was found by Lillard and Tan (1986). Gill (1988) finds that technical change *steepens* the age earnings profiles of more educated workers, and *flattens* the age earnings profiles of less educated workers. Technical change furthermore is found by Mincer (1988a) to *increase quits* among young workers who change jobs, *reduce layoffs* even further, and on balance, to reduce turnover. In the high tech sectors, furthermore, Mincer (1988b) finds that the *duration* of unemployment is reduced, the amount of *job training* is increased and the *level of unemployment* is reduced. That is, with technical change, unemployment is *not* increased in these industries, but instead layoffs are reduced, *more* training is offered in these firms, and this training and adaptation "makes attachment to the firm more durable," according to Mincer (1989, p. 33). "The specter of technological unemployment" (with the exception of agriculture given that the demand for food is income inelastic) among manufacturing industries crops up in sectors with *lagging* rather than *leading* productivity.

Implications for Indonesia. Within Indonesia, the modest declines in the rates of return that have accrued at the senior secondary and college levels from 1986 through 1989 (See McMahon and Boediono 1991, Table 4) are not likely to continue as technology transfer continues. In particular, students receiving good quality secondary education in the basic sciences and newer technologies are likely to experience increasing demand for their skills and hence to command a premium in the job market in the foreseeable future.

In Summary. The international experience is that technological progress and physical capital accumulation are both *complementary* with the more highly educated labor. As Indonesia's high rates of investment (30.17% of GNP) and globalization of technology continues, the demand for *educated* labor will *increase* more rapidly than for the less well educated to sustain the new modes of production. The profitability of education is maintained in the long run as this occurs at levels roughly comparable to that of other investments.

III. IMPLICATIONS FOR CURRICULUM CONTENT: DEVELOPING CAPACITIES TO ADAPT TO CHANGING TECHNOLOGIES

Arising out of the preceding analysis of the relation of education to the diffusion of technology and hence to economic growth, as well as out of the analysis of the relation of technical change to the anticipated demand for educated workers, an explicit goal for expansion of the quantity and the quality of secondary education beyond the current goal of grade 9 is warranted.

Goal #1: *Improved Quality of All Secondary Education By Improvement of Physical Science, Social Science, Life Science, Language, and Problem Solving Teaching and Curricula.*

This quality goal needs to accompany the goal of expanding access to reach *80% net enrollment* rates in *senior secondary education by 2013,* the basis for which was analyzed in Chapters I and II. By making secondary education compulsory through grade 10 by 2008, students would be urged to make the transition from junior to senior secondary schools. But after that transition, if they choose to go to work, or drop out for other reasons, this would be an option. This goal also implies relevant science, math and statistics content in the core curricula that facilitates going on through grade 10, as well as learning on the job, including an emphasis on rational problem solving, writing/composition and logical presentation, as well as on completing one international language.

With respect to vocational education, there are three distinct possibilities that are not mutually exclusive:

- **Improve the learning of technical skills** by trying a Dual System involving SMT/industry joint apprenticeships as suggested in Chapter I above, and by Wardiman Djojonegoro (1992). This would insure that the student is exposed to the newest technologies in use in industry, and force the training to be more job-market oriented.
- **Offer some vocational courses in the Senior Secondary General Schools.** This is consistent with the trend toward comprehensive high schools and two-year community colleges in many industrial countries (e.g., U.S., Australia, Japan) where they work well (although Columbia is an exception). The student who does not go to college from these SMA's then has a marketable skill, and is not labeled a "failure" (for not getting into college) but instead is labeled a "successful graduate" (of high school). The vocational students can use the basic disciplines in the academic track (e.g., mathematics) and the academic students can see the practical relevance of the academic subjects in the applied fields. This complementarity in the curriculum is stressed in the recommendation of the recent U.S. National Vocational Assessment.
- **Increase the percentage of students pursuing curricula that stress the rational, problem solving, hypothesis testing approach of the physical sciences and engineering, of the social sciences** applied in business administration and government, *and of the life sciences* applied in agriculture and health fields. The accreditation process for private (and public) colleges could stress this content, as well as high school course requirements for college admission.

So although it is very important that vocational education at the secondary level needs to be supported, changed, and improved, this is only part of strengthening the quality of education in all of the sciences, including in the SMAs and colleges. It is the more general background in the sciences and in problem solving experience from junior secondary school through Ph.D. that provides new workers the capacity to learn on the job and to later adapt to new and constantly changing technologies.

IV. CONSIDERATION OF INDONESIAN DATA ON COMPARATIVE ADVANTAGES BY LEVEL AND FIELD

Moving toward an export-oriented economy, both the current and future potential comparative advantages have to be considered.

Current Comparative Advantages

The current educational structure of the labor force in Indonesia and in neighboring and Pacific Rim nations can be seen in Table V.1 below.

Currently Indonesia is significantly behind where Korea, Taiwan, and Malaysia were in 1988 in the percent of the labor force with secondary education, and is about where Korea and Taiwan were in 1966 with respect to higher education. Most of the 2.3% of the labor force that have finished college in Indonesia have only an Academy (3 year) or Sarjana (5 year) degree. Some of them have Master degrees or Ph.D.'s, but no detailed information is available. Among these latter groups only a *very* small fraction have training as scientists and engineers (See Djojonegoro (1992)) or are active in research and development of relevant technologies.

Changes over time in the human capital stock can be measured by changes in the mean level of educational attainment of the labor force. This is available for selected years from Psacharopoulos and Arriagada (1992) for the countries being considered here and is shown in Table V.2 below.

Table V.2 shows that Indonesia's human capital stock is below that of Korea, Taiwan, Malaysia, and Singapore, equal to that of Thailand, and above that of Pakistan and India. It has been growing more slowly than that in Korea or Thailand, but at rates comparable to that in the other countries.

Table V.1
Labor Force by Level of Education
Indonesia, Korea, Taiwan, and Malaysia
(percentage)

Country	No Schooling	Primary	Secondary	Higher
Indonesia[1](1989)	15.3	59.1	11.5	2.3
Korea[2] (1966)	25.4	51.8	19.5	3.3
Korea[3]Industry (1988)	8.5	34.9	49.7	9.4
Agriculture (1988)	15.9	43.4	38.0	2.7
Taiwan[4] (1966)	(26.9)	(54.8)	(15.8)	(2.5)
Taiwan (1988)	8.7	37.0	44.2	10.1
Malaysia[5] (1987) (1987)	12.5	37.3	45.0	5.1

1 Percent of the labor force by educational attainment computed from SAKERNAS, 1989

2 Percent of population aged 6 and over by level of education. Data is obtained from *Korea Statistical Yearbook*, 1971.

3 Percent of employed labor force by level of education. Data is obtained from *Korea Statistical Yearbook*, 1988.

4 Percent of population at and over the age of 6 by levels of education. Data is obtained from *Taiwan Statistical Data Book*, 1987.

5 Percent of employed labor force by level of education *Malaysia Statistical Yearbook*, 1988.

Table V.2
Changes in Mean Years of Education of the Labor Force

	1988	1986	1980	1978	1974/5	1967/9	Annual Increase
Indonesia	5.0		4.9	3.9			2.8%
Korea			8.0			3.9	9.5%
Taiwan	9.0		8.6				.6%
Malaysia		7.0	6.5			5.0	2.0%
Thailand			4.6	4.2			4.7%
Singapore			6.0		5.3		2.2%
Pakistan			2.5				
India			1.9				

Source: Psacharopoulos and Arriagada (1992, pp. 10-11)

It reflects the fact that Indonesia still has a comparative advantage in industries and services using labor with only a primary education. This position is not threatened by other countries such as Pakistan, Bangladesh, and India where population growth rates remain higher, increasing labor supplies at the lowest education levels in the future. At the same time Indonesia has as yet no comparative advantage at the secondary education level since these manpower stocks are still low. Furthermore Indonesia is a net technology importer and this condition is likely to continue.

Creation of Future Competitive Advantages

From this, Indonesia has the potential of a prospective future comparative advantage in the secondary education range as discussed in Parts I-III above. Domestic data for Indonesia must be considered further, however, to enable the country to project its role realistically in the global economy in the future.

It is estimated that the size of Indonesia's manufacturing industries will triple by the early 21st century, given the high rate of investment in physical capital. Their technology will continue to advance, so the government and the policy-makers must develop strategies to face this probable development. A competitive advantage in assembly in the more advanced technology industries is likely as suggested above, but only if there is preparation. Development of human capital at the secondary education level especially, but also in the higher education of new industrial scientists and managers must occur. Comprehensive catch-up in technological capabilities consists of development of basic labor force skills as well as acquisition of management and trade expertise.

When industries expand, the need for technical manpower increases. To cope with this growth of demand, the training of technicians will need to continue to expand in STM's, in vocational courses in SMA's, in apprenticeship arrangements between vocational programs and firms, and perhaps in two-year vocational college programs. Better working conditions for technicians will increase the interest of graduates to work as technicians which are vital for industrial development. As their salary levels rise, the rates of return to further education in these fields should remain high, even though the costs increase. These serve as "market signals" identifying the specific needs by field each year, which it is well known cannot be predicted efficiently (by field) by central economic planning far in advance.

Although Indonesia needs to be flexible in technological skill based industries, the country needs also to seek to fill a complementary role to the Pacific Rim Countries. With its larger population, Small and Medium Sized Enterprises (SME's) using secondary-level skilled labor can absorb a much larger fraction of Indonesian manpower. As other Pacific Rim nations move ever more human-capital-intensive-technology, Indonesia needs to strengthen its human capital base to keep up. This can include higher value-added manufacturing assembly and food industries than at present.

We conclude therefore, that Indonesia's most realistic chance lies in developing its comparative advantage for export-oriented industries using primarily a secondary education level skilled labor force. These persons can be employed in the service sector and higher value-added food SME's as well as in manufacturing. But Indonesia' industries must employ the newer production technologies, which requires training more scientists and engineers at advanced levels as well, and have access to an educated labor force with vocational, but also with academic training that can adapt to change.

Market Signals as Criteria for Changing Technology

Any investment has to give sufficient positive net return if it is to make any contribution to economic growth. This principle also applies to investment in R&D, and (eventually) in strategic industries. Wise investment criteria seek to anticipate sufficient return by carefully paying attention to the market signals, including expected future markets. These market signals can be in the form of currently profitable opportunities to invest in R&D by firms without subsidies.

Private Sector Decisions

Decisions by the private sector to invest in R&D are generally more efficiency and short-term profit-oriented, especially for the smaller firms. They are very sensitive to the market. If the estimated private rate of return is above the bank interest rate, this is considered to be the key criterion for recommending increased investment in technology transfer or development.

However, private sector decisions will not provide enough investment in either *basic or applied* research since there are externalities, or social benefit spillovers, and many of the future returns cannot be captured by the firm. Intervention in private sector decisions through matching grants to private firms investing in R&D was used successfully in Japan and may be necessary. But apart from *the less highly applied* research, subsidy of development expenditure should both require a matching contribution by the private firm, and be minimized. Too much intervention in private sector decisions can destroy efficiency and lead to low productivity, and has apparently done this in some industries in Indonesia (See Gozali, 1991).

In Indonesia where industrial and commercial bases are still very weak, it is especially difficult for private firms to carry out profitable investment in research and development alone. The size of Indonesia's private industries is not as yet big enough to have widespread access to international links. Furthermore, most private sector investment is oriented to very short term benefits.

However since industrial progress needs new technological development, private industries need to be encouraged to develop technological competencies that meet the market tests. It might be through absorbing and assimilating foreign technology, as Japan has done, rather than developing new technology. Without effort in developing and adapting technology, industrial progress can be very slow.

Public Sector Decisions

Public Sector decisions must take externalities as well as longer run strategic opportunities into consideration. In contrast to private sector decisions, social rates of return are needed to guide public decisions. Social rates of return are also market signals but are more comprehensive than private rates of return, since they include total returns before taxes and total costs including the public subsidy. The expected returns need to include estimates of the value of the externality spillovers, plus a longer time horizon where there are strategic opportunities and the expected returns are in the much more distant future. Equity considerations also are not included in private decisions but must be added to obtain the full social benefits on which social rates of return are computed.

To develop technological capabilities faster in Indonesia, it is necessary for the government to invest. Small size private companies cannot afford to invest in research where the private returns are long delayed, although they can be expected to finance most of the highly applied product and process innovation where the private returns are immediate. About 90% of the less immediately applied research in the U.S, for example, is supported project by project by the Federal Government and performed in universities and this may be the pattern in Indonesia in the more distant future.

Patent and copyright protections are necessary for firms to invest in the *development* part of R&D, or the results can be easily imitated by others. But again it is only the public sector that can afford to invest in *basic* research, and this needs to be performed primarily at the universities where the new Ph.D's are trained. In this case there are large side benefits from the investment in R&D. Both the human capital that is created, and the investment in R&D, from a national point of view increase the GDP.

Current Expansion Rates

Table V.3 shows the current expansion rates of each industry, giving some idea as to its current productivity, its relation to relative rates of growth, and hence to the new secondary and higher education needs in each field.

An increase in the quantity and quality of secondary and higher education would support future growth in the chemical, metals, and machinery industries, therefore (See Table V.3). However, a list of new products and new processes should be added since investment needs will continually change.

Economically Oriented Longer Run Strategies in Advanced Skill Development

Vocational and Ph.D. level skill development as a part of human resource development needs to be partly guided by the state of the art in science. Many times, however, narrow decisions to narrowly specify advanced specific skill development unfortunately do not take economic criteria into consideration. The effort to pursue technological advancement in this way, or in providing R & D subsidies independent of market tests is common in developing countries, but also wasteful, and is not conducive to economic growth, whatever other goals may be achieved.

There are some success stories predicting future economic viability, but also many failures. So such efforts are very risky. And frequently there is not a firm plan in advance to terminate the inefficient subsidies. A date should be set for all subsidized industries by which time they must meet the market test.

Conclusions

The nation's R&D policy affects education in massive ways, and the education system in turn is a very major determinant of Indonesia's technological capacities. The implications for 25 Year Education goals reflect this interdependence.

Considering the data offered here describing Indonesia's current situation, as well as that offered by Djojonegoro (1992) and Hill (1991), the following major 25 Year Education/R&D Goal is suggested. It reflects the externalities inherent in research as well as in some applied process and product development where there are large numbers of small firms. It also reflects strategic considerations where there is a need to develop highly trained manpower that has long lead times, and the risks inherent in doing this too narrowly given changing technologies and changing needs:

Goal #2: *Research and development that has a longer range objective, or is applied to public policy problems in health, population, economics, public program management, and other fields, and involves greater externalities, will need to be supported by the government in the future. It should be performed primarily in the universities where Indonesia's future Ph.D.'s will be trained, not in research institutes by a salaried staff, and be on a user-driven project-by-project peer group review basis.*

Goal #3: *Shorter term applied process and product development efforts are more appropriately financed on a matching basis with private funding, and need to have a date set after which they must meet a market test.*

Goal #4: *With respect to vocational education, over the next 25 years Indonesia's comparative advantage suggests a growing need for technically trained people at the secondary level. Public/private partnerships offering internships in industry for STM students, and some vocational courses in academic high schools are possibilities. In the long run, much job-oriented training is likely to move upward to the Two-Year Diploma and College levels.*

Table V.3
Production of Selected Industrial Products

	Units	1961	1968	1977/78	Growth Rates (%) 61-68	68-77/78	85/87*
Textile Industry							
Yarn	a	64[k]	130	678	9.3[k]	20.1	6.5%
Textiles	b	374	373	1,332	..	15.2	2.6%
Metals and Machinery							
Radios	c	62.3	350	1,000	28.0	12.4	-7.5%
TV sets	c	n.a.	1	460	n.a.	very high[i]	
Sewing machines	c	n.a.	4	484	n.a.	very high[i]	
Cars	c	10.2	2	84	-20.8	very high[i]	12.5%
Motor cycles	c	n.a.	6	272	n.a.	very high[i]	9.5%
Electric lamps and tubes	e	8.5	4	25	-10.2	very high[i]	
Reinforcing iron	d	n.a.	4	240	n.a.	very high[i]	
Car batteries	c	n.a.	29	575	n.a.	very high[i]	
Dry batteries	e	n.a.	52	1,000	n.a.	very high[i]	6.7%
Chemical Industries							
Urea fertilizer	d	-	96	990	-	29.6	4.7%
ZA fertilizer	d	-	-	93	-	-	
Cement	d	446	410	2,879	-1.2	24.2	8.5%
Paper	d	8	11	83	4.7	25.2	
Glass bottles	d	12	6	60	-9.4	29.2	
Car tyres	c	114	240	1,883[l]	11.2	29.4[l]	7.0%
Salt	d	197[jk]	153[gh]	210[hl]	-3.1[k]	4.6[l]	
Various Industries							
Kretek cigarettes	f	19	24	41	3.4	6.1	9.5%
White cigarettes	f	21[k]	15	23	-4.1[k]	5.5	-11.0%
Soap	d	108	130	195	2.7	4.6	
Cooking oil	d	n.a.	23	31	n.a.	3.4	
Coconut oil	d	217	208	276	-0.6	3.2	
Crumb rubber	d	-	8[g]1	435	n.a.	very high[i]	

**Statistic Indonesia*, 1988.

a = '000 bales.
b = million metres.
c = '000 units.
d = '000 tons.
e = million units.
f = billion units.
g 1969/70 financial year data.
h State enterprise P. N. Garam only: excludes production of *garam rakyat* (smallholder production) which was 335,000 tons in 1976/77.
i low base distorts the growth rate.
j appears to exclude garam rakyat.
k 1960 data; growth figures cover period 1960-1969/70.
l 1976/7 data; growth figures cover period 1969/70-1976/7.

Source: Various issues of the *Lampiran Pidato Kenegaraan, Nota Keuangan*, Bank Indonesia reports, and Soehoed, op. cit.

V. TECHNOLOGY DISSEMINATION THROUGH HIGHER EDUCATION

Higher education graduates take the leading role in the initial technology dissemination. It is also expected that they are flexible enough to adapt imported technology to local conditions, and sometimes advance it further.

In terms of fields of study, to support technological dissemination and modern management techniques, both engineering and non-engineering fields have to be developed. Non-engineering fields include the physical sciences, but also the life sciences and the social sciences. The latter are essential to the management of both public and private programs, business administration, and agriculture, and often are essential to productivity. In the dissemination of technology both formal education (ausbildung) and socialization (erzichung) have to be considered.

The Economic Viability of Higher Education

College students need to be able to shift into those fields where the jobs are, and where the earnings are highest to respond better to the current growth bottlenecks. Some approximate indication of where these needs are can be seen in the different rates of return in Indonesia as shown in Table V.4. However, these rates cannot be used as a single criteria for investment. Externalities as well as the non-monetary benefits of each field must be added, qualitatively before final decisions are made.

These rates of return however showed higher *real* rates of return to investment in Engineering education (11-15%), in Management education (8-13% in spite of the inadequate quality of Management schools in 1960-80), and in *all* fields (9-10%) in 1982 than did the real rates of return to investment in physical capital (averaging 9.4% over 1982-1991, corrected for inflation). Real rates of return to higher education fell somewhat from 1982 through 1989. This could be in part because of increased supplies of graduates, deteriorating quality, and cyclical factors (See McMahon and Boediono, 1991).

The Effective Training of Future Researchers

It is necessary for effective research training for Ph.D. students that they be related to faculty essentially as *apprentices*, and be engaged in *user-driven* research. To cause faculty to stay up-to-date, research involvement and writing for publication in refereed journals are also very important. Furthermore, for efficiency, as higher education expands, the judicious use of research and teaching assistants (RA's and TA's) would dramatically lower costs. The use of RA's provides the busy professor with assistance to carry out parts of his research. Both RA's and the professors benefit from this. RA's are thereby trained to carry out more independent research in the future after graduation. TA's also gain teaching experience under professional guidance before they start to teach on their own.

Besides providing apprenticeship training, part-time employment of the best Indonesian graduate students also provides financial assistance for them to complete their studies. The system is efficient since universities do not have to recruit as many professors to teach first and second year beginning undergraduates. But it is important that the teaching assistants be carefully selected; only the brightest of the new Ph.D students (and not older teachers who are upgrading their skills) should be employed. In this way the new technologies get transmitted to the undergraduates, new teachers are trained under supervision, and the quality of the supervised instruction is maintained. At the same time it is a way to encourage the graduate student to complete his or her education. This system also provides for greater equity in higher education since lower income students with high ability can afford to complete advanced degrees.

Table V.4
Real Rates of Return to HigherEducation by Occupation
(Susenas 1982)

	Academic		University	
	Male	Female	Male	Female
Engineers	11% (29)	n.a.% (1)	15% (13)	n.a.% (1)
Scientists	2 (17)	0* (17)	9* (69)	7% (20)
Managers	13 (162)	7 (21)	8 (133)	5 (17)
Social Scientist	0* (92)	5* (18)	1* (64)	7* (18)
Educators	-2* (135)	0* (71)	-2* (99)	3* (44)
Other	10 (195)	1 (45)	9 (161)	5 (23)
All	10 (495)	6 (102)	9 (440)	6 (79)
For Comparison:				
Average Return to Physical Capital Investment (Real) (1982-90 average corrected for inflation)	9.4%	9.4%	9.4%	9.4%

*Asterisks suggest that there may be major externality benefits in these fields that should be added by making qualitative judgments.

More Selective Overseas Training

Overseas training is needed to assist universities to catch-up with higher education developments in foreign countries. Overseas training will continue to need to be stressed in fields which are not available or of good quality in domestic universities.

First, after upgrading and technical development of universities in Indonesia, including much more extensive use of user-driven research grants based on peer group review for University faculty, an increasingly more selective overseas training will be possible. Selection even now is needed in terms of fields of study. Some fields are very advanced inside the country. In this case, overseas education is not justified. Only for certain fields where facilities are better abroad, should overseas training be encouraged.

Second, in the next 25 years, better selection of the overseas institutions where the students are going also is needed. Selection needs to be done both on financial grounds since some have become very high cost, and in terms of quality. Financial selection is important so that a larger number of students can go for overseas education. Selection in quality is important since all foreign universities are not equal in quality.

Third, selection needs to be carried out among students. Only those students who have demonstrated capacities to perform can be funded to pursue overseas education. There also needs to be thorough prior language training in Indonesia where it is less costly if the students are to benefit.

Fourth, the fellowship programs need to be reformed so that the students going abroad can obtain apprenticeship training as research assistants and as teaching assistants without losing the full amount of their grant. This is especially important in the second and later years, not just to reduce the cost since students learn to do research and to teach by experience. But it would also help to reduce the currently high cost per student of the fellowship programs.

VI. IMPLICATIONS FOR 25 YEAR GOALS INVOLVING HIGHER EDUCATION

The further implications for the next 25 Year Development Goals in summary are:

Goal #5: *User-Driven Research Grants from Government directly to principal investigators in universities (and firms) as a key means of keeping university faculty technologically up-to-date, and as a key means of public funding of research. (See the related Goal #2 above.)*

Goal #6: *Greater use of selected graduate student apprentices in Indonesian universities as research assistants and as teaching assistants, thereby disseminating the new technology to undergraduate students, and to Government and the private sector after the graduate students finish.*

Goal #7: *Improved quality in physical science social science, life science, math, and language instruction not only in the high schools (Goal #1 above) but also in the colleges.*

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VI

Developing Effective Educational Systems

Don Adams and Boediono

ABSTRACT

Indonesia, like many rapidly industrializing countries, is faced with the major task of continued expansion of its educational system, while at the same time improving the quality and capability of the system to support the changing knowledge needs of an evolving society. The continuous process of planning and implementing changes that result in higher quality, more effective education will be one of the great challenges during the period of the 25-year educational plan. The international body of research on effective instruction and school management, although not providing prescriptions readily adaptable across cultures, offers one input to the development of strategies to raise educational quality.

Research on the administration and management of education suggests that *effective school management* often requires:

- Commitment to educational quality
- Development of school climate which emphasizes achievement and encourages high expectations
- Assistance in the evaluation and professional growth of teachers
- Commitment to implementing change as well as maintaining stability
- Commitment to both accountability and capacity building
- Acceptance of role as programmatic and instructional leader
- Recognition of the unique styles and needs of teachers
- Knowledge of educational change process including the rates at which different innovations can be implemented
- Effective interaction with educational bureaucracy
- Expectation of, and competence to cope with, unintended consequences
- Development of cooperative school-community relations

Research suggests that *effective teaching or instruction* frequently has the following characteristics:

- Properly sequenced, adaptable curriculum
- Systematic and logical sequences in teaching
- An orderly, safe, healthy environment
- Clear instructional objectives
- Classroom culture recognizing the individuality of each student
- Maximization of time on task
- Regular homework
- Training in problem solving and reasoning skills
- High achievement expectations clearly expressed
- Use of interactive radio instruction when necessary

- Availability of textbooks and supplementary reading materials
- Classroom climate emphasizing learning
- Regular monitoring of learning and feedback on all practice
- Active learning roles for students
- Emphasis on independent learning

Improvement of the *quality and effectiveness of educational systems* requires planning and leadership al all administrative levels. Successful implementation of innovations and reforms includes:

- Training for policy makers and administrators in educational effectiveness
- Coordination of the change strategies used in the center, province, and local community
- Utilization of both accountability and capacity building approaches
- Development of multi-dimensional, integrated innovations
- Provision of continuous training as reform proceeds
- Focus much of the reform on the teacher and instruction
- Utilization of qualitative and quantitative effectiveness assessment to modify ongoing programs
- Adaption of management information systems for local decisions
- Use of ad hoc surveys to capture current status of changes
- Plan for full participation of teachers, administrators, and, if feasible, parents in evaluating, planning, and implementing reforms
- Monitoring the progress of delivery of needed inputs.

VI

Developing Effective Educational Systems

Don Adams and Boediono

I. INTRODUCTION

During the past three decades, industrialized and developing countries have undertaken many kinds of innovations designed to improve education. These have included broad system-wide reforms, more discrete efforts to build modern institutions to support educational development, and various interventions to improve the teaching/learning process by using better instructional materials, increasing the professional skills of teachers and adapting school management.

There is, then, a growing international consensus around the need to improve educational quality. Translation of this consensus into viable policies will be a great challenge. Indonesia, like many other rapidly industrializing countries, is faced with the major task of continued expansion of its education system while at the same time improving the quality and capability of the system to support the changing knowledge needs of an evolving society. During the period of the 25-year educational plan, there is no educational challenge greater than the continuous process of planning and implementing changes that result in higher quality, more effective education.

In building a more effective Indonesian educational system, two international sources of knowledge, in particular, may be of value: the growing body of international research on effective schools, and studies of educational quality in the developing nations. While most of the effective schools literature has focused on school systems in the United States, there has been some attempt to translate and apply U.S. research to developing countries. There is also a separate but overlapping body of literature variously referred to as effective schools research, or quality of education research, which is focused directly on developing and newly industrialized countries. Both bodies of literature are summarized here.

This paper addresses three basic questions:

- What major insights and generalizations have resulted from research on effective educational systems and school quality?
- What are the policy implications of such research?
- What are appropriate strategies for implementing educational improvement?

Defining and Studying Effective Educational Organizations

Organizational effectiveness must be viewed as a theoretical construct or analytic abstraction. It follows that different theories of how organizations operate may yield "different lists of the characteristics of effective organizations and the factors presumed to make them more effective" (Rowan, 1985).

Many scholarly publications have discussed how to conceptualize and study organizational effectiveness. The range of theories of organizational effectiveness may, however, be subsumed under two headings: the goal centered view and the natural systems view. The *goal-centered* view, the better known of the two approaches, accepts the assumption that organizations have identifiable goals

and explicitly attempt to achieve them. Under this conceptualization, educational effectiveness becomes defined as the extent to which individual schools or educational systems achieve their goals. In practice this view has generated much attention to educational indicators and measures of goal attainment.

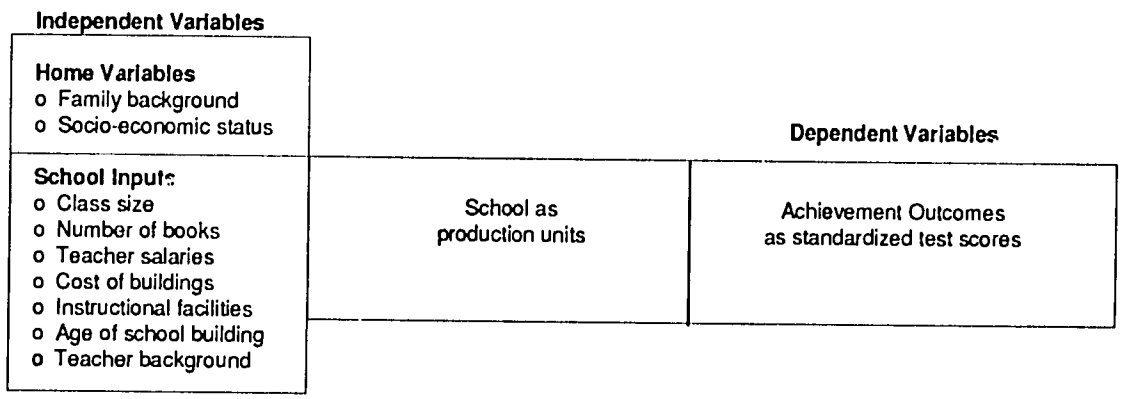
The *natural systems* view holds that "most organizations are too large and complex to specify a finite number of organizational goals." Instead, organizations are seen as being primarily oriented toward organizational health and survival, and these are thought to depend on organizational factors such as "adequate resource mobilization, free flowing communication, high morale, democratic leadership, and participative, problem-solving structures" (Rowan, 1985). This view has tended to increase focus on the internal characteristics and processes in determining systems and organizations.

Although both the goal centered and the natural systems views have strong advocates, and their paradigmatic roots are different, increasingly there are attempts by educational researchers and decision-makers to recognize the significance of both goals and internal structures and processes to educational outcomes.

II. EFFECTIVENESS AS EDUCATIONAL PRODUCTION

Early research on effective schools or educational quality in the U.S. and internationally followed an input-output or production function model (see Figure V.1). Output or production was typically measured in terms of student achievement as measured on standardized achievement tests. Inputs usually consisted of a variety of school and student background variables subject to quantitative measurement. Studies guided by this model in the U.S., e.g., the *Coleman Report* (1966) and in Britain, e.g., *The Plowden Report* (1967), generally concluded that demographic variables such as family background and socio-economic status are much more powerful than school inputs in determining achievement scores. Although these studies have been criticized methodologically, the generalizations that school factors were unimportant in explaining differences in levels of student achievement had wide acceptance among scholars and policy makers during the 1960s and 1970s.

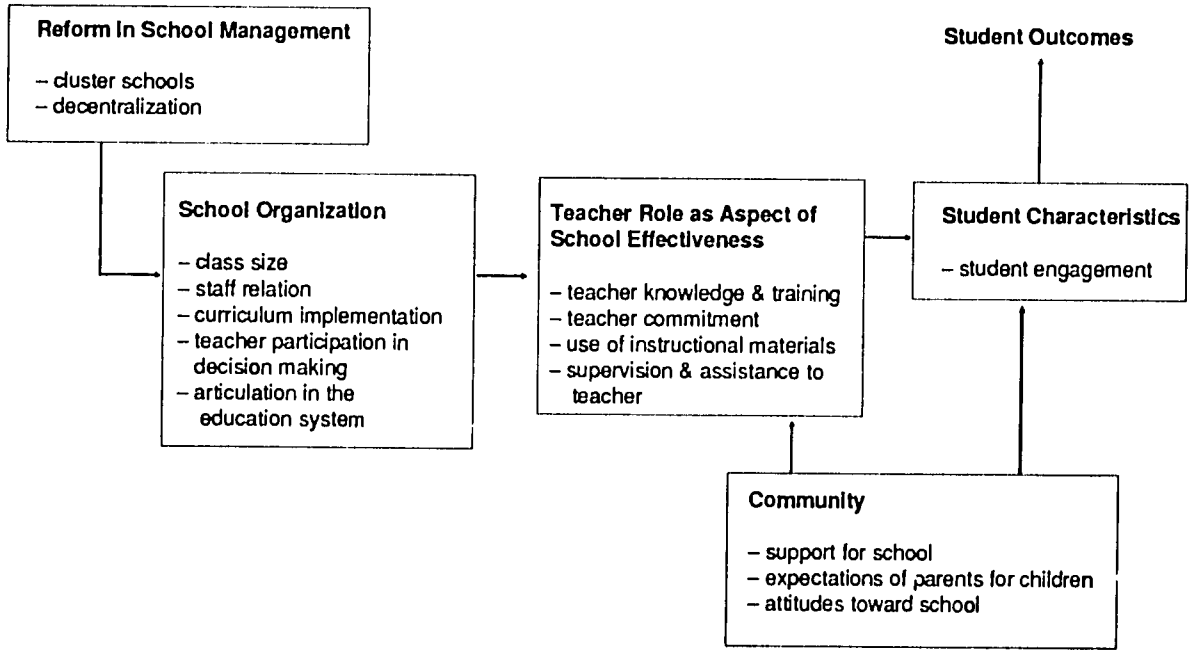
Figure VI.1
A Typical Production Model



In contrast to the studies in highly industrialized countries, research spanning more than a decade in developing countries resulted in the widely accepted conclusion that pupils' background influences, including socio-economic status, are less important as determinants of student achievement than school

and classroom variables (Schiefelbein and Farrell, 1981; Heyneman and Loxley, 1982). As research experience increased, researchers in LDCs tended to recognize that student achievement is the result of a complex interaction of out-of-school and in-school factors (Figure V.2). Some scholars put forth the proposition that the poorer the country, the more powerful the influence of the schools. Research literature on effective schooling in LDCs has increasingly recognized that student achievement is a result of a commingling of out-of-school and in-school factors and that "children's learning is a function of family background and school inputs." World Bank research, among others, in developing countries has concluded that schools and teachers do make a difference, perhaps even more than SES (World Bank, 1990).The more recent effective schools research in the U.S. has suggested that a potential for significant improvement of student achievement was possible through changes at the school and classroom levels. Nevertheless, the basic thesis of the strength of student background factors in explaining the level of achievement has not been rejected. The most recent research in developing countries, however, using new statistical approaches has begun to mount a challenge to the methodology and the conclusions of earlier studies. Preliminary results from using a multilevel regression model in studying school effectiveness suggests that the influence of background factors on student achievement in developing countries may not be very different from that found in the U.S. studies (Rutter, 1983).

Figure VI.2
Developing Effective Schools : An Illustrative Model



Source: BRIDGES publication.

III. EFFECTIVE SCHOOLS MODELS

The results of utilizing a production function research model, particularly in highly industrialized countries, offered educators and planners little room to maneuver. Presumably powerful variables such as family background and socio-economic status are nearly immune to manipulation by policy makers. On the other hand those resource inputs which might be subject to control were often identified as relatively insignificant. The perceived limitations of educational research based on the production function model was a major stimulant to a new approach, popularized in the United States, to the study of effective schooling.

Educators had long known that some schools were demonstrably more successful than others in achieving their objectives. At least a few schools and programs which on the basis of the socio-economic background of students would have been predicted to be low on outcome measures were in fact effective in raising student achievement levels (Clark, 1980). This knowledge provided the context and motivation for researchers to track down characteristics of these exceptional institutions in order to guide policy makers, change agents, or practitioners concerned with the question of how to improve schooling (Bickel, 1990; Clark, 1980). (See Figures VI.3, VI.4).

Defining and Measuring School Effectiveness

Effective schools literature does not subscribe to a single definition of effectiveness or of an effective school. Although existing school effectiveness studies offer a range of process, organizational, and outcome definitions, there are two most commonly used definitions of school effectiveness. One definition assumes schools are oriented toward the achievement of certain short term instructional goals. Thus, school effectiveness, particularly in the 1960s and 1970s, was defined essentially as instructional effectiveness (Bickel, 1990; Rowan, 1983, 1985), as measured by standardized test scores. As the indicator of effectiveness when comparing different schools or programs the mean achievement scores of the relevant student groups are typically used (Bickel, 1990; Mackenzie, 1983; Purkey & Smith, 1983, 1985; Rowan, 1983, 1985). Instructional effectiveness may include not only subject knowledge and cognitive skills, but also those social or life skills, including values and attitudes, which are the outcomes of formal instruction or the school environment. Additionally, assessments of effectiveness may be based on teaching practices, instructional leadership and climate, and the overall coordination of instructional program–factors which research suggests are supportive of instructional outcomes (Rowan, 1985). At the Education for All Conference in Jomtien, Thailand, in March 1991, effective schools were described as those schools that "facilitate the acquisition of subject knowledge, cognitive skills, values and attitudes relative to the needs of the individual and his or her community through active and participatory approaches" (UNESCO, 1990).

In identification of effective schools, researchers in the U.S. most commonly employ a "contrast group" research strategy (Purkey & Smith, 1983; Rowan et al., 1983; Bickel 1990). This strategy has been used to determine statistically highly effective schools (positive outliers) and unusually ineffective schools (negative outliers). Commonly used research methodologies in effective schools research include survey, quasi experimental, and case study approaches (Madaus, et al., 1980; Purkey & Smith, 1985). Survey research typically implies the collection of data by means of questionnaires or interviews related to school characteristics, teachers related variables, and student inputs; student achievement data are gathered from ongoing testing programs using standardized achievement tests (Madaus et al., 1980). The analysis of survey data may take many forms, including regression analyses to discern the proportion of variance in achievement scores explained by predictor or independent variables (Cohn & Rossmiller, 1987).

Figure VI.3
School Characteristics Associated with School Success

Rutter	Coleman	California Assembly	Lightfoot	Lipsitz
o a substantial nucleus of children of above average ability	o students taking more rigorous courses	o clear goals	o a clear and shared school ideology	o clarity about school mission
o staff consensus on aims and values	o students doing more homework	o staff sharing common sense of purpose	o leadership fitting the culture of the school	o clearly articulated and shared goals
o consistent policies and procedures	o higher standards in grading	o high expectations for performance held by principal and staff	o leadership fitting the culture of the school	o a sense of being special as a school for early adolescents
o high expectations of academic success	o higher rate of attendance in grading	o greater use of data to assess progress	o awareness of imperfections and willingness to search for solutions	o strong instructional leadership
o students actively engaged in learning activities	o less class cutting	o more frequent use of diagnostic instruments	o clear authority to solve problems and create means of coordination	o a coherent phliosophy and clear school mission
o frequent use of direct praise and frequent feedback on performance	o fewer disciplinary problems	o responsibility for curriculum located in the schools	o respect for teachers and teaching	o a principal with vision who supports staff
o teachers modeling desired work norms	o discipline perceived as fairer and stricter	o ongoing curriculum review involving teachers	o high quality teachers	o respect for staff as professionals
o clear guidelines for student behavior	o greater teacher interest in students	o expansion of course offerings and frequent curriculum revision	o greater autonomy for teachers	o an orderly and caring environment
o students held responsible for personal behavior and school duties	o higher levels of student self-esteem	o district support	o fearless regard for adolescents and awareness of student values	o a climate of positive attitudes and high expectations
o discipline infrequent but firm	o greater press for students to go to college	o faculty agree on instructional methods	o a safe, regulated environment for student-teacher relationships	o reciprocity in human relations
o homework frequently assigned and marked	o smaller total enrollment	o autonomy to solve school problems	o a sense of community	o pleasant physical setting
o teachers available to be consulted, willing to provide personal assistance, show concern for students	o higher participation in extracurricular activities		o concern for the weakest members of the school community	o high levels of work effort by staff
o shared activities between staff and students				o encouragement of staff ingenuity
o high proportion of children holding positions of responsibility				
o pleasant working conditions for staff and students				

Source: Corcoran (1985).

Figure VI.4
A Selective Summary of a Decade of Educational Research

Research Topics	No. of Results	Percent Positive
Time on learning	25	95.4
Innovative curricula on:		
Innovative learning	45	97.8
Traditional learning	14	35.7
Smaller classes on learning:		
Pre—1954 studies	53	66.0
Pre -1954 better studies	19	84.2
Post-1954 studies	11	72.7
All comparisons	691	60.0
Behavioral instruction on learning	52	98.1
Personal systems of instruction on learning		
Mastery learning	30	96.7
Student vs. instructor-led discussion on:		
Achievement	10	100.0
Attitude	11	100.0
Factual vs. conceptual questions on achievement	4	100.0
Specific teaching traits on achievement:		
Clarity	7	100.0
Flexibility	4	100.0
Enthusiasm	5	100.0
Task of student ideas	7	85.7
Use of student ideas	8	87.3
Indirectness	6	83.3
Structuring	3	100.0
Sparing criticism	17	70.6
Psychological incentives and engagement		
Teacher cues to student	10	100.0
Teacher reinforcement of student	16	87.5
Teacher engagement of class in lesson	6	100.0
Individual student engagement in lesson	15	100.0
Open vs. traditional education on:		
Achievement	26	54.6
Creativity	12	100.0
Self-concept	17	88.2
Attitude toward school	25	92.0
Curiosity	6	100.0
Self-determination	7	85.7
Independence	19	94.7
Freedom from anxiety	8	37.5
Cooperation	6	100.0
Programmed instruction on learning	57	80.7
Adjunct questions on learning		
After text on recal	38	97.4
After text on transfer	35	74.3
Before text on recal	13	76.9
Before text on transfer	17	23.5
Advance organizers on learning	32	37.5
Analytic revision of instruction on achievement	4	100.0
Direct instruction on achievement	4	100.0
Lecture vs. discussion on:		
Achievement	16	68.8
Retention	7	100.0
Attitudes	8	86.0
Student vs. instructor-centered discussion on:		
Achievement	7	57.1
Understanding	6	83.3
Attitude	22	100.0
Factual vs. conceptual questions on achievement	4	100.0
Social-psychological climate and learning:		
Cohesiveness	17	85.7
Satisfaction	17	100.8
Difficulty	16	86.7
Formality	17	64.7
Goal direction	15	73.3
Democracy	14	84.6
Environment	15	85.7
Speed	14	53.8
Diversity	14	30.8
Competition	9	66.7
Friction	7	100.0
Cliqueness	13	8.3
Apathy	15	14.3
Disorganization	17	6.3
Favorisitm	13	10.0
Motivation and learning	232	97.8
Social class and learning	620	97.6
Home environment on:		
Verbal achivement	30	100.0
Math achievement	22	100.0
Intelligence	20	100.0
Reading gains	6	100.0
Ability	8	100.0

Source : From "What makes schooling effective?" by H.J. Walberg, 1982, *Contemporary Education Review*, 1, pp. 1-34.

Quasi experimental methods have been used most often in program evaluation. Since difficulties in randomly assigning students to different programs or schools limit the use of true experimental design in school effectiveness research, researchers tend to use "approximations to experiments" where comparable schools or programs which have not participated in the school improvement project, intervention, or treatment are taken as comparison groups for assessing the impact of the project being implemented. In case studies the "typical methodology has been to observe two or more schools and--on the basis of observed differences among the schools in pupil SES, educational climate, organization, classroom procedures, and other relevant factors--to identify which factors contribute to greater success in the schools showing higher scholastic achievement" (Cohn & Rossmiller, 1987).

In the U.S., effective schools research began in a context of intense struggle against poverty, racial injustice, and unequal educational opportunity. Thus, effective schools research is primarily focused on elementary education with an emphasis on poor and minority student bodies, but not necessarily limited by these target populations. Under these circumstances, effective schools research is framed by three underlying assumptions which are listed in Figure VI.5.

Figure VI.5
Underlying Assumptions of U.S. Effective Schools Research

- Schools which would have been predicted to be ineffective on outcome measures on the basis of student characteristics, such as family background and SES, in fact, are exceptionally effective, can be identified.
- These successful schools may exhibit common characteristics that are correlated with their success, that many of these correlates of effectiveness may well be within the domain of what educators can manipulate and improve.
- The characteristics of successful schools provide a basis for improving schools not deemed to be successful.

Findings

Since much of effective schools research attempts only to identify characteristics of exemplary schools (Purkey and Smith, 1985), causal ordering of these characteristics or the nature of the relationship between identified characteristics and student outcomes is highly uncertain (Rowan et al., 1983). Research findings often can best be characterized as identifying mutually supportive determinants (MacKenzie, 1983). There is however, broad agreement on the characteristics of effective schools which promote higher student achievement, although somewhat different sets of characteristics are cited in the review of effective schools research by different authors. Bossert identifies five main characteristics which have been most consistently described in the research and in the school improvement efforts stimulated by the effective school literature. These characteristics are:

1. A school climate conducive to learning, one free of disciplinary problems and vandalism.
2. The expectation among teachers that all students can achieve.

3. An emphasis on basic skills instruction and high level of student time-on-task.

4. A system of clear instructional objectives for monitoring and assessing student performance.

5. A school principal who is strong programmatic leader and who sets goals, maintains student discipline, frequently observes classrooms, and creates incentives for learning (Bossert, 1985).

A large scale, ambitious research effort, the Basic Quality Study (BEQ) was initiated in Indonesia in 1986. The BEQ in design, in its attention to family variables and school inputs, resembles the input-output and education production models described earlier. However, the BEQ also attempts to include school and classroom process variables. Preliminary findings emphasize the importance of family demographics on student achievement particularly in urban areas. Further analysis, including careful examination of instructional processes may subsequently yield important policy considerations. (The Basic Educational Quality Study, 1991; Also see the several publications of Dr. Ace Suryadi available at Balitbang Dikbud, MOEC, Jakarta, Indonesia.)

Management and Administration

Leadership has been consistently identified as a key component of effective schools, contributing to progress in student achievement, and attaining other institutional objectives. Research has focused around leadership behavior or styles of principals and program leaders, personal and professional characteristics of principals, and the role of principals in the overall development of school climate. The research literature on urban elementary schools in the U.S. found a significant relationship between the principal's leadership style, such as his or her expectations of students and staff, decision making and problem solving behavior, and student achievement outcomes. However, the literature provided no support for concluding that a significant relationship existed between the principal's professional qualifications, tenure in position, or adequacy of administrative staffing and student achievement (Clark et al, 1980). Moreover, some of the descriptions of the contributing behavior of administrators appear to be normative statements with little reported empirical support (Phi Delta Kappa, 1980).

Research in LDCs often supports U.S. findings on the importance of school leadership. Recent studies emphasize that the improvement of learning conditions and upgrading of teachers will succeed only under the guidance of strong managerial leadership and institutional support (World Bank, 1990). The school is seen as a social microcosm where the school culture has a positive effect on academic achievement (Rowan, 1985; Schwille, 1986) and the local school leadership within the context of the community determines the school culture. In turn, the school climate "is a context which either fosters or inhibits teacher engagement in instructional activities, teacher expectancies for their own and their students' success, teacher knowledge and convictions about what to teach, teacher effective use of instructional materials, and teacher adaptability to cultural and other background differences in their students."

If, as the World Bank contends, "organizational structure is the context within which management takes place," (World Bank, 1986), then each organizational level, from the Central Ministry of Education to the local administrative unit, by either its efficiency or inefficiency, directly impacts on the development and operation of effective schools. In sum, "an appropriately structured educational organization gives managers at all levels adequate authority and resources to do their jobs effectively" (World Bank, 1986).

Teachers and Their Professional Development

Empirical evidence from U.S. research indicates that if teachers and administrators set clear goals and high expectations (Cohn & Rossmiller, 1987; Purkey & Smith, 1983, 1985), and are consistent and explicit about standards, student learning tends to improve (Schwille, 1986). Although teachers are very often mentioned as important factors in development of positive achievement outcomes (Clark, 1980), there is a lack of evidence of the relationship between teacher's personal and demographic characteristics, such as years of experience, percent with tenure, graduate training, etc., and achievement outcomes (Clark, 1980). However, care should be taken in interpretation of this finding in U.S.- based research for, among other reasons, the variance in the amount of teacher training is very small in the U.S. schools. Fuller, for example, argues that "teachers in LDCs from higher social class background and with more schooling do a better job" (1986).

At the core of a teacher's professional capability lie subject matter knowledge and pedagogical competence. The most cost effective way of acquiring such knowledge and competence is a topic of controversy among educational researchers and policy makers. Traditional pre-service teacher training programs in both industrialized and developing countries have been criticized for their high costs and ineffectiveness. Over the past few years many innovative in-service training programs have been attempted, some with considerable success. In developing countries, radio and correspondence programs have in some contexts proved to be low cost alternatives to institution-based training. A major international trend is toward localization at the community or school level of in-service training efforts.

Little is known about the immediate and long term effects of staff development programs on student achievement (Cohn & Rossmiller, 1987), effective schools literature in both industrialized and developing countries consistently identifies the presence of school based staff development programs in instructionally effective schools (Clark, 1980; Gregory, 1980; McCarthy, 1980). Staff development need not be defined as formally organized training programs. For example, Clark (1980) argues that such conditions as time for planning, interchange, and "cross-fertilization" of ideas among staff members are associated with staff development in successful schools.

Fiscal Resources and Facilities

Educational policy makers have traditionally focussed on the availability of resources. However, effective schools research in the United States tends to de-emphasize school resources as an important determinant of school effectiveness. Differences in achievement outcomes cannot be satisfactorily explained by attributes of differences in resource inputs. The main conclusions on the role of resources reached after a review of U.S. effective schools literature are: (1) differences in expenditures per pupil do not seem to account for significant differences in student outcomes; and, (2) quality of school facilities is not closely associated with student achievement (Clark, 1980; Cohn & Rossmiller, 1987). Furthermore, some, but not all, of implementation research suggests that level of funding or availability of incentive funding for program implementation has a negative or no effect on program success (Berman & McLaughlin, 1978).

Again, the variance in amount of resources in U.S. cases may not be sufficiently large to create a measurable impact on learning. Moreover, it may be the usage rather than amount of expenditures which is important. Mackenzie argues that the impact of resources on student achievement depends on the nature of interaction between leadership and resources; thus, the issue becomes "how existing and future resources can be used to achieve higher goals" (Mackenzie, 1983) rather than considering resources as neutral inputs.

Clearly some minimum level of funding facilities is necessary for an effective educational system. Research suggests that advanced industrialized countries have typically attained such

standards and incremental improvements may have little effect on school outcomes. In developing countries, however, even minimum adequacy has often not been achieved. Improved facilities, for example, may never compensate for unqualified and unmotivated teachers but may be a necessary condition for children to attend, persist and enjoy schooling.

Curriculum and Instruction

The research literature does not provide a checklist of specific ingredients of a good curriculum. Although findings and generalizations are limited largely to the content areas of basic skill learning, in particular, reading and mathematics, cumulative empirical evidence indicates that effective schools are characterized by clearly stated and agreed upon curricular goals or objectives (Bickel, 1990; Clark, 1980; McCarthy, 1980; Purkey & Smith, 1983, 1985). Case studies of instructional resources have also provided some evidence of a significant positive relationship between instructional hardware, television, and computer-assisted instruction, and achievement scores (McCarthy, 1980). However, such studies provide little or no information about the required level of resources necessary for significant increase in achievement scores.

Teachers expectations of their students guide the curriculum they teach and the instructional strategies they use (Stallings, 1985). In an experimental study of the relationship of teacher expectations and achievement outcomes, Deshimer (1983, cited in Stallings, 1985) found that if teachers do not have high expectations for all students, instructional activities tend to reinforce the high expectations of high achieving students, and the low expectations of low achieving students.

Instructional time has also surfaced in several studies as a factor associated with cognitive learnings. However, the length of instructional time "on task" is ultimately determined by an orderly and disciplined classroom, a supporting school environment, and the instructional strategies used by the teacher. Classroom management strategies within the individual classroom with an emphasis on basic skills and academic activities devoting a larger percentage of time to interactive learning is positively related to student achievement, particularly for low achieving students (Cohn & Rossmiller, 1987; Mackenzie, 1983).

Research in LDCs has shown that textbooks and teacher guides have a positive impact on student achievement (Montero-Siebert, 1989). However, some research cautions that textbooks to be used effectively by undertrained and untrained teachers must be especially well designed (Thiagarajan & Pasigna, 198). Fuller notes that "textbooks seem to make a great difference," but asks the question, "how and through what teaching practices is this effect realized?" (Fuller, 1986).

IV. IMPLICATIONS FOR POLICIES AND STRATEGIES

Questions of educational quality at the school level for policy purposes may be grouped around: instruction and materials; teachers and teacher development; management and administration; and facilities. For improvement in these areas to be effective certain prior conditions must take place. If schools are to foster learning the children must have access to schooling and must persist in attendance. Secondly, certain basic needs of teachers and students in terms of safety, health, and sanitation must be met. Further, teachers must earn a living wage and be committed to teaching at least as a temporary career. The policies identified below have limited potential for success unless such basic conditions exist.

There is an additional constraint on any policy to improve educational quality. Educational policies as they develop specificity and particularly in their implementation usually require adaptation to the institutional and community contexts. Such modifications may not only be necessary across nations but within nations as well. This complexity recognizes at minimum the following attributes.

1. Schooling has multiple outcomes, which do not lend themselves to any simple maximizing strategy.

2. Each category of personnel involved in the production of these outcomes (students, teachers, principals) is heterogeneous enough to respond in diverse ways to external conditions.

3. Various conditions need to be taken into account (e.g., student entry capabilities, student home background, community social structure, peer groups, school norms, labor markets, migration patterns, etc.) if one is to understand the processes by which schooling leads to desirable (and undesirable) outcomes.

4. These conditions are but partly under the control of government policy (Schwille et al., 1986).

An Overall Instructional Development Policy

PROFILE OF EFFECTIVE INSTRUCTION
Properly sequenced, adaptable curriculum
Systematic and logical sequences in teaching
An orderly, safe, healthy environment
Clear instructional objectives
A strong academic emphasis (Corcoran, 1989)
Classroom culture recognizing the individuality of each student
Maximization of time on task
Regular homework
Training in problem solving and reasoning skills (Schwille, 1986)
High achievement expectations clearly expressed
Use of interactive radio instruction when necessary
Availability of textbooks and supplementary reading materials
Classroom climate emphasizing learning
Regular monitoring of learning and feedback on all practice
Active learning roles for students
Emphasis on independent learning

An impressive and growing amount of research is available suggesting the importance of the availability of textbooks and student materials for student achievement. Further, there is some evidence that when the supporting family and community contexts offer least support for learning, textbooks become even more important. Policies that directly affect the use of instructional time and instructional materials may have great impact on learning outcomes in developing countries. Because of limited resources, alternatives must be found with the lowest possible costs suggesting greater introduction of local materials (in the face of material shortages) to improve relevance of the instruction (Montero-Siebert, 1989).

Yet the physical availability of textbooks says nothing about their quality and doesn't necessarily mean wise usage. Teachers will make use of textbooks as any other instructional material only if they have been appropriately trained and motivated to do so. What is needed is an instructional

development policy which considers not only an infrastructure of production and dissemination but also designs a program of training and incentives.

A policy of instructional development should also include attention to the use of instructional time. The amount of instructional time spent on teaching--learning activities tends to be consistently associated with student achievement. Instructional style or teaching technique should also be part of a policy for instructional development. The traditional teacher-centered, teaching by telling or 'chalk and talk' method, employed by a knowledgeable teacher may be adequate and is capable of transmitting much knowledge; however, the use of teaching modules and various interactive techniques may better encourage student responses and foster problem solving. Well developed teacher guides can significantly improved instruction. An instructional development policy may have to challenge conventional wisdom. For example, if there is sufficient achievement improvement because of grade repetition then repeating may not need to be viewed as wastage. Similarly, if graded classrooms offer no discernible advantage then experimentation with non-graded classrooms may be warranted.

Teacher and Staff Development

PROFILE OF EFFECTIVE TEACHER AND STAFF DEVELOPMENTOBJECTIVES:

OBJECTIVES:

- Greater professionalization
- Greater subject matter knowledge
- Greater leadership in instructional process
- Knowledge of instructional design and development
- Greater commitment to personal growth

MEANS:

- Regular in-service training at the local level
- Specific training in use of textbooks, workbooks, instructional methods
- Tutoring and other low cost technologies
- Preparation and dissemination of programmed materials for teaching
- Planned teacher guidance and supervision
- Availability and use of teacher guides

Teachers by their involvement in implementation play a role in determining the effectiveness of most educational innovations and changes at the school level. The capacity to implement change at the school level depends to a large extent on teachers. They are the "street level" policy implementers and often in their teaching redefine and, in effect, create policy. Sarason has noted: "educational change depends on what teachers do and think . . . it's as simple and complex as that." (Sarason, 1971.) Major reform in education, that is, changes which go beyond managerial adjustments, require supporting arrangements for teachers.

In the long term, institutional change may be dependent on a new cadre of better qualified teachers. Such a cadre, in turn, may depend on a reward structure for teachers which recognizes competence and the willingness to utilize all available means to improve educational quality. In the long and short-term, in-service teacher and staff training is a necessity and should be recurrent. Such training should include opportunity to upgrade subject matter knowledge and improve pedagogical practices. Some international research has demonstrated the importance of opportunities for teachers to exchange ideas and feelings about their work, to learn from each other how to improve teaching practice and how to implement changes. Therefore, the nature and extent of teacher peer relationships should not be ignored. The in-service training program should be part of a career development plan linking salary, responsibilities and various incentives to career stages. Schwille et al., conclude: Providing time, resources and support for organizational and staff development may be the most powerful strategy for bringing about intended improvements in schooling (1986).

Reinforcement of, or changes in, attitudinal characteristics of teachers should be integral to in-service training. A positive attitude and behavior which encourages, and responds to, students may be crucial to the improvements of student performance. However, the teacher's willingness to contribute to new organizational goals often depends on the strategies of principals and other administrators.

Educational Management

PROFILE OF EFFECTIVE SCHOOL MANAGEMENT
• Knowledge about conditions of effective schools • Commitment to educational quality • Knowledge of educational change process including the rates at which different innovations can be implemented. • Development of school climate which emphasizes achievement and encourages high expectations • Assistance in the evaluation and professional growth of teachers • Effective interaction with educational bureaucracy • Commitment to implementing change as well as maintaining stability • Commitment to both accountability and capacity building • Acceptance of role as instructional leader • Recognition of the unique styles and needs of teachers • Willingness to engage in flexible scheduling • Expectation of, and competence to cope, with unintended consequences • Development of cooperative school-community relations

The administration and management of education may be highly centralized or decentralized. Neither structure of control is a guarantee of success. Either can be effective, both can be ineffective. Policies seeking lasting improvement in student achievement and in the operational effectiveness of local schools are more likely to succeed if they are school-specific and encourage bottom-up efforts. Such grassroots change efforts require a participatory approach that at minimum involves teachers and local administrators. A potential advantage of decentralization lies in the authority given to principals to manage implementation of educational reforms and innovations.

The principal should be expected to play a strong leadership role at the school level. He or she needs to understand and be committed to the improvement of educational quality and share with teachers and others the responsibility for achieving this end. The principal should help create a learning-centered environment, a school climate which encourages teachers to grow professionally and students to achieve their best. Solving implementation problems must have a high priority.

Inefficiencies in management at the provincial and local levels frequently inhibits full implementation of curriculum and other institutional changes. However, particularly at the school level, the management effectiveness of principals is often constrained by chronic shortages of materials, lack of authority to hire and dismiss teachers and insufficient operating funds. Another major goal of decentralization is to give school or local district managers the authority and budget control necessary to manage and improve instruction and to mobilize local resources.

Resources and Facilities

PROFILE OF EFFECTIVE FACILITIES
• Adequate health and safety conditions • Adequate chairs, tables, cupboards • Adequate classroom and learning space

Available research does not help much in determining the level of expenditures and quality of facilities necessary to achieve quality education. In a study of the educational development of newly industrialized countries (NICS) it was noted that these countries, especially during their take-off period, spent a larger percent of GNP, often over 4%, on education than did developing countries under going slower growth. However, there is considerable range in amount of expenditures for countries with the same level of educational development.

Differences in expenditure per pupil do not appear to explain significant differences in student achievement in American schools. This research, of course, should not be interpreted as providing evidence that current educational expenditures are sufficient in developing countries. In Indonesia, where the percent of GNP spent on education is lower than most Pacific Rim countries and where the expenditures per pupil persists at a low level, most international analysts have advocated significant increases in educational expenditures. Such higher levels of expenditures, however, should be viewed as a necessary but not sufficient requirement for improvement in student achievement. The resources or services purchased by available funds and the uses made of such resources and services are also important in accounting for differences in educational effectiveness.

With regard to facilities, two separate but highly related issues are involved. First, there should be sufficient facilities to provide basic safety, sanitation and health needs for all students. Second, given the availability of facilities which meet such needs there is the question of which facilities are good investments for increasing student achievement or other measure of school quality. But which facilities can enhance the school environment? Possible answers can include items as varied as potable water, desks and writing materials. For instance, in an Ugandan study one of the most important school facilities was the presence of a duplicating machine, which produced greater impact on student achievement than any other tool (Heyneman, 1976). This may be explained by the fact that teachers were able to duplicate reading materials which were otherwise inaccessible for the students due to the scarcity of books. A multi country rural study showed that electrical supply had no real impact whereas drinking water and sanitary facilities produced an increase in test scores from 4 to 13 points and influenced lower grades much more than higher grades (Armitage et al, 1984). It is possible to conclude tentatively from the available data that the poorer the country or community the greater the impact of school facilities on student achievement.

V. ACTION PLANNING FOR IMPROVEMENT OF QUALITY OF EDUCATION

The research on effective schools and school quality is rich with suggestions of the conditions and relationships associated with school effectiveness. The more sophisticated studies in this body of research also provides a number of cautions that educators and policy makers involved in reform would do well to bear in mind. However, the effective schools research does not provide prescriptions readily adaptable across cultures. Moreover, in spite of much misunderstanding to the contrary, this research says little directly about the *process* of improving education. In moving from an international knowledge base on effective schools and school quality to strategies for school improvement and their implementation several different paths may be followed.

Education' Innovations in Indonesia

Indonesia has had significant experience with innovations directed toward educational improvement. A review of this experience can offer insights useful in future action planning in developing a more effective educational system. One of the most thorough external comparisons of educational innovations in Indonesia was carried out by Shaeffer (1990) who, after reviewing in detail three major educational innovations in Indonesia, (Project Perintis Sekolah Pembangunan; Pendidikan Antara Masyrakat, Orang Tua Dan Guru; Student-Active Learning Professional Support System) identified a number of continuing problems growing out of the Indonesian educational and bureaucratic context. These include:

- *The nature of the Indonesian educational bureaucracy.*

More stability is needed in the upper levels of, the bureaucracy to ensure understanding of and commitment to, the cohort process of development and implementation of innovations. Further, Javanese culture may inhibit the often necessary collaboration across given levels of the bureaucracy since communication, loyalty and "sense of support" tend to move along vertical lines.

- *The life history of any innovation*

Successful innovations develop to fit a particular political and bureaucratic climate and need to be "allowed to evolve creatively and richly over time." Schaeffer argues that "both PPSP and Pamong suffered because they were begun in one particular climate and ended in another." The development of the innovations was structured because of new pressure to standardize and quantify aspects of the innovations for quick dissemination. The development of substance took a lower priority than the refinement of form.

- *Disagreements over the meaning of the innovations*

In Indonesia as elsewhere, disagreements persist over the meaning of educational quality between and among parents, teachers, politicians and academics. Different definitions suggest, for example, different roles for the teachers with CBSA. The Ministry and the donor agencies followed a technicist approach which translates into large investments in teacher training to prepare teachers to know and teach the new content. Some teachers and teacher trainees wanted to follow a more localized, participatory approach which would allow teachers to draw from their own and other teachers' experiences and knowledge.

- *Indonesia's "heavy hands"*

The large size of the educational system, its administrative dualism (particularly, between the Ministry of Education and Culture and the Ministry of Home Affairs), and various cultural constraints make any process of major innovation in Indonesia difficult. For example, the Ministry of Education and Culture may provide training for teachers in an innovation; however, the Ministry of Home Affairs may transfer and replace teachers creating the possibility that those responsible for the innovation may be without special training.

The obstacles identified by Schaeffer are significant but not insurmountable. Indeed, variants of each problem or constraint exist in may countries. Planning educational change tends to be a time consuming complex, by some estimates in the United States, an educational reform from initiation to institutionalization takes approximately ten years. Some of types of reforms under the centralized administrations of education found in Europe may be achieved somewhat quicker. The nature of this process varies by type of reform, and the internal and external environments of the organizations being modified.

Top-Down and Bottom-Up Strategies for School Improvement

Indonesia, like most countries operates a national educational bureaucracy which extends from the Ministry of Education and Culture to the local schools. Most major educational reforms are initiated and guided from the center. In idealized terms, the process of educational change flows as follows:

1. Policy makers at the central level identify the key variables in reform or innovation being considered;
2. Policy options are identified;
3. Each policy option is weighed;
4. The most cost effective or promising option is chosen;
5. Administrators and teachers implement change.

This top-down, hierarchical and bureaucratic model is highly familiar and need not be discussed further. This model has been much criticized in recent years. Yet it is still popular in practice and is often successful in fostering change by emphasizing accountability.

Elmore (1978) suggests a counter strategy to the top-down model called "backward mapping" which gives more recognition to those participants directly involved in implementation. A systematic approach to backward mapping requires that the following questions be addressed in order:

1. What grassroots decisions are critical to the attainment of certain desired outcomes (e.g., certain specific improvements in education, health, agriculture, etc.)? Who are the makers of these decisions?
2. In particular, what do central government policy makers want to result from these decisions?
3. What other external conditions influence these decisions?

4. What are the agencies that could be charged with implementation of government policies in this area and what could they do to promote the desired outcomes (with the least adverse effect on attainment of their other objectives)?
5. What tools are available to central government policy makers to promote the desired outcomes through designated implementing agencies?

Bottom-up planning or backward mapping has greatly increased in popularity over the past few years. This approach has been particularly successful implementing changes in local capacity building.

The Need For Local Action Planning in Indonesia

Several conditions suggest the importance of local action planning in education within the context of top-down and bottom up planning:

1. Recognition of the complexities of planning change in Indonesia in the context of a strong bureaucracy, cultural diversity, and resource variations in educational conditions;
2. The nature of education itself with its multiple goals, complexities and uncertainties;
3. The trends in Indonesia toward increased, decentralization, autonomy, and professionalism in education;
4. The results of international research on educational change which emphasizes the importance of school and context factors in successful implementation.

PROFILE OF EFFECTIVE IMPLEMENTATION

- Training for policy makers and administrators in educational effectiveness
- Coordination of the change strategies used in the center, province and local community
- Utilization of both accountability and capacity building approaches
- Development of multi-dimensional, integrated innovations
- Provision of continuous training as reform proceeds
- Focus much of the reform on the teacher and instruction
- Utilization of qualitative and quantitative effectiveness assessment to modify ongoing programs
- Adaption of management information systems for local decisions
- Use of ad hoc surveys to capture current status of changes
- Plan for full participation of teachers, administrators and, if feasible, parents in evaluating, planning and implementing reforms
- Monitoring the progress of delivery of needed inputs

Action planning in education at the local level suggests what might be called an engineering (or physician's) model as opposed to a pure scientific model. The traditional approach to educational change emphasizes an extended period of research and experimentation prior to design of changes. This "scientific" model is appropriate for macro, long term planning in a context where appropriate facilities and personnel are available. Arguably it makes research based knowledge the foundation for all innovations and reforms. Nevertheless, this is a slow, expensive approach which sometimes ignores the contextual complexities and uncertainties associated with educational decision making. At the local level where these conditions usually do not exist another approach may be useful.

An engineering rather than a "scientific" perspective on the development of more effective education focusses on changes, innovations and reforms underway or easily initiated at the local level. Not only is this approach defensible on the grounds of lower costs and requirement of less time (than the scientific model), but also it suggests that innovation and reform agencies can evolve from local experience and knowledge.

Figure VI.6
Implementing Local Educational Change

Choice of Innovation →	Innovation Strategy →	Continuing Evaluation →	Adaption as Necessary →	Institutionalization

Supported by resources and information from the center and grounded in the body of research on effective education, continued improvements in Indonesian education can be defined and implemented through the initiative of local administrators and teachers.

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VII

Education, Demographics, the Labor Market, and Development: Indonesia in the Process of Transition?

James Cobbe and Boediono

ABSTRACT

Indonesia is about to enter on its second Twenty-Five Year Plan, during which it hopes to undergo rapid industrialization. This paper reviews the country's situation with respect to changes in the education and demographic behavior of its population, and the interaction between them and the labor market and development, particularly in comparison to other countries in East and Southeast Asia.

Indonesia is shown to be well into its demographic transition, at a lower income level than many other countries. The important but complex role played by education, especially of women, is discussed, as is the related role of female labor force participation, particularly in wage labor.

Indonesia, despite recent advances, is shown to be behind all other ASEAN countries with respect to both education of girls and female labor force participation. The very dramatic increase in the formal educational attainment of new entrants to the labor force in recent years, which will continue, is demonstrated, and its implications discussed. Planning for the next twenty-five years should include consideration of alternative scenarios for the educational attainment of the labor force, looked at in terms of its distribution by status, occupation, industry, and location. It is argued that the rapidly changing educational composition of the labor force is likely to result in growing proportions of those with junior secondary and higher education levels both in occupations and sectors where they have previously been comparatively underrepresented, and in statuses other than wage employment. This will include a rapid upgrading of the educational attainment of new entrants to most wage labor occupations.

It is argued that both of these outcomes make feedback to the content of education highly desirable, i.e., a reassessment of the objectives, content, and style of formal schooling above the primary level.

VII

Education, Demographics, the Labor Market, and Development: Indonesia and the Process of Transition

James Cobbe and Boediono

I. INTRODUCTION

Much discussion of planning in Indonesia centers around the concept of 'take-off,' and the official view appears to be that Indonesia is now poised for a take-off in the immediate future (Boediono, 1991; Sumawinata, 1989; Sadli, 1989). This paper will focus on where Indonesia stands with respect to the demographic, educational, and labor market changes that characterize economic development, without specifically addressing the usefulness for analytic purposes of the take-off concept.

It has been an established hypothesis since the 1940s that in the process of economic development, countries generally pass through a set of changes in fertility, marriage, and mortality behavior that are commonly labelled the "demographic transition." It is also generally accepted that this demographic transition is influenced in matters of detail by a large number of factors, one of which is education. Others include social and cultural factors such as values and religion, and the structure of the labor force, particularly the proportion agricultural, the proportion that work for wages, and female labor force participation rates. These latter factors are also associated with the pace and style of economic growth and development, although the direction of causation is not unambiguous. The pace, style, and quality of human resource development are also clearly associated with economic growth and development, although again some of the causal links may be of ambiguous direction.[1]

It follows that demographic, educational, and economic developments are interrelated in complex and not fully understood ways. These connections are obviously of great importance for planning educational provision, particularly over longer run time horizons such as twenty five years. This paper seeks to explore some of the more firmly established connections, and to suggest some of the more important and probable implications for long term planning for education in Indonesia. Because it is clearly established that both the demographic transition, and the linkages between education, labor markets, and demographic phenomena, have been rather different in East and Southeast Asia from how they were historically in Europe and North America (Chesnais, 1989), the focus of the paper will be to draw on existing materials relating to the experience not only of Indonesia itself, but also other East and Southeast Asian economies.

II. FERTILITY DECLINE AND ECONOMIC DEVELOPMENT: GENERAL CONNECTIONS

The demographic transition covers the period during which a population shifts from high mortality and high fertility, typical of low-income, pre-industrial, largely agrarian, populations, to low mortality and low fertility, typical of high-income, industrial, and largely urbanized populations. The sequence is normally first, a fall in mortality (especially infant and child mortality), followed by an increase in the age of marriage and a drop in fertility, which typically start well after the start in the fall of mortality. However, the decline in mortality rates (again, especially infant and child mortality rates) typically continues long after the fertility rate has started to decline.

What distinguishes the East and Southeast Asian experience from that of Europe and North America is the speed of the transition, and the extent of changes in the key rates. Japan has gone further in terms of this process than any other country, so that it now not only has a below replacement TFR (Total Fertility Rate, the expected average number of births per woman if current age-specific fertility rates remain unchanged), something which many European populations also have, but also has the longest lifetime life expectancy of any country.

Many factors associated with modern economic growth and development have been associated with these demographic changes. Clearly, many are associated with changes in the economic status and role of women, of the family, and of children within it, in the process of industrialization. The major issues concern women's economic opportunities and behavior, and expectations and perceptions concerning the economic impact on the family of children, both as children and when they become adults.

When few women are economically active outside the home and household enterprises, the normal circumstance before the demographic transition, the opportunity costs of child-bearing and child-care, especially as viewed by the father and husband, are relatively low. This is because child-bearing typically does not greatly interfere with household-level activities, although there are of course costs to the mother herself; and child-care is normally also provided through the extended family with no explicit costs. However, as women become urbanized, work outside the home or the household's own enterprises, and even enter formal-sector wage employment, the opportunity costs of child-bearing and child-care rise dramatically, at least in explicit, out-of-pocket, terms, and as perceived by husbands and fathers.

Similarly, when economic activity is organized within and by the family, children at least potentially are a source of labor and thus income to the family, if not in interactions with the outside economy at least within the household. However, when child labor no longer can produce a net increase in income for the family (either because of a lack of opportunity for children to do productive work, or because of a perceived need for them to undergo education either as an investment for future productivity or as a result of social or legal pressures), the incentive to have more children is reduced.

A third change that typically is associated with the transition from pre-industrial to industrial economy and society concerns the provisions that exist to ensure income security for individuals in case of old age or disability. In societies where most economic activity is organized by and within the household, the normal or only source of such security is the extended family, and accordingly there is a motivation to have many children to increase the chances of adequate support if the individual becomes unable to provide it for him or herself. Once there are alternatives, such as occupational pensions or government social security or provident schemes, in which individuals have confidence, the perceived need for many children for this reason is reduced. Social changes associated with urbanization, industrialization, and the spread of wage employment, such as the weakening of extended family ties and greater mobility of individuals, tend to create a need for these alternatives which then becomes stronger as family size declines. The growth of financial institutions and the greater potential role of government as income per head grows also make alternative provision for income security more feasible.

Lastly, there are two hypotheses that associate the shift from high fertility patterns to low fertility patterns with more psychological or social changes, that allegedly are associated with industrialization and higher incomes, although the mechanisms behind them are not wholly clear. The idea is that two changes in behavior are associated with changes in the desired number of children. The first, associated with the name of Becker (e.g., Becker and Lewis, 1979), draws an analogy between decisions to have children and the purchase of consumer durables, and points out that there is inevitably a quantity/quality trade-off, i.e. given family income levels, the family can choose either to have more children, and invest fewer resources (material and non-material) in each, or to have fewer

children, and invest more in each. The hypothesis is then that as the set of opportunities and costs/prices facing families change as incomes rise, urbanization and female labor force participation rise, etc, increasingly more and more families choose to have fewer children, but higher quality ones -- i.e., invest more in the education, housing, health, nutrition, and clothing, etc, of each. This may partly be a shift in preferences, and partly a response to a changed set of opportunities and prices, with unchanged preferences.

The second idea, associated with Caldwell (e.g., 1976, 1978, 1980, 1982), is more explicitly psychological or social, in that it is based on actual revealed preferences and how they change. The argument is that in agrarian societies, in which individuals are largely dependent on their offspring for support in case of old age or disability, the normal expectation is that over the lifetime of an individual, the direction of any net transfer of wealth between generations will be from children to parents. However, in the advanced, high income societies of the West, the normal expectation appears to be that the usual direction of any net transfer of wealth between generations will be from parents to children, i.e. parents do not generally expect to be recompensed by their children for the investments they have made in them, but direct transfers inter vivos, as well as positive bequests, from parents to children, are not only common but widely expected. The connection with fertility behavior is then direct, if when stated baldly a little crude. On economic grounds, if one expects a net gain from each child, it makes sense to have more; on the other hand, if each child represents an expected reduction in other forms of consumption during the parents' lifetime, on economic grounds it makes sense to have fewer. There is some empirical evidence based on surveys suggesting that in at least some low income societies, responses to attitudinal questions revealing in which direction an individual expects intergenerational wealth transfer to flow are better predictors of desired family size and actual fertility behavior than either income, occupation, or education, although at a gross level these attitudes are weakly correlated with these other variables (Caldwell, 1976).

Impacts on the Labor Force:

One of the best known results of demography is that the level of fertility is one of the major determinants of the age structure of the population (the other, of course, being the pattern of age-specific death rates). In that persons are born at age zero, but on average die at relatively advanced ages, population growth implies that each year a larger cohort of persons age less than one is added to the population than the cohort of persons who died, who were of course on average much older. This implies that a growing population has an age structure tilted toward youth; and because the faster population grows, the greater the excess of births over deaths each year, the faster population grows, the more the tilt of the age structure toward youth.

However, what is not quite so widely appreciated is the effect of declining fertility (and population growth) on the proportion of the population who are of working age, however conventionally defined.[2] When fertility is declining, each succeeding new cohort of births is proportionally less larger than the cohort of deaths in the same year. This implies that the proportion of the population that is in the working-age group will increase steadily for some time after fertility decline begins. Projections based on 1980 and 1985 Indonesian data suggest that the conventionally defined dependency ratio (i.e.population aged 0 to 14 years plus population aged 65 and over divided by population aged 15 to 64) will decrease monotonically until probably around the year 2020, and is unlikely to reach its 1985 level again until the latter half of the 21st century (Jones, 1988:34).

This implies that throughout the next twenty-five year period, the ratio of potential workers to total population should be rising in Indonesia, and thus so long as potential workers can all find work without a reduction in average labor productivity, income per head will rise. However, the opportunity is much greater than this, given that population has been and is still growing, so that within the working-age population there is a strong tilt of the age structure toward youth. For years to come in

Indonesia, the new, young, cohorts entering the labor force will be larger in numbers than the older workers leaving the labor force because of death, retirement, or disablement. For a decade or so, the new cohorts will continue to grow in absolute size, although at a decelerating rate; early in the 21st century, the absolute size of each year's cohort of new entrants to the labor force is likely to start to decline. However, the size of the entering cohort will still be substantially greater than that of the exiting cohort, because of earlier rapid population growth.

On average, the young new workers have much more education than the old workers they more than replace. Thus the average educational attainment incorporated in the work force can, and will, grow faster than implied by the difference in education between an average exiting worker and an average entering worker alone – because there are more workers entering than exiting. The rapidity with which the average educational attainment of the labor force can grow is considerable when past population growth was rapid and education has deepened substantially. In Indonesia between now and the end of this century, it is estimated that four persons will enter the labor force for each one that leaves it (Keyfitz, 1989). The person exiting will on average be illiterate, with perhaps on average two to three years of education; the new entrant will on average probably have close to nine years of education (completed SMP, junior secondary). The average educational attainment embodied in the labor force will therefore rise very rapidly. That this process is already well underway is shown by Table VII.1, based on the 1989 SAKERNAS (Indonesian Labor Force Sample Survey). Already in the labor force in 1989, there were over 20 times as many male, and 95 times as many female, SMA general (academic high school) graduates aged 20 to 24 as there were aged 55 to 59; and over 8 times as many male, and over 30 times as many female, university graduates aged 25 to 29 as aged 55 to 59.

Table VII. 1
Educational Attainment of the Labor Force, Selected Age Groups, Indonesia, 1989, by Sex (%)

	Male			Female		
Age in years	20-24	25-29	55-59	20-24	25-29	55-59
Education						
None	2.8	5.0	27.0	6.0	9.8	55.6
SD	14.3	20.5	38.4	19.0	28.5	30.6
SD	35.0	38.3	26.3	36.1	39.0	11.6
SMP Umum	15.7	10.4	2.8	9.5	4.8	0.9
SMPK	1.8	1.8	0.9	1.1	0.9	0.3
SMA Umum	19.0	11.9	1.8	15.0	5.9	0.4
SMAK	10.5	8.5	1.7	11.5	7.2	0.6
Diploma I/II	0.3	0.5	0.2	0.6	0.9	0.0
Akademi/Dip.III	0.6	1.3	0.4	0.8	1.4	0.0
University	0.2	1.9	0.5	0.4	1.5	0.1
Total (%)	100.2*	100.1*	100.0	100.0	99.9*	100.1*
Total (Number)	4,855,553	5,221,737	2,519,823	3,688,060	3,991,692	1,546,424
LFPR (%)	74.9	92.9	89.3	52.0	55.6	56.8

* Rounding error

Note: In this and following tables, educational attainments are expressed in Indonesian terms. SD is primary school (first six years) < SD means less than full primary; SMP is Junior Secondary, SMA Senior Secondary; 'Umum' is general or academic, K is vocational, technical, and commercial. Diploma I and II are post-secondary qualifications below University first degree, as are Akademi and Diploma III. University refers to first degree (Sarjana) or higher.

LFPR is Labor Force Participation Rate, i.e., the total economically active (the total shown in the table) in the age group divided by the total population in the age group.

Source: BPS, *Keadaan Angkatan Kerja Di Indonesia*, 1989, tables 2.7, 2.8, 7.7, 7.8, based on the last three quarterly rounds of SAKERNAS in 1989.

Even more striking, however, are the contrasts between the educational attainments of those aged 20-24 in 1989, and those aged five years older, 25-29. Among men, the proportion with completed general SMP increases by 50%, and the proportion with completed general SMA increases by 60%. At the same time, the proportion with no school at all declines by 44%, and the proportion with less than a full primary education (SD) falls by 30%. For women, the improvements are even more dramatic: the proportion with completed general SMP almost doubles, and the proportion with completed general SMA increases by 154%! Very clearly, the educational qualifications of new entrants into the labor market in Indonesia are improving very rapidly.

However, surprisingly soon the tendency for the labor force to become, on average, younger will cease, as on average individuals stay in education longer (and therefore enter the labor force later, at an older age), and as the effects of earlier fertility declines begin to make themselves felt on the size of the cohorts entering the labor force. According to one estimate, between 1985 and 2000, the slowest growing age group in the labor force will be 15 to 19 year olds, and the fastest 35-44 year olds (Jones, 1988:16). The average age of the labor force will nevertheless continue to decline, and its total size grow, because of the initial shape of the age structure. But the deceleration of the growth rate of the labor force, and of its trend toward greater youthfulness, are both already underway. Fairly early in the 21st century, the average age of the labor force will start to increase, although the total size of the labor force will continue to grow (albeit at a progressively slower rate) well into the 21st century, as large cohorts born while the population was growing rapidly move up through the age structure.

However, the key point is that in the immediate future, it is likely that the average educational attainment of the labor force will increase very rapidly, whatever policies are adopted. This gives the potential for rapid increase in output per worker and per person, if there is a good economic return maintained to the investment education represents. However, it must be recognized that it is to be anticipated that the relative earnings of the more educated are likely to decline as their relative proportion increases; the key empirical issue is how fast this decline is likely to be, and how elastic to the rate of increase of the labor force with given educational qualifications. In theory, the optimal rate of educational expansion on economic grounds alone would depend, in part, on this elasticity. In practice, it is not feasible to estimate it with any worthwhile degree of confidence, and in any case it is important to include in educational planning other roles that education plays in addition to increasing individual productivity, and also other aspects of the consequences of rapid rates of growth of the average education of the populace. These consequences may be positive, e.g., improved nutrition, reduced fertility, improved participation, greater receptivity to change, etc, or they may be negative, e.g. if persons' expectations or willingness to accept certain roles in the labor market adjust more slowly than the structure of opportunities, producing discontent among unemployed or underemployed educated persons (Jones, 1976 and 1988; Bauer, 1990).

Role of Industrialization:

A key role in the transition is played by the growth of modern industry, in particular manufacturing. In the words of Chenery, "Development is now conceived as the successful transformation of the structure of an economy. In his historical studies of economic growth, Kuznets (1966) identified the shift of resources from agriculture to industry as the central feature of this transformation .... Historically, the rise in the share of manufacturing in output and employment as per capita income increases, and the corresponding decline in agriculture, are among the best documented generalizations about development." (Chenery et al, 1986: ix, 1)

The 1989 situation with respect to the educational qualifications of workers in these two key sectors is shown in Table VII.2. Two points stand out. First, although the percentage distribution of workers by educational attainment differs markedly between the two sectors, agriculture in absolute

Table VII. 2
Educational Attainment of the Employed Labor Force, Agriculture and Manufacturing, Indonesia

1989

Education	Agriculture Number	Percent	Manufacturing Number	Percent
None	8,690,392	21.1	847,398	11.6
< SD	13,903,589	33.7	1,743,219	23.8
SD	15,306,403	37.1	2,840,977	38.7
SMP Umum	2,107,785	5.1	780,994	10.4
SMPK	290,632	0.7	133,056	1.8
SMA Umum	557,104	1.3	520,433	7.1
SMAK	381,356	0.9	393,565	5.4
Diploma I/II	9,851	0.02	10,311	0.1
Akademi/Dip.III	20,982	0.05	33,204	0.5
University	16,138	0.04	31,687	0.4
Total	41,284,232	(100.0)	7,334,874	100.0

Source: BPS, *Keadaan Angkatan Kerja Di Indonesia*, 1989, table 14.9

1990

None	8,554,121	24.1	1,096,834	13.3
SD	12,426,432	35.1	1,931,927	23.5
SD	11,383,594	32.1	2,862,949	34.8
SMP Umum	1,817,329	5.1	944,436	11.5
SMPK	186,560	0.5	88,817	1.1
SMA Umum	654,311	1.8	697,902	8.5
SMAK	374,524	1.1	465,443	5.7
Diploma I/II	8,967	0.03	17,879	0.2
Akademi/Dip.III	17,194	0.05	46,849	0.6
University	26,624	0.08	67,869	0.8
Total	35,450,385		8,221,155	

Source: BPS, *Penduduk Indonesia: Tabel Pandahuluan Hasil Sub-Sampel Sensus Penduduk*, 1990 table 38.9.

Note: Labor Force Survey (the 1989 data) and Census (the 1990 data) in Indonesia are generally not considered fully comparable because of enumeration and definitional differences. See, e.g., Korns (1987).

numbers employs more workers at every level of education through SMA, and even at university level — where manufacturing proportionally employs ten times as many workers as does agriculture — in absolute numbers manufacturing employs fewer than twice as many workers as agriculture. Second, although average educational attainments of workers in manufacturing are clearly higher than of those in agriculture, the difference is not all that great and the 1989 average educational attainment of manufacturing workers is still quite low, the median and modal education both being completed primary school. Part of the reason for this is the heavy concentration of more educated workers in public service; public services in 1989 employed 34.6 % of SMA general, 55.7% of SMA Vocational, 82.5% of Diploma I and II, 64.8% of Akademi/Diploma III, and 72.2% of university graduates, who were working. This compares to only 12.1% of all employed workers having their employment in public services. Data from the 1990 census, also shown in Table VII.2, are clearly not strictly comparable to the 1989 Sakernas (Labour Force Survey) data, but tell a very similar story qualitatively.

Given the intended constraint on the growth of employment in the public service, and the rapid increase in the educational qualifications of new entrants to the labor force, it is clear that educational attainments of the labor force will be upgraded within sectors; a shift in structure of the economy toward manufacturing and modern services will not absorb the new output of SMA and above without an increase in average educational levels of workers within sectors. One of the key issues for the speed and smoothness of Indonesia's transition concerns the rate at which that upgrading will occur, and its impacts on worker productivity and labor relations.

Indonesia's situation with respect to the demographic transition and economic development.

The results of the 1990 Population Census of Indonesia with respect to fertility and mortality have only recently become partially available, so in this section we will concentrate on trends revealed through 1985. However, the total population enumerated in the 1990 census has been published, and it should be noted from the outset that this total population is lower than had been expected on the basis of projections from earlier fertility and mortality trends, indicating (if the census data are accurate) that the fertility decline is proceeding faster than expected although also, regrettably, that the decline in mortality rates has been slower than predicted.

Tables VII.3-5 summarize some relevant data concerning the demographic transition in Indonesia. Table VII.3, taken from Hirschman and Guest (1990), shows some detail on the source of the decline in Indonesia's fertility rate between 1965-69 and 1975-79. It shows that by the late 1970s, except for those with no education (who are likely to be constrained in their fertility behavior by their economic status and its health implications), the TFR declines monotonically with increasing education of the women concerned, from about 4.4 for women with less than a full primary education to about 2.8 for women with post-secondary education. Hirschman and Guest also decompose the origins of the decline between 1965-69 and 1975-79, and show that for both younger and older women the decrease is almost entirely due to a decline in marital fertility, i.e., number of births within each marriage, rather than to a change in marriage behavior.

Nevertheless, the age of first marriage of women in Indonesia is increasing, as shown in Table VII.4. This is probably largely due to increases in average education, i.e., women staying in education delay marriage, but detailed information to permit certainty on this conclusion is not available. However, the indications are that the proportion of women who ever marry is not yet changing much, although it may do in the future if even higher percentages of women complete university (although in Indonesia as in most Asian societies, marriage is almost universal for women, university educated women tend to be the most likely to never marry, because of a strong tendency for men to want to 'marry down,' i.e., marry a wife with lower educational attainment than they have).

Table VII. 3
Change and Decomposition of Change in TFRs (current fertility) by Age and Marital Status for Different Educational Attainments, Indonesia, 1965-69 and 1975-79

Education	TFR 65-69	75-79	Change	Disaggregation of change: % Married	Age 15-29 Marital Fertility	Age 30-44 Marital Fertility
None	4.31	3.66	-0.65	-0.03	-0.29	-0.33
SD	5.19	4.38	-0.81	0.04	-0.46	-0.40
SD	5.43	4.33	-1.10	0.02	-0.65	-0.47
SMP	4.98	3.86	-1.12	0.03	-0.65	-0.50
SMA	4.49	3.23	-1.26	0.02	-0.43	-0.86
Tertiary	3.07	2.81	-0.26	0.35	-0.31	-0.31
Total	4.59	3.95	-0.64	-0.01	-0.36	-0.27

TFR is total fertility rate, calculated from current age-specific fertility rates in the period shown.
Source: Hirschman and Guest, 1990, table 5.

Table VII. 4
Trends in Some Demographic Characteristics, Indonesia, 1960 – 1990

	1960	1970	1980	1985	1988	1990
Percent women literate, ages 20–24	27	47	66	79		93
Median age at marriage, women (years)	n.a.	18.9	19.5	20.5		
Infant mortality rate	150	143	107	n.a.	84	73
Life expectancy at birth (years)	41.2	47.3	53.1	57	61	61.5

Source: Jones, 1990, table 1; Ogawa and Tsuya, 1988, table 2; World Bank, *World Development Report* (various years); UNICEF, *The State of the World's Children*, 1989 and 1990; UNDP, *Human Development Report*, 1991; and 1990 census. Different sources are not always consistent.

Table VII.4 also shows the dramatic increases in the percentage of young women who are literate, the rapid decline in infant mortality, and the impressive increase in life expectancy at birth, in Indonesia since 1960. All these are normally associated with the demographic transition. However, until recently at least, Indonesia has been behind most countries in Asia with which it could be compared. The other members of ASEAN all have had infant mortality rates well below Indonesia's

since at least 1960, and the rate of decline at least up to 1980 was at least as fast in those countries. China probably had a higher infant mortality rate than Indonesia in 1960, but is believed to have experienced a very rapid improvement associated with its strong population polices, with the result that by 1965 it probably had already passed Indonesia. South Korea in the early 60s had an infant mortality rate roughly equal to that of Indonesia in the late 80s. Only the large countries of South Asia, India, Pakistan, and Bangladesh have infant mortality rates that are higher, and declining more slowly, than Indonesia's (Ogawa and Tsuya, 1988:20).

Indonesia's TFR has been falling steadily at least since the 1960s, and there is some suggestion that the pace of decrease has accelerated in the 1980s. The rate of fall has been slower than in Thailand, which has had more rapid economic growth, but Indonesia's TFR is now substantially below that of ethnic Malays in Malaysia, who had a lower TFR in the late 1960s and early 1970s. The TFR of Malays in Singapore fell precipitously, from over 6.0 and well above Indonesia's in the mid 1960s, to below 2.0 in 1978. Since then, the TFR of Singapore Malays has tended to drift upwards again. These contrasts in different parts of Southeast Asia strongly suggest that in addition to economic influences on TFR's, there are effects from both culture and public policy [the TFR's for other ethnic groups in Malaysia and Singapore are quite different from those of Malays]. Pronatalist policies aimed at ethnic Malays in Malaysia are probably in part responsible for the behavior of TFR's of both Malaysian and Singapore Malays (Jones, 1990).

Table VII.5, following Jones (1990), gathers some scattered data on desired and ideal family sizes, as reported by Indonesian women. If actual fertility behavior mirrors reported ideal family size, the rate of decrease of fertility can indeed be expected to have accelerated in the late 1980s. Table VII.6, following Chesnais (1989), for the major countries of South and East Asia aligns a measure of improvement of female literacy with a measure of fertility decline over the 1950 to 1985 period. The table nicely demonstrates that there is a crude correlation between changes in female literacy (which is likely in part proxying for education, labor force participation, and income) and changes in fertility, but also demonstrates that there are clearly other factors at work as well. With respect to Indonesia, it is interesting to note that with the countries ranked by increasing progress on female literacy, as they are in the table, the only country with slower literacy improvement than Indonesia which has greater fertility decline than Indonesia, is China, which of course pursued an extremely strong policy to reduce fertility during much of this period.

Overall, the implication would seem to be that the progress of the demographic transition in Indonesia has been consistent with that in other Asian countries, somewhat slower than most ASEAN and East Asian countries (which, however, have higher incomes per head and higher levels of education), and somewhat faster than the large South Asian countries (which have lower incomes and lower levels of education). The acceleration in the increase in average education levels of women, particularly if associated with faster economic growth, and increased participation in wage labor, is likely to accelerate the process of the demographic transition on the basis of the experience elsewhere in East and Southeast Asia (Jones, 1990; Mason et al., 1986, Hirschman and Guest, 1990).

However, it is important to bear in mind that prediction of fertility behavior, and of total population, is inherently uncertain. Actual fertility behavior is determined by millions of individual couples, who will respond to stimuli of a great variety most of which are inherently unknown. The differential fertility behavior of the Malay populations in Malaysia, Singapore, and Indonesia respectively, or of the various ethnic groups in Malaysia and Singapore, show that economic environment alone cannot explain actual behavior in a quantitative sense. Similarly, the differences between population projections and census results (as in Indonesia in 1990), show the difficulty of making quantitative demographic projections. Thus one can come to qualitative conclusions about the likely direction of trends, but quantitative predictions are very unlikely to be accurate, the more so the more long run they are.

Table VII.5
Ideal or Desired Family Size, Married Women, by Education, Age, and Urban/rural

Year	[Java/Bali only] 1973 Ideal	1976 Desired	All Indonesia 1987 Ideal
Total	4.2	4.2	3.2
By age:			
15–24	3.9	3.5	2.8
25–34	4.1	4.1	3.2
35–44	4.4	4.9	3.5
By education			
None	4.3	4.4	3.4
Primary	4.2	4.1	3.4
Secondary	4.1	4.0	
Tertiary		3.8	2.9
By residence			
Urban	4.2	4.3	3.1
Rural	4.2	4.2	3.3

Notes:
1973 and 1976 data refer to Java and Bali only, and apply to married women aged 15 to 49; the 1987 data refer to all women aged 15 to 49.

Primary education is some primary only (SD); 1987 figure for completed SD was 3.0. 1973 secondary education is completed primary and above; 1976 tertiary is completed secondary and above.

Source: Jones, 1990, table 2.

Table VII. 6
Progress in Female Literacy and Fertility Reduction, Asia

	Percent illiterate women born 1906–15 (1)	1946–55 (2)	Index of progress, literacy (3) = (1)/(2)	TFR about 1950 (4)	TFR about 1985 (5)	TFR Change, 50–85 (5)-(4)
Bangladesh	96.4	82.4	1.2	6.5	5.8	-0.7
Pakistan	96.1	81.8	1.2	7.0	6.7	-0.3
India	92.5	67.5	1.4	6.0	4.5	-1.5
China	97.1	40.4	2.4	6.0	4.5	-3.5
Indonesia	88.0	26.2	3.4	5.5	3.7	-1.8
Sri Langka	56.6	15.7	3.6	5.7	3.1	-2.6
Malaysia	92.5	25.5	3.6	6.8	3.6	-3.2
Phillipines	39.3	7.6	5.2	7.2	4.5	-2.7
Singapore	84.6	15.7	5.4	6.3	1.7	-4.6
Thailand	79.8	8.2	9.7	6.6	3.1	-3.5
South Korea	61.5	1.2	51.2	6.0	2.5	-3.5

Source: Chesnais, 1989, tables 2 and 4, based on population censuses and UN data.

III. EDUCATION AND DEMOGRAPHIC BEHAVIOR.

It is well known, and has been shown in section 2 above, that higher levels of female education tend to be associated with lower total fertility. This can be decomposed into lower and later marriage rates, and lower marital fertility. There also may well be indirect and intergenerational effects, in that more educated women tend to suffer lower infant and child mortality of their children, and the daughters of more educated women are themselves likely to attain more education (Mason, 1988; Knodel, Havanon, and Sittitrai, 1990). However, although all these simple correlations are well established, it is not clear how well they would stand up on a *ceteris paribus* basis, because higher levels of female education are also associated with higher income, better nutrition, better housing and health, and (usually) greater probabilities of labor force participation and participation in wage labor. Thus it is not clear whether the effects on marriage, fertility, and infant and child mortality are the results of education per se, or the results of other variables that are associated with education but may themselves be the direct cause of the demographic change.

In principle, this is the sort of question that should be answerable by multiple regression type analyses, but given the total lack of any reasonable a priori structure to model, the strong correlation between variables, and the difficulties of dealing with large data sets that are usually far from ideal for these purposes, there is as yet no consensus in the social sciences as to the extent to which the influences seen are due to an independent effect of education, as opposed to either an indirect effect through the effects of education on income and labor force participation, or a spurious correlation. Generally, most authorities seem to believe that there probably is some direct, independent effect, but that it is probably quite small, and a few are skeptical of any independent effect at all (e.g. Behrman, 1990).

There are a couple of aspects of education's relation to demographic behavior that have been somewhat different in East Asia than they were in Europe, and which may be of relevance to

Indonesia. The first concerns the very rapid improvement in education for women during the transition. In fact, in several countries average education of women not only rose faster than for men, but also went further, so that now in several countries (Japan, Singapore, South Korea) young women actually tend to have a larger number of completed years of education, on average, than young men of the same age (Chesnais, 1989:9). This tends to have strong effects with respect to young women's labor force participation, on opportunities for wage or salary employment and hence the potential for independent income and life, and through these on age of first marriage and probability of whether ever married. It is unclear whether this process will go as far in Indonesia as it has in some other Asian countries, but Table VII.1 shows that already in 1989, of those actually in the labor force, 20 to 24 year old women were more likely to have completed SMA K, Diploma I, II, or III, Akademi, and university, than young men of the same age; and the contrast between 25 to 29 year olds and 55 to 59 year olds also shows that women's educational attainment at every level from completed primary school up has grown faster than men's over the last thirty years.

Second, there is the issue of the age of marriage for women. In Europe, the age of marriage rose, slowly, before marital fertility began to decline, and had the twin effects of freeing women from the burdens of marriage and motherhood during their most economically productive years, and of reducing total births per woman by reducing their effective child-bearing years. In mid nineteenth century Europe, the singulate mean age of marriage for women was more than 25 years in many cases, and it was through the mechanism of late and selective marriage (relatively high proportions of persons remaining single) that in most West European countries the average number of children per woman was held down to only 4 to 5 (as opposed to the 6 or more common in Asia before the transition) even before any decline in age-specific fertility for married women. However, in Europe, once marital fertility did begin to decline, the age of first marriage also started to decline, so that in many countries in the West it fell to well below the 25 years of the past. More recently, age of actual marriage has tended to rise again in the West, but this time accompanied by fairly widespread cohabitation [and births out of wedlock, a largely non-existent or non-acknowledged phenomenon in East Asia] at younger ages, so that the age of formal marriage has become less important for Western fertility behavior.

In Asia, age of marriage for women has also been rising, in most cases since the 1920s (well before the decline in fertility) or before, but in those countries where the demographic transition is well advanced two differences from European experience are apparent. First, the increase did not stop when fertility started to fall, but continued, with the result that in Japan, Korea, and Taiwan the average age at marriage is now about 25 years -- in fact, in 1985, the figure for Japan was 25.8 years, the highest in the world (Chesnais, 1989:16). However, unlike Europe, marriage is in most of Asia still almost universal eventually for women.[3] Nevertheless, the postponement of marriage has positive effects on the accumulation of education and economic growth, because it makes it easier for young women to continue in school and almost requires them to work (and save) after they leave school but remain single. The proportion of women aged 20 to 24 years who are still single has increased dramatically in several Asian countries, the most dramatic case perhaps being South Korea, where it went from 2.3% to 51.6% from 1930 to 1966. The proportion does appear to be rising in Indonesia, as does the average age of marriage, but there may be some question as to how far the process will go in Indonesia so long as the proportion of the population that is rural remains high (Chesnais, 1989; Ogawa and Tsuya, 1988).

IV. EDUCATION AND THE LABOR MARKET DURING THE TRANSITION.

The main changes in the labor market in the process of economic development are well summarized in Oberai's 1978 study, based on a broad sample of countries, for the ILO. The international cross-section data used strongly suggest characteristic patterns of change in the sectoral

distribution of both labor force and wage employment as income per head increases. Wage employment tends to grow proportionately in all sectors (i.e. the proportion of self- and family-employment falls). Labor force tends to shift toward sectors and occupations that tend to have high wage-labor characteristics, such as large scale manufacturing, modern services, transport, and construction. The tertiary or service sector tends to grow as a proportion of total labor force, largely because of the relatively high labor intensity of much of its output, the relatively low elasticity of factor substitution in most of it, and its generally slow rate of technological change, although the ability of the sector to absorb large numbers of workers in certain small scale, self-employment or family enterprises with low entry barriers, may also mean that part of this tendency is the result of a supply side effect coupled with slow growth of labor demand from other sectors. This last point is sometimes referred to as the high labor-absorptive capacity of certain parts of the service sector.

Oberai also found that wage-earners as a proportion of total employment in each occupational category taken separately also tended to rise with economic development, as measured by income per head. Furthermore, the rise was most marked in those occupations that tended to have the highest training and education requirements. Oberai also found a positive association between modern sector employment and the share of exports in GNP, and between the shift in sectoral distribution of the labor force and rural-urban distribution of the population. However, in both cases the direction of the causal link is unclear, and may not exist: in both cases, both sides of the association may be a result of other changes, such as increases in income per head and education.

In very general terms, therefore, we know roughly what to expect during the transition in the labor market. However, in itself this tells us little, and especially tells us little about the role of education, the importance of relative rates of growth of supply and demand for particular categories and types of labor, or the key issue of the flexibility and integration of different markets.

In general, higher levels of education are associated with higher rates of labor force participation and of wage-employment. Further, higher levels of education are associated with higher status occupations within the modern sector, and with higher average earnings from wage and salary employment. However, the links are not rigid, and there are differences between different kinds and types of education that require the same number of years to acquire. Furthermore, although there is no reason to suppose that Indonesia will differ from the general pattern described above, it is important to recognize that this is a pattern of long run trends, and in the short to medium term it may be obscured or reversed by short run macroeconomic fluctuations, or changes in supply and demand of labor caused by short run changes in the economic and social environment, rather than long run trends. In Indonesia, which underwent some quite marked macroeconomic fluctuations during the 1980s, short run fluctuations clearly do interfere with long run trends on some dimensions.

Consider, for example, Table VII.7, showing the percentage distribution of the total working labor force over the main sectors of the economy from 1980 to 1990. Over the period as a whole, Indonesia's measured real GNP per capita rose, and clearly some economic development took place. And yet the major anticipated shifts in the sectoral distribution of the labor force did not take place — indeed, the key shift from agriculture to manufacturing was going in the wrong direction for much of this period. In fact, the eight observations give no real indication of any trends at all. Partly this may be a reflection of problems with comparability of data from different sources, but probably it also reflects the interaction of two other things. First, during this decade the total labor force was growing very rapidly, far more rapidly than growth of labor demand in the various modern sectors of the economy. The ability of most of Indonesia's potential and actual labor force to withstand even relatively short periods of total unemployment is strictly limited; accordingly, workers who cannot find work in wage employment perforce eventually move into self-employment or family work in those sectors of the economy that can easily absorb them (albeit, maybe, by reducing earnings per unit of effort for workers already there) such as agriculture, trade, and personal services. Second,

macroeconomic fluctuations probably contributed to some of the year to year shifts, on the same kind of basis – workers displaced from activity in sectors with relatively rigid real earnings are absorbed into self- or family-employment in sectors where earnings are, because of very low barriers to entry, much more flexible.

Table VII. 7
Percentage Distribution of Working Labor Force Over Main Sectors, Indonesia, Selected Years

Years	1980	1982	1985	1986	1987	1988	1989*	1990*
Sectors								
Agric.	55.9	54.7	54.7	55.1	55.0	55.8	56.2	49.2
Manuf.	9.1	10.4	9.3	8.2	8.3	8.6	10.0	11.4
Trade	13.0	14.8	15.0	14.3	14.9	14.2	14.8	14.7
Social Services	13.9	12.3	13.3	14.7	15.9	15.4	12.6	14.2
Other & Not Stated	8.2	7.8	7.8	7.8	6.0	5.9	6.3	10.5

Source: Departemen Tenaga Kerja, *Profil Sumber Daya Manusia Indonesia*, Jakarta: 1990, table 22; BPS, *Keadaan Angkatan Kerja Di Indonesia*, 1989, table 20.9; and BPS, 1991, table 31.9. 1990 data are from the Census sub-sample and clearly inconsistent with the earlier data from Sakernas. It is unclear whether the cause is differing interpretations of sectoral classifications, different sampling errors, or a seasonal effect caused by the Census 1990 data referring to one particular week, whereas Sakernas data are averages of four quarterly surveys.

* Assumes 'social services' includes public services and financial and other services; and that 'other and not stated' includes electricity, gas, water, construction, transport, storage, and communications.

With this caveat about the difficulty of disentangling short run fluctuations from long run trends when only a few years' observations are available, let us look now at some evidence that expected trends are taking place in Indonesia. First, consider Table VII.8, which shows LFPR's for women of various age groups (the main child-bearing ones) for 1980 to 1989. Notice the clear trend for the LFPR to rise, at all ages shown, although most strongly between 20 and 34. Even the LFPR for 15 to 19 year old's has been rising, although slowly, despite the high and rising level of school attendance among this age group (what has been declining is "keeping house" — and marriage). Again, the trends are not monotonic from year to year, but this is probably explained by a mixture of non-comparability of different sources (see, e.g., Korns, 1987) and reactions to short run macroeconomic fluctuations.

Table VII.9 gives some indication of the strong connection between education level and the proportion of workers who are wage employees, and a weak confirmation that the expected direction of change in the quantitative probabilities involved applies. The ranking of educational attainment by

percentage of those with that attainment who are wage employees (or, alternatively, self-employed or family workers) is almost exact — only diploma I/II is misplaced, probably because the qualification is of little value except in wage employment. However, more to the point is the apparent direction of change of the probability of being a wage employee for workers with the various levels of education, which is as would be expected in a situation where initially a fairly low proportion of all workers are wage employees and the educational qualifications of the labor force are rising rapidly.[4]

Table VII. 8
Labor Force Participation Rates (LPFR) for Women, Selected Ages & Years, Indonesia

Years	1980	1982	1985	1986	1987	1988	1989
Age group (years)							
15 – 19	31.3	33.2	30.4	36.2	35.7	34.9	34.9
20 – 24	34.2	41.4	41.0	49.7	50.7	52.7	52.0
25 – 29	36.1	43.9	42.5	53.6	55.5	55.1	55.6
30 – 34	39.5	47.0	48.1	57.1	57.2	57.8	57.3
35 – 39	42.7	51.8	51.6	50.1	61.3	60.3	60.7
40 – 44	46.0	54.7	54.5	63.2	63.4	63.4	62.1
All ages > 10 (includes omitted)							
	32.7	38.3	37.6	44.5	44.8	45.0	45.0

Source: Departemen Tenaga Kerja, *Profil Sumber Daya Manusia Indonesia*, Jakarta: 1990, table 28; and (for 1989) BPS *Keadaan Angkatan Tenaga Kerja Di Indonesia*, 1989, table 2.8.

In 1987, only 26.5% of all workers were wage employees. By 1989, this had risen to 26.9%, a move in the expected direction with development and representative of a large increase in total numbers of wage employees (from about 18,657,000 to about 19,782,000, or by about 6% in two years). However, there was a slight increase in the proportion of tertiary graduates who were wage employees; essentially no change in the proportion of those with SMP general or less who were wage employees; and noticeable declines in the proportions of those with SMP Kejuruan (vocational, technical, or commercial junior secondary school) and either kind of SMA (senior secondary, high school) who were wage employees. The reasons for these declines are obvious when one looks back to Table VII.1: by 1989, the proportion of 20 to 24 year olds in the labor force who had completed SMA as their highest level of education was already larger than the entire fraction of the working labor force who were employed for wages. Inevitably, there will be some wage jobs for which SMA is either too little or too much education; accordingly, unless there is a very unlikely mismatch between the rate of expansion of wage jobs and the labor force, the proportions in wage employment in educational categories overrepresented in wage employment will be likely to decline, as not all new graduates can be absorbed into wage employment and eventually are forced into self-employment or family work.[5]

Table VII. 9
Population 10 Years and Over Who Worked the Previous Week by Educational Attainment and Employment Status (% of Educational Attainment Groups), Indonesia

	1 Employee 1987	2 Employee 1989	3 Employer 1989	4 Self-Employed & unpaid family workers 1989	5 Employee 1990
Education					
None	15.6	15.7	0.3	84.0	20.5
< SD	18.4	18.6	0.5	81.0	25.2
SD	23.0	22.8	0.6	76.5	31.5
SMP Umum	34.5	34.6	1.1	64.3	43.7
SMPK	42.0	40.4	1.6	58.0	48.9
SMA Umum	63.0	59.9	2.0	38.1	65.5
SMAK	79.5	74.9	0.9	24.2	76.0
Diploma I/II	86.4	90.1	0.6	9.3	85.7
Akademi/Dip.III	85.3	86.4	2.6	11.0	85.3
University	88.6	89.9	1.2	8.9	88.0
Total	26.5	26.9	0.7	72.4	34.8
Total (Number)	18,689,818	19,781,672	498,781	53,143,649	25,031,302

[Columns 2 + 3 = 100; other columns omitted for 1987 and 1990.

Source: BPS, *Keadaan Angkatan Kerja Di Indonesia, 1989*, table 15.9, for 1989; BPS *Statistik Indonesia 1988*, table 3.2.14, for 1987; BPS, 1991, table 40.9 for 1990. 1987, 1989 data are based on Sakernas, 1990 data are based on the 1990 Census and sub-sample, and the two sources are obviously inconsistent. The definition of 'employee' was interpreted more liberally by census enumerators than by Sakernas enumerators.

The alternatives, of course, are withdrawal from the labor force or unemployment, and it is notable that almost all unemployment in Indonesia is among those under 30, and among persons who have never worked (this is especially true of the more educated; in 1989, at University level, there were more than 14 unemployed graduates who had never worked for every one unemployed graduate who had ever worked). Some persons (generally, the children of the better off) are able to undertake long searches for first employment, and the expansion of education has coincided with a very rapid upgrading of the educational qualifications of the unemployed, as shown in Table VII.10. By the late 1980s, over half the unemployed in Indonesia had full senior secondary school (SMA) or higher education, whereas not until after 1982 did the proportion of the unemployed who had only completed primary education or less fall below 60%.

High levels of young, well-educated unemployed are symptomatic of inefficiently functioning labor markets. The problem is usually a mix of several causes. One is a mismatch between detailed characteristics of new entrants to the labor force and the opportunities available to them, i.e., the demands of the labor market. These mismatches may be geographical, occupational, status-oriented, or specific skill problems. Another is expectations or initial reservation prices (interpreted broadly to include qualitative characteristics of opportunities) that are higher than the offers available from the demand side, and a slow adjustment process on the part of the labor market entrants. A third is plain

inefficient functioning of the market: imperfect and slow information flows, slow decision processes, bureaucratic delays, etc. There is reason to believe all these problems persist in Indonesian labor markets. Even if the bulk of unemployment is of young recent graduates who have never worked and are in the search process for first employment, experience in India and elsewhere has shown that in aggregate this can amount to a great deal of unemployment of some of the most educated persons in the population, and thus a considerable loss of potential output attributable to the inadequate functioning of labor markets and/or the failure of the education system to turn out graduates with appropriate expectations of their employment prospects or appropriate characteristics for available work opportunities.

Table VII. 10
Actively Seeking Work and Unemployed, by Education, Indonesia, Selected Years, % of Total

Year	1976	1978	1980	1982	1985	1986	1989	1990
Education								
< SD	32.2	37.8	53.0	33.1	14.8	12.6	6.7	18.6
SD	35.2	30.1	22.9	28.6	1.2	21.0	18.9	24.3
SMP	15.4	14.4	8.9	11.8	15.1	17.1	16.0	15.2
SMA	16.0	16.7	14.3	25.0	47.6	45.4	52.7	36.4
Tertiary	1.2	0.9	0.8	1.5	3.2	4.0	5.7	5.6
Total*	100	99.9	99.9	100	99.9	100.1	100	100.1

* Not all columns add to 100 because of rounding errors and the omission of small numbers with unspecified education.

Sources: Pernia and Wilson, 1989, Table IV-17; BPS, *Keadaan Angkatan Kerja Di Indonesia*, 1989, table 4.9; and BPS, 1991, table 29.9. 1990 data are based on the Census sub-sample and are not stritely comparable to earlier data, except for the 1980 data (which are also Census data) – i.e., 1980 and 1990 are comparable, but 1980 and 1990 are not comparable with other years.

Nevertheless, the existing rate of return estimates, based on the assumption of unchanging age-income profiles by education class and on data for urban wage employees only, continue to show rates of return to education at SMA level and above that is at least competitive with the rate of return on physical capital, whether or not adjustments are made for unobserved heterogeneity (McMahon, Boediono, and Gozali, 1991; Behrman and Deolaikar, 1990). Two issues raise concern about these estimates. First, they assume unchanging age-income profiles over future working lives, which is highly unlikely for a period during which the relative availability of more educated labor in Indonesia will increase rapidly (see 2 above). In fact, available evidence reflects the expected tendency for the relative incomes of university and SMA graduates to decline in the 1980s. Ignoring this tends to bias rate of return estimates up. Second, the data used are wage and salary incomes from main job of those in wage employment in urban areas. Thus the self-employed and family workers are omitted (for lack of data), and rural workers are omitted. One cannot know for certain, but it is at least plausible that the wage-employed in towns will tend to be disproportionately drawn from the better graduates in each education category, in that wage employment and urban residence are both normally preferred over the alternatives by most young people in Indonesia. Again, this will tend to bias upward the rate of return estimates.

With respect to occupational trends, a useful exercise has been carried out by Jones (1989), from which most of Table VII.11 is taken. Jones points out that the three occupational classifications, Professional, Managerial, and Clerical, accounted in 1985 in Indonesia for over 46% of all employed SMA general graduates, 53% of all SMA Kejuruan graduates, over 84% of all Akademi graduates, and 90% of all university graduates. At the same time, over 90% of all professional, over 80% of all managerial, and almost 70% of all clerical employees had at least an SMA education. Table VII.11 shows how the proportion of workers classified in these three occupational categories varied across industries in three countries with different levels of GNP per capita and development, namely Indonesia, Malaysia, and Australia. In general, consistent with findings by Oberai and others, the proportion of all workers classified in these categories tends to rise with GNP per capita or level of development, both because of an increase in their share within each industry and because of a shift in economic structure toward larger proportions of total employment being in industries that have higher fractions of their labor force in these categories.

Table VII. 11
Percent of Total Employment in Professional, Managerial, and Clerical Occupations by Sector, Indonesia, Malaysia, and Australia

	Indonesia 1985	Malaysia, 1984	Australia 1986	Indonesia 1990
1984 GNP/Capita, U.S.$	$540	$1,980	$11,740	
Agriculture	0.0	0.9	73.0*	0.1
Mining and quarrying	10.7	24.2	31.2	4.5
Manufacturing	4.0	13.0	28.1	3.7
Electricity, gas, water	30.0	35.0	41.8	21.6
Construction	3.6	12.2	27.5	3.0
Commerce, trade	0.9	11.2	32.8	1.0
Transport and communications	10.2	28.1	29.7	8.9
Finance and insurance	61.6	77.4	71.6	73.3
Community services#	49.2	48.4	65.5	51.6
All sectors	7.5	19.1	48.7	8.8

Source: Jones, 1989, table 8, for first three columns; BPS, 1991, table 33.9 for 1990 Indonesia, which may not be strictly comparable with the 1985 source.

Note: All sectors percentage for Indonesia was 6.0 in 1971, 6.5 in 1980, 6.6 in 1982 (1971 Population Census, and Departemen Tenaga Kerja, *Profil Sumber Daya Manusia Indonesia*, Jakarta: 1990, table 25)

1984 GNP/capita in U.S.$ from World Bank, *World Development Report 1986*.

*The managerial occupation appears to include all self-employed farmers; in earlier years, the figure was about 2 percent; total employment in agriculture is only 6 percent of total employment in Australia.

Public and recreational services.

Jones then performs a projection exercise for Indonesia to the year 2000 on the basis of various assumptions about possible changes in the industry/occupation matrix and overall educational and employment expansion. The exercise tends to suggest that there will be a substantial shortfall in

employment openings of the kinds that the more educated have been used to. The key point is that although it should be expected that the share of the labor force in these professional, managerial, and technical categories that are education-intensive should rise, both because of sectoral shifts of employment from less-intensive users of these categories of labor to more-intensive users, and because of an increase of the share of the labor force in each industry in these categories, in the immediate medium term future it is likely that the supply of labor educated at senior secondary level and higher is likely to expand in Indonesia much faster than demand for persons with such levels of education for employment in these occupational categories, which are the ones traditionally associated (especially in status terms) with that level of education. The implication is that increasing proportions of workers at these higher educational levels will have to be absorbed into other occupations, such as sales, actual production (e.g. skilled manual workers), and farming. This provides an opportunity to increase average labor productivity in these categories of labor, if education is of a suitable type, but also raises the possibility of social difficulties if more educated workers are reluctant or unwilling to accept employment in these traditionally lower prestige occupations.

In many ways this is unsurprising. An inevitable consequence of rapid educational expansion is a change in the average educational attainment of new entrants to particular occupations and jobs, and over time the evolution of entirely new kinds of occupation and job, made possible by the availability at lower relative cost than before of abundant supplies of labor with educational attainments that were previously relatively scarce. This process involves adjustment and, to some extent, disruption, but it is entirely to be expected. However, it does also have to be anticipated, and it is desirable to take what steps are possible to make the process as smooth and least costly as possible.

One of the key issues is flexibility. The whole essence of the process of transition from agrarian society to developed one is change. Change is disruptive and costly, but is necessary if development is to occur. Disruption will be less, and change less costly, if markets are flexible, rather than rigid, so that both prices and quantities can adjust smoothly; if education systems are flexible, so that they can adjust what they deliver to the changing demands of society and the market place; and if individuals are flexible, so that they can adapt their occupation, labor force status, and economic activities to the opportunities that are actually available, rather than sticking rigidly to expectations that may have become obsolete.

It has to be recognized that Indonesia on some characteristics resembles more closely the populous countries of South Asia than the other ASEAN or East Asian countries.[7] Accordingly, it may be appropriate for Indonesia to take account of the difficulties experienced with the integration of formal education and the world of work in such countries as India (and also the Philippines), as well as the successes of such countries as South Korea and Taiwan. In order to avoid possible difficulties arising from unwillingness of graduates to enter non-traditional occupations, labor force statuses, or industries, it would be desirable to examine the content of education to ensure that it has a productivity payoff in these non-traditional contexts; to attempt via the curriculum to discourage prejudice against non-traditional roles for educated workers; and to improve the functioning of labor markets and labor market information systems so that it is no longer individually privately rational (but socially wasteful) for graduates to spend long periods unemployed after graduation before accepting their first employment (Pernia and Wilson, 1989; Manning and Pang, 1990).

V. IMPLICATIONS FOR PLANNING AND POLICY

As noted, the output of workers with education at SMA level and above is likely to be larger, at least for the medium term, than the demand for such workers in traditional occupations as wage or salary employees. This is often expressed as a policy problem in terms of absorption of more educated entrants to the labor force. Individuals and markets react with some mix of three responses: the more educated can accept jobs in the wage and salary sector that they would previously have normally been

considered overqualified for, thereby raising the average educational attainment of such jobs and simultaneously 'bumping' entrants with lower levels of educational attainment (previously considered adequate) further down the ladder;[8] a larger fraction of the more educated can enter self-employment and family work, including small scale agriculture; and/or the more educated can spend longer unemployed after graduation in first job search.

The last of these is obviously socially unproductive and should be discouraged by improvements in labor market information and functioning, and attempts to provide graduates before they graduate with accurate information concerning their job market prospects to discourage unrealistic initial job demands and long search times while expectations adjust. The other two are less easy to analyze. With respect to the first, if raising the average educational attainment of a class of worker will increase productivity, sufficiently to make the additional investment in human capital worthwhile, then it makes sense to have this happen, even though it raises parallel questions about the appropriateness of the education delivered to those lower down the ladder who get 'bumped,' and the impact of rising average education on productivity in their new occupations. If the more educated will not have sufficiently higher productivity in the nontraditional occupations than the less educated they replace, then care must be exercised, because employing truly 'overqualified' workers may not only be socially wasteful of the investment made in their education, but may also actually reduce productivity via worker dissatisfaction, alienation, and morale problems.

With respect to the other possibility, there needs to be recognition that growing absolute numbers, and very likely for some time proportions, of secondary graduates, and probably university graduates as well, will have to earn their livings in the self-employment and family enterprise sector. This raises very directly as a public policy issue whether the formal education system is actually serving persons employed in such environments as well as it could. It is very unlikely that it is.

This also suggests that there could be a high return to including careful attention in the curriculum of the formal school system to such questions as the attitudes implicitly and explicitly promoted, the extent to which content promotes the capability to continue lifelong learning, and whether the curriculum should explicitly include some measure of 'career guidance' or realistic information on labor market prospects, and entrepreneurial/basic managerial training aimed at the microenterprise sector. This is especially important from an economic development point of view because in many of the more successful Asian newly industrialized countries (notably Taiwan, Korea, and earlier in Japan), many of today's industrial giant firms started as family owned micro enterprises; and even today, much of the growth of employment is in the small and micro-enterprise sectors.

It is clear that improvements in female education play a key role in the speed and progression of the demographic transition, as does female labor force participation. Thus there is a case for carefully monitoring progress with respect to the education of women, and promoting equality of access between men and women at all levels of education. Despite improvement over the past twenty-five years, Indonesia still lags behind all its fellow ASEAN countries on female participation in education and the labor force (UNDP, 1990: 144-145). To the extent that there may still be resistance on cultural or social bases to female labor force participation, particularly of young women outside major cities (see, e.g., Jones 1986), there may also be a role for the formal education system in trying to change values to break down such resistance.

In the very long run, there is clearly a very strong association between economic development and average levels of educational attainment. Causation probably runs in both directions, in that for high income individuals there is a strong consumption demand for education beyond the legal minimum. However, at Indonesia's level of income per head, this is an important influence only for a relatively small minority at the very top of the income distribution. For the great bulk of the population, education is seen as primarily an investment, something that is necessary, and the more of it the better, in order to give children the chance of a reasonably good life that parents wish for them.

In other countries, this tends to produce an income elasticity of demand for higher levels of education (beyond what the majority achieve) substantially greater than one, and very rapid expansion of secondary and higher levels of education once a certain threshold has been passed, especially in a context of rapidly declining fertility (because with smaller family sizes, parents can afford to educate each child more).

One key conclusion is that at all levels, education has a triple preparatory role: it must prepare the graduates at each level for (1) progression to the next level of education; (2) direct entry into the wage labor market; and (3) entry into self-employment and family work. In Indonesia, within the education system most emphasis has been on (1); (2), and, especially (3), have been relatively neglected. Of course, the three may not be fully compatible, and the public may not want equal emphasis on each. In particular, except perhaps in some rural areas, the consequence of status perceptions and aspiration tendencies almost certainly is to downgrade the importance of (3). Policy should explicitly consider the possibility of reversing this, otherwise the education system will be neglecting the actual career path of a very large number of its customers.

There are also financing issues for levels of education beyond those intended to be universal. In a predominantly market economy, levels of education above that achieved by all (or almost all) are likely to be rewarded in the market. Accordingly, except for any excess of social return over private, and ignoring income distribution concerns, it is not clear why education beyond the level intended to be universal should be subsidized by the state. This suggests shifting the burden of financing education at SMA level and above to students and their families, to the extent that they will capture the private returns, so long as there are adequately funded and accessible scholarship or loan opportunities for those with insufficient income or wealth to be able to finance such levels of education without the assistance or guarantee of the state.

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Notes

1. For discussions of alternative overall views of the relationship between population and development, see Hodgson 1988 and Blanchet 1991.

2. In Indonesia, often taken as 10 to 64 years, although the labor force participation rate (LFPR) is now below 12% for 10 to 14 year olds, and over 40% for those 65 and older.

3. Anecdotal evidence suggests growing numbers of more educated Japanese young women may never marry.

4. The 1990 data are from the census sub-sample and are clearly not fully comparable to the earlier data, so for change over time 1987 and 1989 should be compared. The 1990 census data are included because they confirm the relationship between educational attainment and the probability of employee status.

5. The 1990 census data suggest that larger proportions of those with lower educational attainments were wage employees that the Sakernas data do, but this probably arises from misclassification of unpaid family workers by census enumerators, who are less well trained and less experienced compared to Sakernas enumerators.

6. According to the Indonesian Central Bureau of Statistics (BPS) *Indikator Tingkat Hidup Pekerja 1987*, although in 1978 the average wage or salary of employees with Akademi or University education was nine times, and of those with academic high school education (SMA Umum) five times, that of those with less than full primary education, by 1987 these multiples had declined to less than four and a half times, and just over two and a half times, respectively.

7. Hill 1990a:100 notes that Indonesian labor productivity remains well below that of neighboring East Asian countries in virtually all industries, and only when compared to India are the Indonesian figures higher. Currently, low labor productivity is offset by wages that are low in both foreign exchange and real terms: *The Economist* [319(7711):38, 15 June 1991] reports that the Indonesian manpower minister "proudly notes that the country's average minimum wage, when it is honoured, is now nearly two-thirds of what a single man needs to stay alive."

8. This possibility is of considerable concern to Keyfitz (1989).

VIII

Indonesian - ASEAN - Pacific Rim Comparisons

Ninasapti Triaswati, Walter W. McMahon, and Reta Hendrati Dewi[1]

ABSTRACT

This paper provides an overview of the data on educational development in Indonesia for 1960-1989 compared to data for ASEAN and Pacific Rim countries. The comparisons are for Indonesia to India, Japan, Malaysia, Pakistan, the Philippines, Singapore, South Korea, Thailand, Taiwan, and the United States. The data on which they are based is given in Chapter IX (the Appendix).

The discussion contains four comparisons of Indonesian development. These are, *first*, per capita income growth for each nation shown with major sources of economic growth, namely investment in education, investment in physical capital, and investment in R&D or technology transfer, all as a percent of GDP; *second*, population growth rates related to the educational attainment of women; *third*, labor productivity and labor absorption rates by industrial sectors; and *fourth*, the export growth rate and education of the labor force.

Underlying these comparisons is the basic proposition developed in Chapters II and III that education plays an important role in raising labor productivity within each industry, and also in facilitating the structural adjustment from agriculture to manufacturing and to more human-capital intensive services. For this reason it is important to improve the internal and the external efficiency of the education system in Indonesia to improve the quality of the labor force needed for growth and to improve the quality of the Indonesian people.

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VIII

Indonesian - ASEAN - Pacific Rim Comparisons

Ninasapti Triaswati, Walter W. McMahon, and Reta Hendrati Dewi

This paper compares trends in Indonesian educational development, industrial structure, and economic growth with comparable data for Pacific Rim and ASEAN nations, and the United States for 1960-89. It presents these comparisons on graphs and describes changes in the relative position among nations within each five-year Repelita period within the First 25 Year Development using data in the Appendix (Chapter IX).

Specifically, comparisons are made of investment as a percent of GNP in education, in physical capital, and in R&D and growth rates; of the education of women with population growth; of labor productivity trends and labor absorption rates by industry; and of the export growth rate with the enrollment ratios in education. The countries covered are Indonesia, Japan, Malaysia, the Philippines, Singapore, Korea, Thailand, Taiwan, and the United States, and in a more limited way Hong Kong, Pakistan, and India, all for 1960-1989. It is hoped that insights can be gained from these comparisons useful to decisions about potential 25 Year Education goals discussed in the other chapters.

The Sources of Economic Growth

This section considers the sources of economic growth in Indonesia. These are primarily investment in human capital, physical capital, and the application of technology to production between 1969-1987.

Many economists since the 1950s have measured the sources of economic growth--most notably, Solow (1957) and Denison (1962). In 1961, T. W. Schultz produced his pioneering study on the role of human capital in economic growth. Drawing inspiration from Schultz, researchers have examined the relative importance to economic growth of investment in education, increases in raw unimproved labor, investment in physical capital, and investment in adaptation of western technology through R&D, trade, and through investment in human and physical capital.

Empirical work on the relationship between human capital and economic growth includes work by Denison (1967, 1979, 1984), Hicks (1980), Wheeler (1980), McMahon (1984, 1987), and Knight and Sabot (1991). Denison finds that education alone accounts for about 14 percent of GNP growth in the U.S. in 1929-73. Hicks (1980) examined cross-country evidence for 83 countries using multiple regression techniques. He tested the hypotheses and found evidence that per capita GDP growth is influenced by the physical capital investment rate, import growth rate, and the level of human resource development. Wheeler (1980) in a simultaneous equation model shows that human capital contributes directly and indirectly to output growth. The indirect contributions of human capital to output growth are through its effect on increasing manufacturing exports, improving health, and decreasing the birth rate. McMahon (1984, 1987) finds that labor productivity growth in both the OECD nations and in 44 African nations is determined primarily by the rate of investment in physical capital investment in primary and secondary education, and by technology development or transfer, after controlling for other things. Knight and Sabot (1991) reach similar conclusions for East Africa.

Indonesia's real income grew more than 4 percent annually over the entire period 1969-1987. However, the annual growth rate declined during that period (see Figure VIII.1). In Repelita I

(1969-74) the average annual growth rate of real income per capita of Indonesia was 5.88 percent. It decreased to 5.23 percent in Repelita II (1974-79), 3.69 percent in Repelita III (1979-1984) and 2.53 percent in the first four years (1986-88) of Repelita IV.

The growth rate of real GDP per capita during the 1980s is shown in Figure VIII.1. It is based (for the 1980s) on recent data in *Indonesia: Foundations for Sustained Growth* by the World Bank (1990, p. 131). Growth fell sharply during 1982 during the worldwide recession, and again in 1985. This was affected by oil prices which fell from 1982 through 1986, reducing export earnings and budget revenues. But since that time, there has been a successful effort to reduce the dependence on oil revenues and broaden the export base. With the economic recovery worldwide, growth of real GDP per capita rose to 3.7 percent in 1986, 2.5 percent in 1987, and 3.6 percent in 1988 (see Figure VIII.1, and the World Bank (1990, pp. 131 and 127). Oil prices then rose again during the trouble in the Middle East, but economic growth has slowed in 1991 in the U.S. and some other places.

These real growth rates of per capita GDP expressed in local currencies of 3.69% during Repelita III may be compared to the pattern in South Korea of 7.29% during the same period. During Repelita IV, Indonesia's was 2.53% and Korea's was 8.23%. (See Figure VIII.2 and Table VIII.1.) Most Pacific Rim countries experienced a dip in 1984 or 1985, and recovery in the 1986-89 period. However the relative position of Indonesia has declined from the third or fourth in real per capita growth rates among the countries compared during Repelita I and II, to fifth or sixth during Repelita III and IV (see Table VIII.1). If the recent World Bank data is used for the 1985-88 period (Repelita V) and if 1988 is included, the per capita growth rate is a somewhat higher 2.53 percent during Repelita IV, but still well below South Korea's (8.23%) or even below Pakistan's which was affected by the Afghan war (4.94%), or India's (3.47%), or Japan's (3.35%), or Thailand's (3.17%).

Prior to Repelita IV, Indonesia ranked in the middle-income countries. However, its sluggish economic performance for 1985-87 as oil prices declined dropped Indonesia's per capita growth rate to the Slow Growth group (see Table VIII.1). Indonesia's great dependence on oil exports contributed both to declines in the country's growth rate and in absolute per capita real income. In 1973, the first oil shock, during which the average oil price increased from U.S. $4 per barrel to U.S. $11.9 per barrel, caused Indonesia's income growth rate to rise to 8.6 percent in that year. In 1979, the second oil shock, which boosted the average oil price from U.S. $18.7 per barrel to U.S. $31.6 per barrel, pushed Indonesia's income growth rate to 7.4 percent in that year.

When oil prices decreased in 1982, Indonesia's income growth dropped very sharply, to .01 percent. In 1986, oil prices dropped again--from U.S. $27.9 per barrel to U.S. $13.7 per barrel--which contributed to the decline in Indonesia's income growth rate to .33 percent in that year.

Indonesia's economic problems have worsened its relative position in the ASEAN community. During Repelita I, Indonesia had the third fastest growth in real income per capita (after Singapore and Korea). Indonesia dropped to third place (surpassed by Thailand) during Repelita II. It dropped to fourth (surpassed temporarily by Malaysia) during Repelita III, and to eighth (surpassed also by Pakistan, India, Japan, and the U.S.) during Repelita IV. However, on the average over the period 1969-1987, Indonesia ranks second (after Singapore) in real income per capita growth among ASEAN countries or ranks third (after South Korea and Singapore) among all the countries in this study. Its average annual per capita growth rate has been 4.31 percent (see Table VIII.1).

By comparison, Japan and the United States have very high per capita income (above U.S. $5000) and have had more stable growth in real per capita income. Japan is classified as a medium income growth country (between 2 and 4 percent) and U.S. as a slow income growth country (less than 2 percent).

Comparisons between economic growth and investment in physical capital, education, and R&D in each country can be seen in Tables VIII.2, VIII.3, and VIII.4.

Figure VIII.1
Indonesia: Ex. on Educ., R&D & Phy. Cap. as a % of GNP

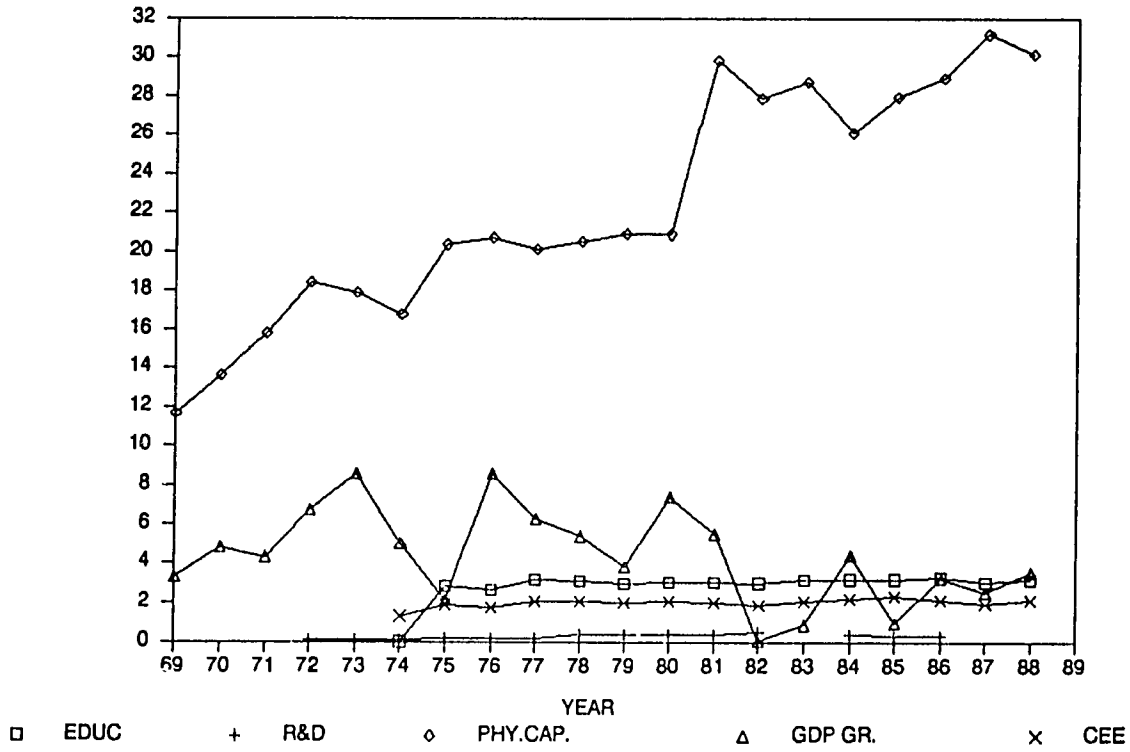


Figure VIII.2
Japan: Ex. on Educ., R&D & Phy. Cap. as a % of GNP

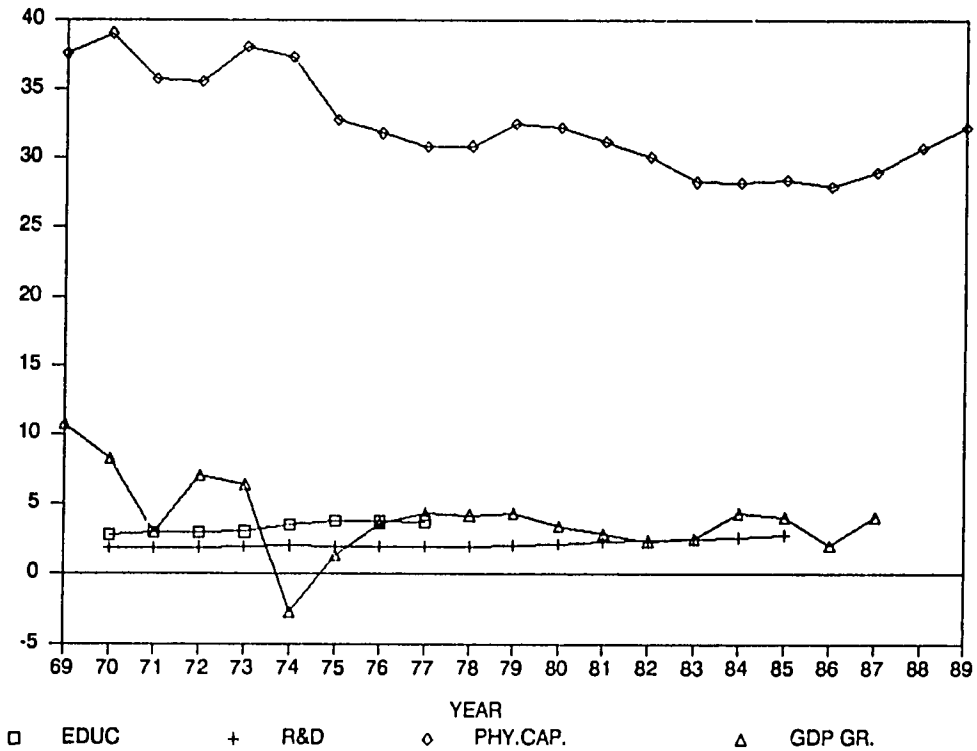


Figure VIII.3
Malaysia: Ex. on Educ., R&D & Phy. Cap. as a % of GNP

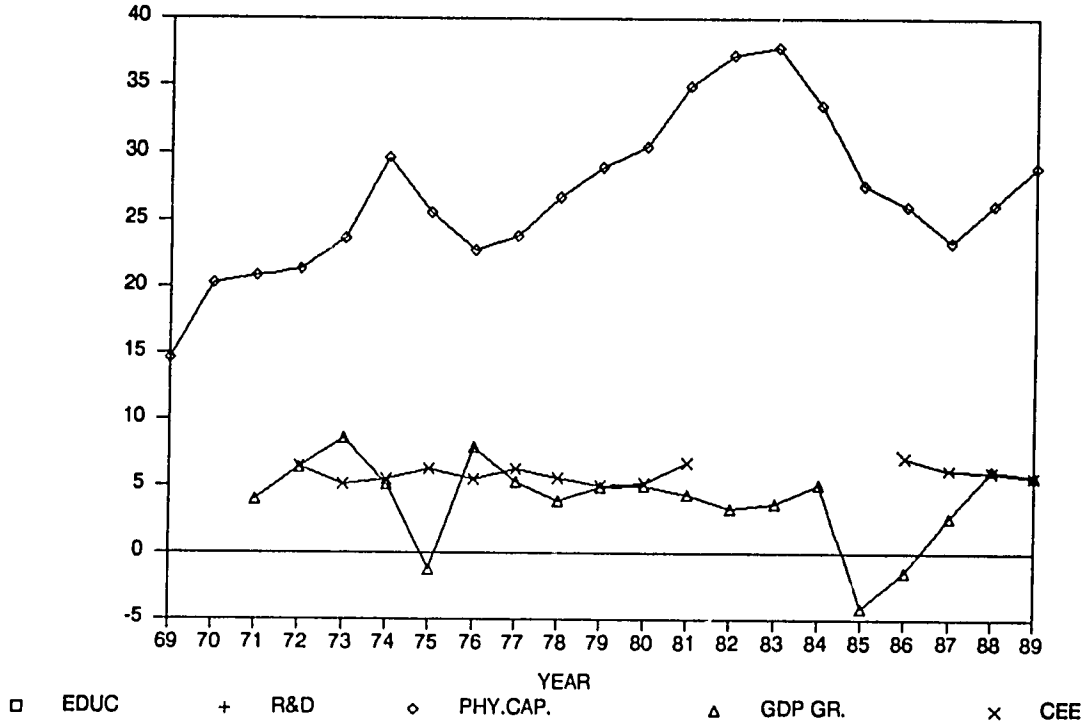


Figure VIII.4
Philippines: Ex. on Educ., R&D & Phy. Cap. as a % of GNP

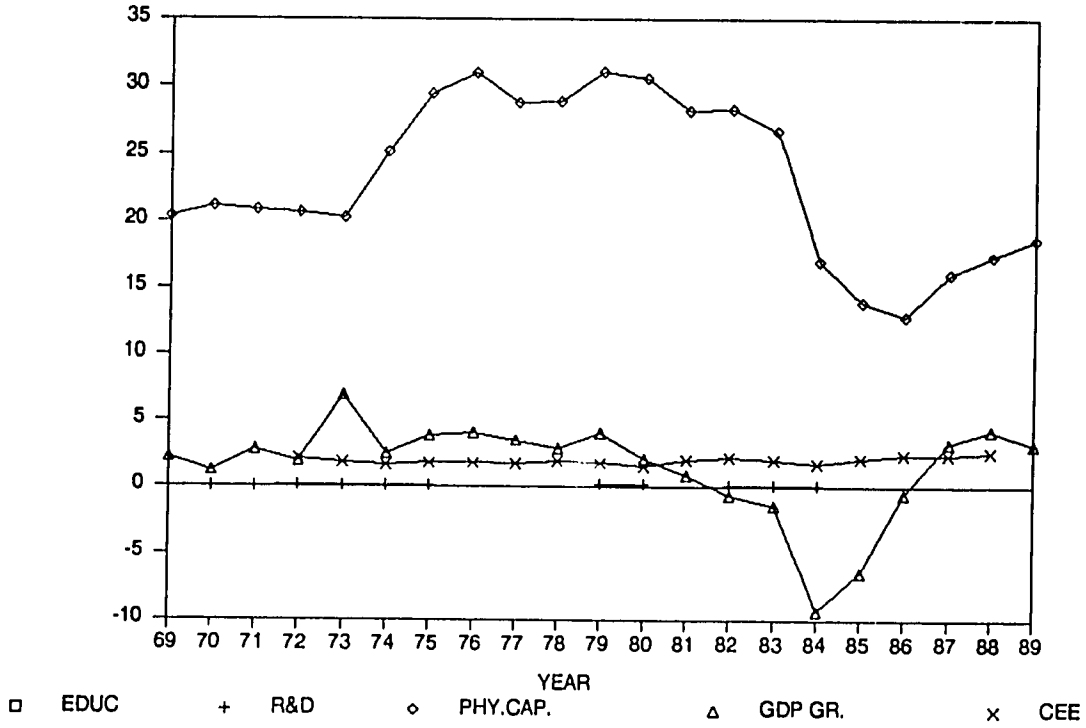


Figure VIII.5
Singapore: Ex. on Educ., R&D & Phy. Cap. as a % of GNP

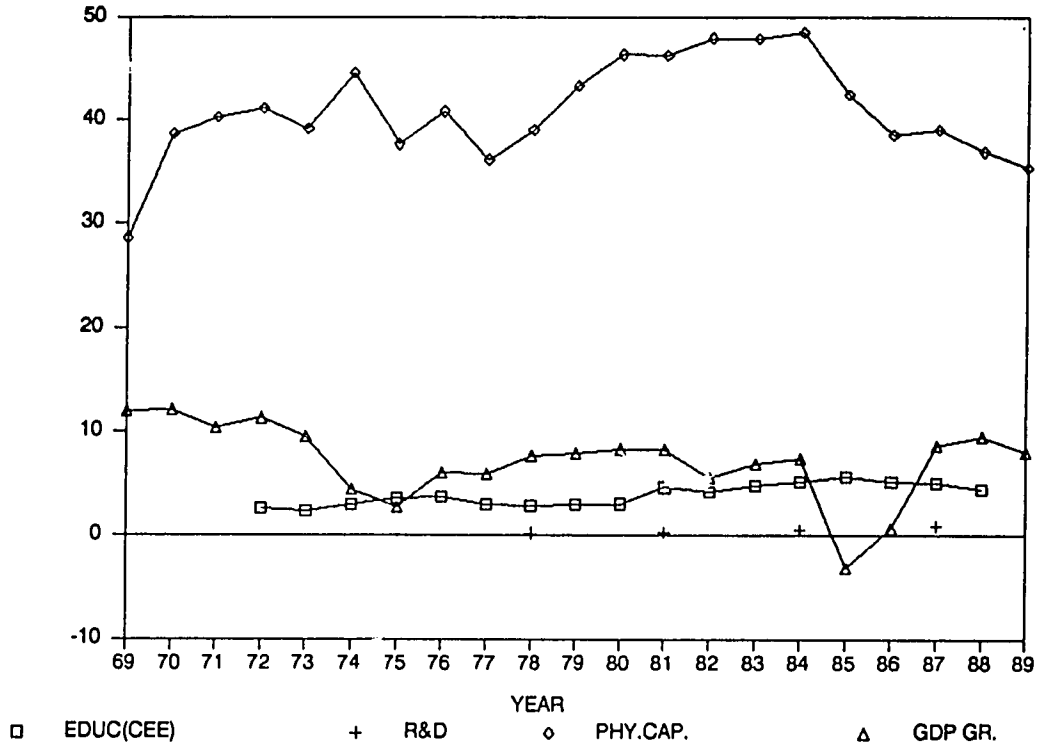


Figure VIII.6
South Korea: Ex. on Educ., R&D & Phy. Cap. as a % of GNP

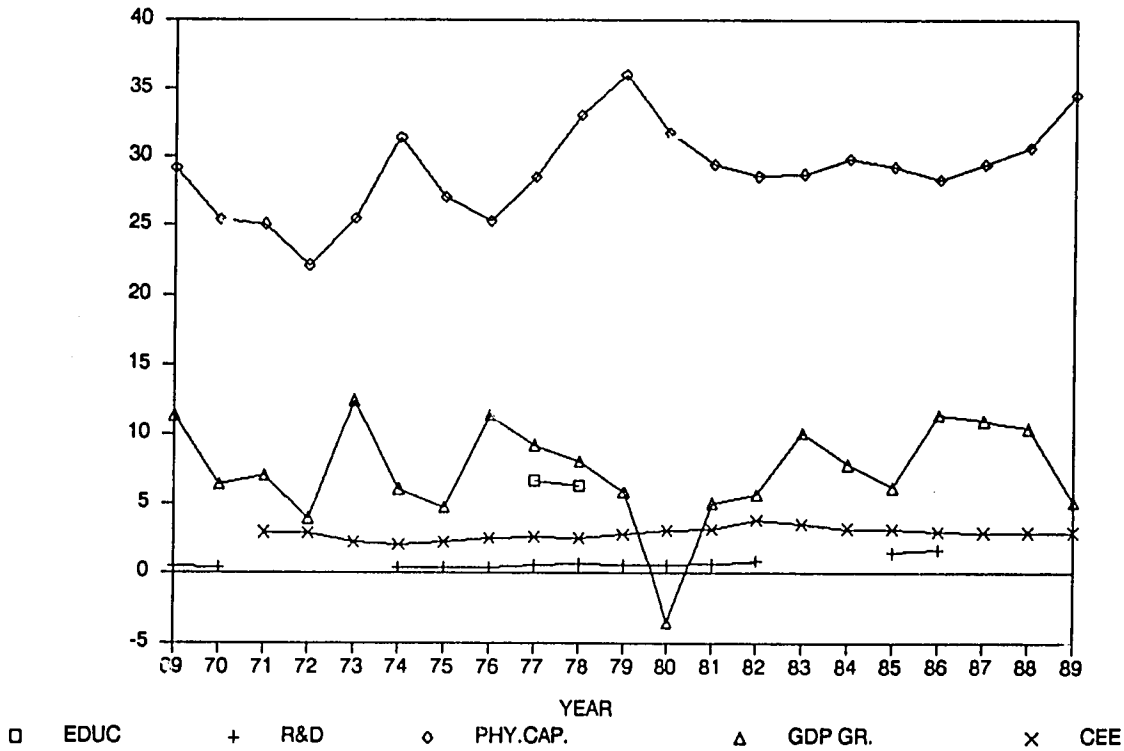


Figure VIII.7
Thailand: Ex. on Educ., R&D & Phy. Cap. as a % of GNP

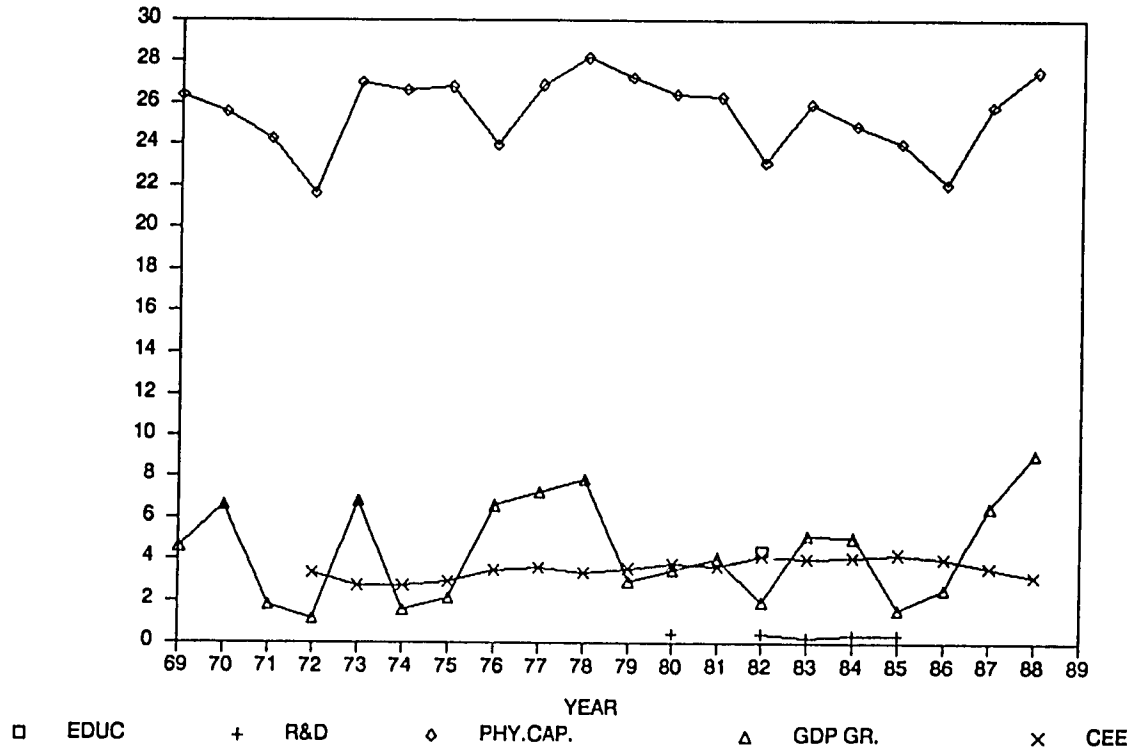
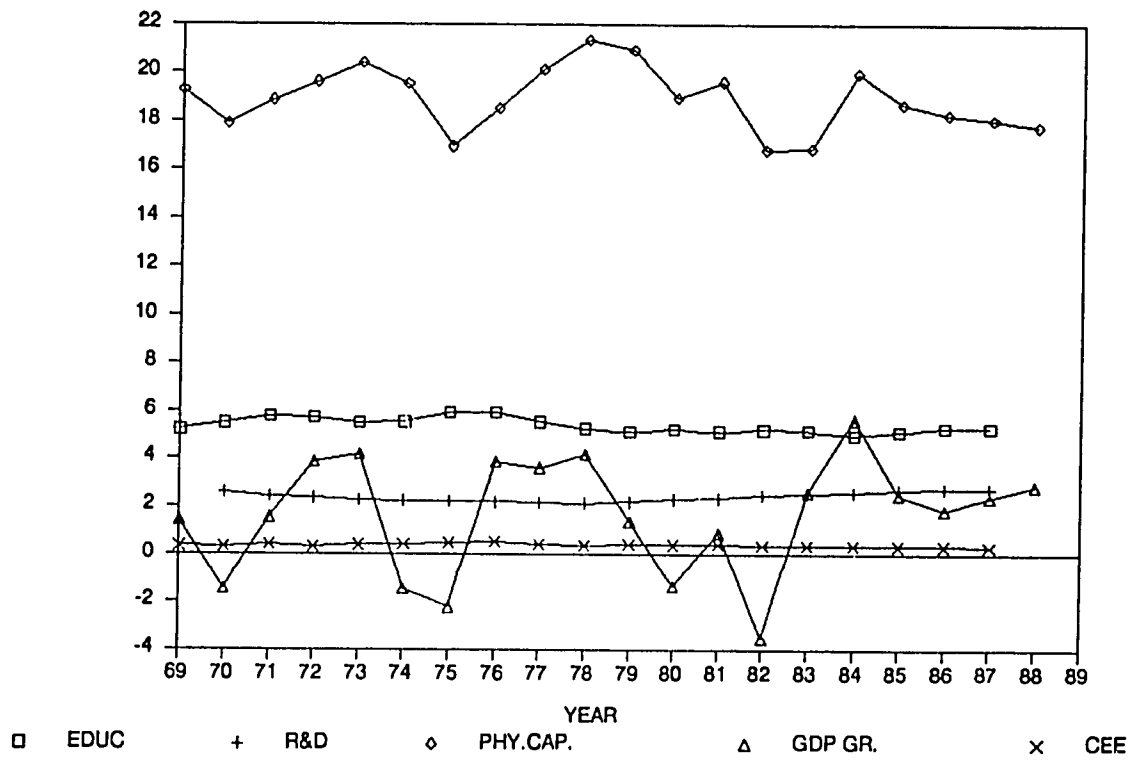


Figure VIII.8
United States: Ex. on Educ., R&D & Phy. Cap. as a % of GNP



At the beginning of Repelita I, Indonesia had the lowest proportion of total investment in physical capital relative to its income, or 11.66 percent (see Table VIII.2). This proportion increased steadily to 26.33 percent in 1987 (mid-Repelita IV), but accompanied by a decreasing growth rate in real income per capita!

However, Indonesia is at the very lowest end in financing education. Total education expenditure as a percent of GNP increased from 2.2 percent in 1974 to 3.3 percent in 1987 (see Table VIII.3). But other countries increased their education effort even further, and Indonesia remains at the low end of the group, above only the Philippines and Pakistan.

Compared to other ASEAN countries, Indonesia is very aggressive in increasing investment in physical capital therefore, but very moderate in increasing investment in human capital as discussed in Chapter II. Based on the share of total education expenditure relative to income, Malaysia, Singapore, and Thailand all support their human capital development much more than Indonesia, and are all growing faster than Indonesia in all years. In 1987, Singapore is the only country in ASEAN however where the proportion of total investment in physical capital to income is greater than Indonesia. Singapore's average growth rate of real income per capita from 1969 to 1987 also was high: 6.6 percent.

Another fast growing country in Asia, South Korea, also has very high rates of investment in both physical and human capital. The ratio of total physical capital investment to income in South Korea was approximately 30 percent from 1969 to 1987, whereas the ratio of total education expenditure to income was rising from 3.60 percent in 1969 to 4.2 percent in 1987.

Investment in R&D and technology transfer is also a source of economic growth. Indonesia increased its expenditure as a percent of income from .1 percent in 1974 to .3 percent in 1984 (see Table VIII.4). In the same year, the share of investment in R&D to income in other ASEAN countries was for Singapore, Thailand, and the Philippines .5 percent, .3 percent and .1 percent respectively.

Among Pacific Rim countries in this study, Japan has had the highest proportion of total R&D as a percent of income since 1974. It increased its R&D to income ratio from 2.0 percent in 1974 to 2.6 percent in 1987. Another country which has an equally high proportion of total R&D to income is the United States but it invests a much larger fraction of this in defense R&D than does Japan. The share of total R&D investment to income in India was .8 percent in 1984 and in South Korea it was .6 percent in 1979.

The Impact of Education for Women

Another strategy to maintain a high real income per capita is to maintain a low growth rate of population (see Figure VIII.9 to Figure VIII.16).

The population growth rate in Indonesia has been decreasing moderately: from 2.5 percent in 1970-74 to 2.1 percent in 1984-87 (see Table VIII.5). The absolute population in Indonesia increased from 119 million in 1970 to 170 million in 1987 (see Table VIII.6).

One strategy to decrease the population growth rate is by increasing the education of women, since more years of school delays marriage and also opens up non-farm employment opportunities. In Indonesia, there is an inverse relationship between the female school enrollment ratio (SER) for basic education and the population growth rate. The female gross enrollment ratio for the first and second level in Indonesia increased from 43 in 1970 to 77 in 1984 (see Table VIII.7 and Figure VIII.9).

In 1984-87, Japan and the U.S. had an average annual population growth of less than 1 percent and gross school enrollment ratios in basic education among females close to 99%. In the same period, other Asian countries such as South Korea, Singapore and Hong Kong also had *high* school enrollment ratios of around 90%, and *low* population growth rates of less than 1.5 percent. For the trends of female school enrollment ratios in Pacific Rim, ASEAN, and South Asian countries and the U.S., see Figures VIII.9-16 and Table VIII.7.

Figure VIII.9
Enrollment Ratio (F) & Population Growth
Indonesia, 1960-89, in Percent

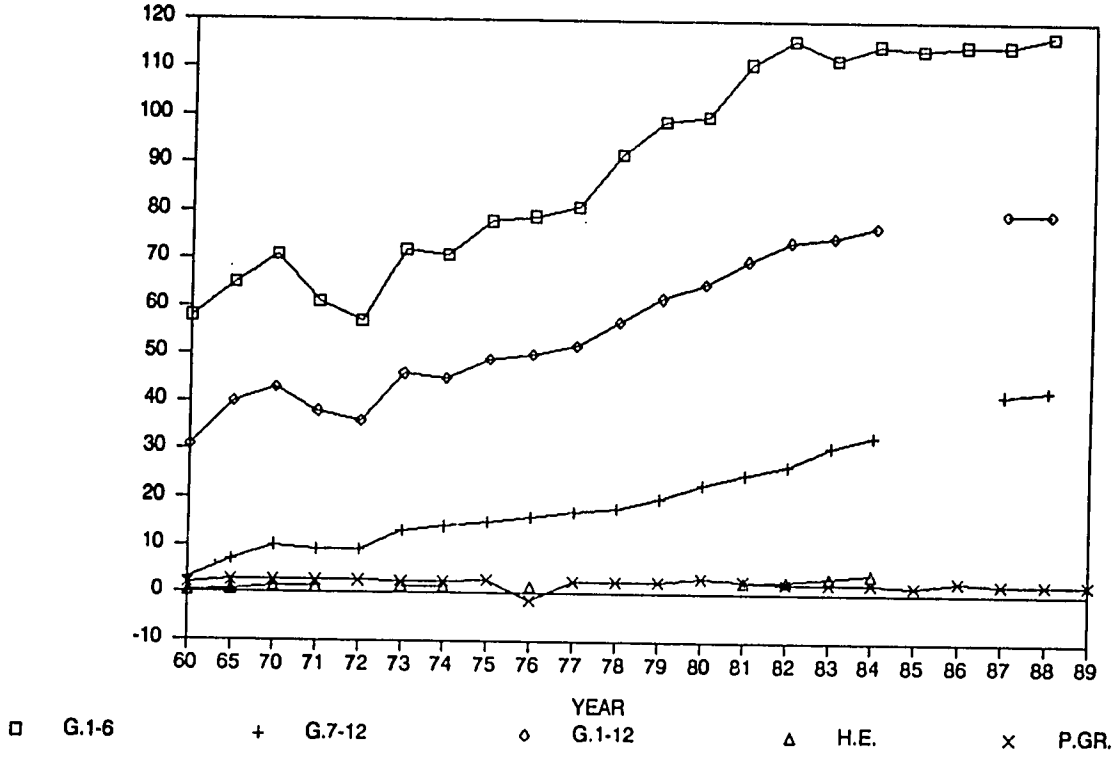


Figure VIII.10
Enrollment Ratio (F) & Population Growth
Japan, 1960-89, in Percent

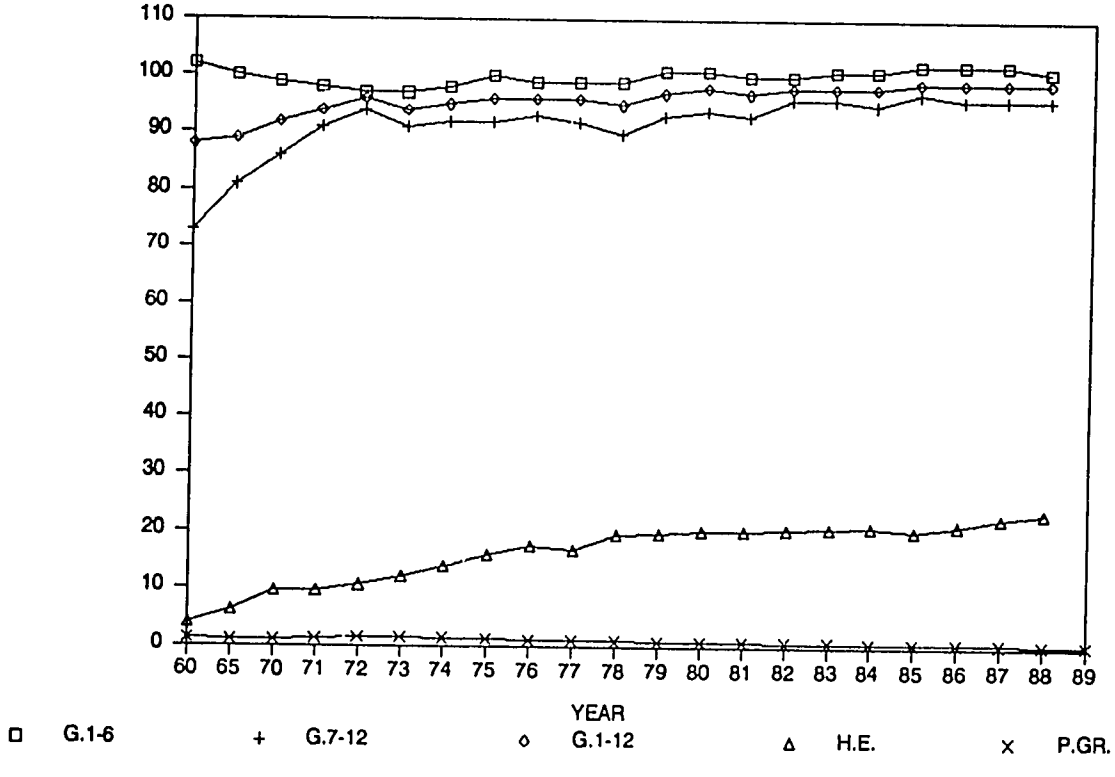


Figure VIII.11
Enrollment Ratio (F) & Population Growth
Malaysia, 1960-89, in Percent

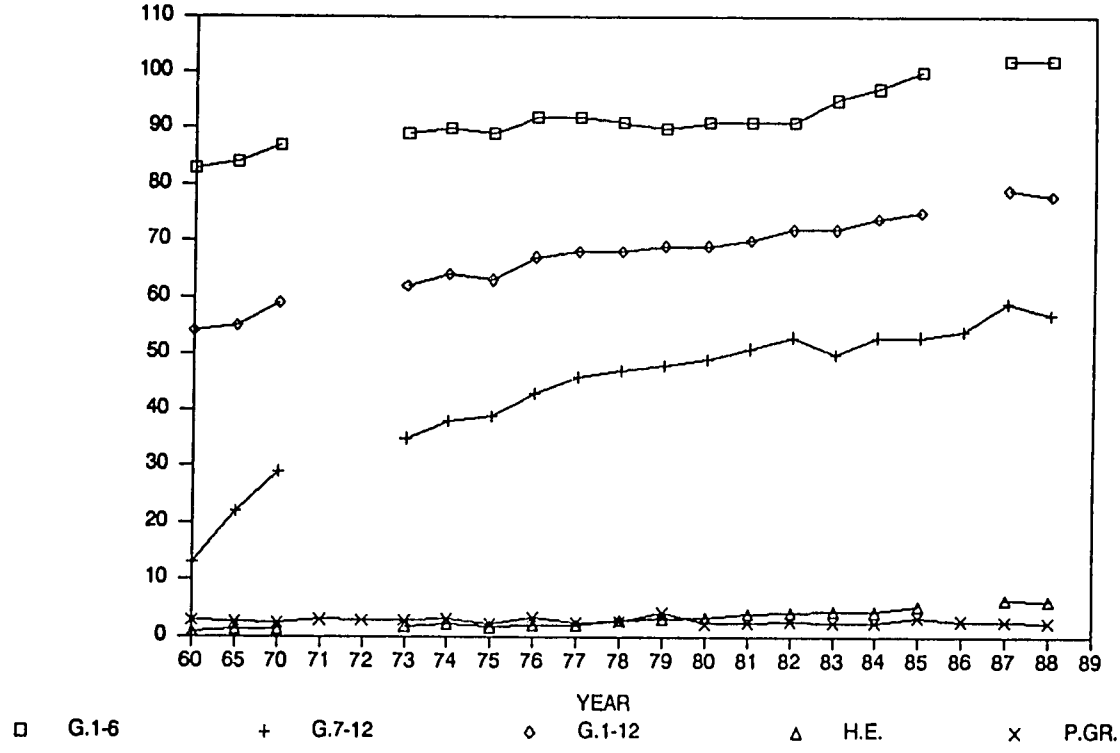


Figure VIII.12
Enrollment Ratio (F) & Population Growth
Philippines, 1960-89, in Percent

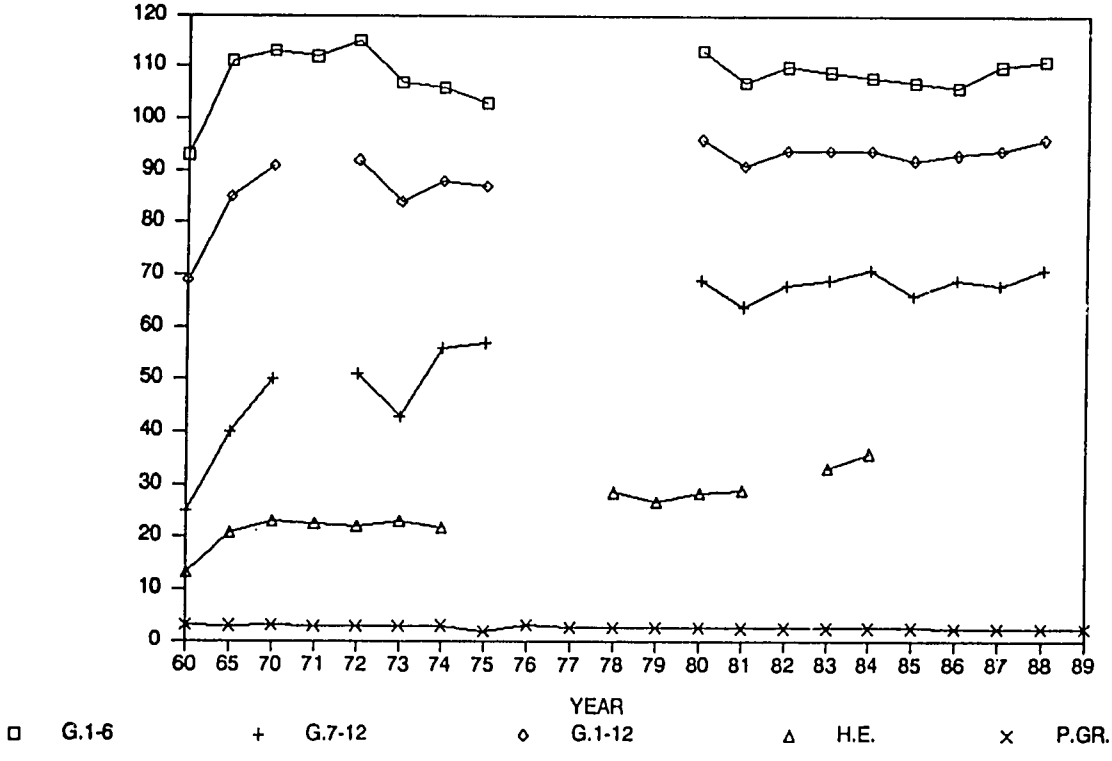


Figure VIII.13
Enrollment Ratio (F) & Population Growth
Singapore, 1960-89, in Percent

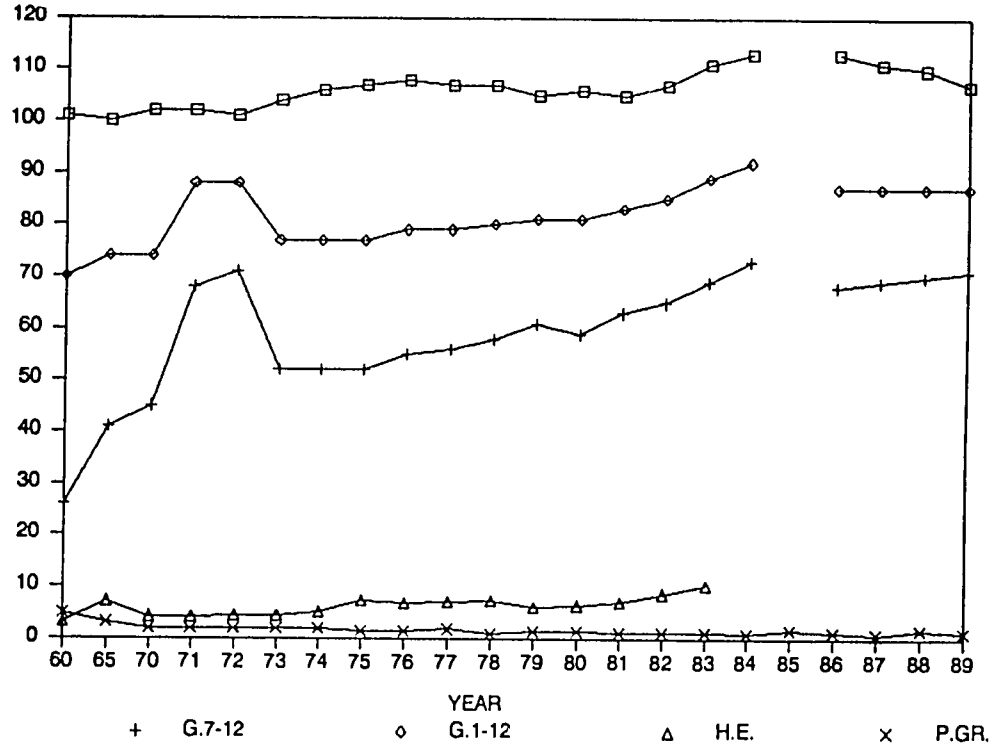


Figure VIII.14
Enrollment Ratio (F) & Population Growth
South Korea, 1960-89, in Percent

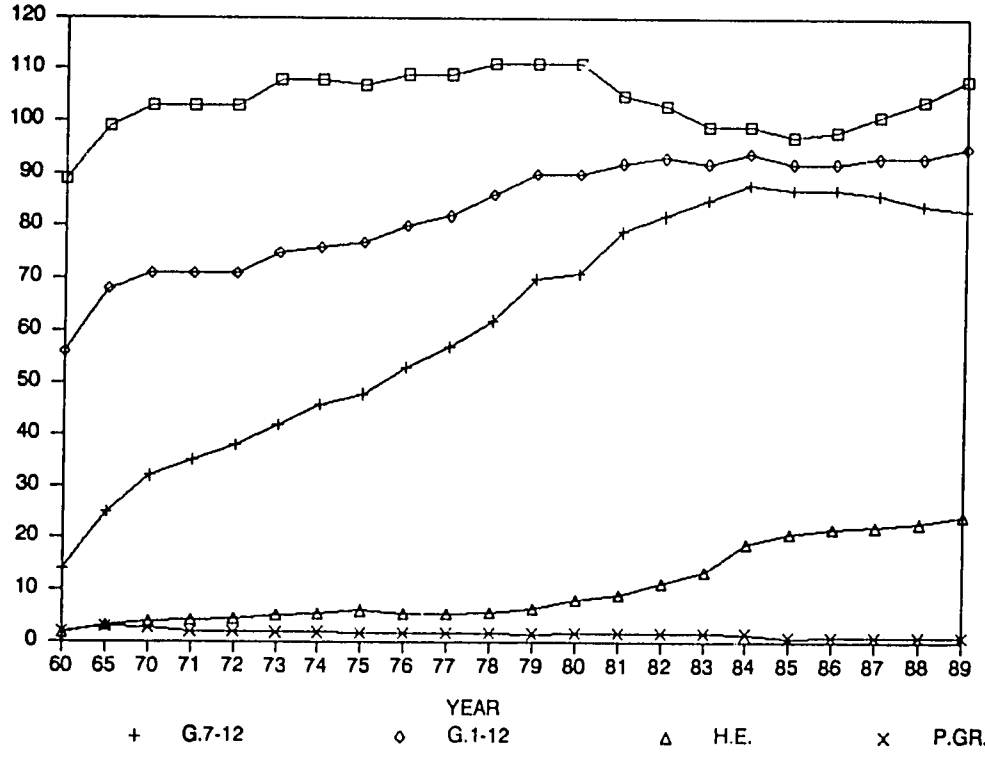


Figure VIII.15
Enrollment Ratio (F) & Population Growth
Thailand, 1960-89, in Percent

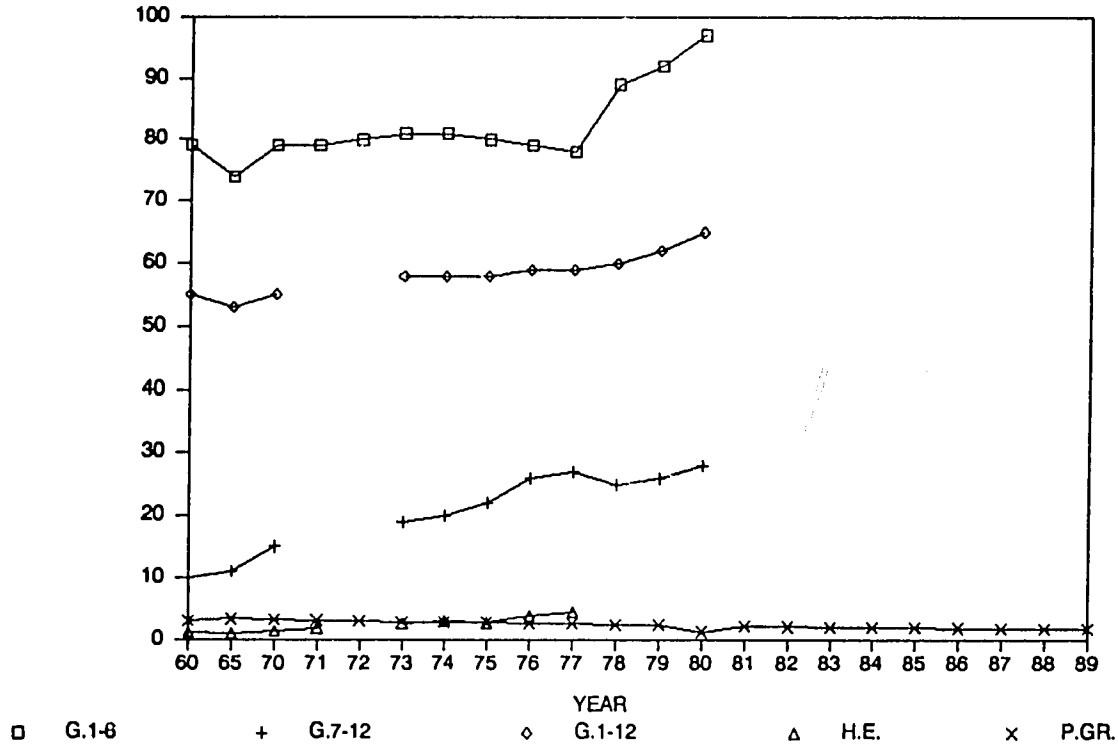
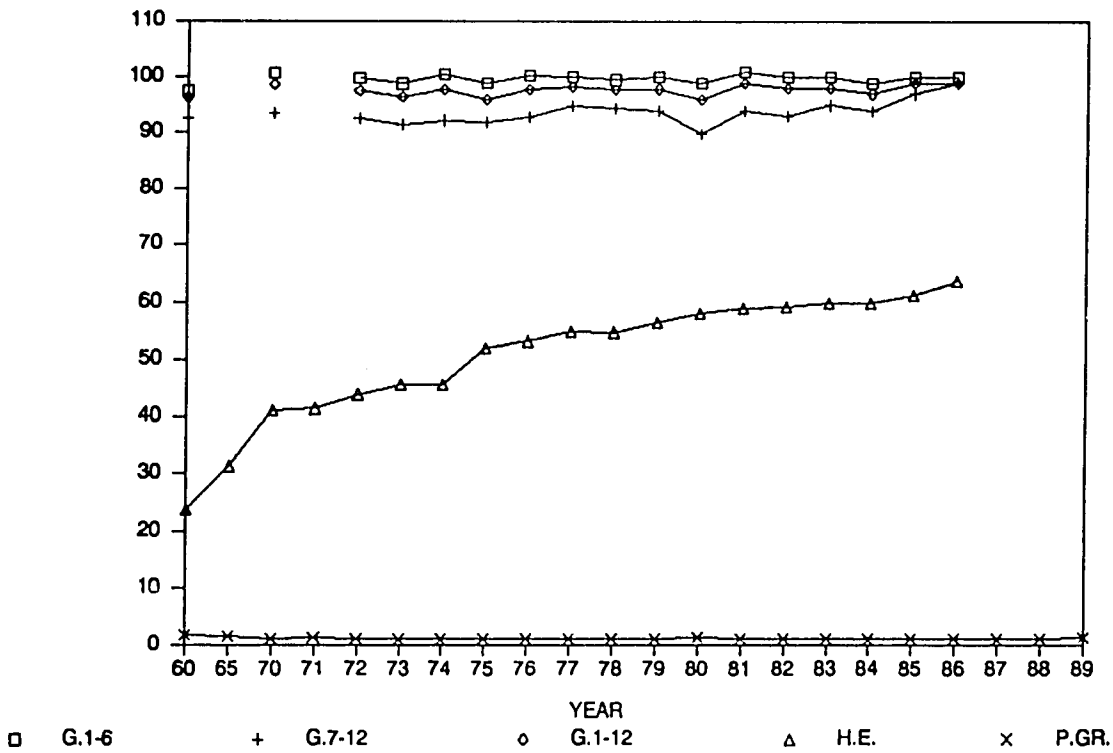


Figure VIII.16
Enrollment Ratio (F) & Population Growth
United States, 1960-89, in Percent



Indonesia has the best performance in achieving high participation of women in education among all developing countries with a population greater than 100 million. The female school enrollment ratio for Indonesia in 1984 was 77, compared to India's 48 and Pakistan's 20.

Employment

Indonesia, like other developing countries, depends heavily on agriculture. In 1970, at the beginning of Repelita I, 64 percent of all employed Indonesians worked in the agricultural sector. This number dropped to 54 percent in mid Repelita IV (1987). However, agriculture contributed only 32 percent to Indonesian GDP in 1970 and it fell to 23 percent of GNP in 1987. From these numbers we can calculate the relative labor productivity ratio of Indonesian agriculture. This ratio, which is percentage share of GDP in each industry divided by its percentage share of employment is merely a measure of labor productivity, but it has the advantage of being expressed in a form that makes comparisons among countries possible[2].

Indonesia's relative productivity ratio of agriculture declined from .51 in 1970 to .42 in 1987 (see Table VIII.8). Indonesian agriculture's share of GDP decreased faster than the agriculture's share of total employment.

As shown by Table VIII.9[3], Indonesian agricultural sector was more labor intensive in the first half of Repelita IV. Therefore the labor absorption ratio in that period was greater than 1, because the growth rate of employment in the agricultural sector was greater than the growth rate of agriculture in GDP.

Among ASEAN countries, Thailand has trends similar to Indonesia. The United States, on the other hand, had a steadily increasing trend in its relative productivity ratio of agriculture, from .70 in 1970 to .78 in 1984. Agriculture in the U.S. also has had a negative labor absorption ratio since 1974-79, due to mechanization and the continuing decrease in the number of people working in agriculture.

One country in Asia that has had a negative labor absorption ratio of agriculture since Repelita II is South Korea. As the South Korean economy has grown, agricultural employment has shifted to the industrial and service sectors.

During the two decades of Repelita, employment productivity in industry in Indonesia has been very high compared to other Asian countries and the United States[4]. The relative productivity ratio of industry has been highest since the beginning of Repelita III, although the ratio decreased continuously from 4.19 in Repelita I to 3.05 in Repelita III and 2.79 in the first-half period Repelita IV (see Table VIII.10). Industry's labor absorption ratio was greater than 1.0 in Repelita II and Repelita III (see Table VIII.11), even though production has a tendency to be less labor intensive. The labor absorption ratio declined from 2.05 in 1974-79 to 1.21 in 1979-84.

2 Relative productivity ratio of sector i =percentage share of sector i in Gross Domestic Product ÷ percentage share of sector i in employment

3 Labor Absorption Ratio of sector i = percentage average annual growth rate of sector i in employment structure ÷ percentage average annual growth rate of sector i in Gross Domestic Product

4 The term "industry" here consists of mining (extraction manufacturing, construction and public utilities [water, gas and electricity]).

Thailand and the Philippines are two Asian countries that have had high relative productivity ratios in industry since 1970. Thailand also has had a declining relative productivity ratio of industry, but it has a tendency to be more labor intensive. The labor absorption in Thailand increased from .39 in 1974-79 to .69 in 1979-84. The Philippines had an increasing trend in its relative productivity ratio of industry from 1.81 in 1970 to 2.45 in 1984. Unlike Indonesia and Thailand, the Philippines had a tendency to be more capital intensive in 1984-87. Singapore had a relatively moderate trend in its productivity ratio from 1984 to 1987, and it had a tendency to be more capital intensive.

South Korea in 1984-87 had a relatively moderate trend in its productivity ratio (between 1 and 1.5) and production was more labor intensive. Two industrialized countries in this analysis, Japan and United States, had a little trend in their productivity ratios. Japanese industry had a relatively low labor absorption ratio of 19% in 1979-84. U.S. industry had an extremely low labor absorption ratio of negative .58 in 1979-84.

Generally, the average annual growth rate of industry depends on the manufacturing sector. Almost all of the countries studied (except Indonesia) had a ratio of manufacturing to industry in 1987 greater than 50 percent. Therefore, it is important to discuss the manufacturing sector here.

Indonesia's manufacturing sector had an increasing trend in its relative productivity ratio. In the beginning of Repelita I the ratio was only 1.11. The ratio increased to 1.60 in the beginning of Repelita IV and 1.77 in the middle of Repelita IV (see Table 12). The labor absorption ratio in Indonesian manufacturing increased from .98 in 1974-79 to 1.79 in the first half of Repelita IV (see Table VIII.13).

Among other countries, Thailand had the highest ratio of relative productivity in manufacturing in 1970-1984. Thailand's fast-growing manufacturing sector also had a tendency to be more labor intensive, since its labor absorption rate increased from .28 in 1974-79 to .43 in 1979-84.

Singapore had a very moderate productivity ratio in manufacturing since 1970 (around 1.00). It also became more capital intensive, as evidenced by a labor absorption ratio that has decreased during the period 1974-87. South Korea, which also had a very moderate relative productivity ratio since 1970 (around 1.25), had a tendency to be more labor intensive. Its labor absorption ratio increased from .56 in 1974-79 to .78 in 1984-87.

The United States had an increasing relative productivity in manufacturing and a decreasing labor absorption rate during 1970-84. Increasing productivity in the U.S. manufacturing sector may be attributed to mechanization, increased human capital intensity, and technical progress. Japan, which also had an increasing relative productivity rate in manufacturing since 1970, had a relatively lower labor absorption rate. Overall, Japan is similar to the United States.

In the services sector, Indonesia had a relatively moderate increase in relative productivity from 1.16 in 1970 to 1.23 in 1984 (see Table VIII.14). It also had a tendency to be more labor intensive. The trend in the labor absorption rate in the services sector cannot be determined due to lack of data in the 1964-74 and 1984-87 periods (see Table VIII.15).

Among other countries in this study, Thailand has had the highest productivity in the services sector since 1970. It had a tendency to a more capital intensive. The labor absorption rate in the services sector increased from .17 in 1974-79 to .81 in 1979-84. The Philippines had the highest labor absorption rate in the services sector during 1979-87, reaching 2.5 to 3.2.

Education and Export Growth

Education contributes indirectly to output growth by stimulating export growth. We will consider the trends and compare them between countries.

Indonesia's average annual real export growth rate has been declining since 1969-74. It stood at 37.1 percent in Repelita I, dropped to 7.7 percent in Repelita II, 3.3 percent in Repelita III, and 2.8 percent in 1984-87, the first half period of Repelita IV (see Table VIII.16).

This decreasing Indonesian export growth rate can be explained through the structure of exports. As discussed above, oil plays a very important role in Indonesian economy, including exports. The share of oil exports to total Indonesian exports at the beginning of Repelita IV was still very high, almost 72 percent. Even though this number had decreased to 53 percent in 1986, it still significantly influences the Indonesian economy. Therefore, we must delete oil exports before trying to explain the direct contribution of education to Indonesian export growth.

Indonesia's education level has also increased sharply from 1969 to the present. The gross SER for the first level of education increased from 77 in 1970 to 120 in 1984 (see Table VIII.10 and Figure VIII.17). The Gross School Enrollment Ratio (SER) for the *secondary level* increased from 15 in 1970 to 46 in 1989 (see Table VIII.17) and the Gross SER for the third level increased from 2.8 in 1970 to 6.5 in 1984 (see Table VIII.17). Indonesia's relative position improved in relation to other ASEAN and Pacific Rim countries at the primary and secondary levels (Table VIII.17), but especially at the primary level (see Tables VIII.18, VIII.19, and VIII.20). Although there is a delay before the education level of the labor force is affected, as this occurs it has an indirect effect on export growth in Indonesia, by increasing the productivity of labor and hence the competitiveness of exports in all sectors, including agriculture, industry, and services.

An ASEAN country that maintained its export growth rate successfully was Thailand. The average annual export growth rate increased from 11.4 percent in 1969-74 to 14.9 percent in 1984-87. The education level of Thailand in 1984 was relatively high. The total gross school enrollment rate (SER) for the first level increased from 83 in 1970 to 95 in 1987; the SER for the secondary level increased from 17 in 1970 to 28 in 1987; and the SER for the third level was increasing sharply from 1.7 in 1970 to 19.5 in 1987 (see Figures VIII.19, VIII.20, VIII.21, VIII.22, and VIII.24 for the other countries, and Figure VIII.23 for Thailand). The impact of relatively high education levels can be seen in the productivity of labor in this country. Compared to other Asian countries and the U.S., Thailand had the highest relative productivity ratio (which is labor productivity times labor's share in GNP) in *industry, manufacturing,* and *services* sectors, despite having an *agricultural* sector in which relative labor productivity was low and decreasing slightly.

South Korea had the highest real export growth rate. South Korea's real export growth rate has been increasing since 1974-79, from 9.8 percent in that period to 12.65 percent in 1979-84 and 16.13 percent in 1984-87. The education level of South Korea is also one of the highest among Asian countries. The total gross SER in 1989 for the first level was 109, for the second level it was 80, and for the third level it was 36 (see Figure VIII.22). The high education level in South Korea were very helpful to the industrialization process, and the job markets there are tight now. This can be seen through a relatively high relative productivity of industry and manufacturing. Since 1970 South Korea has maintained a relative productivity of industry at around 1.4 and of manufacturing around 1.25.

In 1989, industrialized countries like Japan and United States have reached gross SERs of more than 98 percent for first and second education levels (see Table VIII.17, Figure VIII.20 and Figure VIII.24). They maintained export growth rates of around 5 percent in 1969-87.

Figure VIII.17
Gross Enrollment Ratio (Total)
Indonesia, 1960-89, In Percent

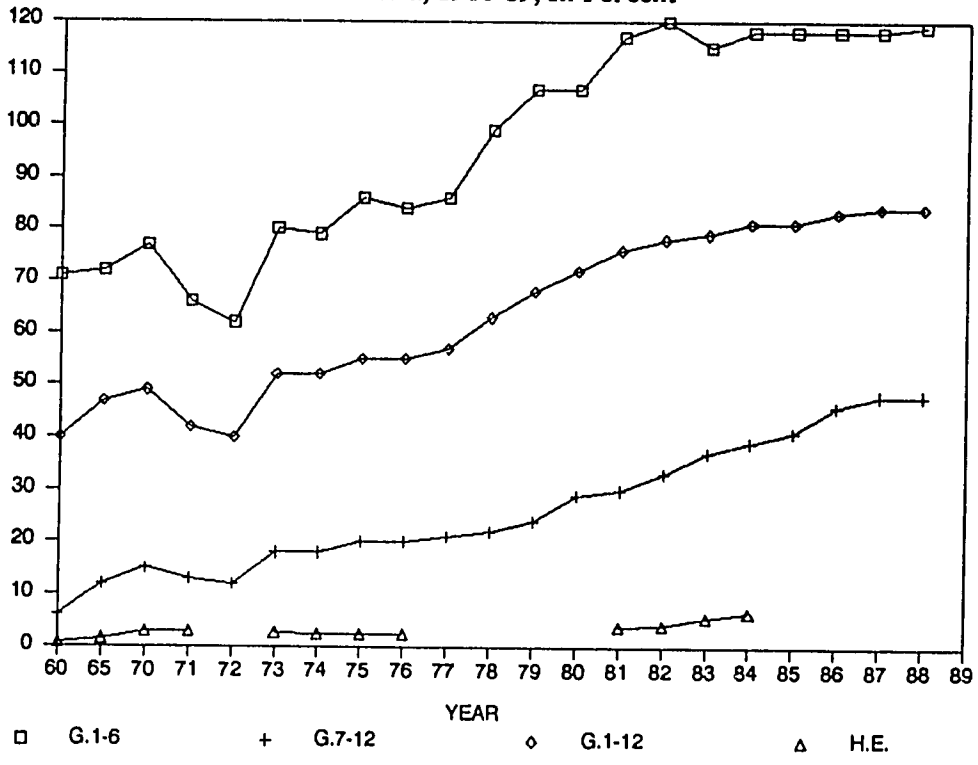


Figure VIII.18
Gross Enrollment Ratio (Total)
Japan, 1960-89, In Percent

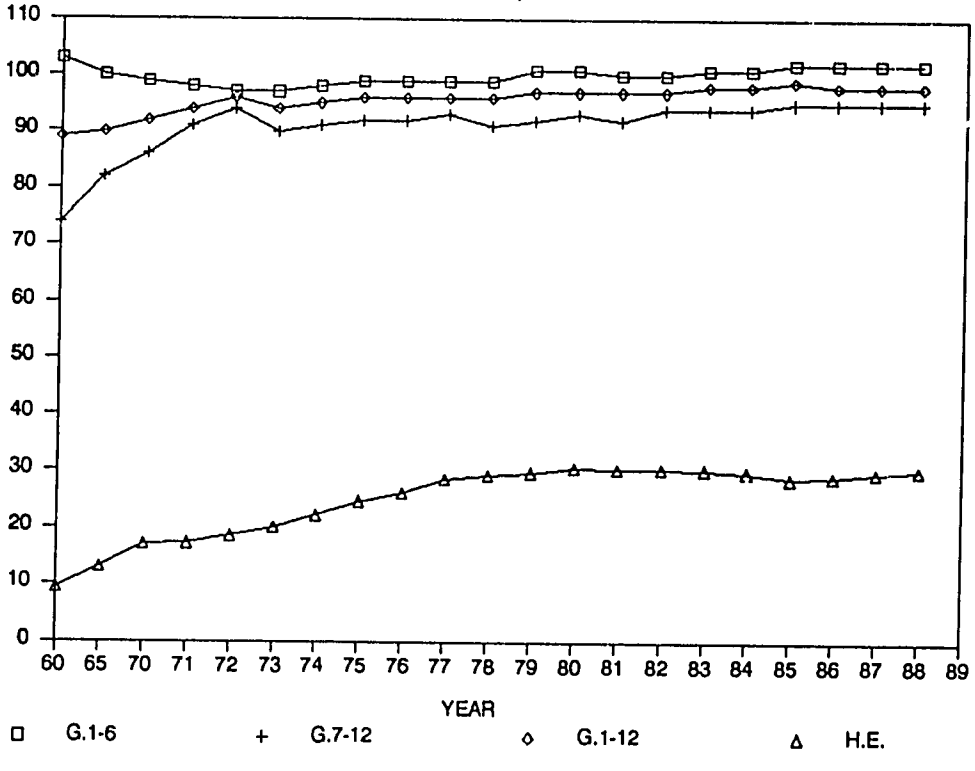


Figure VIII.19
Gross Enrollment Ratio (Total)
Malaysia, 1960-89, In Percent

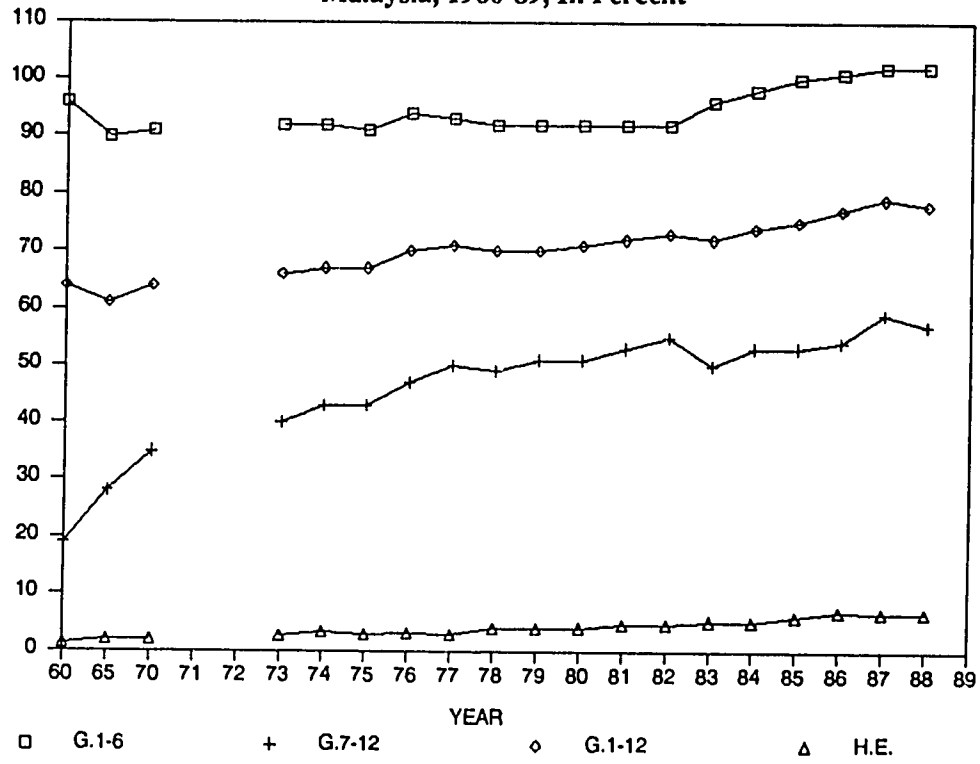


Figure VIII.20
Gross Enrollment Ratio (Total)
Philippines, 1960-89, In Percent

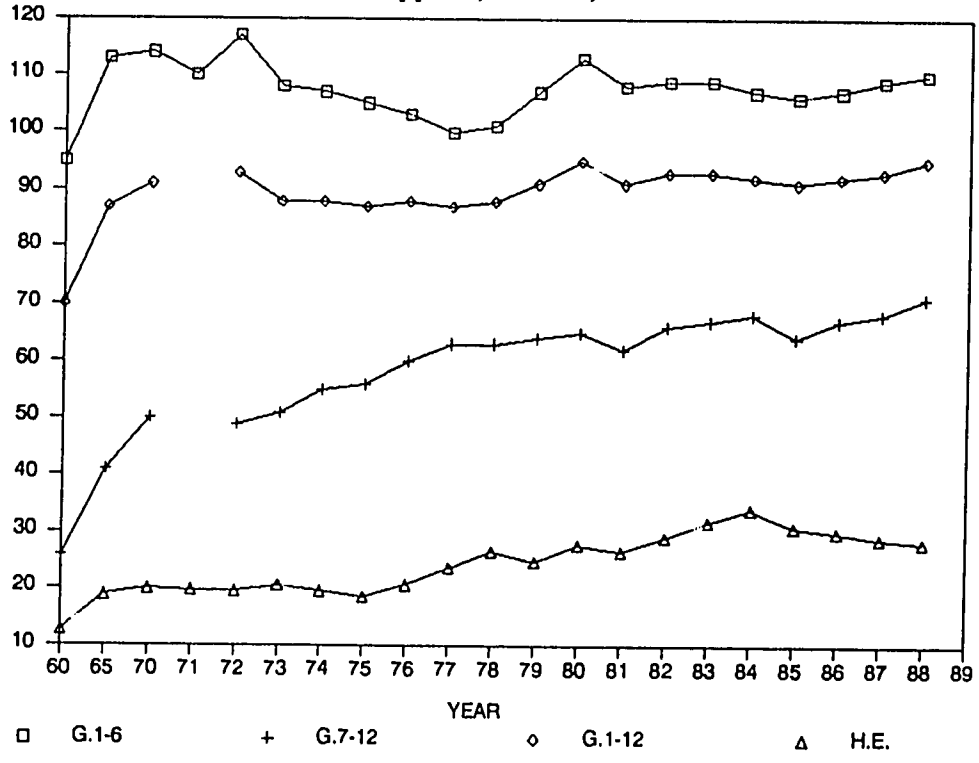


Figure VIII.21
Gross Enrollment Ratio (Total)
Singapore, 1960-89, In Percent

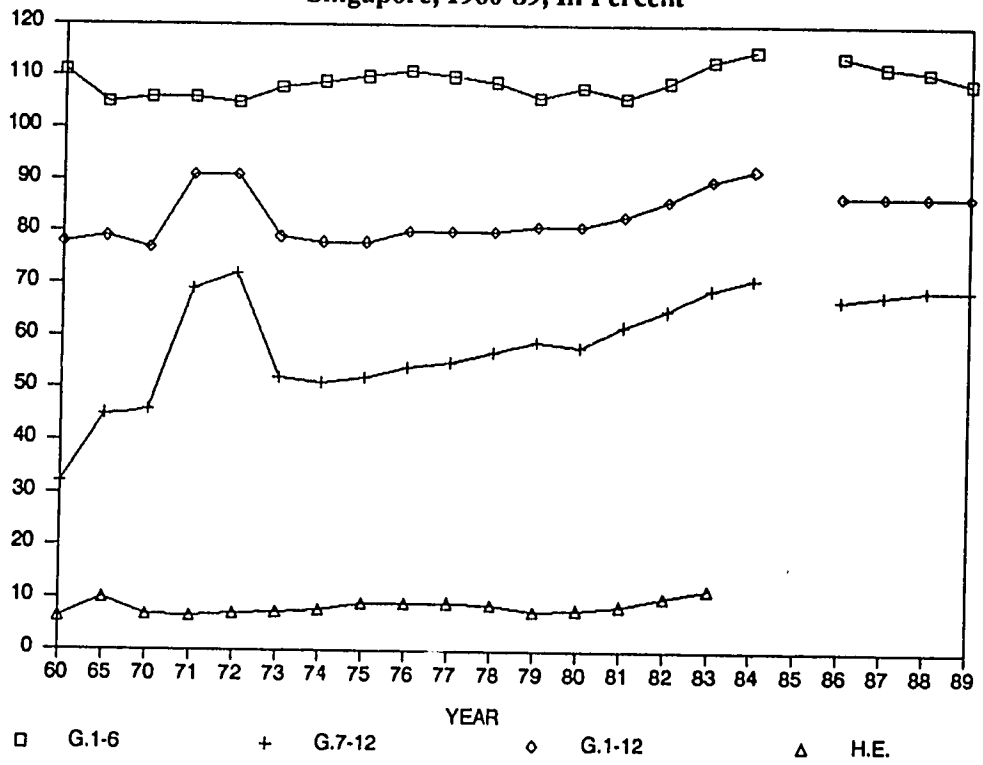


Figure VIII.22
Gross Enrollment Ratio (Total)
South Korea, 1960-89, In Percent

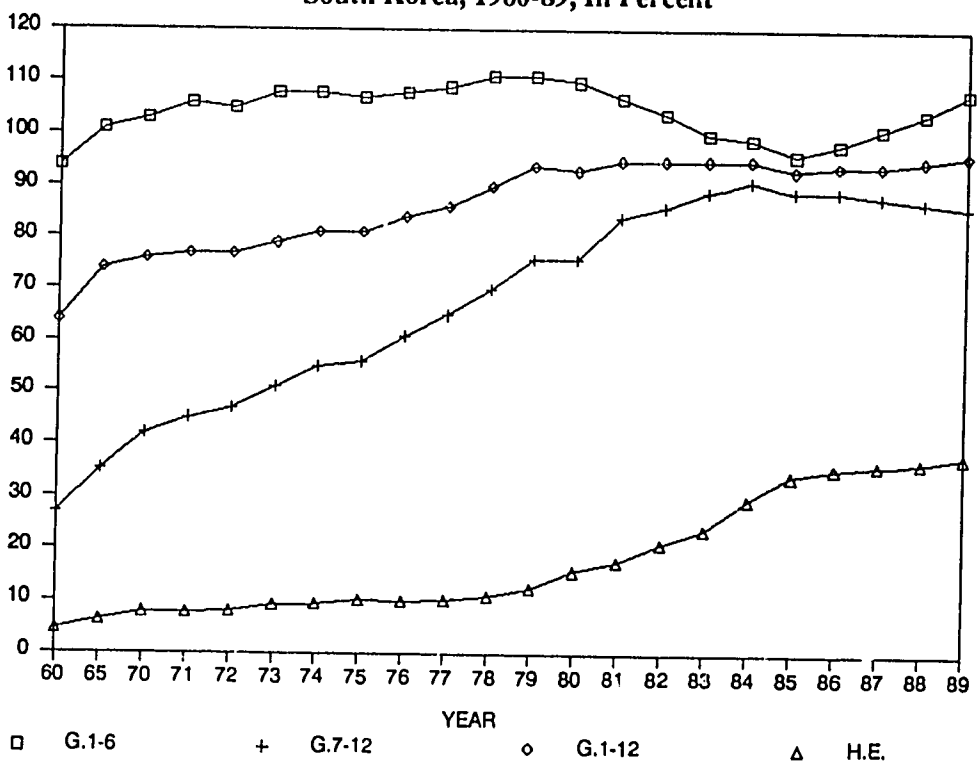


Figure VIII.23
Gross Enrollment Ratio (Total)
Thailand, 1960-89, In Percent

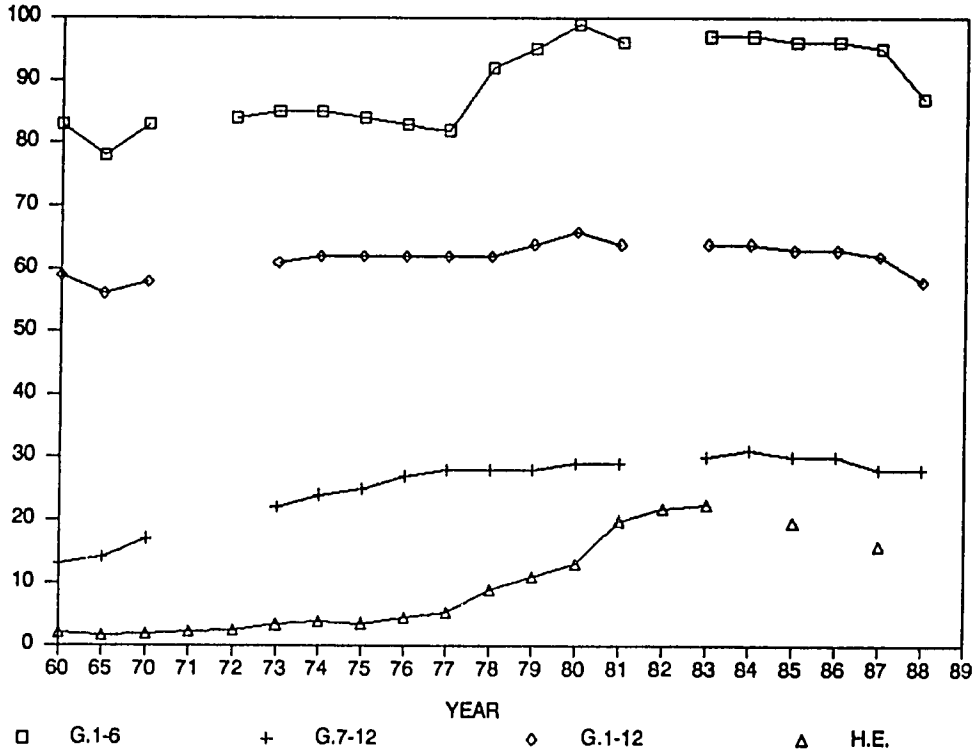
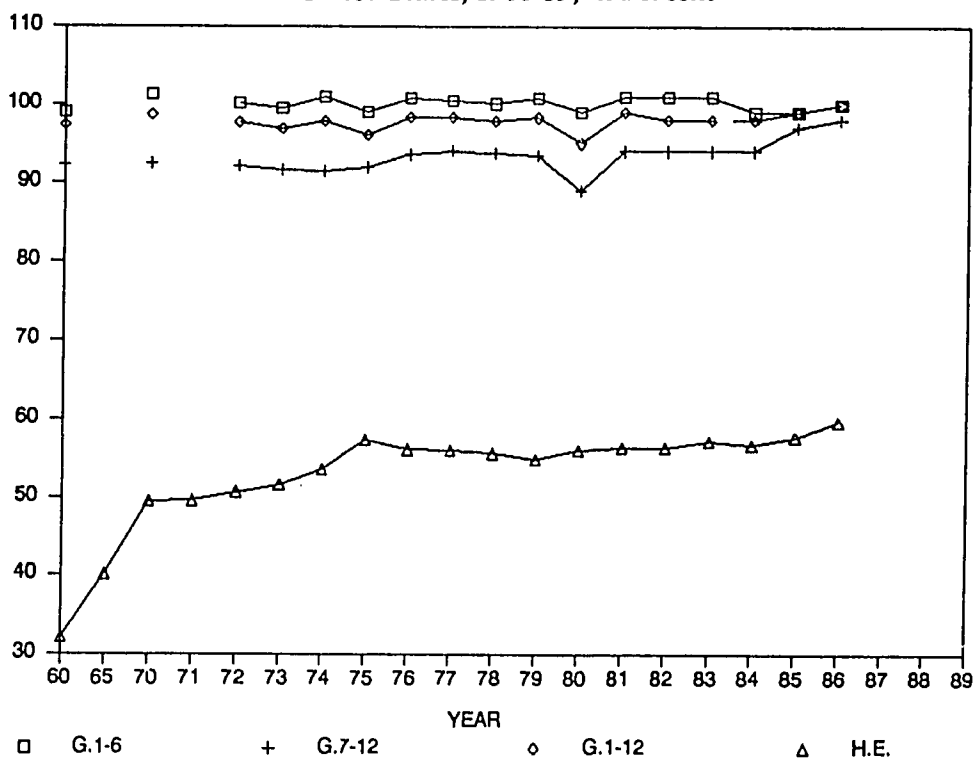


Figure VIII.24
Gross Enrollment Ratio (Total)
United States, 1960-89, In Percent



Conclusions and Recommendations

Indonesia's average annual economic growth between 1969 and 1989 was 4.3 percent and among the highest of the countries in this study. Unfortunately, the high growth was mostly during the early part of this period, and the growth rate of real per capita income fell sharply in 1982 and again in 1985 in ways that reflected the worldwide recession. The impact of the recession on Indonesia was delayed by the oil price rise, and then the impact of the recovery was delayed by the fall in oil prices.

But the population growth rates have continued to decline from the earlier 2.29 percent 1950-1970 average to 2.1 percent currently, so *per capita* income has risen somewhat more rapidly as a result of that. As worldwide economic recovery occurred, Indonesia's real per capita income growth rose 2.5 percent in 1987 and 3.6 percent in 1988. In 1990 oil prices rose again, but now with the 1991 U.S. slowdown, there is the possibility that the whole earlier pattern of a delayed recession will be repeated. This could mean somewhat higher per capita growth for 1990 and 1991 followed by a slowdown as the effect of very high interest rates in Indonesia during 1991 on domestic investment takes effect.

Over the medium term (5-10 years), education plays an important role in raising labor productivity within each industry, and in facilitating the structural adjustment that occurs as each new generation of labor force entrants moves from lower productivity activities (e.g., out of agriculture, and away from underemployment in the rural villages) to higher productivity activities (e.g., manufacturing, and export-oriented industries). The education of this group is an essential element to making them employable in small and medium enterprises in the provincial cities.

Combined with high rates of investment in physical capital, and in the types of R&D that facilitate technology transfer, higher rates of investment in junior and senior secondary education where Indonesia has been losing its competitive edge offers real promise that Indonesia will be achieving a take off into faster sustained real per capita economic growth, accompanied by declining inequality in the income distribution as has been the pattern in the Pacific Rim countries. The relative productivity of employed labor in all sectors has already improved in Indonesia.

The data show that the *education* of workers at the junior secondary and senior secondary levels is still quite low and has been falling relative to the achievements in other countries. This could prove to be a severe limitation in assimilating the high rates of investment in physical capital. If continued it could potentially lead to diminishing returns to investment in physical capital (per Rupiah invested) and to increasing inequality in the income distribution. The ratio of Indonesia's education total Central and Provincial government expenditure to income is still low among ASEAN and Pacific Rim countries (3.3% in 1989). Industrialized countries like Japan and the United States have maintained a ratio of education expenditure to income of around 5 percent since 1974. In 1987, South Korea and Singapore spent over 4 percent of their GDP on education, and more than this if local support of the schools is considered. Efforts to improve the internal and external efficiency of the Indonesian education system are also highly relevant. The impact of all investments in education can be increased further if both public and private investment in education is used efficiently and effectively. But even at the current level of efficiency, the larger the ratio of total education investment to income, the greater the effect of human capital formation on economic growth in Indonesia.

TABLE VIII.1

COMPARISONS OF REAL INCOME PERCAPITA GROWTH RATE : INDONESIA VS. OTHER ASIAN COUNTRIES AND U.S. (IN PERCENT)

	REPELITA I 1969-74	REPELITA II 1974-79	REPELITA III 1979-84	REPELITA IV 1984-87	AVERAGE 1969-87
A FIST GROWTH COUNTRIES: Average Annual Growth Rate of Income Percapita more than 4 percent (in local currencies, constant prices)	1. Singapore (9.51%) 2. South Korea (7.52%) 3. Indoensia (5.88%) 4. Malaysia 2) (4.80%) 5. Japan (4.30%)	1. South Korea (7.99%) 2. Singapore (6.04%) 3. Thailand (5.31%) 4. Indonesia (5.23%) 5. Malaysia (4.13%)	1. Singapore (7.29%) 2. Malaysia (4.30%) 3. South Korea (4.20%)	1. South Korea (8.23%) 2. Pakistan (4.94%)	1. South Korea (6.83%) 2. Singapore (4.59%) 3. Indonesia (4.31%) 4. Thailand (4.08%)
B. MEDIUM GROWTH COUNTRIES: Average Annual Growth Rate of Income Percapita between 2 and 4 percent (in local currencies constant prices)	6. Thailand (3.56%) 7. Philippines (3.11%)	6. Philippines (3.70%) 7. Japan (3.60%) 8. United States (2.13%) 9. Pakistan (2.02%)	4. Thailand (3.92%) 5. Indonesia (3.69%) 6. Pakistan (3.67%) 7. India (3.32%) 8. Japan (3.14%)	3. India (3.47%) 4. Japan (3.35%) 5. Thailand (3.17%) 6. United States (2.24%)	5. Japan (3.62%) 6. Malaysia 3) (3.47%) 7. Pakistan (2.10%)
C. SLOW GROWTH COUNTRIES Average Annual Growth Rate of Income Percapita less than 2 percent (in local currencies)	8. United States (1.31%) 9. India (-.02%) 10. Pakistan (-.99%)	10. India (1.76%)	9. United States (.79%) 10. Philippines (- 1.73%)	7. Singapore (1.69%) 8. Indonesia (1.24%) 9. Malaysia (- 1.07%) 10. Philippines (-1.27%)	8. India (1.97%) 9. United States (1.55%) 10. Philippines (1.17%)

Source : International Monetary Fund, International Financial Statistics 1989 (data income and population for all countries)

Notes :
1) Absolute Income is in 1985 constant prices
Income = GNP for Japan, Philippines and United States
Income = GDP for others
2) Data for period 1970-74
3) Data for period 1970-87

TABLE VIII.2

COMPARISONS OF TOTAL INVESTMENT IN PHYSICAL CAPITAL PER INCOME : INDONESIA VS. OTHER ASIAN COUNTRIES AND U.S.

TOTAL INVESTMENT PHYSICAL CAPITAL PER INCOME (%)	THE BEGINNING OF REPELIA I 1969	THE BEGINNING OF REPELITA II 1974	THE BEGINNING OF REPELITA III 1979	THE BEGINNING OF REPELITA IV 1984	MID REPELITA IV 1987
A. HIGH : MORE THAN 30 PERCENT	1. Japan (37.55%)	1. Singapore (44.58%) 2. Japan (37.31%) 3. South Korea (31.38%)	1. Singapore (43.37%) 2. South Korea (35.47%) 3. Japan (32.49%) 4. Philippines (31.12%)	1. Singapore (48.48%) 2. Malaysia (33.56%) 3. South Korea (30.79%)	1. Singapore (39.44%)
B. MEDIUM : BETWEEN 20 AND 30 PERCENT	2. South Korea (29.20%) 3. Singapore (28.65%) 4. Thailand (26.36%) 5. Philippines (20.42%)	4. Malaysia (29.63%) 5. Thailand (26.61%) 6. Philippines (25.18%) 7. India (20.35%)	5. Malaysia (28.91%) 6. Thailand (27.21%) 7. India (24.32%) 8. Indonesia (20.93%) 9. United States (20.91%)	4. Japan (28.30%) 5. Indonesia (25.47%) 6. Thailand (24.91%) 7. India (23.66%)	2. Japan (29.13%) 3. South Korea (29.08%) 4. Indonesia (26.33%) 5. Malaysia (24.05%) 6. Thailand (23.84%) 7. India (21.26%)
C. LOW : LESS THAN 20 PERCENT	6. United States (19.27%) 7. India (17.58%) 8. Pakistan (15.81%) 9. Malaysia (14.60%) 10. Indonesia (11.66%)	8. United States (19.53%) 9. Indonesia (16.78%) 10. Pakistan (13.37%)	10. Pakistan (17.89%)	8. United States (19.96%) 9. Philippines (11.01%) 10. Pakistan (16.84%)	8. United States (18.04%) 9. Pakistan (17.00%) 10. Philippines (15.59%)

Source : International Monetary Fund, Government Finance Statistics 1989 (date total education expenditure for Indonesia for the year 1984 and 1987).

TABLE VIII.3

COMPARISONS OF TOTAL EDUCATION EXPENDITURE PER INCOME : INDONESIA VS. OTHER ASIAN COUNTRIES AND U.S.

TOTAL EDUCATION EXPENDITURE PER INCOME (%)	THE BEGINNING OF REPELITA I 1968	THE BEGINNING OF REPELITA II 1974	THE BEGINNING OF REPELITA III 1974	THE BEGINNING OF REPELITA IV 1984	MID REPELITA IV 1987
A. HIGH : MORE THAN 4 PERCENT	1. United States (5.23%) 2. Malaysia (4.88%) 3. Singapore (4.26%)	1. United States (5.55%) 2. Malaysia (5.41%) 3. Japan (5.23%)	1. Japan (5.76%) 2. Malaysia (5.53%) 3. United States (5.16%)	1. Malaysia (6.08%) 2. Japan (5.25%) 3. United States (5.00%) 4. South Korea (4.80%)	1. Malaysia (6.83%) 2. United States (5.32%) 3. South Korea (4.20%)
B. MEDIUM : BETWEEN 2 AND4 PERCENT	4. Japan (3.84%) 5. South Korea (3.60%) 6. Thailand (3.03%) 7. India (2.76%) 8. Philippines (2.18%)	4. Singapore (2.71%) 5. Thailand (2.62%) 6. India (2.61%) 7. Indonesia (2.22%)	4. India (3.25%) 5. South Korea (3.20%) 6. Thailand (3.13%) 7. Singapore (2.72%)	5. India (3.44%) 6. Indonesia (3.32%)	4. Singapore (3.84%) 5. Thailand (3.64%) 6. Indonesia (3.33%)
C. LOW : LESS THAN 2 PERCENT	9. Pakistan (1.92%)	8. Pakistan (1.99%) 9. Philippines (1.70%)	8. Pakistan (1.98%) 9. Philippines (1.95%) 10. Indonesia (1.63%)	7. Pakistan (1.99%) 8. Phillippines (1.31%)	7. Phillippines (1.98%) 8. Pakistan (1.93%)

Source : International Monetary Fund, Government Finance Statistics 1982 and 1989 (data total education expenditure for Indonesia for the year 1984 and 1987)
UNESCO, Statistical Yearbook, various years (data total education expenditure for others)

TABLE VIII.4

COMPARISONS OF TOTAL EXPENDITURE ON RESEARCH AND DEVELOPMENT PER INCOME :
INDONESIA VS. OTHER ASIAN COUNTRIES AND U.S.
(IN PERCENT)

TOAL EXPENDITURE ON R & D PER INCOME (IN PERCENT)	THE BEGINNING OF REPELITA I 1969	THE BEGINNING OF REPELITA II 1974	THE BEGINNING OF REPELITA III 1979	THE BEGINNING OF REPELITA IV 1984
A. HIGH : MORE THAN 1 PERCENT		1. Japan (2.015) 2. United States (1.630)	1. Japan (2.054) 2. United States (1.686)	1. Japan (2.630) 2. United States (1.862)
B. MEDIUM : BETWEEN 0.4 AND 1 PERCENT	1. South Korea (.454)	3. India (.421)	3. South Korea (.566)	3. India (.795) 4. Sinagpore (.525)
C. LOW : LESS THAN 0.4 PERCENT	2. India (.319) 3. Pakistan (.218)	4. South Korea (.376) 5. Phillippines (.200) 6. Indonesia (.111)	4. Indonesia (.336) 5. Phillippines (.234) 6. Pakistan (.187)	5. Thailand (.343) 6. Indonesia (.337) 7. Pakistan (.329) 8. Phillippines (.116)

Source : UNESCO, Statistical Yearbook, Various years
International Monetary Fund, International Financial Statistics 1989

TABLE VIII.5

INDONESIA VS. OTHER ASIAN COUNTRIES AND U.S. (IN PERCENT)

POPULATION GROWTHRATE	REPELITA I 1970-74		REPELITA II 1974-79		REPELITA III 1979-84	
A. SLOW GROWTH : LESS THAN 1.5 PERCENT	1. United States	(1.06%)	1. Japan	(1.02%)	1. Japan	(.71%)
	2. Japan	(1.37%)	2. United States	(1.03%)	2. United States	(1.04%)
	3. South Korea	(1.41%)	3. Singapore	(1.31%)	3. Singapore	(1.15%)
					4. Hong Kong	(1.17%)
B. MEDIUM GROWTH : BETWEEN 1.5 AND 2.5 PERCENT	4. Singapore	(1.88%)	4. Indonesia	(1.62%)	5. South Korea	(1.55%)
	5. Taiwan	(1.95%)	5. South Korea	(1.63%)	6. Taiwan	(1.70%)
	6. Hong Kong	(2.17%)	6. Taiwan	(1.97%)	7. Thailand	(1.91%)
	7. India	(2.21%)	7. India	(2.33%)	8. India	(2.20%)
					9. Indonesia	(2.25%)
C. FAST GROWTH : MORE THAN 2.5 PERCENT	8. Indonesia	(2.52%)	8. Thailand	(2.50%)	10. Malaysia	(2.46%)
	9. Philippines	(2.89%)	9. Philippines	(2.64%)	11. Philippines	(2.55%)
	10. Thailand	(2.90%)	10. Malaysia	(2.92%)	12. Pakistan	(3.08%)
	11. Malaysia	(2.90%)	11. Hong Kong	(2.99%)		
	12. Pakistan	(3.25%)	12. Pakistan	(3.07%)		
POPULATION GROWTH RATE	REPELITA I 1970-74		REPELITA II 1974-79		REPELITA III 1979-84	
A. SLOW GROWTH : LESS THAN 1.5 PERCENT	1. Japan	(.57%)	1. Japan	(1.11%)	1. Japan	(.93%)
	2. United States	(.97%)	2. United States	(1.50%)	2. United States	(1.03%)
	3. South Korea	(1.03%)			3. Singapore	(1.37%)
	4. Singapore	(1.18%)			4. South Korea	(1.45%)
	5. Hong Kong	(1.27%)				
B. MEDIUM GROWTH : BETWEEN 1.5 AND 2.5 PERCENT	6. Thailand	(1.86%)	3. India	(2.06%)	5. Hong Kong	(1.96%)
	7. India	(2.01%)	4. Indonesia	(2.29%)	6. Indonesia	(2.10%)
	8. Indonesia	(2.10%)	5. South Korea	(2.32%)	7. India	(2.21%)
	9. Philippines	(2.45%)			8. Thailand	(2.31%)
C. FAST GROWTH : MORE THAN 2.5 PERCENT	10. Malaysia	(2.86%)	6. Pakistan	(2.57%)	9. Philippines	(2.64%)
	11. Pakistan	(3.20%)	7. Malaysia	(2.70%)	10. Malaysia	(2.77%)
			8. Philippines	(3.03%)	11. Pakistan	(3.14%)
			9. Thailand	(3.13%)		
			10. Singapore	(3.60%)		
			11. Hong Kong	(3.69%)		

Source : International Monetary Fund, International Financial Statistics 1989 (data population for all countries, except Hong Kong, Pakistan and Taiwan)
Republic of China, Statistical Yearbook 1987 (data population for Taiwan)
The World Bank, World Tables 1988-89 edition, Washington D.C., 1989 (data population for Hong Kong and Pakistan)

TABLE VIII.6

COMPARISONS OF TOTAL POPULATION :
INDONESIA VS. OTHER ASIAN COUNTRIES AND U.S.
(IN MILLIONS)

	THE BEGINNING OF REPELITA I 1970	THE BEGINNING OF REPELITA II 1974	THE BEGINNING OF REPELITA III 1979	THE BEGINNING OF REPELITA IV 1984	MID REPELITA IV 1987
A. HIGHLY POPULATED COUNTRIES : MORE THAN 100 MILLIONS	1. India (539) 2. United States (205) 3. Indonesia (119) 4 Japan (104)	1. India (588) 2. United States (214) 3. Indonesia (132) 4. Japan (110)	1. India (660) 2. United States (225) 3. Indonesia (143) 4. Japan (116)	1. India (736) 2. United States (237) 3. Indonesia (160) 4. Japan (120)	1. India (781) 2. United States (244) 3. Indonesia (170) 4. Japan (122) 5. Pakistan (102)
B. MIDDLE POPULATED COUNTRIES : BETWEEN 20 AND 100 MILLIONS	5. Pakistan (61) 6. Philippines (37) 7. Thailand (36) 8. South Korea (32)	5. Pakistan (69) 6. Philippines (41.3) 7. Thailand (40.8) 8. South Korea (34)	5. Pakistan (80) 6. Philippines (47) 7. Thailand (46) 8. South Korea (37)	5. Pakistan (93) 6. Philippines (53) 7. Thailand (51) 8. South Korea (40)	6. Philippines (57) 7. Thailand (54) 8. South Korea (41)
C. LESS POPULATED COUNTRIES : LESS THAN 20 MILLIONS	9. Taiwan (14.7) 10. Malaysia (10.4) 11. Hong Kong (3.9) 12. Singapore (2.1)	9 Taiwan (15.9) 10. Malaysia (11.7) 11. Hong Kong (4.3) 12. Singapore (2.2)	9. Taiwan (17.5) 10. Malaysia (13.5) 11. Hong Kong (5.0) 12. Singapore (2.4)	9. Taiwan (19.0) 10. Malaysia (15.2) 11. Hong Kong (5.3) 12. Singapore (2.5)	9. Malaysia (16.5) 10 Hong Kong (5.5) 11. Singapore (2.6)

Source : International Monetary Fund, International Financial Statistics 1989 (data for GNP or GDP in 1985 prices, exchange rates and population).
The World Bank, World Tables 1988-1989 (data population for Pakistan).

TABLE VIII.7

COMPARISONS OF FEMALE GROSS SCHOOL ENROLLMENT RATIO FOR FIRST AND SECOND LEVEL : INDONESIA VS. OTHER ASIAN COUNTRIES AND U.S
(IN PERCENT)

	THE BEGINNING OF REPELITA I 1970	THE BEGINNING OF REPELITA II 1974	THE BEGINNING OF REPELITA III 1979	THE BEGINNING OF REPELITA IV 1984	
A. HIGH : MORE THAN 90 PERCENT	1. United States (99) 2. Japan (92) 3. Philippines (91)	1. United States (98) 2. Japan (95) 3. South Korea (90)	1. United States (98) 2. Japan (97) 3. South Korea (94)	1. Japan (98) 2. United States (97) 3. Philippines (93) 4. Philippines (94) 5. Singapore (92)	1. Japan (99) 2. United States (99) 4. South Korea (92)
B. MEDIUM : BETWEEN 70 AND 90 PERCENT	4. Singapore (74) 5. Hong Kong (73) 6. South Korea (71)	3. Philippines (88) 4. Singapore (77) 5. Hong Kong (77)	4. Singapore (81) 5. Hong Kong (80)	6. Hong Kong (87) 7. Indonesia (77)	5. Hong Kong (88)
C. LOW : LESS THAN 70 PERCENT	7. Malaysia (59) 8. Thailand (55) 9. Indonesia (43) 10. India (37) 11. Pakistan (18)	7. Malaysia (64) 8. Thailand (58) 9. Indonesia (45) 10. India (38)	6. Malaysia (69) 8. Thailand (62) 9. Indonesia (62) 10. India (40)	9. India (48) 10. Pakistan (20)	6. India (51) 7. Pakistan (20)

Source : Republic of China, Statistics Yearbook 1987 (data school enrollment ratio for Taiwan).
UNESCO, Statistical Yearbook, various years (data school enrollment ratio for others).

TABLE VIII.8

COMPARISONS OF RELATIVE PRODUCTIVITY RATIO OF AGRICULTURE :
INDONESIA VS. OTHER ASIAN COUNTRIES AND U.S

	THE BEGINNING OF REPELITA I 1970	THE BEGINNING OF REPELITA II 1974	THE BEGINNING OF REPELITA III 1979	THE BEGINNING OF REPELITA IV 1984	MID REPELITA IV 1987
A. HIGH : MORE THAN 1.5			1. India (6.34)	1. India (6.54)	
B. MEDIUM : BETWEEN 1 AND 1.5	1. United States (.70) 2. South Korea (.57) 3. Indonesia (.51)	1. United States (.70) 2. Singapore (.65) 3. Pakistan (.60) 4. South Korea (.52)	2. Singapore (.94) 3. United States (.75) 4. Pakistan (.54)	2. Singapore (1.25) 3. United States (.78) 4. Malaysia (.63) 5. South Korea (.53)	1. Singapore (.71) 2. Malaysia (66) 3. Philippines (54) 4. South Korea (.52)
C. LOW : LESS THAN 0.5	4. Philippines (.49) 5. Thailand (.38) 6. Japan (.34)	5. Philippines (.45) 6. Thailand (.43) 7. Japan (.43)	5. South Korea (.49) 6. Indonesia (.38) 7. Thailand (.37) 8. Japan (.37)	6. Philippines (.49) 7. Pakistan (.46) 8. Indonesia (.42) 9. Japan (.38) 10. Thailand (.34)	5. Indonesia (.42)

Source : International Labour Office, Yearbook of Labour Statistics 1988, Geneva 1988 (data for employment by structure)
The World Bank, World Tables 1988-1989, Washington D.C., 1989 (data for GDP in constant 1980 prices by structure)

TABLE VIII.9

COMPARISONS OF LABOR ABSORPTION RATE OF AGRICULTURE : INDONESIA VS. OTHER ASIAN COUNTRIES AND U.S.

	REPELITA I 1969-74	REPELITA II 1974-79	REPELITA III 1979-84	REPELITA IV 1984-87
A. HIGH : MORE THAN 1		1. Japan (1.52)	1. Japan (9.31) 2. Pakistan (1.15) 3. Thailand (1.09)	1. Indonesia (1.05)
B. MEDIUM : BETWEEN 0 AND 1	1. United States (.50)	2. Pakistan (.68) 3. Thailand (.42)	4. Philippines (.98) 5. Indonesia (.38) 6. India (.19)	2. Malaysia (.68) 3. Philippines (.43)
C. Low : LESS THAN 0	2. Japan (-2.42)	4. United States (-.43) 5. Indonesia (-.58) 6. South Korea (-.97) 7. Singapore (-2.37)	7. United States (-.20) 8. South Korea (-2.79) 9. Singapore (-32.76)	4. Singapore (-.55) 5. South Korea (- 2.12)

Source : International Labour Office, Yearbook of Labour Statistics 1988, Geneva 1988 (data for employment by structure)
The World Bank, World Tables 1988-1989, Washington D.C., 1989 (data for GDP in constant 1980 prices by structure)

TABLE VIII.10

COMPARISONS OF RELATIVE PRODUCTIVITY RATIO OF INDUSTRY :
INDONESIA VS. OTHER ASIAN COUNTRIES AND U.S

	THE BEGINNING OF REPELITA I 1970	THE BEGINNING OF REPELITA II 1974	THE BEGINNING OF REPELITA III 1979	THE BEGINNING OF REPELITA IV 1984
A. HIGH ; MORE THAN 1.5	1. Thailand (4.86) 2. Indonesia (4.19) 3. Philippines (1.81)	1. Philippines (2.44) 2. Thailand (2.25)	1. Indonesia (3.05) 2. Thailand (2.31)	1. Indonesia (2.79) 2. Philippines (2.45) 3. Thailand (2.38) 4. Malaysia (1.61)
B. MEDIUM : BETWEEN 1 AND 1.5	4. South Korea (1.46) 5. Japan (1.15) 6. United States (1.09)	3. South Korea (1.42) 4. Pakistan (1.39) 5. United States (1.14) 6. Japan (1.13) 7. Singapore (1.06)	3. South Korea (1.34) 4. Pakistan (1.31) 5. Japan (1.19) 6. United States (1.10) 7. Singapore (1.08)	5. Pakistan (1.46) 6. South Korea (1.44) 7. Japan (1.26) 8. United States (1.16) 9. Singapore (1.06)
C. LOW : LESS THAN 1			8. India (.70)	10. India (.73)

Source : International Labour Office, Yearbook of Labour Statistics 1988, Geneva 1988 (data for employment by structure)
The World Bank, World Tables 1988-1989, Washington D.C., 1989 (data for GDP in constant 1980 prices by structure)

TABLE VIII.11

COMPARISONS OF LABOR ABSORPTION RATE OF INDUSTRY : INDONESIA VS. OTHER ASIAN COUNTRIES AND U.S.

	REPELITA I 1969-74	REPELITA II 1974-79	REPELITA III 1979-84	REPELITA IV 1984-87
A. HIGH : MORE THAN 1		1. indonesia (2.05) 2. United States (1.09)	1. Philippines (14.88) 2. Indonesia (1.21)	1. Singapore (2.84)
B. MEDIUM : BETWEEN 0 AND 1	1. Japan (.28) 2. United States (.43)	3. Pakistan (.78) 4. South Korea (.64) 5. Singapore (.56) 6. Thailand (.39)	3. Thailand (.69) 4. Pakistan (.45) 5. Singapore (.42) 6. India (.26) 7. Japan (.19) 8. South Korea (.19)	2. South Korea (.67)
C. LOW : LESS THAN 0		7. Japan (-.06)	9. United States (-.58)	3. Malaysia (-.09) 4. Philippines (-1.77)

Source : International Labour Office, Yearbook of Labour Statistics 1988, Geneva 1988 (data for employment by structure)
The World Bank, World Tables 1988-1989, Washington D.C., 1989 (data for GDP in constant 1980 prices by structure)

TABLE VIII.12

COMPARISONS OF RELATIVE PRODUCTIVITY RATIO OF MANUFACTURING : INDONESIA VS. OTHER ASIAN COUNTRIES AND U.S

	THE BEGINNING OF REPELITA I 1970	THE BEGINNING OF REPELITA II 1974	THE BEGINNING OF REPELITA III 1979	THE BEGINNING OF REPELITA IV 1984	MID REPELITA IV 1987
A. HIGH : MORE THAN AND EQUAL 1.5	1. Thailand (4.13)	1. Thailand (1.95)	1. Thailand (2.11)	1. Thailand (2.30) 2. Indonesia (1.60)	1. Indonesia (1.77) 2. Malaysia (1.50)
B. MEDIUM : BETWEEN 1 AND 1.5	2. South Korea (1.26) 3. Indonesia (1.11)	2. South Korea (1.25) 3. Pakistan (1.21) 4. Japan (1.04)	2. South Korea (1.25) 3. Japan (1.15) 4. Pakistan (1.14) 5. Indonesia (1.07) 6. Singapore (1.01) 7. United States (1.00)	3. Malaysia (1.38) 4. Pakistan (1.37) South Korea (1.35) 6. Japan (1.35) 7. United States (1.12)	3. South Korea (1.25) 4. Singapore (1.00)
C. LOW : LESS THAN 1	4. Japan (.97) 5. United States (.82)	5. Pakistan (.96) 6. United States (93)	8. India (.71)	8. Singapore (.90) 9. India (.79)	

Source : International Labour Office, Yearbook of Statistics 1988 (data for employment by structure)
The World Bank, World Tables 1988-1989, Washington D.C.,1989 (data for GDP in constant 1980 prices by structure)
UNESCO, Statistical Yearbook, various years (data total education expenditure for others)

TABLE VIII.13

COMPARISONS OF LABOR ABSORPTION RATE OF MANUFACTURING
INDONESIA VS. OTHER ASIAN COUNTRIES AND U.S.

	REPELITA I 1969-74	REPELITA II 1974-79	REPELITA III 1979-84	REPELITA IV 1984-87
A. HIGH : MORE THAN 1			1. Philippines (2.58)	1. indonesia (1.79)
B. MEDIUM : BETWEEN 0 AND 1	1. Japan (.13) 2. United States (.09)	1. Indonesia (.98) 2. Pakistan (.75) 3. South Korea (.56) 4. Singapore (.53) 5. United States (.39) 6. Thailand (.28)	2. Thailand (.43) 3. Singapore (.37) 4. Pakistan (.30) 5. Japan (.20) 6. South Korea (.19) 7. India (.18) 8. indonesia (.04)	2. South Korea (.78)
C. LOW : LESS THAN 0		7. Japan (-.31)	9. United States (-.84)	3. Singapore (-.06) 4. Malaysia (-0.40) 5. Philippines (-19.37)

Source : International Labour Office, Yearbook of Labour Statistics 1988, Geneva 1988 (data for employment by structure)
The World Bank, World Tables 1988-1989, Washington D.C., 1989 (data for GDP in constant 1980 prices by structure)

TABLE VIII.14

COMPARISONS OF RELATIVE PRODUCTIVITY RATIO OF SERVICES :
INDONESIA VS. OTHER ASIAN COUNTRIES AND U.S.

	THE BEGINNING OF REPELITA I 1970	THE BEGINNING OF REPELITA II 1974	THE BEGINNING OF REPELITA III 1979	THE BEGINNING OF REPELITA IV 1984	MID REPELITA IV 1987
A. HIGH : MORE THAN 1.5	1. Thailand (2.85)	1. Thailand (2.00) 2. Pakistan (1.64)	1. Thailand (2.08) 2. Pakistan (1.73) 3. Indonesia (1.53)	1. Thailand (2.08) 2. Pakistan (1.69)	
B. MEDIUM : BETWEEN 1 AND 1.5	2. South Korea (1.37) 3. Indonesia (1.16) 4. Japan (1.11)	3. South Korea (1.47) 4. Japan (1.05)	4. South Korea (1.23) 5. Japan (1.01)	3. Indonesia (1.23)	1. Singapore (1.00)
C. LOW : LESS THAN 1	5. United States (.97)	5. Singapore (.98) 6. United States (.95)	6. United States (.96) 7. Singapore (.96) 8. India (.66)	4. South Korea (.98) 5. Singapore (.96) 6. United States (.94) 7. Japan (.94) 8. Malaysia (.92) 9. India (.65)	2. South Korea (.94) 3. Malaysia (.86)

Source : International Labour Office, Yearbook of Labour Statistics 1988, Geneva 1988 (data for employment by structure)
The World Bank, World Tables 1988-1989, Washington D.C., 1989 (data for GDP in constant 1980 prices by structure)

TABLE VIII.15

COMPARISONS OF LABOR ABSORPTION RATIO OF SERVICES : INDONESIA VS. OTHER ASIAN COUNTRIES AND U.S.

	REPELITA I 1969-74	REPELITA II 1974-79	REPELITA III 1979-84	REPELITA IV 1984-87
A. HIGH : MORE THAN 1	1. United States (1.02)		1. Philippines (3.20)	1. Philippines (2.54) 2. Indonesia (1.43)
B. MEDIUM : BETWEEN 0 AND 1	2. Japan (.55) 3. Singapore (.65)	1. United States (.79) 2. South Korea (.69) 5. Thailand (.81) 4. Japan (.45) 5. Pakistan (.44) 6. Thailand (.17)	3. South Korea (.98) 4. United States (.89) 4. Singapore (.28) 6. Pakistan (.62) 7. Japan (.60) 8. India (.45) 9. Singapore (.31)	2. South Korea (.62) 3. Malaysia (.40)
C. LOW : LESS THAN 0		7. Indonesia (-.48)		

Source : International Labour Office, Yearbook of Labour Statistics 1988, Geneva 1988 (data for employment by structure)
The World Bank, World Tables 1988-1989, Washington D.C., 1989 (data for GDP in constant 1980 prices by structure)

Notes : 1) Data for average 1976-79
2) Data for average 1979-85

TABLE VIII.16

COMPARISONS OF REAL EXPORT GROWTH RATE : INDONESIA VS. OTHER ASIAN COUNTRIES AND U.S. (IN PERCENT)

	REPELITA I 1974	REPELITA II 1974-79	REPELITA III 1979- 1984	REPELITA IV 1984-87	AVERAGE 1969-87
A. FAST GROWTH : Average Annual Growth Rate of Real Export more than 10 percent	1. Indonesia (37.12) 2. South Korea (25.88) 3. Philippines (18.04) 4. Pakistan (15.04) 5. United States (13.13) 6. Japan (11.75) 7. Thailand (11.38)	1. India (11.46)	1. South Korea (12.65) 2. Japan (10.00)	1. South Korea (16.13) 2. Thailand (14.87) 3. Pakistan (12.08)	1. South Korea (15.94) 2. Indonesia (12.98)
B. MEDIUM GROWTH : Average Annual Growth Rate of Real Export between 5 and 10 percent	8. India (6.87)	2. South Korea (9.79) 3. Thailand (8.89) 4. Indonesia (7.72)	3. Pakistan (7.45) 4. Thailand (5.59)	4. Malaysia (5.07)	3. Thailand (9.62) 4. Pakistan (8.28) 5. Philippines (7.21) 6. India *) (7.16) 7. Japan (5.44)
C. SLOW GROWTH : Average Annual Growth Rate of Real Export less than 5 percent	9. Malaysia (.89)	5. United States (4.58) 6. Malaysia (6.05) 7. Philippines (3.03) 8. Japan (1.70) 9. Pakistan (.62)	5. Philippines (4.08) 6. India (3.31) 7. Indonesia (3.29) 8. Malaysia (-1.55) 9. United States (-1.60)	5. Indonesia (2.84) 6. Philippines (2.53) 7. United States (2.45) 8. Japan (-5.27)	8. United States (4.74) 9. Malaysia (1.76)

Source : International Monetary Fund, International Financial Statistics 1989

Notes : *) Data annual growth rate for 1969-1985

TABLE VIII.17

COMPARISONS OF TOTAL GROSS SCHOOL ENROLLMENT RATIO FOR FIRST AND SECOND LEVEL : INDONESIA VS. OTHER ASIAN COUNTRIES AND U.S. (IN PERCENT)

	THE BEGINNING OF REPELITA I 1970	THE BEGINNING OF REPELITA II 1974	THE BEGINNING OF REPELITA III 1979	THE BEGINNING OF REPELITA IV 1984	MID REPELITA IV 1987 *)
A. HIGH : MORE THAN 90 PERCENT	1. United States (99) 2. Japan (92) 3. Philippines (91)	1. United States (98) 2. Japan (95)	1. United States (98) 2. Japan (97) 3. South Korea (94) 4. Philippines (91)	1. United States (98) 2. Japan (98) 3. South Korea (95) 4. Philippines (92) 5. Singapore (92)	1. United States (100) 2. Japan (99) 3. South Korea (94) 4. Philippines (92)
B. MEDIUM : BETWEEN 70 AND 90 PERCENT	4. Singapore (77) 5. Hong Kong (76) 6. South Korea (76)	3. Philippines (88) 4. South Korea (81) 5. Hong Kong (79) 6. Singapore (78)	5. Singapore (81) 6. Hong Kong (79) 7. Malaysia (70)	6. Hong Kong (86) 7. Indonesia (81) 8. Malaysia (74)	5. Hong Kong (88) 6. Indonesia (83) 7. Malaysia (79)
C. LOW : LESS THAN 70 PERCENT	7. Malaysia (64) 8. Thailand (58) 9. Indonesia (49)	7. Malaysia (67) 8. Thailand (62) 9. Indonesia (52)	8. Indonesia (68)	9. Thailand (64)	8. Thailand (62)

Source : Republic of China, Statistical Yearbook 1987 (data schhool enrollment ratio for Taiwan).
UNESCO, Statistical Tearbook, various years (data school enrollment ratio for others).

Note : *) United States, Taiwan, Indonesia and Philippines : data for the year 1986.

TABLE VIII.18

COMPARISONS OF TOTAL GROSS SCHOOL ENROLLMENT RATIO FOR FIRST LEVEL : INDONESIA VS. OTHER ASIAN COUNTRIES AND U.S. (IN PERCENT)

	THE BEGINNING OF REPELITA I 1970	THE BEGINNING OF REPELITA II 1974	THE BEGINNING OF REPELITA III 1979	THE BEGINNING OF REPELITA IV 1984	MID REPELITA IV 1987*)
A. HIGH : MORE THAN 90 PERCENT	1. Hong Kong (117) 2. Philippines (114) 3. Singapore (106) 4. South Korea (103) 5. United States (101) 6 Japan (99) 7. Taiwan (98) 8. Malaysia (91)	1. Hong Kong (123) 2. Singapore (109) 3. South Korea (108) 4. Philippines (107) 5. United States (101) 6. Taiwan (99) 7. Japan (98) 8. Malaysia (92)	1. Hong Kong (111) 2. South Korea (111) 3. Philippines (107) 4. Indonesia (107) 5. Singapore (106) 6. United States (101) 7. Japan (101) 8. Taiwan (100) 9. Thailand (95) 10. Malaysia (92)	1. Indonesia (118) 2. Singapore (115) 3. Philippines (107) 4 Hong Kong (104) 5. Japan (101) 6. Taiwan (100) 7. South Korea (99) 8. United States (99) 9. Malaysia (98) 10. Thailand (97)	1. Indonesia (118) 2. Philippines (107) 3. Hong Kong (106) 4. Japan (102) 5. Malaysia (102) 6. South Korea (101) 7. Taiwan (100) 8. United states (100) 9. Thailand (95)
B. MEDIUM : BETWEEN 70 AND 90 PERCENT	9. Thailand (83) 10. Indonesia (77)	9. Thailand (85) 10. Indonesia (79)			
C. LOW : LESS THAN 70 PERCENT					

Source : Republic of China, Statistical Yearbook 1987 (data school enrollment ratio for Taiwan).
UNESCO, Statistical Yearbook, various years (data school enrollment ratio for others).

Note : *) United States, Taiwan, Indonesia and Philippines : data for the year 1986

TABLE VIII.19

COMPARISONS OF TOTAL GROSS SCHOOL ENROLLMENT RATIO FOR SECOND LEVEL : INDONESIA VS. OTHER ASIAN COUNTRIES AND U.S. (IN PERCENT)

	THE BEGINNING OF REPELITA I 1970	THE BEGINNING OF REPELITA II 1974	THE BEGINNING OF REPELITA III 1979	THE BEGINNING OF REPELITA IV 1984	MID REPELITA IV 1987 *)
A. HIGH: MORE THAN 90 PERCENT	1. United States (92)	1. United States (91) 2. Japan (91)	1. United States (93) 2. Japan (92)	1. United States (94) 2. Japan (94) 3. South Korea (91)	1. United States (98) 2. Japan (96) 3. Taiwan (89)
B. MEDIUM: BETWEEN 70 AND 90 PERCENT	2. Japan (86)		3. Taiwan (78) 4. South Korea (76)	4. Taiwan (89)	4. South Korea (88)
C. LOW: LESS THAN 70 PERCENT	3. Taiwan (54) 4. Philippines (50) 5. Singapore (46) 6. South Korea (42) 7. Hong Kong (36) 8. Malaysia (35) 9. Thailand (17) 10. Indonesia (15)	3. Taiwan (63) 4. South Korea (55) 5. Philippines (55) 6. Singapore (51) 7. Hong Kong (46) 8. Malaysia (43) 9. Thailand (24) 10. Indonesia (18)	5. Philippines (64) 6. Singapore (59) 7. Hong Kong (60) 8. Malaysia (51) 9. Thailand (28) 10. Indonesia (24)	5. Hong Kong (72) 6. Singapore (71) 7. Philippines (68) 8. Malaysia (53) 9. Indonesia (39) 10. Thailand (31)	5. Hong Kong (74) 6. Philippines (67) 7. Malaysia (59) 8. Indonesia (46) 9. Thailand (28)

Source : Republic of China, Statistical Yearbook 1987 (data school enrollment ratio for Taiwan).
UNESCO, Statistical Yearbook, various years (data school enrollment ratio for others).

Note : *) United States, Taiwan, Indonesia and Philippines : data for the year 1986

TABLE VIII.20

COMPARISONS OF TOTAL GROSS SCHOOL ENROLLMENT RATIO FOR THIRD LEVEL : INDONESIA VS. OTHER ASIAN COUNTRIES AND U.S.
(IN PERCENT)

	THE BIGINNING OF REPELITA I 1970	THE BIGINNING OF REPELITA II 1974	THE BIGINNING OF REPELITA III 1979	THE BIGINNING OF REPELITA IV 1984	MID REPELITA IV 1987
A. HIGH : MORE THAN 30 PERCENT	1. United States (49.4)	1. United States (53.6)	1. United States (54.9)	1. United States (56.7) 2. Philippines (34.1)	1. United States (59.6) 2. South Korea (36.0)
B. MEDIUM : BETWEEN 15 AND 30 PERCENT	2. Philippines (19.9) 3. Japan (17.0)	2. Japan (22.1) 3. Philippines (19.5) 5. Thailand *) (22.5)	2. Japan (29.8) 3. Philippines (24.8)	3. Japan (29.8) 4. South Korea (29.4)	3. Japan (28.3) 4. Thailand **) (19.6)
C. LOW : LESS THAN 15 PERCENT	4. Taiwan (8.3) 5. South Korea (7.9) 6. Hong Kong (7.3) 7. Singapore (6.8) 8. Indonesia (2.8) 9. Malaysia (2.0) 10. Thailand (1.7)	4. South Korea (9.6) 5. Taiwan (9.5) 6. Hong Kong (9.3) 7. Singapore (7.7) 8. Thailand (3.9) 9. Malaysia (3.2) 10. Indonesia (2.4)	5. Thailand (11.0) 6. Taiwan (10.3) 7. Hong Kong (10.0) 8. Singapore (7.5) 9. Malaysia (3.9)	6. Hong Kong (13.2) 7. Taiwan (12.5) 8. Singapore *) (11.8) 9. Indonesia (6.5) 10. Malaysia (5.1)	5. Taiwan (14.2) 6. Malaysia (6.8)

Source : Republic of China, Statistical Yearbook 1987 (data school enrollment ratio for Taiwan).
UNESCO, Statistical Yearbook, various years (data school enrollment ratio for others).

Note : *) data for the year 1983
**) data for the year 1985

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IX

APPENDIX

Data for Indonesia, ASEAN, and Pacific Rim Nations, 1960-1990

Nina Triaswati, W. W. McMahon, and Reta Hendrati Dewi

Table I. Investment in Education, in R&D, and in Physical Capital, 1969-89

1. Indonesia	2. Japan	3. Malaysia	4. Philippines
5. Singapore	6. Korea	7. Thailand	8. United States
9. Taiwan			

Table II. Industrial Structure of GDP and Employment, 1970-1989

1. Indonesia	2. Japan	3. Malaysia	4. Philippines
5. Singapore	6. South Korea	7. Thailand	8. United States
9. Taiwan			

Table III. Population and Gross School Enrollment Rations, Primary, Secondary, and Higher Education, 1950-1989

1. Indonesia	2. Japan	3. Malaysia	4. Philippines
5. Singapore	6. South Korea	7. Thailand	8. United States
9. Hong Kong		10. Taiwan	

I. EXPENDITURE ON EDUCATION, R & D AND INVESTMENT ON PHYSICAL CAPITAL: 1. INDONESIA, 1960 - 1968

YEAR	1960	1963	1964	1965	1966	1967	1968
Education Expenditure (bil.of Rupiah) a)							
Central							
State/Province							
Total Gov Expenditure (bil.of Rupiah) a)							
GDP (current prices,bil.of Rupiah) b)		3	7	24	316	848	2097
GNP (current prices, bil of Rupiah) b)		3	7	24	311	838	2068
CEE/TGE (%)							
CEE/GNP CUR (%)							
EE/GNP CUR (%)							
GDP (1985 prices, bil.of Rupiah) b)	24294	25540	26524	26524	27135	27756	30840
Population (millions) b)	92.70	99.94	102.47	105.07	107.83	110.61	113.49
Real GDP/POP (000 Rupiah)	262.07	255.55	258.85	252.44	251.65	250.94	271.74
Annual Growth Rate Real GDP/POP (%)		-4.80	1.29	-2.47	-0.31	-0.28	8.29
Gross Fixed Cap Form.(cp, bil.of Rp) b)			1	2	14	68	185
Total Investment (cp, bil.of Rp) b)			1	2	14	68	185
TI/GDP CUR (%)			14.29	8.33	4.43	8.02	8.82
Net Factor Inc.fr.ab.(cp, bil.of Rp) b)					-5	-10	-29
Expenditure on R&D (bil of Rupiah) c)							
Expenditure on R&D/GNP (%)							
YEAR	1960	1963	1964	1965	1966	1967	1968

Sources: a) International Monetary Fund, Government Finance Statistics 1982 and 1990
b) International Monetary Fund, International Financial Statistics 1990
c) UNESCO Office of the regional Co-ordinator for UNESCO Programmes in Asia and the Pasific, Statistical Digest for Asia and the Pasific 1984: Education, Sciences, Culture, Communication, Bangkok UNESCO 1985 (data expenditure on R&D for other countries except Japan and the United States)

I. EXPENDITURE ON EDUCATION, R & D AND INVESTMENT ON PHYSICAL CAPITAL: 1. INDONESIA, 1969 - 1975

YEAR	1969	1970	1971	1972	1973	1974	1975
Education Expenditure (bil.of Rupiah) a)							
Central							348.5
State/Province						133.4	230.2
Total Gov Expenditure (bil.of Rupiah) a)							118.3
GDP (current prices,bil.of Rupiah) b)	2718	3340	3672	718.2	1103	1856.3	2592.2
GNP (current prices, bil of Rupiah) b)	2683	3290	3605	4654	6753	10708	12643
CEE/TGE (%)				4495	6507	10201	12087
CEE/GNP CUR (%)						7.19	8.88
EE/GNP CUR (%)						1.31	1.90
GDP (1985 prices, bil.of Rupiah) b)	33225	35728	38231	41834	46565	0.00	2.88
Population (millions) b)	116.46	119.47	122.53	125.64	128.8	50120	52615
Real GDP/POP (000 Rupiah)	285.29	299.05	312.01	332.97	361.53	132	135.67
Annual Growth Rate Real GDP/POP (%)	3.30	4.82	4.33	6.72	8.58	379.70	387.82
Gross Fixed Cap Form.(cp, bil.of Rp) b)	317	455	580	857	1208	5.03	2.14
Total Investment (cp, bil.of Rp) b)	317	455	580	857	1208	1797	2572
TI/GDP CUR (%)	11.66	13.62	15.80	18.41	17.89	1797	2572
Net Factor Inc.fr.ab.(cp, bil.of Rp) b)	-35	-50	-67	-159	-246	16.78	20.34
Expenditure on R&D (bil of Rupiah) c)				3.32	4.77	-507	-556
Expenditure on R&D/GNP (%)				0.07	0.07	11.34	19.50
						0.11	0.16
YEAR	1969	1970	1971	1972	1973	1974	1975

Sources: a) International Monetary Fund, Government Finance Statistics 1982 and 1990
b) International Monetary Fund, International Financial Statistics 1990
c) UNESCO Office of the regional Co-ordinator for UNESCO Programmes in Asia and the Pasific, Statistical Digest for Asia and the Pasific 1984: Education, Sciences, Culture, Communication, Bangkok UNESCO 1985 (data expenditure on R&D for other countries except Japan and the United States)

I. EXPENDITURE ON EDUCATION, R & D AND INVESTMENT ON PHYSICAL CAPITAL: 1. INDONESIA, 1976 - 1982

YEAR	1976	1977	1978	1979	1980	1981	1982
Education Expenditure (bil.of Rupiah) a)	398.9	580.5	680.1	917	1339	1728	1823
Central	261.6	376.7	447	608	900	1130	1146
State/Province	137.3	203.8	233.1	309	439	598	677
Total Gov Expenditure (bil.of Rupiah) a)	3374.5	3707.4	4870.8	7284	10827	14246	13568
GDP (current prices,bil.of Rupiah) b)	15467	19011	22746	32025	45446	58127	62476
GNP (current prices, bil of Rupiah) b)	15035	18332	21854	30541	43435	56197	60496
CEE/TGE (%)	7.75	10.16	9.18	8.35	8.31	7.93	8.45
CEE/GNP CUR (%)	1.74	2.05	2.05	1.99	2.07	2.01	1.89
EE/GNP CUR (%)	2.65	3.17	3.11	3.00	3.08	3.07	3.01
GDP (1965 prices, bil.of Rupiah) b)	56238	61166	65962	70068	77013	83118	84985
Population (millions) b)	133.53	136.63	139.8	143.04	146.36	149.7	153.04
Real GDP/POP (000 Rupiah)	421.16	447.68	471.83	489.99	526.19	555.23	555.31
Annual Growth Rate Real GDP/POP (%)	8.60	6.30	5.40	3.85	7.39	5.52	0.01
Gross Fixed Cap Form.(cp, bil.of Rp) b)	3205	3826	4671	6704	9485	17324	17406
Total Investment (cp, bil.of Rp) b)	3205	3826	4671	6704	9485	17324	17406
TI/GDP CUR (%)	20.72	20.13	20.54	20.93	20.87	29.80	27.86
Net Factor Inc.fr.ab.(cp, bil.of Rp) b)	-432	-679	-892	-1484	-2011	-1930	-1980
Expenditure on R&D (bil of Rupiah) c)	26.02	32.47	82.73	102.76	160.49	200.67	295.48
Expenditure on R&D/GNP (%)	0.17	0.18	0.38	0.34	0.37	0.36	0.49
YEAR	1976	1977	1978	1979	1980	1981	1982

Sources: a) International Monetary Fund, Government Finance Statistics 1982 and 1990
b) International Monetary Fund, International Financial Statistics 1990
c) UNESCO Office of the regional Co-ordinator for UNESCO Programmes in Asia and the Pasific, Statistical Digest for Asia and the Pasific 1984: Education, Sciences, Culture, Communication, Bangkok UNESCO 1985 (data expenditure on R&D for other countries except Japan and the United States)

I. EXPENDITURE ON EDUCATION, R & D AND INVESTMENT ON PHYSICAL CAPITAL: 1. INDONESIA, 1983 - 1989

YEAR	1983	1984	1985	1986	1987	1988	1989
Education Expenditure (bil.of Rupiah) a)	2361	2755	2997	3241	3612	4213	
Central	1545	1905	2165	2113	2279	2848	
State/Province	816	850	832	1128	1333	1365	
Total Gov Expenditure (bil.of Rupiah) a)	16359	16803	20770	24844	26013	28482	32545
GDP (current prices,bil.of Rupiah) b)	77676	89750	96850	102546	124539	139452	
GNP (current prices, bil of Rupiah) b)	74396	85569	92909	98320	118523	132719	
CEE/TGE (%)	9.44	11.34	10.42	8.51	8.76	10.00	
CEE/GNP CUR (%)	2.08	2.23	2.33	2.15	1.92	2.15	
EE/GNP CUR (%)	3.17	3.22	3.23	3.30	3.05	3.17	
GDP (1985 prices, bil.of Rupiah) b)	88548	94515	96850	102612	107501	113650	
Population (millions) b)	158.08	161.58	164.05	168.35	172.02	175.59	179.14
Real GDP/POP (000 Rupiah)	560.15	584.94	590.37	609.52	624.93	647.25	
Annual Growth Rate Real GDP/POP (%)	0.87	4.43	0.93	3.24	2.53	3.57	
Gross Fixed Cap Form.(cp, bil.of Rp) b)	22303	23405	27060	29669	38827	42076	
Total Investment (cp, bil.of Rp) b)	22303	23405	27060	29669	38827	42076	
TI/GDP CUR (%)	28.71	26.08	27.94	28.93	31.18	30.17	
Net Factor Inc.fr.ab.(cp, bil.of Rp) b)	-3281	-4182	-3942	-4226	-6016	-6733	
Expenditure on R&D (bil.of Rupiah) c)		279.00	242.12	241.75			
Expenditure on R&D/GNP (%)		0.34	0.27	0.26			
YEAR	1983	1984	1985	1986	1987	1988	1989

Sources: a) International Monetary Fund, Government Finance Statistics 1982 and 1990
b) International Monetary Fund, International Financial Statistics 1990
c) UNESCO Office of the regional Co-ordinator for UNESCO Programmes in Asia and the Pasific, Statistical Digest for Asia and the Pasific 1984: Education, Sciences, Culture, Communication, Bangkok UNESCO 1985 (data expenditure on R&D for other countries except Japan and the United States)

I. EXPENDITURE ON EDUCATION, R & D AND INVESTMENT ON PHYSICAL CAPITAL: 2. JAPAN, 1950 - 1968

YEAR	1950	1960	1964	1965	1966	1967	1968
Public Education Exp. : (mil.of $) a)		1365.73		2911.72			
Official Exchange Rate a)		359.91		361.493			
Public Education Exp. : (bil.of Yen) a)		491.54		1052.57			
Total Gov. Exp. (bil. of Yen) a)							
GDP (current prices, bil of Yen) b)				32800	38085	44629	52922
GNP (current prices, bil. of Yen) b)	6395.1	15824		32708	37988	44525	52772
PEE/TE (%)							
PEE/GNP CUR (%)		3.11		3.22			
GNP(1985 prices, bil.of Yen) b)		61152	93636	98456	108784	120096	135140
Population (millions) b)	83.59	94.10	97.83	98.88	99.79	100.83	101.96
Real GDP/POP (000 Yen)		649.86	957.13	995.71	1090.13	1191.07	1325.42
Annual Growth Rate Real GDP/POP			47.28	4.03	9.48	9.26	11.28
Gross Fixed Cap Form. (cp,bil.of Yen) b)				9782	11562	14287	17567
Increase in Stocks (cp,bil.of Yen) b)				695	815	1528	1910
Total Investment(cp, bil.of Yen) b)				10477	12377	15815	19477
TI/GDP CUR (%)				31.94	32.50	35.44	36.80
Expenditure on R&D (cp,mil.of Yen) c)							
Expenditure on R&D/GNP (%)							
Est.Non-Defense R&D Exp.(cp,bil.of Yen) c)							
NDRD/GNP (%)							
YEAR	1950	1960	1964	1965	1966	1967	1968

Sources: a) Organisation for Economic Co-operation and Development, Educational Statistics in OECD countries, Paris 1981 (data: education expenditure for Japan)
b) International Monetary Fund, International Financial Statistics 1990
c) National Science Board, Science & Engineering Indicators - 1987 (data expenditure on R&D for Japan and United States)

I. EXPENDITURE ON EDUCATION, R & D AND INVESTMENT ON PHYSICAL CAPITAL: 2. JAPAN, 1969 - 1975

YEAR	1969	1970	1971	1972	1973	1974	1975
Public Education Expenditure : (mil.of $)		5710.03	6991.83	9124.44	12573.21	16312.14	19021.13
Official Exchange Rate		358.15	348.03	303.11	271.22	291.51	296.80
Public Education Expenditure : (bil.of Yen)		2045.07	2433.39	2765.70	3410.06	4755.17	5645.47
Total Gov Expenditure (bil. of Yen)			9144	11758	14143	18824	21827
GDP (current prices, bil of Yen)	62260	73345	80701	92394	112498	134244	148327
GNP (current prices, bil. of Yen)	62097	73188	80592	92401	112520	133997	148170
PEE/TE (%)			26.61	23.52	24.11	25.26	25.86
PEE/GNP CUR (%)		2.79	3.02	2.99	3.03	3.55	3.81
GNP(1985 prices, bil.of Yen)	151492	165821	172967	187730	202552	199678	205020
Population (millions)	103.17	104.34	105.70	107.19	108.71	110.16	111.57
Real GDP/POP (000 Yen)	1468.37	1589.24	1636.40	1751.38	1863.23	1812.62	1837.59
Annual Growth Rate Real GDP/POP	10.79	8.23	2.97	7.03	6.39	-2.72	1.38
Gross Fixed Cap Form. (cp,bil.of Yen)	21441	26043	27637	31524	40938	46695	48136
Increase in Stocks (cp,bil.of Yen)	1938	2573	1215	1299	1885	3396	476
Total Investment(cp, bil.of Yen)	23379	28616	28852	32823	42823	50091	48612
TI/GDP CUR (%)	37.55	39.02	35.75	35.53	38.07	37.31	32.77
Expenditure on R&D (cp,mil.of Yen)		1355505	1532372	1791879	2215837	2716032	2974573
Expenditure on R&D/GNP (%)		1.85	1.90	1.94	1.97	2.03	2.01
Est.Non-Defense R&D Exp.(cp,bil.of Yen)			1520.1	1777.8	2200.2	2699.8	2957.5
NDRD/GNP (%)			1.89	1.92	1.96	2.01	2.00
YEAR	1969	1970	1971	1972	1973	1974	1975

Sources: International Monetary Fund, Government Finance Statistics 1982 and 1990
International Monetary Fund, International Financial Statistics 1990
National Science Board, Science & Engineering Indicators - 1987 (data expenditure on R&D for Japan and United States)
Organisation for Economic Co-operation and Development, Educational Statistics in OECD countries, Paris 1981 (data: education expenditure for Japan)
UNESCO Office of the regional Co-ordinator for UNESCO Programmes in Asia and the Pasific, Statistical Digest for Asia and the Pasific 1984: Education, Sciences, Culture, Communication, Bangkok UNESCO 1985 (data expenditure on R&D for other countries except Japan and the United States)

I. EXPENDITURE ON EDUCATION, R & D AND INVESTMENT ON PHYSICAL CAPITAL: 2. JAPAN, 1976 - 1982

YEAR	1976	1977	1978	1979	1980	1981	1982
Public Education Exp. : (mil.of $)	21607.50	26132.70					
Official Exchange Rate	296.55	268.508					
Public Education Exp. : (bil.of Yen)	6407.70	7016.84					
Total Gov Expenditure (bil. of Yen)	25534	29841	35207	39728	44137	47619	49831
GDP (current prices, bil of Yen)	166573	185622	204404	221547	240176	257363	269629
GNP (current prices, bil. of Yen)	166417	185530	204475	221825	240098	256817	269697
PEE/TE (%)	25.09	23.51					
PEE/GNP CUR (%)	3.85	3.78					
GNP(1985 prices, bil.of Yen)	214854	226318	238066	250651	261373	270972	279326
Population (millions)	112.77	113.86	114.90	115.87	116.78	117.65	118.45
Real GDP/POP (000 Yen)	1905.24	1987.69	2071.94	2163.21	2238.17	2303.20	2358.18
Annual Growth Rate Real GDP/POP	3.68	4.33	4.24	4.40	3.47	2.91	2.39
Gross Fixed Cap Form. (cp,bil.of Yen)	51945	55982	62147	70171	75821	78941	79987
Increase in Stocks (cp,bil.of Yen)	1092	1280	1027	1813	1613	1403	1189
Total Investment(cp, bil.of Yen)	53037	57262	63174	71984	77434	80344	81176
TI/GDP CUR (%)	31.84	30.85	30.91	32.49	32.24	31.22	30.11
Expenditure on R&D (cp,mil.of Yen)	3320288	3651319	4045864	4583630	5246247	5982356	6528701
Expenditure on R&D/GNP (%)	2.00	1.97	1.98	2.07	2.19	2.33	2.42
Est.Non-Defense R&D Exp.(cp,bil.Yen)	3301.4	3629.3	4021.7	4556.9	5217.2	5950.1	6493.1
NDRD/GNP (%)	1.98	1.96	1.97	2.05	2.17	2.32	2.41
YEAR	1976	1977	1978	1979	1980	1981	1982

Sources: International Monetary Fund, Government Finance Statistics 1982 and 1990
International Monetary Fund, International Financial Statistics 1990
National Science Board, Science & Engineering Indicators - 1987 (data expenditure on R&D for Japan and United States)
Organisation for Economic Co-operation and Development, Educational Statistics in OECD countries, Paris 1981 (data: education expenditure for Japan)
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I. EXPENDITURE ON EDUCATION, R & D AND INVESTMENT ON PHYSICAL CAPITAL: 2. JAPAN, 1983 - 1989

YEAR	1983	1984	1985	1986	1987	1988	1989
Public Education Exp. : (mil.of $)							
Official Exchange Rate							
Public Education Exp. : (bil.of Yen)							
Total Gov Expenditure (bil. of Yen)	52012	53148	55212	56924	58591	60514	
GDP (current prices, bil of Yen)	280257	297948	316115	330024	343422	365087	
GNP (current prices, bil. of Yen)	280568	298453	317252	331254	345476	367389	390942
PEE/TE (%)							
PEE/GNP CUR (%)							
GNP(1985 prices, bil.of Yen)	288379	303016	317252	325768	340888	360481	377806
Population (millions)	119.26	120.02	120.75	121.49	122.09	122.61	123.12
Real GDP/POP (000 Yen)	2418.07	2524.71	2627.35	2681.44	2792.10		
Annual Growth Rate Real GDP/POP	2.54	4.41	4.07	2.06	4.13		
Gross Fixed Cap Form. (cp,bil.of Yen)	79217	83176	87624	91220	99267	111401	124561
Increase in Stocks (cp,bil.of Yen)	217	1138	2540	1586	834	1616	1571
Total Investment(cp, bil.of Yen)	79434	84314	90164	92806	100101	113017	126132
TI/GDP CUR (%)	28.31	28.25	28.42	28.02	28.97	30.76	32.26
Expenditure on R&D (cp,mil.of Yen)	7180782	7893931	8890299				
Expenditure on R&D/GNP (%)	2.56	2.64	2.80				
Est.Non-Defense R&D Exp.(cp,bil.Yen)	7140.3	7848.1	8830.0				
NDRD/GNP (%)	2.54	2.63	2.78				
YEAR	1983	1984	1985	1986	1987	1988	1989

Sources: International Monetary Fund, Government Finance Statistics 1982 and 1990
International Monetary Fund, International Financial Statistics 1990
National Science Board, Science & Engineering Indicators - 1987 (data expenditure on R&D for Japan and United States)
Organisation for Economic Co-operation and Development, Educational Statistics in OECD countries, Paris 1981 (data: education expenditure for Japan)
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I. EXPENDITURE ON EDUCATION, R & D AND INVESTMENT ON PHYSICAL CAPITAL: 3. MALAYSIA, 1950 - 1968

YEAR	1950	1960	1964	1965	1966	1967	1968
Education Expenditure (mil.of Ringgit) a)							
Central							
State/Province							
Total Gov Expenditure (mil. of Ringgit) a)							
GDP (current prices, mil.of Ringgit) b)		6837	8056	8837	9394	9774	10160
GNP (current prices, mil of Ringgit) b)		6767	7826	8582	9126	9630	10006
CEE/TGE (%)							
CEE/GNP CUR (%)							
EE/GNP CUR (%)							
GDP (1985 prices, mil.of Ringgit) b)							
Population (millions) b)	6.1	8.11	9.01	9.24	9.47	9.71	9.94
Real GDP/POP (Ringgit)							
Annual Growth Rate Real GDP/POP (%)							
Gross Capital Formation (mil.of R) b)		863	1280	1390	1476	1572	1602
Total Investment (mil.of Ringgit) b)		863	1280	1390	1476	1572	1602
TI/GDP CUR (%)		12.62	15.89	15.73	15.71	16.08	15.77
Net Factor Inc.from abroad(mil.of R) b)		-70	-230	-255	-268	-144	-154
Expenditure on R&D (mil of Ringgit) c)							
Expenditure on R&D/GNP (%)							
YEAR	1950	1960	1964	1965	1966	1967	1968

Sources: a) International Monetary Fund, Government Finance Statistics 1982 and 1990
b) International Monetary Fund, International Financial Statistics 1990
c) UNESCO Office of the regional Co-ordinator for UNESCO Programmes in Asia and the Pasific, Statistical Digest for Asia and the Pasific 1984: Education, Sciences, Culture, Communication, Bangkok UNESCO 1985 (data expenditure on R&D for other countries except Japan and the United States)

I. EXPENDITURE ON EDUCATION, R & D AND INVESTMENT ON PHYSICAL CAPITAL: 3. MALAYSIA, 1969 - 1975

YEAR	1969	1970	1971	1972	1973	1974	1975
Education Expenditure (mil.of Ringgit)							
Central				897	927	1216	1364
State/Province				3836	4049	5189	5991
Total Gov Expenditure (mil. of Ringgit)				14220	18723	22858	22332
GDP (current prices, mil.of Ringgit)	11629	12155	12955	13842	18064	21861	21605
GNP (current prices, mil of Ringgit)	11295	11800	12592	23.38	22.89	23.43	22.77
CEE/TGE (%)				6.48	5.13	5.56	6.31
CEE/GNP CUR (%)							
EE/GNP CUR (%)							
GDP (1985 prices, mil.of Ringgit)		28066	30054	32876	36722	39777	40096
Population (millions)	10.15	10.39	10.7	11	11.31	11.65	11.9
Real GDP/POP (Ringgit)		2701.25	2808.79	2988.73	3246.86	3414.33	3369.41
Annual Growth Rate Real GDP/POP (%)			3.98	6.41	8.64	5.16	-1.32
Gross Capital Formation (mil.of R)	1698	2467	2703	3032	4425	6772	5703
Total Investment (mil.of Ringgit)	1698	2467	2703	3032	4425	6772	5703
TI/GDP CUR (%)	14.60	20.30	20.86	21.32	23.63	29.63	25.54
Net Factor Inc.from abroad(mil.of R)	-334	-355	-363	-378	-659	-997	-727
Expenditure on R&D (mil of Ringgit)							
Expenditure on R&D/GNP (%)							
YEAR	1969	1970	1971	1972	1973	1974	1975

Sources: International Monetary Fund, Government Finance Statistics 1982 and 1990
International Monetary Fund, International Financial Statistics 1990
National Science Board, Science & Engineering Indicators - 1987 (data expenditure on R&D for Japan and United States)
Organisation for Economic Co-operation and Development, Educational Statistics in OECD countries, Paris 1981 (data: education expenditure for Japan)
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I. EXPENDITURE ON EDUCATION, R & D AND INVESTMENT ON PHYSICAL CAPITAL: 3. MALAYSIA, 1976 - 1982

YEAR	1976	1977	1978	1979	1980	1981	1982
Education Expenditure (mil.of Ringgit)							
Central	1487	2125	2044	2257	2786	3517	
State/Province							
Total Gov Expenditure (mil.of Rnggit)	7361	8994	9558	10294	15187	22143	22618
GDP (current prices, mil.of Ringgit)	28085	32340	37886	46424	53308	57613	62579
GNP (current prices, mil.of Ringgit)	26988	31064	36186	44354	51390	55602	59690
CEE/TGE (%)	20.20	23.63	21.39	21.93	18.34	15.88	
CEE/GNP CUR (%)	5.51	6.32	5.65	5.09	5.28	6.76	
EE/GNP CUR (%)							
GDP (1985 prices, mil.of Ringgit)	44732	48200	51408	56214	60398	64591	68429
Population (millions)	12.3	12.58	12.91	13.45	13.76	14.1	14.46
Real GDP/POP (Ringgit)	3636.75	3831.48	3982.03	4179.48	4389.39	4580.92	4732.30
Annual Growth Rate Real GDP/POP (%)	7.93	5.35	3.93	4.96	5.02	4.36	3.30
Gross Capital Formation (mil.of R)	6398	7712	10104	13423	16217	20157	23338
Total Investment (mil.of Ringgit)	6398	7712	10104	13423	16217	20157	23338
TI/GDP CUR (%)	22.78	23.85	26.67	28.91	30.42	34.99	37.29
Net Factor Inc.from abroad(mil.of R)	-1097	-1276	-1700	-2070	-1918	-2011	-2889
Expenditure on R&D (mil.of Ringgit)							
Expenditure on R&D/GNP (%)							
YEAR	1976	1977	1978	1979	1980	1981	1982

Sources: International Monetary Fund, Government Finance Statistics 1982 and 1990
International Monetary Fund, International Financial Statistics 1990
National Science Board, Science & Engineering Indicators - 1987 (data expenditure on R&D for Japan and United States)
Organisation for Economic Co-operation and Development, Educational Statistics in OECD countries, Paris 1981 (data: education expenditure for Japan)
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I. EXPENDITURE ON EDUCATION, R & D AND INVESTMENT ON PHYSICAL CAPITAL: 3. MALAYSIA, 1983 - 1989

YEAR	1983	1984	1985	1986	1987	1988	1989
Education Expenditure (mil.of Ringgit)							
Central				4807	4671	5210	5557
State/Province							
Total Gov Expenditure (mil.of Rnggit)	21789	21933	22934	24812	23925	24568	29372
GDP (current prices, mil.of Ringgit)	69941	79550	77547	71729	79711	90806	101453
GNP (current prices, mil of Ringgit)	65530	74182	72039	66953	74729	85798	96587
CEE/TGE (%)				19.67	19.52	21.21	18.92
CEE/GNP CUR (%)				7.18	6.25	6.07	5.75
EE/GNP CUR (%)							
GDP (1985 prices, mil.of Ringgit)	72706	78349	77547	78509	82675	89906	97522
Population (millions)	14.82	15.19	15.68	16.11	16.53	16.92	17.34
Real GDP/POP (Ringgit)	4905.94	5157.93	4945.60	4873.31	5001.51	5313.59	5624.11
Annual Growth Rate Real GDP/POP (%)	3.67	5.14	-4.12	-1.46	2.63	6.24	5.84
Gross Capital Formation (mil.of R)	26466	26697	21367	18664	18616	23710	29287
Total Investment (mil.of Ringgit)	26466	26697	21367	18664	18616	23710	29287
TI/GDP CUR (%)	37.84	33.56	27.55	26.02	23.35	26.11	28.87
Net Factor Inc.from abroad(mil.of R)	-4411	-5368	-5508	-4776	-4982	-5008	-4866
Expenditure on R&D (mil of Ringgit)							
Expenditure on R&D/GNP (%)							
YEAR	1983	1984	1985	1986	1987	1988	1989

Sources: International Monetary Fund, Government Finance Statistics 1982 and 1990
International Monetary Fund, International Financial Statistics 1990
National Science Board, Science & Engineering Indicators - 1987 (data expenditure on R&D for Japan and United States)
Organisation for Economic Co-operation and Development, Educational Statistics in OECD countries, Paris 1981 (data: education expenditure for Japan)
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I. EXPENDITURE ON EDUCATION, R & D AND INVESTMENT ON PHYSICAL CAPITAL: 4. PHILIPPINES, 1950 - 1968

YEAR	1950	1960	1964	1965	1966	1967	1968
Education Expenditure (mil.of Pesos) a)							
Central							
Local							
Total Gov.Expenditure (mil.of pesos) a)							
GNP (current prices, bil.of Pesos)b)	6.95	13.83	21.39	23.39	25.74	28.73	31.79
GDP (current prices, bil.of Pesos)b)	6.99	14.03	21.47	23.5	25.88	29.02	32.13
CEE/TGE (%)							
CEE/GNP CUR (%)							
EE/GNP CUR (%)							
GNP (1985 prices, bil.of Pesos) b)	111.16	205.11	255.97	268.85	280.55	294.04	309.8
Population (millions) b)	20.28	27.41	30.84	31.77	32.73	33.71	34.73
Real GNP/POP (000 Pesos)	5.481	7.483	8.300	8.462	8.572	8.723	8.920
Annual Growth Rate Real GNP/POP (%)		3.16	0.40	1.96	1.29	1.76	2.27
Gross Fixed Cap Form.(cp,bil.of P)b)	0.9	1.89	3.84	4.13	4.25	5.25	5.52
Increase in Stocks (cp,bil.of P)b)	0.15	0.35	0.69	0.75	0.84	0.8	1.27
Total Investment (cp,bil.of P) b)	1.05	2.24	4.53	4.88	5.09	6.05	6.79
TI/GDP CUR (%)	15.02	15.97	21.10	20.77	19.67	20.85	21.13
Net Factor Inc.fr.abr.(mil.of P) b)	-0.04	-0.2	-0.08	-0.11	-0 14	-0.29	-0.34
Expenditure on R&D (mil. of P) c)							
Expenditure on R&D/GNP (%)							
YEAR	1950	1960	1964	1965	1966	1967	1968

Sources: a) International Monetary Fund, Government Finance Statistics 1982 and 1990
b) International Monetary Fund, International Financial Statistics 1990
c) UNESCO Office of the regional Co-ordinator for UNESCO Programmes in Asia and the Pasific, Statistical Digest for Asia and the Pasific 1984: Education, Sciences, Culture, Communication, Bangkok UNESCO 1985 (data expenditure on R&D for other countries except Japan and the United States)

I. EXPENDITURE ON EDUCATION, R & D AND INVESTMENT ON PHYSICAL CAPITAL: 4. PHILIPPINES, 1969 - 1975

YEAR	1969	1970	1971	1972	1973	1974	1975
Education Expenditure (mil.of Pesos)							
Central				1223	1336	1711	2104
Local							
Total Gov.Expenditure (mil.of pesos)				7507	10060	9968	17276
GNP (current prices, bil.of Pesos)	35.02	41.75	49.60	55.52	72.19	99.86	114.44
GDP (current prices, bil.of Pesos)	35.30	42.45	50.12	56.07	72.32	99.49	114.70
CEE/TGE (%)				16.29	13.28	17.16	12.18
CEE/GNP CUR (%)				2.20	1.85	1.71	1.84
EE/GNP CUR (%)							
GNP (1985 prices, bil.of Pesos)	326.31	340.38	360.01	377.73	415.78	439.05	464.52
Population (millions)	35.77	36.85	37.90	38.99	40.12	41.30	42.07
Real GNP/POP (000 Pesos)	9.12	9.24	9.50	9.69	10.36	10.63	11.04
Annual Growth Rate Real GNP/POP (%)	2.27	1.25	2.84	1.99	6.97	2.58	3.86
Gross Fixed Cap Form.(cp,bil.of Pes)	5.73	6.70	8.15	8.83	11.42	18.43	27.13
Increase in Stocks (cp,bil.of Pesos)	1.48	2.29	2.30	2.74	3.22	6.62	6.71
Total Investment (cp,bil.of Pesos)	7.21	8.99	10.45	11.57	14.64	25.05	33.84
TI/GDP CUR (%)	20.42	21.18	20.85	20.63	20.24	25.18	29.50
Net Factor Inc.fr.abr.(mil.of Pesos)	-0.28	-0.70	-0.52	-0.55	-0.13	0.37	-0.26
Expenditure on R&D (mil. of Pesos)		35.48	44.15	80.41	126.05	200.00	176.93
Expenditure on R&D/GNP (%)		0.08	0.09	0.14	0.17	0.20	0.15
YEAR	1969	1970	1971	1972	1973	1974	1975

Sources: International Monetary Fund, Government Finance Statistics 1982 and 1990
International Monetary Fund, International Financial Statistics 1990
National Science Board, Science & Engineering Indicators - 1987 (data expenditure on R&D for Japan and United States)
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I. EXPENDITURE ON EDUCATION, R & D AND INVESTMENT ON PHYSICAL CAPITAL: 4. PHILIPPINES, 1976 - 1982

YEAR	1976	1977	1978	1979	1980	1981	1982
Education Expenditure (mil.of Pesos)							
Central	2459	2721	3572	4006	4224	6202	7646
Local							
Total Gov.Expenditure (mil.of pesos)	18706	20542	23502	25417	32561	38880	40821
GNP (current prices, bil.of Pesos)	134.20	153.26	177.02	218.03	264.53	303.63	335.44
GDP (current prices, bil.of Pesos)	135.27	154.23	177.67	217.54	264.65	305.26	340.60
CEE/TGE (%)	13.15	13.25	15.20	15.76	12.97	15.95	18.73
CEE/GNP CUR (%)	1.83	1.78	2.02	1.84	1.60	2.04	2.28
EE/GNP CUR (%)							
GNP (1985 prices, bil.of Pesos)	498.89	530.50	561.08	599.72	629.47	651.18	663.54
Population (millions)	43.41	44.58	45.79	47.04	48.32	49.54	50.78
Real GNP/POP (000 Pesos)	11.49	11.90	12.25	12.75	13.03	13.14	13.07
Annual Growth Rate Real GNP/POP (%)	4.08	3.55	2.97	4.05	2.18	0.90	-0.59
Gross Fixed Cap Form.(cp,bil.of Pes)	33.69	36.44	42.31	56.31	67.99	72.29	86.03
Increase in Stocks (cp,bil.of Pesos)	8.30	7.93	9.04	11.38	13.16	13.98	10.50
Total Investment (cp,bil.of Pesos)	41.99	44.37	51.35	67.69	81.15	86.27	96.53
TI/GDP CUR (%)	31.04	28.77	28.90	31.12	30.66	28.26	28.34
Net Factor Inc.fr.abr.(mil.of Pesos)	-1.07	-0.97	-0.65	0.49	-0.12	-1.63	-5.16
Expenditure on R&D (mil. of Pesos)				510.74	623.00		522.97
Expenditure on R&D/GNP (%)				0.23	0.24		0.16
YEAR	1976	1977	1978	1979	1980	1981	1982

Sources: International Monetary Fund, Government Finance Statistics 1982 and 1990
International Monetary Fund, International Financial Statistics 1990
National Science Board, Science & Engineering Indicators - 1987 (data expenditure on R&D for Japan and United States)
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I. EXPENDITURE ON EDUCATION, R & D AND INVESTMENT ON PHYSICAL CAPITAL: 4. PHILIPPINES, 1983 - 1989

YEAR	1983	1984	1985	1986	1987	1988	1989
Education Expenditure (mil.of Pesos)							
Central	8021	9538	12893	14838	17040	22021	
Local							
Total Gov.Expenditure (mil.of pesos)	44942	52753	64084	82409	108451	128867	
GNP (current prices, bil.of Pesos)	378.75	527.36	597.74	614.70	703.36	822.87	961.38
GDP (current prices, bil.of Pesos)	384.10	540.47	612.68	627.13	708.37	825.85	964.00
CEE/TGE (%)	17.85	18.08	20.12	18.01	15.71	17.09	
CEE/GNP CUR (%)	2.12	1.81	2.16	2.41	2.42	2.68	
EE/GNP CUR (%)							
GNP (1985 prices, bil.of Pesos)	670.89	623.44	597.74	608.88	644.26	687.72	726.74
Population (millions)	52.06	53.35	54.67	56.00	57.36	58.72	60.10
Real GNP/POP (000 Pesos)	12.89	11.69	10.93	10.87	11.23	11.71	12.09
Annual Growth Rate Real GNP/POP (%)	-1.38	-9.32	-6.44	-0.56	3.30	4.27	3.25
Gross Fixed Cap Form.(cp,bil.of Pes)	95.25	100.10	89.97	80.82	101.78	126.41	167.14
Increase in Stocks (cp,bil.of Pesos)	7.27	-8.14	-4.57	0.29	11.94	16.84	12.58
Total Investment (cp,bil.of Pesos)	102.52	91.96	85.40	81.11	113.72	143.25	179.72
TI/GDP CUR (%)	26.69	17.01	13.94	12.93	16.05	17.35	18.64
Net Factor Inc.fr.abr.(mil.of Pesos)	-5.35	-13.11	-14.94	-12.43	-5.01	-2.98	-2.62
Expenditure on R&D (mil. of Pesos)	514.59	613.41					
Expenditure on R&D/GNP (%)	0.14	0.12					
YEAR	1983	1984	1985	1986	1987	1988	1989

Sources: International Monetary Fund, Government Finance Statistics 1982 and 1990
International Monetary Fund, International Financial Statistics 1990
National Science Board, Science & Engineering Indicators - 1987 (data expenditure on R&D for Japan and United States)
Organisation for Economic Co-operation and Development, Educational Statistics in OECD countries, Paris 1981 (data: education expenditure for Japan)
UNESCO Office of the regional Co-ordinator for UNESCO Programmes in Asia and the Pasific, Statistical Digest for Asia and the Pasific 1984: Education, Sciences, Culture, Communication, Bangkok UNESCO 1985 (data expenditure on R&D for other countries except Japan and the United States)

I. EXPENDITURE ON EDUCATION, R & D AND INVESTMENT ON PHYSICAL CAPITAL: 5. SINGAPORE, 1950 - 1968

YEAR	1950	1960	1964	1965	1966	1967	1968
Education Expenditure (mil.of S $) a)							
Central							
Total Gov Expenditure (mil.of S $) a)							
GDP (current prices, mil. of S $) b)		2150	2715	2956	3331	3746	4315
GNP (current prices, mil.of S $) b)		2189		3020			4402
CEE/TGE (%)							
CEE/GNP CUR (%)							
EE/GNP CUR (%)							
GDP (1985 prices, mil. of S $) b)		5014	6169	6632	7370	8242	9386
Population (millions) b)	1.02	1.63	1.84	1.89	1.93	1.98	2.01
Real GDP/POP (000 S $)		3076.07	3352.72	3508.99	3818.65	4162.63	4669.65
Annual Growth Rate Real GDP/POP (%)			2.18	4.66	8.82	9.01	12.18
Gross Fixed Cap.Form.(cp,mil.of S $) b)		205	547	625	655	738	997
Increase in Stocks (cp,mil.of S $) b)		40	-5	23	74	93	78
Total Investment (cp,mil.of S $) b)		245	542	648	729	831	1075
TI/GDP CUR (%)		11.40	19.96	21.92	21.89	22.18	24.91
Net Factor Inc.fr.abr.(cp,mil.of S $) b)							87
Expenditure on R&D (cp,mil of S $) c)							
Expenditure on R&D/GNP (%)							
YEAR	1950	1960	1964	1965	1966	1967	1968

Sources: a) International Monetary Fund, Government Finance Statistics 1982 and 1990
b) International Monetary Fund, International Financial Statistics 1990
c) UNESCO Office of the regional Co-ordinator for UNESCO Programmes in Asia and the Pasific, Statistical Digest for Asia and the Pasific 1984: Education, Sciences, Culture, Communication, Bangkok UNESCO 1985 (data expenditure on R&D for other countries except Japan and the United States)

I. EXPENDITURE ON EDUCATION, R & D AND INVESTMENT ON PHYSICAL CAPITAL: 5. SINGAPORE, 1969 - 1975

YEAR	1969	1970	1971	1972	1973	1974	1975
Education Expenditure (mil.of S $)				215	240	369	486
Central				215	240	369	486
Total Gov Expenditure (mil.of S $)				1369	1588	1916	2401
GDP (current prices, mil. of S $)	5020	5805	6823	8156	10205	12543	13373
GNP (current prices, mil.of S $)	5105	5861	6813	8135	9981	12255	13345
CEE/TGE (%)				15.70	15.11	19.26	20.24
CEE/GNP CUR (%)				2.64	2.40	3.01	3.64
EE/GNP CUR (%)				2.61	2.40	3.01	3.64
GDP (1985 prices, mil. of S $)	10671	12135	13654	15487	17273	18369	19120
Population (millions)	2.04	2.07	2.11	2.15	2.19	2.23	2.26
Real GDP/POP (000 S $)	5.23	5.86	6.47	7.20	7.89	8.24	8.46
Annual Growth Rate Real GDP/POP (%)	12.02	12.07	10.38	11.31	9.50	4.44	2.71
Gross Fixed Cap.Form.(cp,mil.of S $)	1326	1889	2473	3054	3561	4695	4698
Increase in Stocks (cp,mil.of S $)	112	356	271	300	439	897	336
Total Investment (cp,mil.of S $)	1438	2245	2744	3354	4000	5592	5034
TI/GDP CUR (%)	28.65	38.67	40.22	41.12	39.20	44.58	37.64
Net Factor Inc.fr.abr.(cp,mil.of S$)	85	56	-10	-21	-224	-288	-28
Expenditure on R&D (cp,mil of S $)							
Expenditure on R&D/GNP (%)							
YEAR	1969	1970	1971	1972	1973	1974	1975

Sources: International Monetary Fund, Government Finance Statistics 1982 and 1990
International Monetary Fund, International Financial Statistics 1990
National Science Board, Science & Engineering Indicators - 1987 (data expenditure on R&D for Japan and United States)
Organisation for Economic Co-operation and Development, Educational Statistics in OECD countries, Paris 1981 (data: education expenditure for Japan)
UNESCO Office of the regional Co-ordinator for UNESCO Programmes in Asia and the Pasific, Statistical Digest for Asia and the Pasific 1984: Education, Sciences, Culture, Communication, Bangkok UNESCO 1985 (data expenditure on R&D for other countries except Japan and the United States)

I. EXPENDITURE ON EDUCATION, R & D AND INVESTMENT ON PHYSICAL CAPITAL: 5. SINGAPORE, 1976 - 1982

YEAR	1976	1977	1978	1979	1980	1981	1982
Education Expenditure (mil.of S $)	536	478	508	609	735	1312	1351
Central	536	478	508	609	735	1312	1351
Total Gov Expenditure (mil.of S $)	2900	3299	3491	4026	5027	6833	6961
GDP (current prices, mil. of S $)	14651	16039	17830	20523	25091	29339	32670
GNP (current prices, mil.of S $)	14570	15852	17787	20444	24189	28191	31776
CEE/TGE (%)	18.48	14.49	14.55	15.13	14.62	19.20	19.41
CEE/GNP CUR (%)	3.68	3.02	2.86	2.98	3.04	4.65	4.25
EE/GNP CUR (%)	3.68	3.02	2.86	2.98	3.04	4.65	4.25
GDP (1985 prices, mil. of S $)	20549	22143	24046	26285	28833	31603	33772
Population (millions)	2.29	2.33	2.35	2.38	2.41	2.44	2.47
Real GDP/POP (000 S $)	8.97	9.50	10.23	11.04	11.96	12.95	13.67
Annual Growth Rate Real GDP/POP (%)	6.07	5.91	7.67	7.93	8.33	8.26	5.57
Gross Fixed Cap.Form.(cp,mil.of S $)	5288	5458	6365	7520	10203	12785	15506
Increase in Stocks (cp,mil.of S $)	694	341	592	1380	1425	802	153
Total Investment (cp,mil.of S $)	5982	5799	6957	8900	11628	13587	15659
TI/GDP CUR (%)	40.83	36.16	39.02	43.37	46.34	46.31	47.93
Net Factor Inc.fr.abr.(cp,mil.of S$)	-81	-187	-43	-79	-902	-1148	-894
Expenditure on R&D (cp,mil of S $)			37			81.9	
Expenditure on R&D/GNP (%)			0.21			0.29	
YEAR	1976	1977	1978	1979	1980	1981	1982

Sources: International Monetary Fund, Government Finance Statistics 1982 and 1990
International Monetary Fund, International Financial Statistics 1990
National Science Board, Science & Engineering Indicators - 1987 (data expenditure on R&D for Japan and United States)
Organisation for Economic Co-operation and Development, Educational Statistics in OECD countries, Paris 1981 (data: education expenditure for Japan)
UNESCO Office of the regional Co-ordinator for UNESCO Programmes in Asia and the Pasific, Statistical Digest for Asia and the Pasific 1984: Education, Sciences, Culture, Communication, Bangkok UNESCO 1985 (data expenditure on R&D for other countries except Japan and the United States)

I. EXPENDITURE ON EDUCATION, R & D AND INVESTMENT ON PHYSICAL CAPITAL: 5. SINGAPORE, 1983 - 1989

YEAR	1983	1984	1985	1986	1987	1988	1989
Education Expenditure (mil.of S $)	1783	2113	2284	2076	2204	2231	
Central	1783	2113	2284	2076	2204	2231	
Total Gov Expenditure (mil.of S $)	8273	10474	10580	11437	15271	11742	
GDP (current prices, mil. of S $)	36733	40048	38924	38654	42609	49365	55310
GNP (current prices, mil.of S $)	36561	40815	40331	39603	43191	50359	56347
CEE/TGE (%)	21.55	20.17	21.59	18.15	14.43	19.00	
CEE/GNP CUR (%)	4.88	5.18	5.66	5.24	5.10	4.43	
EE/GNP CUR (%)	4.88	5.18	5.66	5.24	5.10	4.43	
GDP (1985 prices, mil. of S $)	36537	39573	38924	39641	43387	48224	52679
Population (millions)	2.50	2.52	2.56	2.59	2.61	2.65	2.68
Real GDP/POP (000 S $)	14.61	15.70	15.20	15.31	16.62	18.20	19.66
Annual Growth Rate Real GDP/POP (%)	6.89	7.45	-3.18	0.66	8.61	9.47	8.02
Gross Fixed Cap.Form.(cp,mil.of S $)	17464	19122	16425	14310	15165	17312	20605
Increase in Stocks (cp,mil.of S $)	132	295	126	585	1472	893	-1036
Total Investment (cp,mil.of S $)	17596	19417	16551	14895	16637	18205	19569
TI/GDP CUR (%)	47.90	48.48	42.52	38.53	39.05	36.88	35.38
Net Factor Inc.fr.abr.(cp,mil.of S$)	-172	767	1407	1396	1373		
Expenditure on R&D (cp,mil of S $)		214.3			374.7		
Expenditure on R&D/GNP (%)		0.53			0.87		
YEAR	1983	1984	1985	1986	1987	1988	1989

Sources: International Monetary Fund, Government Finance Statistics 1982 and 1990
International Monetary Fund, International Financial Statistics 1990
National Science Board, Science & Engineering Indicators - 1987 (data expenditure on R&D for Japan and United States)
Organisation for Economic Co-operation and Development, Educational Statistics in OECD countries, Paris 1981 (data: education expenditure for Japan)
UNESCO Office of the regional Co-ordinator for UNESCO Programmes in Asia and the Pasific, Statistical Digest for Asia and the Pasific 1984: Education, Sciences, Culture, Communication, Bangkok UNESCO 1985 (data expenditure on R&D for other countries except Japan and the United States)

I. EXPENDITURE ON EDUCATION, R & D AND INVESTMENT ON PHYSICAL CAPITAL: 6. SOUTH KOREA, 1955 - 1968

YEAR	1955	1960	1964	1965	1966	1967	1968
Education Expenditure (bil.of Won) a)							
Central							
State/Province							
Local							
Total Gov. Expenditure (bil.of Won) a)							
GDP (current prices, bil.of Won) b)		243	711	798	1024	1259	1630
GNP (current prices, bil. of Won) b)		245	716	806	1037	1281	1653
CEE/TGE (%) c)	9.4	15.2		16.2			
CEE/GNP CUR (%) c)	2.3	2.6		1.9			
EE/GNP CUR (%)							
GDP (1985 prices,bil.of Won) b)		10595	13709	14496	16262	17221	19173
Population (millions) b)		24.7	27.68	28.73	28.96	30.13	30.84
Real GDP/POP (000 Won)		428.95	495.27	504.56	561.53	571.56	621.69
Annual Growth Rate Real GDP/POP (%)			6.58	1.88	11.29	1.79	8.77
Gross Fixed Cap Form.(cp,bil.of Won) b)		27	81	119	210	275	414
Increase in Stocks(cp, bil.of Won) b)			19	2	14	6	14
Total Investment (cp, bil of Won) b)		27	100	121	224	281	428
TI/GDP CUR (%)		11.11	14.06	15.16	21.88	22.32	26.26
Net Factor Inc.fr.abr.(cp, bil. Won) b)		2	5	8	13	22	23
Expenditure on R&D (cp,bil. of Won) d)							
Expenditure on R&D/GNP CUR(%)							
YEAR	1955	1960	1964	1965	1966	1967	1968

Sources: a) International Monetary Fund, Government Finance Statistics 1982 and 1990
b) International Monetary Fund, International Financial Statistics 1990
c) Korean Educational Development Institute, Educational Indicators in Korea, 1987
d) UNESCO Office of the regional Co-ordinator for UNESCO Programmes in Asia and the Pasific, Statistical Digest for Asia and the Pasific 1984: Education, Sciences, Culture, Communication, Bangkok UNESCO 1985 (data expenditure on R&D for other countries except Japan and the United States)

I. EXPENDITURE ON EDUCATION, R & D AND INVESTMENT ON PHYSICAL CAPITAL: 6. SOUTH KOREA, 1969 - 1975

YEAR	1969	1970	1971	1972	1973	1974	1975
Education Expenditure (bil.of Won)							
Central			98.9	119.2	121.1	154.8	224.6
State/Province							
Local							
Total Gov. Expenditure (bil.of Won)			541.9	751.3	707.2	1065.4	1600.7
GDP (current prices, bil.of Won)	2130	2724	3379	4170	5416	7569	10224
GNP (current prices, bil. of Won)	2155	2736	3375	4154	5379	7503	10065
CEE/TGE (%)			18.25	15.87	17.12	14.53	14.03
CEE/GNP CUR (%)			2.93	2.87	2.25	2.06	2.23
EE/GNP CUR (%)							
GDP (1985 prices,bil.of Won)	22503	24475	26726	28314	32398	34961	37230
Population (millions)	31.54	32.24	32.88	33.51	34.10	34.69	35.28
Real GDP/POP (000 Won)	713.47	759.15	812.83	844.94	950.09	1007.81	1055.27
Annual Growth Rate Real GDP/POP (%)	11.32	6.40	7.07	3.95	12.44	6.08	4.71
Gross Fixed Cap Form.(cp,bil.of Won)	556	627	726	831	1258	1899	2550
Increase in Stocks(cp, bil.of Won)	66	66	122	92	124	476	217
Total Investment (cp, bil of Won)	622	693	848	923	1382	2375	2767
TI/GDP CUR (%)	29.20	25.44	25.10	22.13	25.52	31.38	27.06
Net Factor Inc.fr.abr.(cp, bil. Won)	25	12	-4	-16	-37	-66	-159
Expenditure on R&D (cp,bil. of Won)	9.77	10.55				28.18	42.66
Expenditure on R&D/GNP CUR(%)	0.45	0.39				0.38	0.42
YEAR	1969	1970	1971	1972	1973	1974	1975

Sources: International Monetary Fund, Government Finance Statistics 1982 and 1990
International Monetary Fund, International Financial Statistics 1990
National Science Board, Science & Engineering Indicators - 1987 (data expenditure on R&D for Japan and United States)
Organisation for Economic Co-operation and Development, Educational Statistics in OECD countries, Paris 1981 (data: education expenditure for Japan)
UNESCO Office of the regional Co-ordinator for UNESCO Programmes in Asia and the Pasific, Statistical Digest for Asia and the Pasific 1984: Education, Sciences, Culture, Communication, Bangkok UNESCO 1985 (data expenditure on R&D for other countries except Japan and the United States)

I. EXPENDITURE ON EDUCATION, R & D AND INVESTMENT ON PHYSICAL CAPITAL: 6. SOUTH KOREA, 1976 - 1982

YEAR	1976	1977	1978	1979	1980	1981	1982
Education Expenditure (bil.of Won)		1180.3	1511.8				
Central	349.[illegible]	469.7	605.5	863.2	1123	1444	1976
State/Province		447	584.8				
Local		263.6	321.5				
Total Gov. Expenditure (bil.of Won)	2293.7	2804.3	3781.9	5224	6563	8[illegible]5	10115
GDP (current prices, bil.of Won)	13996	18074	24327	31323	38041	47482	54443
GNP (current prices, bil. of Won)	13818	17807	24002	30802	36750	45528	52182
CEE/TGE (%)	15.22	16.75	16.01	16.52	17.11	17.95	19.54
CEE/GNP CUR (%)	2.53	2.64	2.52	2.80	3.06	3.17	3.79
EE/GNP CUR (%)		6.66	6.32				
GDP (1985 prices,bil.of Won)	42151	46749	51289	55102	53989	57615	61821
Population (millions)	35.85	36.41	36.97	37.53	38.12	38.72	39.33
Real GDP/POP (000 Won)	1175.76	1283.96	1387.31	1468.21	1416.29	1487.99	1571.85
Annual Growth Rate Real GDP/POP (%)	11.42	9.20	8.05	5.83	-3.54	5.06	5.64
Gross Fixed Cap Form.(cp,bil.of Won)	3365	5100	7909	10576	12226	13276	15446
Increase in Stocks(cp, bil.of Won)	181	60	132	702	-154	718	117
Total Investment (cp, bil of Won)	3546	5160	8041	11278	12072	13994	15563
TI/GDP CUR (%)	25.34	28.55	33.05	36.01	31.73	29.47	28.59
Net Factor Inc.fr.abr.(cp, bil. Won)	-178	-267	-325	-521	-1291	-1954	-2261
Expenditure on R&D (cp,bil. of Won)	60.90	108.29	152.42	174.04	211.73	293.13	457.69
Expenditure on R&D/GNP CUR(%)	0.44	0.61	0.64	0.57	0.58	0.64	0.88
YEAR	1976	1977	1978	1979	1980	1981	1982

Sources: International Monetary Fund, Government Finance Statistics 1982 and 1990
International Monetary Fund, International Financial Statistics 1990
National Science Board, Science & Engineering Indicators - 1987 (data expenditure on R&D for Japan and United States)
Organisation for Economic Co-operation and Development, Educational Statistics in OECD countries, Paris 1981 (data: education expenditure for Japan)
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I. EXPENDITURE ON EDUCATION, R & D AND INVESTMENT ON PHYSICAL CAPITAL: 6. SOUTH KOREA, 1983 - 1989

YEAR	1983	1984	1985	1986	1987	1988	1989
Education Expenditure (bil.of Won)							
Central	2188	2258	2459	2709	3108	3701	4143
State/Province							
Local							
Total Gov. Expenditure (bil.of Won)	10682	11875	13336	14948	16944	19454	23776
GDP (current prices, bil.of Won)	63833	72644	80847	93426	108428	127963	142267
GNP (current prices, bil. of Won)	61722	70084	78088	90599	106024	126231	141066
CEE/TGE (%)	20.48	19.01	18.44	18.12	18.34	19.02	17.43
CEE/GNP CUR (%)	3.54	3.22	3.15	2.99	2.93	2.93	2.94
EE/GNP CUR (%)							
GDP (1985 prices,bil.of Won)	69101	75606	80847	90868	101804	113492	120429
Population (millions)	39.93	40.51	40.80	41.18	41.57	41.97	42.38
Real GDP/POP (000 Won)	1730.55	1866.35	1981.54	2206.61	2448.98	2704.12	2841.65
Annual Growth Rate Real GDP/POP (%)	10.10	7.85	6.17	11.36	10.98	10.42	5.09
Gross Fixed Cap Form.(cp,bil.of Won)	18669	20998	22837	25993	31131	37355	44778
Increase in Stocks(cp, bil.of Won)	-308	668	837	492	813	1857	4342
Total Investment (cp, bil of Won)	18361	21666	23674	26485	31944	39212	49120
TI/GDP CUR (%)	28.76	29.82	29.28	28.35	29.46	30.64	34.53
Net Factor Inc.fr.abr.(cp, bil. Won)	-2111	-2560	-2759	-2827	-2404	-1732	-1201
Expenditure on R&D (cp,bil. of Won)			1155.16	1523.28			
Expenditure on R&D/GNP CUR(%)			1.48	1.68			
YEAR	1983	1984	1985	1986	1987	1988	1989

Sources: International Monetary Fund, Government Finance Statistics 1982 and 1990
International Monetary Fund, International Financial Statistics 1990
National Science Board, Science & Engineering Indicators - 1987 (data expenditure on R&D for Japan and United States)
Organisation for Economic Co-operation and Development, Educational Statistics in OECD countries, Paris 1981 (data: education expenditure for Japan)
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I. EXPENDITURE ON EDUCATION, R & D AND INVESTMENT ON PHYSICAL CAPITAL: 7. THAILAND, 1950 - 1968

YEAR	1950	1960	1964	1965	1966	1967	1968
Total Education Exp (mil. of Baht) a)							
Central							
Local							
Total Gov.Expenditure (mil.of Baht) a)							
GDP (current prices, bil. of Baht)b)	22.6	54.0	74.7	84.3	101.4	108.3	116.8
GNP (current prices, bil.of Baht) b)	22.6	53.9	74.6	84.3	101.4	108.5	117.1
CEE/TGE (%)							
CEE/GNP CUR (%)							
EE/GNP CUR (%)							
GDP (1985 prices, bil. of Baht) b)	108.4	180.5	237.5	256.2	287.5	309.9	336.2
Population (millions) b)	19.64	26.39	30.08	31.03	32	33	34.04
Real GDP/POP (000 Baht)	5.519	6.840	7.896	8.257	8.984	9.391	9.877
Annual Growth Rate Real GDP/POP (%)		2.17	1.04	4.57	8.82	4.52	5.17
Gross Fixed Cap Form.(cp,bil.Baht)b)	2.3	7.6	14.5	16	20.4	24.9	27.5
Increase in Stocks(cp,bil.of Baht)b)	0.5	0.9	0.5	1	3.6	0.8	2
Total Investment (cp,bil.of Baht) b)	2.8	8.5	15	17	24	25.7	29.5
TI/GDP CUR (%)	12.39	15.74	20.08	20.17	23.67	23.73	25.26
Net Factor Inc.fr.abr(cp, bil. Baht) b)		-0.1	-0.1			0.2	0.3
Expenditure on R&D (cp, bil.of Baht) c)							
Expenditure on R&D/GNP CUR(%)							
YEAR	1950	1960	1964	1965	1966	1967	1968

Sources: a) International Monetary Fund, Government Finance Statistics 1982 and 1990
b) International Monetary Fund, International Financial Statistics 1990
c) UNESCO Office of the regional Co-ordinator for UNESCO Programmes in Asia and the Pasific, Statistical Digest for Asia and the Pasific 1984: Education, Sciences, Culture, Communication, Bangkok UNESCO 1985 (data expenditure on R&D for other countries except Japan and the United States)

I. EXPENDITURE ON EDUCATION, R & D AND INVESTMENT ON PHYSICAL CAPITAL: 7. THAILAND, 1969 - 1975

YEAR	1969	1970	1971	1972	1973	1974	1975
Total Education Exp (mil. of Baht)							
Central				5646	6046	7708	8907
Local							
Total Gov.Expenditure (mil.of Baht)				28316	32673	34956	44246
GDP (current prices, bil. of Baht)	128.6	147.4	153.4	170.1	222.1	279.2	303.3
GNP (current prices, bil.of Baht)	128.8	147.6	153.3	169.5	221.2	279.1	303.3
CEE/TGE (%)				19.94	18.50	22.05	20.13
CEE/GNP CUR (%)				3.33	2.73	2.76	2.94
EE/GNP CUR (%)							
GDP (1985 prices, bil. of Baht)	362.8	400.7	420.6	437.8	480.9	501.9	526.2
Population (millions)	35.11	36.37	37.49	38.59	39.69	40.78	41.87
Real GDP/POP (000 Baht)	10.333	11.017	11.219	11.345	12.116	12.308	12.567
Annual Growth Rate Real GDP/POP (%)	4.62	6.62	1.83	1.12	6.80	1.58	2.11
Gross Fixed Cap Form.(cp, bil. Baht)	30.8	35	35.8	38.6	49.9	65	69.4
Increase in Stocks (cp, bil.of Baht)	3.1	2.7	1.4	-1.8	10	9.3	11.8
Total Investment (cp, bil.of Baht)	33.9	37.7	37.2	36.8	59.9	74.3	81.2
TI/GDP CUR (%)	26.36	25.58	24.25	21.63	26.97	26.61	26.77
Net Factor Inc.fr.abr(cp, bil. Baht)	0.2	0.2	-0.1	-0.6	-0.9	-0.1	0
Expenditure on R&D (cp, bil.of Baht)							
Expenditure on R&D/GNP CUR(%)							
YEAR	1969	1970	1971	1972	1973	1974	1975

Sources: International Monetary Fund, Government Finance Statistics 1982 and 1990
International Monetary Fund, International Financial Statistics 1990
National Science Board, Science & Engineering Indicators - 1987 (data expenditure on R&D for Japan and United States)
Organisation for Economic Co-operation and Development, Educational Statistics in OECD countries, Paris 1981 (data: education expenditure for Japan)
UNESCO Office of the regional Co-ordinator for UNESCO Programmes in Asia and the Pasific, Statistical Digest for Asia and the Pasific 1984: Education, Sciences, Culture, Communication, Bangkok UNESCO 1985 (data expenditure on R&D for other countries except Japan and the United States)

I. EXPENDITURE ON EDUCATION, R & D AND INVESTMENT ON PHYSICAL CAPITAL: 7. THAILAND, 1976 - 1982

YEAR	1976	1977	1978	1979	1980	1981	1982
Total Education Exp (mil. of Baht)							35514
Central	12024	14409	16212	19720	24695	27320	33754
Local							1760
Total Gov.Expenditure (mil.of Baht)	55238	64140	80105	95823	124484	144611	169695
GDP (current prices, bil. of Baht)	346.5	403.5	488.2	558.9	658.5	760.2	820
GNP (current prices, bil.of Baht)	345.6	402.3	484.6	552.6	653.1	748.2	807.1
CEE/TGE (%)	21.77	22.46	20.24	20.58	19.84	18.89	19.89
CEE/GNP CUR (%)	3.48	3.58	3.35	3.57	3.78	3.65	4.18
EE/GNP CUR (%)							4.40
GDP (1985 prices, bil. of Baht)	575.5	632.5	698.5	735.6	770.8	819.6	852.9
Population (millions)	42.96	44.04	45.1	46.14	46.72	47.74	48.74
Real GDP/POP (000 Baht)	13.40	14.36	15.49	15.94	16.50	17.17	17.50
Annual Growth Rate Real GDP/POP (%)	6.59	7.21	7.84	2.94	3.48	4.06	1.93
Gross Fixed Cap Form.(cp, bil. Baht)	79.4	104.6	123.3	142.9	165.7	188.1	192.2
Increase in Stocks (cp, bil.of Baht)	3.7	3.9	14.3	9.2	8.3	11.7	-2.6
Total Investment (cp, bil.of Baht)	83.1	108.5	137.6	152.1	174	199.8	189.6
TI/GDP CUR (%)	23.98	26.89	28.19	27.21	26.42	26.28	23.12
Net Factor Inc.fr.abr(cp, bil. Baht)	-0.9	-1.2	-3.6	-6.3	-5.4	-12.0	-12.9
Expenditure on R&D (cp, bil.of Baht)					2.549		3.271
Expenditure on R&D/GNP CUR(%)					0.39		0.41
YEAR	1976	1977	1978	1979	1980	1981	1982

Sources: International Monetary Fund, Government Finance Statistics 1982 and 1990
International Monetary Fund, International Financial Statistics 1990
National Science Board, Science & Engineering Indicators - 1987 (data expenditure on R&D for Japan and United States)
Organisation for Economic Co-operation and Development, Educational Statistics in OECD countries, Paris 1981 (data: education expenditure for Japan)
UNESCO Office of the regional Co-ordinator for UNESCO Programmes in Asia and the Pasific, Statistical Digest for Asia and the Pasific 1984: Education, Sciences, Culture, Communication, Bangkok UNESCO 1985 (data expenditure on R&D for other countries except Japan and the United States)

I. EXPENDITURE ON EDUCATION, R & D AND INVESTMENT ON PHYSICAL CAPITAL: 7. THAILAND, 1983 - 1989

YEAR	1983	1984	1985	1986	1987	1988	1989
Total Education Exp (mil. of Baht)							
Central	36559	39494	42351	43117	43798	45422	51503
Local							
Total Gov. Expenditure (mil.of Baht)	180134	191059	216816	220808	227009	235789	266317
GDP (current prices, bil. of Baht)	910.1	973.4	1014.4	1094.7	1234.0	1465.7	
GNP (current prices, bil.of Baht)	903.4	962.0	996.8	1072.2	1211.4	1440.4	
CEE/TGE (%)	20.30	20.67	19.53	19.53	19.29	19.26	19.34
CEE/GNP CUR (%)	4.05	4.11	4.25	4.02	3.62	3.15	
EE/GNP CUR (%)							
GDP (1985 prices, bil. of Baht)	914.8	980.0	1014.4	1060.0	1148.9	1275.0	
Population (millions)	49.73	50.71	51.68	52.65	53.60	54.54	55.45
Real GDP/POP (000 Baht)	18.40	19.33	19.63	20.13	21.43	23.38	
Annual Growth Rate Real GDP/POP (%)	5.12	5.06	1.57	2.57	6.47	9.06	
Gross Fixed Cap Form.(cp, bil. Baht)	218.5	238.6	240.3	237.5	290.5	377.8	
Increase in Stocks (cp, bil.of Baht)	17.6	3.9	3.7	3.8	28.0	25.3	
Total Investment (cp, bil.of Baht)	236.1	242.5	244	241.3	318.5	403.1	
TI/GDP CUR (%)	25.94	24.91	24.05	22.04	25.81	27.50	
Net Factor Inc.fr.abr(cp, bil. Baht)	-6.7	-11.4	-17.6	-22.5	-22.6	-25.3	
Expenditure on R&D (cp, bil.of Baht)	2.126	3.295	3.473				
Expenditure on R&D/GNP CUR(%)	0.24	0.34	0.35				
YEAR	1983	1984	1985	1986	1987	1988	1989

Sources: International Monetary Fund, Government Finance Statistics 1982 and 1990
International Monetary Fund, International Financial Statistics 1990
National Science Board, Science & Engineering Indicators - 1987 (data expenditure on R&D for Japan and United States)
Organisation for Economic Co-operation and Development, Educational Statistics in OECD countries, Paris 1981 (data: education expenditure for Japan)
UNESCO Office of the regional Co-ordinator for UNESCO Programmes in Asia and the Pasific, Statistical Digest for Asia and the Pasific 1984: Education, Sciences, Culture, Communication, Bangkok UNESCO 1985 (data expenditure on R&D for other countries except Japan and the United States)

I. EXPENDITURE ON EDUCATION, R & D AND INVESTMENT ON PHYSICAL CAPITAL: 8. UNITED STATES, 1950 - 1968

YEAR	1950	1960	1964	1965	1966	1967	1968
Total Education Exp (bil.of US $) a)	9.6	19.4	27.3	29.6	34.8	40.2	43.6
Central (Federal)	2.5	0.7	1.1	1.1	1.6	2.3	2.5
State and Local	7.2	18.7	26.3	28.6	33.3	37.9	41.2
Total Gov Expend. (bil.of US $) b)	70.3	151.3	196.4	205.7	224.8	257.8	282.6
Central (Federal)	42.4	90.3	115.9	119.0	129.9	151.8	166.4
State and Local	27.9	61.0	80.6	86.7	94.9	106.0	116.2
GDP (cur. prices, bil.of US $) b)	286.7	511.9	644.4	699.3	766.4	810.5	885.9
GNP (cur. prices, bil. of US $) b)	288.3	515.3	649.8	705.1	772.0	816.4	892.7
CEE/TGE(%)	3.51	0.45	0.54	0.51	0.69	0.89	0.87
CEE/GNP CUR (%)	0.86	0.13	0.16	0.15	0.20	0.28	0.28
TEE/GNP CUR (%)	3.35	3.77	4.21	4.20	4.51	4.93	4.89
GDP (1985 prices,bil.of US $) b)	1335.4	1847.5	2189.3	2316.1	2450.1	2520	2624.6
Population (millions) b)	152.27	180.68	191.89	194.3	196.56	198.71	200.71
Real GDP/POP (US $)	8769.95	10225.26	11409.14	11920.23	12464.90	12681.80	13076.58
Annual Growth Rate Real GDP/POP (%)		1.55	3.88	4.48	4.57	1.74	3.11
Govt.Gross Cap.Form.(cp,bil.of US $)b)	7.8	16.5	22.5	24.9	27.6	29.3	31.5
Priv.Gross Fixed Cap.Form.(cp,b.US$)b)	48.3	75.1	94.3	106.3	114.4	115.4	129.1
Increase in Stocks (cp,bil. of US $)b)	6.8	3.1	5.4	9.9	14.2	10.3	7.9
Total Investment (cp,bil.of US $)b)	62.9	94.7	122.2	141.1	156.2	155	168.5
TI/GDP CUR (%)	21.94	18.50	18.96	20.18	20.38	19.12	19.02
Expenditure on R&D (mil. US $)c)							
Expenditure on R&D/GNP (%)							
Est. Non-Defense R&D Exp.(bil. US $)c)							
NDRD/GNP (%)							
YEAR	1950	1960	1964	1965	1966	1967	1968

Sources: a) Bureau of Census of the U.S., Statistical Abstract of the United States 1990
b) International Monetary Fund, International Financial Statistics 1990
c) National Science Board, Science & Engineering Indicators - 1987 (data expenditure on R&D for Japan and United States)

I. EXPENDITURE ON EDUCATION, R & D AND INVESTMENT ON PHYSICAL CAPITAL: 8. UNITED STATES, 1969 - 1975

YEAR	1969	1970	1971	1972	1973	1974	1975
Total Education Exp (bil.of US $) a)	50.4	55.8	63.8	69.4	74.9	81.7	95.0
Central (Federal)	3.1	3.1	4.4	3.6	5.2	5.9	7.1
State and Local	47.2	52.7	59.4	65.8	69.7	75.8	87.9
Total Gov Expend. (bil.of US $) b)	308.3	333.0	372.1	400.4	436.7	478.3	560.1
Central (Federal)	176.7	184.9	221.4	211.6	231.4	252.6	291.9
State and Local	131.6	148.1	150.7	188.8	205.3	225.7	268.2
GDP (cur. prices, bil.of US $) b)	957.1	1008.3	1093.4	1201.6	1343.1	1453.4	1580.9
GNP (cur. prices, bil. of US $) b)	964.0	1015.5	1102.7	1212.8	1359.3	1472.8	1598.4
CEE/TGE(%)	1.02	0.92	1.18	0.90	1.19	1.23	1.28
CEE/GNP CUR (%)	0.33	0.30	0.40	0.30	0.38	0.40	0.45
TEE/GNP CUR (%)	5.23	5.49	5.79	5.72	5.51	5.55	5.94
GDP (1985 prices,bil.of US $) b)	2688.5	2680.7	2756.8	2894.1	3044.4	3028.1	2990
Population (millions) b)	202.68	205.05	207.66	209.9	211.91	213.85	215.97
Real GDP/POP (US $)	13264.75	13073.40	13275.55	13787.99	14366.48	14159.93	13844.52
Annual Growth Rate Real GDP/POP (%)	ERR	-1.44	1.55	3.86	4.20	-1.44	-2.23
Govt.Gross Cap.Form.(cp,bil.of US $)b)	31.2	31.8	33.9	33.7	35.1	42.9	48.5
Priv.Gross Fixed Cap.Form.(cp,b.US$)b)	143.4	145.7	164.7	191.5	219.2	225.4	225.2
Increase in Stocks (cp,bil. of US $)b)	9.8	3.1	7.8	10.5	19.6	15.5	-5.6
Total Investment (cp,bil.of US $)b)	184.4	180.6	206.4	235.7	273.9	283.8	268.1
TI/GDP CUR (%)	19.27	17.91	18.88	19.62	20.39	19.53	16.96
Expenditure on R&D (mil. US $)c)		26134	26676	28477	30718	32864	35213
Expenditure on R&D/GNP (%)		2.57	2.42	2.35	2.26	2.23	2.20
Est. Non-Defense R&D Exp.(bil. US $)c)			18.1	19.4	21.5	24.0	26.1
NDRD/GNP (%)			1.64	1.60	1.58	1.63	1.63
YEAR	1969	1970	1971	1972	1973	1974	1975

Sources: a) Bureau of Census of the U.S., Statistical Abstract of the United States 1990
b) International Monetary Fund, International Financial Statistics 1990
c) National Science Board, Science & Engineering Indicators - 1987 (data expenditure on R&D for Japan and United States)

I. EXPENDITURE ON EDUCATION, R & D AND INVESTMENT ON PHYSICAL CAPITAL: 8. UNITED STATES, 1976 - 1982

YEAR	1976	1977	1978	1979	1980	1981	1982
Total Education Exp (bil.of US $) a)	106.3	110.6	118.8	129.4	143.8	158.0	165.8
Central (Federal)	9.1	7.8	8.0	10.0	10.6	12.2	11.5
State and Local	97.2	102.8	110.8	119.4	133.2	145.8	154.3
Total Gov Expend. (bil.of US $) b)	625.0	682.5	745.4	832.4	958.6	1109.8	1233.5
Central (Federal)	322.0	359.3	400.1	452.0	526.3	624.6	710.5
State and Local	303.0	323.2	345.3	380.4	432.3	485.2	523.0
GDP (cur. prices, bil.of US $) b)	1761.7	1965.1	2219.2	2464.4	2684.4	3000.5	3114.8
GNP (cur. prices, bil. of US $) b)	1782.8	1990.5	2249.7	2508.2	2732	3052.6	3166
CEE/TGE(%)	1.45	1.15	1.08	1.20	1.10	1.10	0.93
CEE/GNP CUR (%)	0.51	0.39	0.36	0.40	0.39	0.40	0.36
TEE/GNP CUR (%)	5.96	5.56	5.28	5.16	5.26	5.18	5.24
GDP (1985 prices,bil.of US $) b)	3136.1	3282.5	3456.2	3541.7	3536.1	3604.5	3512.6
Population (millions) b)	218.04	220.24	222.59	225.06	227.76	230.14	232.52
Real GDP/POP (US $)	14383.14	14904.20	15527.20	15736.69	15525.55	15662.21	15106.66
Annual Growth Rate Real GDP/POP (%)	3.89	3.62	4.18	1.35	-1.34	0.88	-3.55
Govt.Gross Cap.Form.(cp,bil.of US $)b)	49	51.5	56.7	60.5	71.5	73.1	77.2
Priv.Gross Fixed Cap.Form.(cp,b.US$)b)	261.7	322.8	388.2	441.9	445.3	491.5	471.8
Increase in Stocks (cp,bil. of US $)b)	16.0	21.3	28.7	13	-8.3	24	-24.5
Total Investment (cp,bil.of US $)b)	326.7	395.6	473.6	515.4	508.5	588.6	524.5
TI/GDP CUR (%)	18.54	20.13	21.34	20.91	18.94	19.62	16.84
Expenditure on R&D (mil. US $)c)	39018	42783	48129	54933	62593	71840	79328
Expenditure on R&D/GNP (%)	2.19	2.15	2.14	2.19	2.29	2.35	2.51
Est. Non-Defense R&D Exp.(bil. US $)c)	28.9	32.1	36.6	42.3	48.8	55.3	59.5
NDRD/GNP (%)	1.62	1.61	1.63	1.69	1.79	1.81	1.88
YEAR	1976	1977	1978	1979	1980	1981	1982

Sources: a) Bureau of Census of the U.S., Statistical Abstract of the United States 1990
b) International Monetary Fund, International Financial Statistics 1990
c) National Science Board, Science & Engineering Indicators - 1987 (data expenditure on R&D for Japan and United States)

I. EXPENDITURE ON EDUCATION, R & D AND INVESTMENT ON PHYSICAL CAPITAL: 8. UNITED STATES, 1983 - 1989

YEAR	1983	1984	1985	1986	1987	1988	1989
Total Education Exp (bil.of US $) a)	176.6	188.6	205.9	224.4	240.7		
Central (Federal)	12.7	12.5	13.2	13.6	14.0		
State and Local	163.9	176.1	192.7	210.8	226.7	242.7	
Total Gov Expend. (bil.of US $) b)	1350.8	1428.1	1581.0	1696.2	1810.0	1920.4	
Central (Federal)	785.7	829.2	1032.1	1096.4	1148.7	1214.8	
State and Local	565.1	598.9	548.9	599.8	661.4	705.6	
GDP (cur. prices, bil.of US $) b)	3355.9	3724.8	3974.2	4205.4	4497.2	4839.4	
GNP (cur. prices, bil. of US $) b)	3405.7	3774.5	4014.9	4240.3	4526.7	4864.3	
CEE/TGE(%)	0.94	0.87	0.84	0.80	0.78		
CEE/GNP CUR (%)	0.37	0.33	0.33	0.32	0.31		
TEE/GNP CUR (%)	5.19	5.00	5.13	5.29	5.32		
GDP (1985 prices,bil.of US $) b)	3638.1	3879.7	4014.9	4129.2	4268.1	4433.5	
Population (millions) b)	234.8	237.00	239.28	241.62	243.93	246.33	
Real GDP/POP (US $)	15494.46	16370.04	16779.09	17089.64	17497.23	17998.21	
Annual Growth Rate Real GDP/POP (%)	2.57	5.65	2.50	1.85	2.38	2.86	
Govt.Gross Cap.Form.(cp,bil.of US $)b)	64.1	73	99.3	101.7	98.4	93.1	
Priv.Gross Fixed Cap.Form.(cp,b.US$)b)	509.4	601.9	631.8	650.4	673.7	718.1	
Increase in Stocks (cp,bil. of US $)b)	-7.1	68.6	11.3	15.6	39.2	48.4	
Total Investment (cp,bil.of US $)b)	566.4	743.5	742.4	767.7	811.3	859.6	
TI/GDP CUR (%)	16.88	19.96	18.68	18.26	18.04	17.76	
Expenditure on R&D (mil. US $)c)	87204	97639	107642	116793	124250		
Expenditure on R&D/GNP (%)	2.56	2.59	2.68	2.75	2.74		
Est. Non-Defense R&D Exp.(bil. US $)c)	63.7	70.3	74.3	79.4	84.5		
NDRD/GNP (%)	1.87	1.86	1.85	1.87	1.87		
YEAR	1983	1984	1985	1986	1987	1988	1989

Sources: a) Bureau of Census of the U.S., Statistical Abstract of the United States 1990
b) International Monetary Fund, International Financial Statistics 1990
c) National Science Board, Science & Engineering Indicators - 1987 (data expenditure on R&D for Japan and United States)

I. EXPENDITURE ON EDUCATION, R & D AND INVESTMENT ON PHYSICAL CAPITAL: 9. TAIWAN, 1954 - 1968

YEAR	1954	1960	1964	1965	1966	1967	1968
Total Education Exp (mil.of NT $)	737	1648	2549	2794	3459	4070	4865
Central (Federal)							
State and Local							
Total Gov Expend. (mil.of NT $)	5356	12193	18486	22391	23836	30727	33002
Central (Federal)							
State and Local							
GDP (cur. prices, mil.of NT $)	25204	62507	101966	112627	126022	145817	169904
GNP (cur. prices, mil. of NT $)	25200	62480	101982	112433	125925	145494	169446
CEE/TGE(%)							
CEE/GNP CUR (%)							
TEE/GNP CUR (%)	2.92	2.64	2.50	2.49	2.75	2.80	2.87
GDP (1985 prices,mil.of NT $)	322918	535690	617631	613671	630274	659053	703495
Population (millions)	8.75	10.79	12.26	12.63	12.99	13.30	13.65
Real GDP/POP (mil. of NT $)	36909	49638	50390	48596	48509	49564	51538
Annual Growth Rate Real GDP/POP (%)		5.06	0.38	-3.56	-0.18	2.18	3.98
Gross Fixed Cap.Form.(cp,mil.of NT $)	3337	10361	14872	19090	24031	30022	37319
Increase in Stocks (cp,mil. of NT $)	704	2257	4217	6456	2705	5860	5305
Total Investment (cp,mil.of NT $)	4041	12618	19089	25546	26736	35882	42624
TI/GDP CUR (%)	16.03	20.19	18.72	22.68	21.22	24.61	25.09
Expenditure on R&D (mil. NT $)							
Expenditure on R&D/GNP (%)							
YEAR	1954	1960	1964	1965	1966	1967	1968

Sources: Taiwan, Statistical Data Book 1989

I. EXPENDITURE ON EDUCATION, R & D AND INVESTMENT ON PHYSICAL CAPITAL: 9. TAIWAN, 1969 - 1975

YEAR	1969	1970	1971	1972	1973	1974	1975
Total Education Exp (mil.of NT $)	6818	7992	9636	11046	13512	14994	20741
Central (Federal)							
State and Local							
Total Gov Expend. (mil.of NT $)	41869	49153	54829	63668	79856	89934	126436
Central (Federal)							
State and Local							
GDP (cur. prices, mil.of NT $)	196845	226805	263676	316172	410405	549577	589651
GNP (cur. prices, mil. of NT $)	196598	226393	263554	316240	410289	549400	586307
CEE/TGE(%)							
CEE/GNP CUR (%)							
TEE/GNP CUR (%)	3.47	3.53	3.66	3.49	3.29	2.73	3.54
GDP (1985 prices,mil.of NT $)	748050	773951	796999	843254	970169	1284131	1313197
Population (millions)	14.34	14.676	14.995	15.289	15.565	15.852	16.15
Real GDP/POP (US $)	52183	52736	53151	55154	62330	81008	81313
Annual Growth Rate Real GDP/POP (%)	1.25	1.06	0.79	3.77	13.01	29.97	0.38
Gross Fixed Cap.Form.(cp,mil.of NT $)	43564	49054	61282	74978	102301	156712	183312
Increase in Stocks (cp,mil. of NT $)	4655	8832	7897	6104	17072	58613	-4265
Total Investment (cp,mil.of NT $	48219	57886	69179	81082	119373	215325	179047
TI/GDP CUR (%)	24.50	25.52	26.24	25.64	29.09	39.18	30.36
Expenditure on R&D (mil. NT $)							
Expenditure on R&D/GNP (%)							
YEAR	1969	1970	1971	1972	1973	1974	1975

Sources: Taiwan, Statistical Data Book 1989

I. EXPENDITURE ON EDUCATION, R & D AND INVESTMENT ON PHYSICAL CAPITAL: 9. TAIWAN, 1976 - 1982

YEAR	1976	1977	1978	1979	1980	1981	1982
Total Education Exp (mil.of NT $)	23783	28277	38990	41228	52846	75561	87698
Central (Federal)							
State and Local							
Total Gov Expend. (mil.of NT $)	149994	192493	226900	254711	345396	433221	493741
Central (Federal)							
State and Local							
GDP (cur. prices, mil.of NT $)	707710	828995	991602	1195838	1491059	1773931	1886915
GNP (cur. prices, mil. of NT $)	702694	823871	989271	1196238	1488953	1764278	1886233
CEE/TGE(%)							
CEE/GNP CUR (%)							
TEE/GNP CUR (%)	3.38	3.43	3.94	3.45	3.55	4.28	4.65
GDP (1985 prices,mil.of NT $)	1384129	1471521	1549435	1727359	2007391	2249510	2326286
Population (millions)	16.51	16.81	17.14	17.48	17.81	18.14	18.46
Real GDP/POP (US $)	83846	87523	90420	93825	112743	124036	126031
Annual Growth Rate Real GDP/POP (%)	3.12	4.39	3.31	9.30	14.08	10.02	1.61
Gross Fixed Cap.Form.(cp,mil.of NT $)	195724	212590	255597	335916	456446	494043	488659
Increase in Stocks (cp,mil. of NT $)	20507	20360	24074	57463	47465	35790	-20655
Total Investment (cp,mil.of NT $	216231	232950	279671	393379	503911	529833	468004
TI/GDP CUR (%)	30.55	28.10	28.20	32.90	33.80	29.87	24.80
Expenditure on R&D (mil. NT $)				7287	7960	12882	12859
Expenditure on R&D/GNP (%)				0.61	0.53	0.73	0.68
YEAR	1976	1977	1978	1979	1980	1981	1982

Sources: Taiwan, Statistical Data Book 1989

I. EXPENDITURE ON EDUCATION, R & D AND INVESTMENT ON PHYSICAL CAPITAL: 9. TAIWAN, 1983 - 1989

YEAR	1983	1984	1985	1986	1987	1988	1989
Total Education Exp (mil.of NT $)	96554	98812	111865	129556	134293	148020	
Central (Federal)							
State and Local							
Total Gov Expend. (mil.of NT $)	498159	519049	563729	632661			
Central (Federal)							
State and Local							
GDP (cur. prices, mil.of NT $)	2071821	2288866	2393024	2743757	3098024	3335234	
GNP (cur. prices, mil. of NT $)	2074541	2311551	2434278	2814349	3164004	3423406	
CEE/TGE(%)							
CEE/GNP CUR (%)							
TEE/GNP CUR (%)	4.65	4.27	4.60	4.60	4.24	4.32	
GDP (1985 prices,mil.of NT $)	2369803	2388619	2393024	2480500	2492613	2513132	
Population (millions)	18.73	19.01	19.26	19.46	19.67	19.90	
Real GDP/POP (US $)	126504	125637	124261	127499	126702	126263	
Annual Growth Rate Real GDP/POP (%)	0.38	-0.69	-1.10	2.61	-0.63	-0.35	
Gross Fixed Cap.Form.(cp,mil.of NT $)	472453	485109	449793	501182	598975	694059	
Increase in Stocks (cp,mil. of NT $)	-3058	-748	-28656	-62948	12705	105080	
Total Investment (cp,mil.of NT $	469395	484361	421137	438234	611680	799139	
TI/GDP CUR (%)	22.66	21.16	17.60	15.97	19.74	23.96	
Expenditure on R&D (mil. NT $)	14516	17028	20195	23537	30347		
Expenditure on R&D/GNP (%)	0.70	0.74	0.83	0.84	0.96		
YEAR	1983	1984	1985	1986	1987	1988	1989

Sources: Taiwan, Statistical Data Book 1989

II. STRUCTURE OF GROSS DOMESTIC PRODUCT AND EMPLOYMENT: 1. INDONESIA, 1970 - 1979

YEAR	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
GDP (at constant 1980 market prices, in bil.of Ind. Rp.) a)	23165	24669	27015	30079	32388	34015	36364	39628	42689	45317
Agriculture	7547	8006	8131	8889	9220	9220	9656	9778	10283	10967
Industry	8293	8642	10500	12753	13656	13779	15560	17646	18238	18946
Manufacturing	1707	1761	2027	2336	2714	3048	3343	3803	4443	5177
Services,etc	7325	8021	8384	8437	9512	11016	11148	12204	14168	15404
Distribution of GDP (%)										
Agriculture	32.58	32.45	30.10	29.55	28.47	27.11	26.55	24.67	24.09	24.20
Industry	35.80	35.03	38.87	42.40	42.16	40.51	42.79	44.53	42.72	41.81
Manufacturing	7.37	7.14	7.50	7.77	8.38	8.96	9.19	9.60	10.41	11.42
Services,etc	31.62	32.51	31.03	28.05	29.37	32.39	30.66	30.80	33.19	33.99
Annual Growth Rate of GDP (%)		6.49	9.51	11.34	7.68	5.02	6.91	8.98	7.72	6.16
Agriculture		6.08	1.56	9.32	3.72	0.00	4.73	1.26	5.16	6.65
Industry		4.21	21.50	21.46	7.08	0.90	12.93	13.41	3.35	3.88
Manufacturing		3.16	15.11	15.24	16.18	12.31	9.68	13.76	16.83	16.52
Services,etc		9.50	4.53	0.63	12.74	15.81	1.20	9.47	16.09	8.72
Total Employment (in 000) b)		41621					53444	48314	51780	51004
Agriculture		26473					35258	29694	31545	32662
Industry		3484					4736	5212	4798	6998
Mining		86					44	171	123	238
Manufacturing		2682					3560	4171	3856	5464
Construction		678					1098	838	806	1283
Electricity, Gas and Water		37					34	32	13	13
Services,etc		11664					13450	13408	15437	11345
Transport and Communications		951					1112	1421	1289	1253
Trade and Finance		4715					6327	6861	7751	5438
Public Administration and Defense		4120					5157	5094	6395	4653
Others		1878					854	32	3	1
Annual Growth Rate of Employment (%)										
Total								-9.60	7.17	-1.50
Agriculture								-15.78	6.23	3.54
Industry								10.05	-7.95	45.88
Manufacturing								17.16	-7.56	41.72
Services,etc								-0.31	15.14	-26.51
Absolute Productivity (mil. of Rupiah per worker)										
Total		0.59					0.68	0.82	0.82	0.89
Agriculture		0.30					0.27	0.33	0.33	0.34
Industry		2.48					3.29	3.39	3.8[illegible]	2.71
Manufacturing		0.66					0.94	0.91	1.15	0.95
Services,etc		0.69					0.83	0.91	0.92	1.36
Annual Growth Rate of Absolute Productivity (%)										
Total								20.55	0.51	7.77
Agriculture								20.24	-1.01	3.01
Industry								3.05	12.28	-28.79
Manufacturing								-2.90	26.39	-17.78
Services,etc								9.82	0.83	47.95
Relative Labor Absorption Ratio										
Total								-1.07	0.93	-0.24
Agriculture								-12.49	1.21	0.53
Industry								0.75	-2.37	11.82
Manufacturing								1.25	-0.45	2.53
Services,etc								-0.03	0.94	-3.04
YEAR	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979

Sources: a) The World Bank, World Tables 1988-89, Washington D.C., 1989
a) The World Bank, World Tables 1991, Washington D.C., 1991
b) Indonesia, Biro Pusat Statistik, Statistical Pocketbook of Indonesia 1974/75
b) Indonesia, Biro Pusat Statistik, Statistical Yearbook of Indonesia 1983
b) International Labour Office, Yearbook of Labour Statistics, Geneva (various years)

II. STRUCTURE OF GROSS DOMESTIC PRODUCT AND EMPLOYMENT: 1. INDONESIA, 1980 - 1989

YEAR	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
GDP (at constant 1980 market prices, in bil.of Ind. Rp.) a)	48913	52545	52360	54067	57339	58703	61134	63329	74318	79766
Agriculture	11725	12289	12420	12653	13178	13735	14091	14465	15865	16553
Industry	20405	21444	19764	20224	21856	21982	23014	23455	27693	29896
Manufacturing	6353	6853	6935	7142	8498	9211	9726	10484	14194	15485
Services,etc	16783	18812	20176	21190	22305	22986	24029	25409	30874	33489
Distribution of GDP (%)										
Agriculture	23.97	23.39	23.72	23.40	22.98	23.40	23.05	22.84	21.35	20.75
Industry	41.72	40.81	37.75	37.41	38.12	37.45	37.65	37.04	37.26	37.48
Manufacturing	12.99	13.04	13.24	13.21	14.82	15.69	15.91	16.55	19.10	19.41
Services,etc	34.31	35.80	38.53	39.19	38.90	39.16	39.31	40.12	41.54	41.98
Annual Growth Rate of GDP (%)	7.94	7.43	-0.35	3.26	6.05	2.38	4.14	3.59	17.35	7.33
Agriculture	6.91	4.81	1.07	1.88	4.15	4.23	2.59	2.65	9.68	4.33
Industry	7.70	5.09	-7.83	2.33	8.07	0.58	4.69	1.92	18.07	7.96
Manufacturing	22.72	7.87	1.20	2.98	18.99	8.39	5.59	7.79	35.39	9.09
Services,etc	8.95	12.09	7.25	5.03	5.26	3.05	4.54	5.74	21.51	8.47
Total Employment (in 000) b)	51554	59123	57803	57811	60084	62457	68338	70402	72817	
Agriculture	28834	36336	31593	32014	33079	34142	37645	38722	40456	
Industry	6791		8621			8377	5606	5819	5899	
Mining	387	326	391	405	411	416	421	427		
Manufacturing	4680	4727	6022	5339	5565	5796	6049	6307		
Construction	1657		2146			2096				
Electricity, Gas and Water	66		62			70				
Services,etc	15929		17589			19939				
Transport and Communications	1469		1796			1958				
Trade and Finance	6981		8667			9596	14938	14659	11176	
Public Adm. and Defense	7145		7125			8317	10018	11200	15276	
Others	334		1			67	131	3	10	
Annual Growth Rate of Employment (%)										
Total	1.08	14.68	-2.23	0.01	3.93	3.95	9.42	3.02	3.43	
Agriculture	-11.72	26.02	-13.05	1.33	3.33	3.21	10.26	2.86	4.48	
Industry	-2.97									
Manufacturing	-14.35	1.00	27.39	-11.34	4.23	4.15	4.37	4.27		
Services,etc	40.41									
Absolute Productivity (mil. of Rupiah per worker)										
Total	0.95	0.89	0.91	0.94	0.95	0.94	0.89	0.90	1.02	
Agriculture	0.41	0.34	0.39	0.40	0.40	0.40	0.37	0.37	0.39	
Industry			2.29			2.62			4.69	
Manufacturing	1.36	1.45	1.15	1.34	1.53	1.59	1.61	1.66		
Services,etc			1.15			1.15				
Annual Growth Rate of Absolute Productivity (%)										
Total	6.79	-6.33	1.92	3.25	2.04	-1.51	-4.82	0.55	13.46	
Agriculture	21.10	-16.83	16.24	0.54	0.80	0.98	-6.95	-0.20	4.98	
Industry			-5.39			4.60			21.40	
Manufacturing	43.28	6.80	-20.56	16.13	14.15	4.07	1.17	3.38		
Services,etc			-5.47			0.17				
Relative Labor Absorption Ratio										
Total	0.14	1.98	6.34	0.00	0.65	1.66	2.27	0.84	0.20	
Agriculture	-1.70	5.41	-12.24	0.71	0.80	0.76	3.96	1.08	0.46	
Industry	-0.39									
Manufacturing	-0.63	0.13	22.89	-3.80	0.22	0.49	0.78	0.55		
Services,etc	4.51									
YEAR	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989

Sources: a) The World Bank, World Tables 1988-89, Washington D.C., 1989
a) The World Bank, World Tables 1991, Washington D.C., 1991
b) Indonesia, Biro Pusat Statistik, Statistical Pocketbook of Indonesia 1974/75
b) Indonesia, Biro Pusat Statistik, Statistical Yearbook of Indonesia 1983
b) International Labour Office, Yearbook of Labour Statistics, Geneva (various years)

II. STRUCTURE OF GROSS DOMESTIC PRODUCT AND EMPLOYMENT: 2. JAPAN, 1970 - 1979

YEAR	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
GDP (at constant 1980 market prices, in bil. of Yen) a)	152579	159120	172435	186027	183783	188542	197558	208004	218611	229951
Agriculture	9082	8567	9713	10336	10112	10071	9601	9402	9358	9493
Industry	61947	65896	71504	79123	77152	76053	80997	84078	90237	95217
Manufacturing	39554	41773	45749	52014	51911	48745	53645	56577	60338	64451
Services,etc	81550	84657	91218	96568	96519	102418	106960	114524	119016	125241
Distribution of GDP (%)										
Agriculture	5.95	5.38	5.63	5.56	5.50	5.34	4.86	4.52	4.28	4.13
Industry	40.60	41.41	41.47	42.53	41.98	40.34	41.00	40.42	41.28	41.41
Manufacturing	25.92	26.25	26.53	27.96	28.25	25.85	27.15	27.20	27.60	28.03
Services,etc	53.45	53.20	52.90	51.91	52.52	54.32	54.14	55.06	54.44	54.46
Annual Growth Rate of GDP (%)		4.29	8.37	7.88	-1.21	2.59	4.78	5.29	5.10	5.19
Agriculture		-5.67	13.38	6.41	-2.17	-0.41	-4.67	-2.07	-0.47	1.44
Industry		6.37	8.51	10.66	-2.49	-1.42	6.50	3.80	7.33	5.52
Manufacturing		5.61	9.52	13.69	-0.20	-6.10	10.05	5.47	6.65	6.82
Services,etc		3.81	7.75	5.87	-0.05	6.11	4.43	7.07	3.92	5.23
Total Employment (in 000) b)	50920	51220	51250	52570	52360	52240	52720	53430	54080	54810
Agriculture	8860	8150	7550	7050	6750	6610	6430	6340	6330	6130
Industry	18190	18450	18610	19570	19380	18730	18880	18890	18930	19140
Mining	200	190	160	130	140	160	180	190	150	120
Manufacturing	13770	13830	13830	14430	14270	13460	13450	13400	13260	13330
Construction	3940	4140	4330	4670	4640	4790	4920	4990	5200	5360
Electricity, Gas & Water	280	290	290	340	330	320	330	310	320	330
Services,etc	23870	24620	25090	25950	26230	26900	27410	28200	28820	29540
Transport and Comm.	3240	3330	3270	3370	3310	3320	3410	3410	3420	3490
Trade and Finance	11440	11800	11990	12420	12600	12970	14270	14790	15060	15380
Community, Soc.& Personal	9120	9420	9750	10060	10220	10510	9630	9880	10240	10560
Others	70	70	80	100	100	100	100	120	100	110
Annual Growth Rate of Employment (%)										
Total		0.59	0.06	2.58	-0.40	-0.23	0.92	1.35	1.22	1.35
Agriculture		-8.01	-7.36	-6.62	-4.26	-2.07	-2.72	-1.40	-0.16	-3.16
Industry		1.43	0.87	5.16	-0.97	-3.35	0.80	0.05	0.21	1.11
Manufacturing		0.44	0.00	4.34	-1.11	-5.68	-0.07	-0.37	-1.04	0.53
Services,etc		3.14	1.91	3.43	1.08	2.55	1.90	2.88	2.20	2.50
Absolute Productivity (mil. of Yen per worker)										
Total	3.00	3.11	3.36	3.54	3.51	3.61	3.75	3.89	4.04	4.20
Agriculture	1.03	1.05	1.29	1.47	1.50	1.52	1.49	1.48	1.48	1.55
Industry	3.41	3.57	3.84	4.04	3.98	4.06	4.29	4.45	4.77	4.97
Manufacturing	2.87	3.02	3.31	3.60	3.64	3.62	3.99	4.22	4.55	4.84
Services,etc	3.42	3.44	3.64	3.72	3.68	3.81	3.90	4.06	4.13	4.24
Annual Growth Rate of Absolute Productivity (%)										
Total		3.68	8.30	5.17	-0.81	2.83	3.83	3.89	3.84	3.79
Agriculture		2.55	22.39	13.96	2.18	1.70	-2.00	-0.68	-0.31	4.75
Industry		4.88	7.58	5.23	-1.54	2.00	5.65	3.75	7.10	4.36
Manufacturing		5.15	9.52	8.97	0.92	-0.45	10.13	5.86	7.77	6.26
Services,etc		0.65	5.73	2.36	-1.12	3.47	2.49	4.07	1.69	2.67
Relative Labor Absorption Ratio										
Total		0.14	0.01	0.33	0.33	-0.09	0.19	0.25	0.24	0.26
Agriculture		1.41	-0.55	-1.03	1.96	5.12	0.58	0.68	0.34	-2.19
Industry		0.22	0.10	0.48	0.39	2.35	0.12	0.01	0.03	0.20
Manufacturing		0.08	0.00	0.32	5.60	0.93	-0.01	-0.07	-0.16	0.08
Services,etc		0.82	0.25	0.58	-21.26	0.42	0.43	0.41	0.56	0.48
YEAR	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979

Sources: a) The World Bank, World Tables 1988-89, Washington D.C., 1989
a) The World Bank, World Tables 1991, Washington D.C., 1991
b) International Labour Office, Yearbook of Labour Statistics, Geneva (various years)

II. STRUCTURE OF GROSS DOMESTIC PRODUCT AND EMPLOYMENT: 2. JAPAN, 1980 - 1989

YEAR	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
GDP (at constant 1980 market prices, in bil. of Yen) a)	240177	249446	256526	264614	277885	290990	297943	282412	300468	312571
Agriculture	8847	8578	9015	9123	9314	9259	8870	8950	8861	
Industry	100681	104434	108440	112801	122087	129222	131279	121818	131923	
Manufacturing	70232	73416	77653	83873	93569	100116	100717	90192	97379	
Services,etc	130649	136434	139071	142690	146484	152509	157794	151647	159809	
Distribution of GDP (%)										
Agriculture	3.68	3.44	3.51	3.45	3.35	3.18	2.98	3.17	2.95	
Industry	41.92	41.87	42.27	42.63	43.93	44.41	44.06	43.14	43.91	
Manufacturing	29.24	29.43	30.27	31.70	33.67	34.41	33.80	31.94	32.41	
Services,etc	54.40	54.69	54.21	53.92	52.71	52.41	52.96	53.70	53.19	
Annual Gr. Rate of GDP (%)	4.45	3.86	2.84	3.15	5.02	4.72	2.39	-5.21	6.39	4.03
Agriculture	-6.81	-3.04	5.09	1.20	2.09	-0.59	-4.20	0.90	-0.99	
Industry	5.74	3.73	3.84	4.02	8.23	5.84	1.59	-7.21	8.29	
Manufacturing	8.97	4.53	5.77	8.01	11.56	7.00	0.60	-10.45	7.97	
Services,etc	4.32	4.43	1.93	2.60	2.66	4.11	3.47	-3.90	5.38	
Total Employment (in 000) b)	55350	55810	56390	57320	57660	58070	58540	59110	60110	61280
Agriculture	5770	5570	5480	5310	5120	5090	4950	4890	4740	4630
Industry	19500	19700	19650	19930	20080	20250	20180	19970	20520	20990
Mining	110	100	100	100	80	90	80	80	70	70
Manufacturing	13670	13850	13800	14060	14380	14530	14440	14250	14540	14840
Construction	5480	5440	5410	5410	5270	5300	5340	5330	5600	5780
Electricity, Gas & Water	300	310	340	360	350	330	320	310	310	300
Services,etc	30020	30540	31260	32080	32460	32730	33410	34250	34840	35670
Transport and Comm.	3500	3440	3490	3500	3410	3430	3530	3480	3530	3680
Trade and Finance	15650	16060	16450	16790	17020	17100	17540	18040	18420	18800
Community, Soc.& Personal	10740	10920	11170	11640	11820	11970	12120	12490	12610	12880
Others	130	120	150	150	210	230	220	240	280	310
Annual Growth Rate of Employment (%)										
Total	0.99	0.83	1.04	1.65	0.59	0.71	0.81	0.97	1.69	1.95
Agriculture	-5.87	-3.47	-1.62	-3.10	-3.58	-0.59	-2.75	-1.21	-3.07	-2.32
Industry	2.19	0.72	-0.25	1.42	0.75	0.85	-0.35	-1.04	2.75	2.29
Manufacturing	2.55	1.32	-0.36	1.88	2.28	1.04	-0.62	-1.32	2.04	2.06
Services,etc	1.62	1.73	2.36	2.62	1.18	0.83	2.08	2.51	1.72	2.38
Absolute Productivity (mil. of Yen per worker)										
Total	4.34	4.47	4.55	4.62	4.82	5.01	5.09	4.78	5.00	5.10
Agriculture	1.53	1.54	1.65	1.72	1.82	1.82	1.79	1.83	1.87	
Industry	5.15	5.30	5.52	5.66	6.08	6.38	6.51	6.10	6.43	
Manufacturing	5.14	5.30	5.63	5.97	6.51	6.89	6.97	6.33	6.70	
Services,etc	4.35	4.47	4.45	4.45	4.51	4.66	4.72	4.43	4.59	
Annual Growth Rate of Absolute Productivity (%)										
Total	3.43	3.00	1.78	1.48	4.40	3.98	1.57	-6.13	4.62	2.04
Agriculture	-0.99	0.44	6.82	4.44	5.88	-0.00	-1.49	2.14	2.14	
Industry	3.47	2.99	4.10	2.56	7.42	4.96	1.94	-6.23	5.39	
Manufacturing	6.26	3.17	6.15	6.01	9.08	5.89	1.23	-9.26	5.82	
Services,etc	2.65	2.65	-0.41	-0.02	1.46	3.25	1.36	-6.25	3.60	
Relative Labor Absorption Ratio										
Total	0.22	0.22	0.37	0.52	0.12	0.15	0.34	-0.19	0.26	0.48
Agriculture	0.86	1.14	-0.32	-2.59	-1.71	0.99	0.65	-1.35	3.10	
Industry	0.38	0.19	-0.07	0.35	0.09	0.14	-0.22	0.14	0.33	
Manufacturing	0.26	0.29	-0.06	0.24	0.20	0.15	-1.03	0.13	0.26	
Services,etc	0.38	0.39	1.22	1.01	0.45	0.20	0.60	0.65	0.32	
YEAR	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989

Sources: a) The World Bank, World Tables 1988-89, Washington D.C., 1989
a) The World Bank, World Tables 1991, Washington D.C., 1991
b) International Labour Office, Yearbook of Labour Statistics, Geneva (various years)

II. STRUCTURE OF GROSS DOMESTIC PRODUCT AND EMPLOYMENT: 3. MALAYSIA, 1970 - 1979

YEAR	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
GDP (at constant 1980 market prices, in mil. Ringgit) a)	24984	26458	28935	32313	34967	35250	39382	42448	45320	49613
Agriculture	7381	7488	8059	9008	9630	9338	10481	10729	10905	11532
Industry	8669	9549	10345	11410	11939	11979	14095	15191	16707	18899
Manufacturing	3659	4119	4538	5560	6137	6318	7487	8280	9048	10073
Services,etc	8934	9421	10531	11895	13398	13933	14806	16528	17708	19182
Distribution of GDP (%)										
Agriculture	29.54	28.30	27.85	27.88	27.54	26.49	26.61	25.28	24.06	23.24
Industry	34.70	36.09	35.75	35.31	34.14	33.98	35.79	35.79	36.86	38.09
Manufacturing	14.65	15.57	15.68	17.21	17.55	17.92	19.01	19.51	19.96	20.30
Services,etc	35.76	35.61	36.40	36.81	38.32	39.53	37.60	38.94	39.07	38.66
Annual Growth Rate of GDP (%)		5.90	9.36	11.67	8.21	0.81	11.72	7.79	6.77	9.47
Agriculture		1.45	7.63	11.78	6.90	-3.03	12.24	2.37	1.64	5.75
Industry		10.15	8.34	10.29	4.64	0.34	17.66	7.78	9.98	13.12
Manufacturing		12.57	10.17	22.52	10.38	2.95	18.50	10.59	9.28	11.33
Services,etc		5.45	11.78	12.95	12.64	3.99	6.27	11.63	7.14	8.32
Total Employment (in 000) b)										
Agriculture										
Industry										
Mining										
Manufacturing										
Construction										
Electricity, Gas and Water										
Services,etc										
Transport and Communications										
Trade and Finance										
Community, Social & Personal										
Others										
Annual Growth Rate of Employment (%)										
Total										
Agriculture										
Industry										
Manufacturing										
Services,etc										
Absolute Productivity (000 Ringgit per worker)										
Total										
Agriculture										
Industry										
Manufacturing										
Services,etc										
Annual Growth Rate of Absolute Productivity (%)										
Total										
Agriculture										
Industry										
Manufacturing										
Services,etc										
Relative Labor Absorption Ratio										
Total										
Agriculture										
Industry										
Manufacturing										
Services,etc										
YEAR	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979

Sources: a) The World Bank, World Tables 1988-89, Washington D.C., 1989
a) The World Bank, World Tables 1991, Washington D.C., 1991
b) International Labour Office, Yearbook of Labour Statistics, Geneva (various years)

II. STRUCTURE OF GROSS DOMESTIC PRODUCT AND EMPLOYMENT: 3. MALAYSIA, 1980 - 1989

YEAR	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
GDP (at constant 1980 market prices, in mil. Ringgit) a)	53308	56960	60355	64215	69282	68514	69430	73135	79678	86756
Agriculture	11680	12247	13040	12956	13324	13657	14202	15259	15966	16892
Industry	20164	20879	22276	24594	27411	26490	27745	29562	33284	36949
Manufacturing	11002	11522	12167	13125	14739	14175	15242	17285	20326	22765
Services,etc	21464	23834	25039	26665	28547	28367	27483	28314	30428	32915
Distribution of GDP (%)										
Agriculture	21.91	21.50	21.61	20.18	19.23	19.93	20.46	20.86	20.04	19.47
Industry	37.83	36.66	36.91	38.30	39.56	38.66	39.96	40.42	41.77	42.59
Manufacturing	20.64	20.23	20.16	20.44	21.27	20.69	21.95	23.63	25.51	26.24
Services,etc	40.26	41.84	41.49	41.52	41.20	41.40	39.58	38.71	38.19	37.94
Annual Growth Rate of GDP (%)	7.45	6.85	5.96	6.40	7.89	-1.11	1.34	5.34	8.95	8.88
Agriculture	1.28	4.85	6.48	-0.64	2.84	2.50	3.99	7.44	4.63	5.80
Industry	6.69	3.55	6.69	10.41	11.45	-3.36	4.74	6.55	12.59	11.01
Manufacturing	9.22	4.73	5.60	7.87	12.30	-3.83	7.53	13.40	17.59	12.00
Services,etc	11.90	11.04	5.06	6.49	7.06	-0.63	-3.12	3.02	7.47	8.17
Total Employment (in 000) b)	4786.5	5067.1	5248.9	5456.9	5566.7	5633.3	5760.2	5983.8		
Agriculture	1780.7	1811.4	1635.8	1670.9	1695.0	1717.4	1764.5	1846.4		
Industry	1154.3	1288.6	1280.1	1414.1	1365.8	1345.7	1316.4	1334.1		
Mining	46.4	55.5	51.7	55.1	46.5	44.4	40.6	33.0		
Manufacturing	768.8	813.5	816.0	894.1	858.4	850.4	874.0	928.9		
Construction	273.4	351.8	377.5	425.6	428.0	419.4	369.4	336.3		
Electricity, Gas & Water	65.7	67.8	34.9	39.3	32.9	31.5	32.4	35.9		
Services,etc	1851.5	1967.1	2333.0	2371.9	2505.9	2570.2	2679.3	2803.3		
Transport and Comm.	209.6	233.5	223.1	235.9	242.8	224.3	242.0	252.0		
Trade and Finance	692.3	705.3	1063.0	1095.0	1157.1	1213.2	1269.7	1333.3		
Community,Soc.& Personal	949.6	1027.9	1046.7	1040.3	1104.1	1131.8	1166.9	1217.5		
Others		0.4	0.2	0.7	1.9	0.9	0.7	0.5		
Annual Growth Rate of Employment (%)										
Total		5.86	3.59	3.96	2.01	1.20	2.25	3.88		
Agriculture		1.72	-9.69	2.15	1.44	1.32	2.74	4.64		
Industry		11.63	-0.66	10.47	-3.42	-1.47	-2.18	1.34		
Manufacturing		5.81	0.31	9.57	-3.99	-0.93	2.78	6.28		
Services,etc		6.24	18.60	1.67	5.65	2.57	4.24	4.63		
Absolute Productivity (000 Ringgit per worker)										
Total	1113.72	1124.11	1149.86	1176.77	1244.58	1216.23	1205.34	1222.22		
Agriculture	655.92	676.11	797.16	775.39	786.08	795.21	804.87	826.42		
Industry	1746.86	1620.29	1740.18	1739.20	2006.96	1968.49	2107.04	2215.88		
Manufacturing	1431.06	1416.35	1491.05	1467.96	1717.03	1666.86	1743.94	1860.80		
Services,etc	1159.28	1211.63	1073.25	1124.20	1139.19	1103.69	1025.75	1010.02		
Annual Growth Rate of Absolute Productivity (%)										
Total		0.93	2.29	2.34	5.76	-2.28	-0.90	1.40		
Agriculture		3.08	17.90	-2.73	1.38	1.16	1.21	2.68		
Industry		-7.25	7.40	-0.06	15.40	-1.92	7.07	5.14		
Manufacturing		-1.03	5.27	-1.55	16.97	-2.92	4.62	6.70		
Services,etc		4.52	-11.42	4.75	1.33	-3.12	-7.06	-1.53		
Relative Labor Absorption Ratio										
Total		0.86	0.60	0.62	0.26	-1.08	1.68	0.73		
Agriculture		0.36	-1.50	-3.33	0.51	0.53	0.69	0.62		
Industry		3.28	-0.10	1.01	-0.30	0.44	-0.46	0.21		
Manufacturing		1.23	0.05	1.22	-0.32	0.24	0.37	0.47		
Services,etc		0.57	3.68	0.26	0.80	-4.07	-1.36	1.53		
YEAR	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989

Sources: a) The World Bank, World Tables 1988-89, Washington D.C., 1989
a) The World Bank, World Tables 1991, Washington D.C., 1991
b) International Labour Office, Yearbook of Labour Statistics, Geneva (various years)

II. STRUCTURE OF GROSS DOMESTIC PRODUCT AND EMPLOYMENT: 4. PHILIPPINES, 1970 - 1979

YEAR	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
GDP (at constant 1980 market prices, in bil. of Pesos) a)	145.42	152.55	161.03	174.78	183.45	195.56	210.89	224.07	236.46	251.40
Agriculture	38.42	40.31	41.98	44.59	45.89	47.72	51.63	54.24	56.32	58.93
Industry	43.61	47.01	52.17	58.83	62.02	67.53	74.77	80.86	85.79	92.45
Manufacturing	32.92	35.12	38.98	44.55	46.50	48.17	50.96	54.85	58.75	61.82
Services,etc	63.39	65.23	66.88	71.36	75.54	80.31	84.49	88.97	94.35	100.02
Distribution of GDP (%)										
Agriculture	26.42	26.42	26.07	25.51	25.01	24.40	24.48	24.21	23.82	23.44
Industry	29.99	30.82	32.40	33.66	33.81	34.53	35.45	36.09	36.28	36.77
Manufacturing	22.64	23.02	24.21	25.49	25.35	24.63	24.16	24.48	24.85	24.59
Services,etc	43.59	42.76	41.53	40.83	41.18	41.07	40.06	39.71	39.90	39.79
Annual Growth Rate of GDP (%)		4.90	5.56	8.54	4.96	6.60	7.84	6.25	5.53	6.32
Agriculture		4.92	4.14	6.22	2.92	3.99	8.19	5.06	3.83	4.63
Industry		7.80	10.98	12.77	5.42	8.88	10.72	8.14	6.10	7.76
Manufacturing		6.68	10.99	14.29	4.38	3.59	5.79	7.63	7.11	5.23
Services,etc		2.90	2.53	6.70	5.86	6.31	5.20	5.30	6.05	6.01
Total Employment (in 000) b)	11339	12246	12834	13450	13885	14143	14238	14547	16668	
Agriculture	6100	6091	6907	7352	7727	7633	7659	7276	8702	
Industry	1877	1994	1919	1901	1921	2076	2158	2288	2518	
Mining	52	58	52	62	47	49	81	72	67	
Manufacturing	1354	1443	1396	1406	1442	1546	1598	1638	1916	
Construction	438	438	429	395	394	437	428	522	480	
Electricity, Gas & Water	33	55	42	38	38	44	51	56	55	
Services,etc	3381	4161	4008	4197	4237	4434	4421	4983	5448	
Transport and Comm.	498	521	486	509	510	510	600	680	681	
Trade and Finance	839	1517	1558	1566	1559	1599	1398	1530	2053	
Community, Soc.&Personal	1861	2095	1954	2095	2143	2290	2374	2658	2660	
Others	183	28	10	27	25	35	49	115	54	
Annual Growth Rate of Employment (%)										
Total		7.82	4.80	4.80	3.23	1.86	0.67	2.17	14.58	
Agriculture		-0.15	13.40	6.44	5.10	-1.22	0.34	-5.00	19.60	
Industry		6.23	-3.76	-0.94	1.05	8.07	3.95	6.02	10.03	
Manufacturing		6.57	-3.26	0.72	2.56	7.21	3.36	2.50	16.97	
Services,etc		23.07	-3.68	4.72	0.95	4.65	-0.29	12.71	9.33	
Absolute Productivity (000 Pesos per worker)										
Total	12.80	12.46	12.55	12.99	13.21	13.83	14.81	15.40	14.19	
Agriculture	6.30	6.62	6.08	6.07	5.94	6.25	6.74	7.45	6.47	
Industry	23.23	23.58	27.19	30.95	32.27	32.53	34.65	35.34	34.07	
Manufacturing	24.31	24.34	27.92	31.69	32.25	31.16	31.89	33.49	30.66	
Services,etc	18.75	15.68	16.69	17.00	17.83	18.11	19.11	17.85	17.32	
Annual Growth Rate of Absolute Productivity (%)										
Total		-2.70	0.72	3.57	1.67	4.66	7.12	3.99	-7.90	
Agriculture		5.07	-8.16	-0.21	-2.08	5.27	7.83	10.59	-13.18	
Industry		1.47	15.31	13.83	4.32	0.75	6.51	2.00	-3.59	
Manufacturing		0.10	14.73	13.48	1.77	-3.38	2.35	5.01	-8.43	
Services,etc		-16.39	6.44	1.89	4.86	1.59	5.51	-6.57	-3.00	
Relative Labor Absorption Ratio										
Total		1.59	0.86	0.56	0.65	0.28	0.09	0.35	2.64	
Agriculture		-0.03	3.23	1.04	1.75	-0.31	0.04	-0.99	5.11	
Industry		0.80	-0.34	-0.07	0.19	0.91	0.37	0.74	1.65	
Manufacturing		0.98	-0.30	0.05	0.58	2.01	0.58	0.33	2.39	
Services,etc		7.95	-1.45	0.70	0.16	0.74	-0.06	2.40	1.54	
YEAR	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979

Sources: a) The World Bank, World Tables 1988-89, Washington D.C., 1989
a) The World Bank, World Tables 1991, Washington D.C., 1991
b) International Labour Office, Yearbook of Labour Statistics, Geneva (various years)

II. STRUCTURE OF GROSS DOMESTIC PRODUCT AND EMPLOYMENT: 4. PHILIPPINES, 1980 - 1989

YEAR	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
GDP (at constant 1980 market prices, in bil. of Pesos) a)	264.70	274.86	282.86	286.01	267.92	255.96	259.45	272.11	289.91	306.35
Agriculture	61.80	64.15	66.23	64.93	66.23	68.45	70.69	69.97	72.47	75.58
Industry	96.80	101.44	103.47	104.34	93.61	84.05	82.25	88.57	96.32	102.98
Manufacturing	64.60	66.83	68.22	69.89	64.88	59.98	60.47	64.51	70.39	74.86
Services,etc	106.10	109.27	113.16	116.74	108.08	103.46	106.51	113.57	120.69	127.26
Distribution of GDP (%)										
Agriculture	23.35	23.34	23.41	22.70	24.72	26.74	27.25	25.71	25.00	24.67
Industry	36.57	36.91	36.58	36.48	34.94	32.84	31.70	32.55	33.23	33.62
Manufacturing	24.40	24.31	24.12	24.44	24.22	23.43	23.31	23.71	24.28	24.44
Services,etc	40.08	39.75	40.01	40.82	40.34	40.42	41.05	41.74	41.63	41.54
Annual Growth Rate of GDP (%)	5.29	3.84	2.91	1.11	-6.32	-4.46	1.36	4.88	6.54	5.57
Agriculture	4.87	3.80	3.24	-1.96	2.00	3.35	3.27	-1.02	3.57	4.30
Industry	4.71	4.79	2.00	0.84	-10.28	-10.21	-2.14	7.68	8.75	6.91
Manufacturing	4.50	3.45	2.08	2.45	-7.17	-7.55	0.82	6.68	9.12	6.35
Services,etc	6.08	2.99	3.56	3.16	-7.42	-4.27	2.95	6.63	6.27	5.45
Total Employment (in 000) b)	17154	17810	18614	19366	19368	20327	20926	20795	21497	21850
Agriculture	8894	9171	9696	10075	9705	10085	10418	9940	9920	9852
Industry	2635	2520	2642	2663	2767	2812	2799	3045	3348	3446
Mining	130	91	78	141	133	129	152	146	157	154
Manufacturing	1850	[illegible]	1888	1822	1847	1926	1906	2059	2238	2298
Construction	600	586	615	634	716	678	678	759	858	911
Electricity, Gas & Water	55	63	61	66	71	79	63	81	95	83
Services,etc	5625	6119	6276	6628	6896	7430	7709	7810	8229	8552
Transport and Comm.	725	725	740	892	881	913	860	946	1049	1095
Tradu and Finance	2107	2359	2431	2534	2808	3001	3210	3243	3351	3472
Community, Soc.&Personal	2791	3035	3105	3201	3204	3515	3639	3621	3827	3972
Others	2			1	3	1			2	13
Annual Growth Rate of Employment (%)										
Total		3.82	4.51	4.04	0.01	4.95	2.95	-0.63	3.38	1.64
Agriculture		3.11	5.72	3.91	-3.67	3.92	3.30	-4.59	-0.20	-0.69
Industry		-4.36	4.84	0.79	3.91	1.63	-0.46	8.7[illegible]	9.95	2.93
Manufacturing		-3.78	6.07	-3.50	1.37	4.28	-1.04	8.03	8.69	2.68
Services,etc		8.78	2.57	5.61	4.04	7.74	3.76	1.31	5.36	3.93
Absolute Productivity (000 Pesos per worker)										
Total	15.43	15.43	15.20	14.77	13.83	12.59	12.40	13.09	13.49	14.02
Agriculture	6.95	6.99	6.83	6.44	6.82	6.79	6.79	7.04	7.30	7.67
Industry	36.74	40.25	39.16	39.18	33.83	29.89	29.39	29.09	28.77	29.88
Manufacturing	34.92	37.54	36.13	38.36	35.13	31.14	31.73	31.33	31.45	32.58
Services,etc	18.86	17.86	18.03	17.61	15.67	13.92	13.82	14.54	14.67	14.88
Annual Growth Rate of Absolute Productivity (%)										
Total		0.01	-1.53	-2.81	-6.33	-8.97	-1.54	5.54	3.06	3.96
Agriculture		0.67	-2.35	-5.65	5.89	-0.54	-0.03	3.74	3.77	5.02
Industry		9.58	-2.71	0.05	-13.66	-11.65	-1.[illegible]9	-1.02	-1.09	3.87
Manufacturing		7.52	-3.76	6.16	-8.42	-11.34	1.87	-1.25	0.39	3.57
Services,etc		-5.33	0.97	-2.32	-11.02	-11.15	-0.78	5.25	0.86	1.47
Relative Labor Absorption Ratio										
Total		1.00	1.55	3.63	-0.00	-1.11	2.16	-0.13	0.52	0.29
Agriculture		0.82	1.77	-1.99	-1.83	1.17	1.01	4.50	-0.06	-0.16
Industry		-0.91	2.42	0.95	-0.38	-0.16	0.22	1.14	1.14	0.42
Manufacturing		-1.10	2.92	-1.43	-0.19	-0.57	-1.27	1.20	0.95	0.42
Services,etc		2.94	0.72	1.77	-0.55	-1.81	1.27	0.20	0.86	0.72
YEAR	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989

Sources: a) The World Bank, World Tables 1988-89, Washington D.C., 1989
a) The World Bank, World Tables 1991, Washington D.C., 1991
b) International Labour Office, Yearbook of Labour Statistics, Geneva (various years)

II. STRUCTURE OF GROSS DOMESTIC PRODUCT AND EMPLOYMENT: 5. SINGAPORE, 1970 - 1979

YEAR	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
GDP (at constant 1980 market prices, in mil. of S $) a)	10615	11940	13526	15045	16061	16699	17891	19280	20937	22877
Agriculture	265	292	314	297	275	282	309	314	312	318
Industry	3790	4431	5204	5696	5940	6090	6785	7229	7741	8690
Manufacturing	2600	3077	3632	4219	4384	4296	4800	5247	5842	6648
Services,etc	6560	7217	8008	9052	9846	10327	10797	11737	12884	13869
Distribution of GDP (%)										
Agriculture	2.50	2.45	2.32	1.97	1.71	1.69	1.73	1.63	1.49	1.39
Industry	35.70	37.11	38.47	37.86	36.98	36.47	37.92	37.49	36.97	37.99
Manufacturing	24.49	25.77	26.85	28.04	27.30	25.73	26.83	27.21	27.90	29.06
Services,etc	61.80	60.44	59.20	60.17	61.30	61.84	60.35	60.88	61.54	60.62
Annual Growth Rate of GDP (%)		12.48	13.28	11.23	6.75	3.97	7.14	7.76	8.59	9.27
Agriculture		10.19	7.53	-5.41	-7.41	2.55	9.57	1.62	-0.64	1.92
Industry		16.91	17.45	9.45	4.28	2.53	11.41	6.54	7.08	12.26
Manufacturing		18.35	18.04	16.16	3.91	-2.01	11.73	9.31	11.34	13.80
Services,etc		10.02	10.96	13.04	8.77	4.89	4.55	8.71	9.77	7.65
Total Employment (in 000) b)				799.6	824.3	833.5	870.5	903.9	955.7	1018.2
Agriculture				21.4	21.7	17.4	19.7	19.8	17.6	15.1
Industry				253.7	288.8	269.3	289.2	300.5	331.7	358.9
Mining				1.1	1.8	3.1	1.9	1.6	1.1	1.5
Manufacturing				189.9	234.2	218.1	234.0	245.5	269.5	293.3
Construction				41.5	42.5	39.2	42.0	42.0	51.4	54.3
Electricity, Gas and Water				11.2	10.3	8.9	11.3	11.4	9.7	9.8
Services,etc				524.5	513.8	546.8	561.6	583.6	606.4	644.2
Transport and Communications				93.7	97.5	97.9	101.6	105.6	109.1	118.8
Trade and Finance				224.8	219.3	242.4	257.5	272.4	288.0	308.5
Community, Social & Personal				205.8	195.1	204.0	200.6	204.3	207.5	216.2
Others				0.2	1.9	2.5	1.9	1.3	1.8	0.7
Annual Growth Rate of Employment (%)										
Total					3.09	1.12	4.44	3.84	5.73	6.54
Agriculture					1.40	-19.82	13.22	0.51	-11.11	-14.20
Industry					13.84	-6.75	7.39	3.91	10.38	8.20
Manufacturing					23.33	-6.87	7.29	4.91	9.78	8.83
Services,etc					-2.04	6.42	2.71	3.92	3.91	6.23
Absolute Productivity (000 S $ per worker)										
Total				18815.7	19484.4	20034.8	20552.6	21329.8	21907.5	22468.1
Agriculture				13878.5	12672.8	16206.9	15685.3	15858.6	17727.3	21059.6
Industry				22451.7	20567.9	22614.2	23461.3	24056.6	23337.4	24212.9
Manufacturing				22217.0	18719.0	19697.4	20512.8	21372.7	21677.2	22666.2
Services,etc				17258.3	19163.1	18886.2	19225.4	20111.4	21246.7	21529.0
Annual Growth Rate of Absolute Productivity (%)										
Total					3.55	2.82	2.58	3.78	2.71	2.56
Agriculture					-8.69	27.89	-3.22	1.10	11.78	18.80
Industry					-8.39	9.95	3.75	2.54	-2.99	3.75
Manufacturing					-15.74	5.23	4.14	4.19	1.42	4.56
Services,etc					11.04	-1.44	1.80	4.61	5.65	1.33
Relative Labor Absorption Ratio										
Total					0.46	0.28	0.62	0.49	0.67	0.71
Agriculture					-0.19	-7.78	1.38	0.31	17.44	-7.39
Industry					3.23	-2.67	0.65	0.60	1.47	0.67
Manufacturing					5.96	3.42	0.62	0.53	0.86	0.64
Services,etc					-0.23	1.31	0.59	0.45	0.40	0.82
YEAR	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979

Sources: a) The World Bank, World Tables 1988-89, Washington D.C., 1989
a) The World Bank, World Tables 1991, Washington D.C., 1991
b) International Labour Office, Yearbook of Labour Statistics, Geneva (various years)

II. STRUCTURE OF GROSS DOMESTIC PRODUCT AND EMPLOYMENT: 5. SINGAPORE, 1980 - 1989

YEAR	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
GDP (at constant 1980 market prices, in mil. of S $) a)	25091	27494	29384	31781	34414	33878	34475	37504	41973	45843
Agriculture	322	316	301	308	323	290	258	232	203	191
Industry	9563	10600	11117	12222	13421	12177	12061	13257	15081	16341
Manufacturing	7313	7993	7713	7929	8524	7901	8565	10023	11849	13021
Services,etc	15206	16578	17966	19251	20670	21411	22156	24015	26670	29300
Distribution of GDP (%)										
Agriculture	1.28	1.15	1.02	0.97	0.94	0.86	0.75	0.62	0.48	0.42
Industry	38.11	38.55	37.83	38.46	39.00	35.94	34.98	35.35	35.93	35.64
Manufacturing	29.15	29.07	26.25	24.95	24.77	23.32	24.84	26.73	28.23	28.40
Services,etc	60.60	60.30	61.14	60.57	60.06	63.20	64.27	64.03	63.54	63.91
Annual Growth Rate of GDP (%)	9.68	9.58	6.87	8.16	8.28	-1.56	1.76	8.79	11.92	9.22
Agriculture	1.26	-1.86	-4.75	2.33	4.87	-10.22	-11.03	-10.08	-12.45	-6.19
Industry	10.05	10.84	4.88	9.94	9.81	-9.27	-0.95	9.92	13.76	8.35
Manufacturing	10.00	9.30	-3.50	2.80	7.50	-7.31	8.40	17.02	18.21	9.90
Services,etc	9.64	9.02	8.37	7.15	7.37	3.58	3.48	8.39	11.05	9.86
Total Employment (in 000) b)	1068.8	1112.8	1140.5	1167.7	1174.8	1154.3	1148.9	1193.0	1238.5	1277.4
Agriculture	14.1	12.7	11.5	11.8	8.8	8.1	9.6	10.4	5.4	5.8
Industry	381.9	412.9	418.4	419.3	433.1	406.7	398.7	418.2	444.5	462.1
Mining	1.6	1.2	2.6	2.4	1.9	2.4	1.3	0.6	0.8	0.8
Manufacturing	312.6	338.0	336.0	324.4	322.2	293.8	290.1	318.9	352.6	369.9
Construction	58.1	66.3	71.9	84.0	99.8	102.8	99.5	91.5	83.3	84.5
Electricity, Gas & Water	9.6	7.4	7.9	8.5	9.2	7.7	7.8	7.2	7.8	6.9
Services,etc	672.8	687.2	710.6	736.6	732.9	739.5	740.6	764.4	788.6	809.5
Transport and Comm.	122.4	127.2	129.8	131.9	122.4	117.0	114.1	121.0	120.2	126.2
Trade and Finance	323.8	327.1	343.3	360.0	365.5	371.8	365.5	385.1	395	408.6
Community, Soc.& Personal	222.8	230.0	235.5	243.1	242.2	248.3	259.2	256.7	271.6	273.5
Others	3.8	2.9	2.0	1.6	2.8	2.4	1.8	1.6	1.8	1.2
Annual Growth Rate of Employment (%)										
Total	4.97	4.12	2.49	2.38	0.61	-1.74	-0.47	3.84	3.81	3.14
Agriculture	-6.62	-9.93	-9.45	2.61	-25.42	-7.95	18.52	8.33	-48.08	7.41
Industry	6.41	8.12	1.33	0.22	3.29	-3.10	-1.97	4.89	6.29	3.96
Manufacturing	6.58	8.13	-0.59	-3.45	-0.68	-8.81	-1.26	9.93	10.57	4.91
Services,etc	4.44	2.14	3.41	3.66	-0.50	0.90	0.15	3.21	3.17	2.65
Absolute Productivity (000 S $ per worker)										
Total	23475.9	24707.0	25764.1	27216.8	29293.5	29349.4	30007.0	31436.7	33890.5	35887.8
Agriculture	22836.9	24881.9	26173.9	26101.7	36704.5	35802.5	26875.0	22307.7	37612.0	32852.0
Industry	25040.6	25672.1	26570.3	29148.6	30988.2	29941.0	30250.8	31700.1	33929.1	35361.6
Manufacturing	23394.1	23647.9	22955.4	24442.0	26455.6	26892.4	29524.3	31429.9	33603.5	35202.3
Services,etc	22601.1	24124.0	25282.9	26134.9	28203.0	28953.3	29916.3	31416.8	33819.2	36195.4
Annual Growth Rate of Absolute Productivity (%)										
Total	4.49	5.24	4.28	5.64	7.63	0.19	2.24	4.76	7.81	5.89
Agriculture	8.44	8.95	5.19	-0.28	40.62	-2.46	-24.94	-16.99	68.61	-12.66
Industry	3.42	2.52	3.50	9.70	6.31	-3.38	1.03	4.79	7.03	4.22
Manufacturing	3.21	1.08	-2.93	6.48	8.24	1.65	9.79	6.45	6.92	4.76
Services,etc	4.98	6.74	4.80	3.37	7.91	2.66	3.33	5.02	7.65	7.03
Relative Labor Absorption Ratio										
Total	0.51	0.43	0.36	0.29	0.07	1.12	-0.27	0.44	0.32	0.34
Agriculture	-5.26	5.33	1.99	1.12	-5.22	0.78	-1.68	-0.83	3.86	-1.20
Industry	0.64	0.75	0.27	0.02	0.34	0.66	2.06	0.49	0.46	0.47
Manufacturing	0.66	0.87	0.17	-1.23	-0.09	1.21	-0.15	0.58	0.58	0.50
Services,etc	0.46	0.24	0.41	0.51	-0.07	0.25	0.04	0.38	0.29	0.27
YEAR	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989

Sources: a) The World Bank, World Tables 1988-89, Washington D.C., 1989
a) The World Bank, World Tables 1991, Washington D.C., 1991
b) International Labour Office, Yearbook of Labour Statistics, Geneva (various years)

II. STRUCTURE OF GROSS DOMESTIC PRODUCT AND EMPLOYMENT: 6. SOUTH KOREA, 1970 - 1979

YEAR	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
GDP (at constant 1980 market prices, in bil. of Won) a)	16885	18543	19573	22379	24316	26148	29605	32833	36411	39100
Agriculture	4990	5158	5262	5636	6037	6289	6928	7132	6427	6899
Industry	4321	4833	5273	6630	7586	8497	10223	11957	14560	15789
Manufacturing	2613	3097	3517	4534	5264	5896	7334	8455	10529	11340
Services,etc	7574	8552	9038	10113	10693	11362	12454	13744	15424	16412
Distribution of GDP (%)										
Agriculture	29.55	27.82	26.88	25.18	24.83	24.05	23.40	21.72	17.65	17.64
Industry	25.59	26.06	26.94	29.63	31.20	32.50	34.53	36.42	39.99	40.38
Manufacturing	15.48	16.70	17.97	20.26	21.65	22.55	24.77	25.75	28.92	29.00
Services,etc	44.86	46.12	46.18	45.19	43.98	43.45	42.07	41.86	42.36	41.97
Annual Growth Rate of GDP (%)		9.82	5.55	14.34	8.66	7.53	13.22	10.90	10.90	7.39
Agriculture		3.37	2.02	7.11	7.11	4.17	10.16	2.94	-9.89	7.34
Industry		11.85	9.10	25.73	14.42	12.01	20.31	16.96	21.77	8.44
Manufacturing		18.52	13.56	28.92	16.10	12.01	24.39	15.28	24.53	7.70
Services,etc		12.91	5.68	11.89	5.74	6.26	9.61	10.36	12.22	6.41
Total Employment (in thousands) b)		10066	10559	11139	11586	11830	12556	12929	13490	13664
Agriculture		4876	5346	5569	5584	5425	5601	5405	5181	4887
Industry		1801	1936	2227	2547	2811	3310	3559	3974	4119
Mining		92	54	47	50	60	65	103	107	111
Manufacturing		1336	1445	1774	2012	2205	2678	2798	3016	3126
Construction		348	392	371	450	511	529	625	821	836
Electricity, Gas and Water		25	45	35	35	35	38	33	30	46
Services,etc		3389	3277	3343	3455	3594	3645	3965	4335	4658
Transport and Communications		369	355	360	359	361	390	479	531	610
Trade and Finance		1707	1691	1761	1907	2027	2034	2170	2376	2563
Community, Social & Personal		1313	1231	1222	1189	1206	1221	1316	1428	1485
Others										
Annual Growth Rate of Employment (%)										
Total			4.90	5.49	4.01	2.11	6.14	2.97	4.34	1.29
Agriculture			9.64	4.17	0.27	-2.85	3.24	-3.50	-4.14	-5.67
Industry			7.50	15.03	14.37	10.37	17.75	7.52	11.66	3.65
Manufacturing			8.16	22.77	13.42	9.59	21.45	4.48	7.79	3.65
Services,etc			-3.30	2.01	3.35	4.02	1.42	8.78	9.33	7.45
Absolute Productivity (mil. of Won per worker)										
Total		1842.1	1853.7	2009.1	2098.7	2210.3	2357.8	2539.5	2699.1	2861.5
Agriculture		1057.8	964.3	1012.0	1081.1	1159.3	1236.9	1319.5	1240.5	1411.7
Industry		2683.5	2723.7	2977.1	2978.4	3022.8	3088.5	3359.7	3663.8	3833.2
Manufacturing		2318.1	2433.9	2555.8	2616.3	2673.9	2738.6	3021.8	3491.0	3627.6
Services,etc		2523.5	2758.0	3025.1	3094.9	3161.4	3416.7	3466.3	3558.0	3523.4
Annual Growth Rate of Absolute Productivity (%)										
Total			0.63	8.38	4.46	5.32	6.67	7.70	6.29	6.02
Agriculture			-6.95	2.82	6.83	7.23	6.70	6.68	-5.99	13.80
Industry			1.50	9.31	0.04	1.49	2.18	8.78	9.05	4.62
Manufacturing			5.00	5.01	2.37	2.20	2.42	10.34	15.53	3.91
Services,etc			9.29	9.69	2.31	2.15	8.08	1.45	2.65	-0.97
Relative Labor Absorption Ratio										
Total			0.88	0.38	0.46	0.28	0.46	0.27	0.40	0.17
Agriculture			4.78	0.59	0.04	-0.68	0.32	-1.19	0.42	-0.77
Industry			0.82	0.58	1.00	0.86	0.87	0.44	0.54	0.43
Manufacturing			0.60	0.79	0.83	0.80	0.88	0.29	0.32	0.47
Services,etc			-0.58	0.17	0.58	0.64	0.15	0.85	0.76	1.16
YEAR	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979

Sources: a) The World Bank, World Tables 1988-89, Washington D.C., 1989
a) The World Bank, World Tables 1991, Washington D.C., 1991
b) International Labour Office, Yearbook of Labour Statistics, Geneva (various years)

II. STRUCTURE OF GROSS DOMESTIC PRODUCT AND EMPLOYMENT: 6. SOUTH KOREA, 1980 - 1989

YEAR	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
GDP (at constant 1980 market prices, in bil. of Won) a)	37915	40724	43036	47743	51872	54674	61062	67821	76258	81174
Agriculture	5525	6760	6981	7436	7453	7809	8114	7767	8300	8167
Industry	15670	16555	17662	20187	22890	24045	27630	31892	36338	38731
Manufacturing	11214	12059	12559	14096	16188	16805	19737	22964	26603	27761
Services,etc	16720	17409	18393	20120	21529	22820	25318	28162	31725	34300
Distribution of GDP (%)										
Agriculture	14.57	16.60	16.22	15.58	14.37	14.28	13.29	11.45	10.88	10.06
Industry	41.33	40.65	41.04	42.28	44.13	43.98	45.25	47.02	47.65	47.71
Manufacturing	29.58	29.61	29.18	29.52	31.21	30.74	32.32	33.86	34.89	34.20
Services,etc	44.10	42.75	42.74	42.14	41.50	41.74	41.46	41.52	41.60	42.25
Annual Growth Rate of GDP (%)	-3.03	7.41	5.68	10.94	8.65	5.40	11.68	11.07	12.44	6.45
Agriculture	-19.92	22.35	3.27	6.52	0.23	4.78	3.91	-4.28	6.86	-1.61
Industry	-0.75	5.65	6.69	14.30	13.39	5.05	14.91	15.43	13.94	6.58
Manufacturing	-1.11	7.54	4.15	12.24	14.84	3.81	17.45	16.35	15.84	4.35
Services,etc	1.88	4.12	5.65	9.39	7.00	6.00	10.95	11.23	12.65	8.12
Total Employment (in 000) b)	13685	14024	14381	14504	14430	14969	15505	16354	16869	17517
Agriculture	4654	4801	4612	4315	3914	3733	3662	3550	3484	3420
Industry	3966	3891	4005	4222	4433	4611	4942	5566	5882	6133
Mining	124	124	111	108	143	155	187	186	139	93
Manufacturing	2955	2859	3033	3266	3348	3504	3826	4416	4667	4841
Construction	843	876	829	817	905	911	889	920	1024	1140
Electricity, Gas & Water	44	32	32	31	37	41	40	44	52	59
Services,etc	5065	5332	5764	5967	6083	6625	6901	7208	7503	7964
Transport and Comm.	619	615	607	626	665	701	733	763	823	867
Trade and Finance	2957	3153	3554	3681	3652	3940	4094	4291	4395	4614
Community, Soc.& Personal	1489	1564	1603	1660	1766	1984	2074	2154	2285	2483
Others										
Annual Growth Rate of Employment (%)										
Total	0.15	2.48	2.55	0.86	-0.51	3.74	3.58	5.48	3.15	3.84
Agriculture	-4.77	3.16	-3.94	-6.44	-9.29	-4.62	-1.90	-2.24	-2.68	-1.84
Industry	-3.71	-1.89	2.93	5.42	5.00	4.02	7.18	12.63	5.68	4.27
Manufacturing	-5.47	-3.25	6.09	7.68	2.51	4.66	9.19	15.42	5.68	3.73
Services,etc	8.74	5.27	8.10	3.52	1.94	8.91	4.17	4.45	4.09	6.14
Absolute Productivity (mil. of Won per worker)										
Total	2770.6	2903.9	2992.6	3291.7	3594.7	3652.5	3938.2	4147.1	4520.6	4634.0
Agriculture	1187.2	1408.0	1513.7	1723.3	1904.2	2091.9	2215.7	2169.6	2382.4	2387.9
Industry	3951.1	4254.7	4410.0	4781.4	5163.5	5214.7	5590.9	5729.8	6177.9	6315.1
Manufacturing	3794.9	4217.9	4140.8	4316.0	4835.1	4795.9	5158.7	5200.2	5700.1	5734.5
Services,etc	3301.1	3265.0	3191.0	3371.9	3539.2	3444.5	3668.7	3907.0	4228.3	4306.9
Annual Growth Rate of Absolute Productivity (%)										
Total	-3.18	4.81	3.05	10.00	9.21	1.61	7.82	5.30	9.01	2.51
Agriculture	-15.91	18.61	7.50	13.85	10.50	9.86	5.92	-2.08	9.81	0.23
Industry	3.08	7.68	3.65	8.42	7.99	0.99	7.21	2.49	7.82	2.22
Manufacturing	4.61	11.15	-1.83	4.23	12.03	-0.81	7.56	0.81	9.61	0.60
Services,etc	-6.31	-1.09	-2.27	5.67	4.96	-2.68	6.51	6.50	8.22	1.86
Relative Labor Absorption Ratio										
Total	-0.05	0.33	0.45	0.08	-0.06	0.69	0.31	0.49	0.25	0.60
Agriculture	0.24	0.14	-1.20	-0.99	-40.65	-0.97	-0.49	0.52	-0.39	1.14
Industry	4.93	-0.33	0.44	0.38	0.37	0.80	0.48	0.82	0.41	0.65
Manufacturing	4.92	-0.43	1.47	0.63	0.17	1.22	0.53	0.94	0.36	0.86
Services,etc	4.66	1.28	1.43	0.38	0.28	1.49	0.38	0.40	0.32	0.76
YEAR	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989

Sources: a) The World Bank, World Tables 1988-89, Washington D.C., 1989
a) The World Bank, World Tables 1991, Washington D.C., 1991
b) International Labour Office, Yearbook of Labour Statistics, Geneva (various years)

II. STRUCTURE OF GROSS DOMESTIC PRODUCT AND EMPLOYMENT: 7. THAILAND, 1970 - 1979

YEAR	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
GDP (at constant 1980 market prices, in bil. of Baht) a)	345.2	362.4	376.4	413.4	431.2	451.9	494.2	541.8	599.1	629.2
Agriculture	104.2	108.6	106.6	116.8	120.2	125.4	133.1	136.1	153.2	150.2
Industry	86.2	93.9	102.1	112.6	117.5	122.9	143.0	165.4	184.1	196.0
Manufacturing	53.6	59.4	67.4	77.9	82.9	87.6	100.9	115.6	125.5	136.0
Services,etc	154.8	159.8	167.7	184.0	193.6	203.5	218.1	240.4	261.8	283.0
Distribution of GDP (%)										
Agriculture	30.17	29.97	28.33	28.25	27.88	27.76	26.94	25.11	25.57	23.87
Industry	24.97	25.92	27.11	27.24	27.24	27.20	28.93	30.52	30.73	31.15
Manufacturing	15.52	16.39	17.90	18.85	19.21	19.38	20.43	21.33	20.95	21.62
Services,etc	44.85	44.11	44.56	44.51	44.88	45.04	44.14	44.36	43.70	44.99
Annual Growth Rate of GDP (%)		4.97	3.88	9.81	4.33	4.80	9.35	9.64	10.56	5.03
Agriculture		4.27	-1.82	9.52	2.96	4.32	6.11	2.23	12.54	-1.94
Industry		8.93	8.67	10.35	4.30	4.67	16.28	15.69	11.31	6.45
Manufacturing		10.84	13.42	15.64	6.35	5.72	15.23	14.50	8.57	8.41
Services,etc		3.22	4.95	9.68	5.21	5.16	7.16	10.21	8.92	8.11
Total Employment (in 000) b)		16618.2	16129.5	17042.7	17159.1	18181.2	18410.7	20306.0	19215.2	19021.1
Agriculture		13157.6	11642.1	12270.5	11226.3	13269.9	13948.5	14921.5	13246.5	12350.9
Industry		885.4	1638.6	1618.4	2081.5	1631.2	1454.3	1759.4	2064.3	2560.6
Mining		19.0	118.4	110.9	49.6	28.4	28.5	50.2	37.1	62.4
Manufacturing		659.0	1239.5	1201.1	1693.5	1355.7	1145.3	1329.2	1613.4	1951.1
Construction		188.9	256.7	258.0	276.8	205.7	235.9	331.7	358.6	494.4
Electricity, Gas and Water		18.5	24.0	48.4	61.5	41.4	44.6	48.3	55.2	52.7
Services,etc		2575.2	2848.8	3153.8	3851.3	3280.1	3007.9	3625.1	3904.4	4109.6
Transport and Communications		213.3	313.6	383.9	465.1	381.3	326.6	362.8	408.7	451.1
Trade and Finance		1180.8	1230.4	1392.3	1628.6	1377.2	1298.2	1674.5	1685.3	1809.6
Community, Social & Personal		1171.9	1302.7	1375.6	1756.7	1521.6	1381.9	1567.1	1810.2	1848.9
Others		9.2	2.1	2.0	0.9		1.2	0.7	0.2	
Annual Growth Rate of Employment (%)										
Total			-2.94	5.66	0.68	5.96	1.26	10.29	-5.37	-1.01
Agriculture			-11.52	5.40	-8.51	18.20	5.11	6.98	-11.23	-6.76
Industry			85.07	-1.23	28.61	-21.63	-10.84	20.98	17.33	24.04
Manufacturing			88.09	-3.10	41.00	-19.95	-15.52	16.06	21.38	20.93
Services,etc			10.62	10.71	22.12	-14.83	-8.30	20.52	7.70	5.26
Absolute Productivity (mil. of Baht per worker)										
Total		21.80	23.34	24.25	25.13	24.86	26.84	26.68	31.18	33.08
Agriculture		8.25	9.16	9.52	10.71	9.45	9.54	9.12	11.56	12.16
Industry		106.07	62.28	69.58	56.43	75.37	98.30	94.00	89.18	76.53
Manufacturing		90.14	54.35	64.87	48.93	64.62	88.13	86.95	77.77	69.72
Services,etc		62.07	58.88	58.33	50.26	62.05	72.51	66.31	67.06	66.87
Annual Growth Rate of Absolute Productivity (%)										
Total			7.03	3.93	3.62	-1.10	7.99	-0.59	16.83	6.10
Agriculture			10.96	3.91	12.54	-11.74	0.95	-4.44	26.78	5.17
Industry			-41.28	11.73	-18.91	33.57	30.43	-4.37	-5.13	-14.18
Manufacturing			-39.70	19.34	-24.57	32.07	36.40	-1.34	-10.56	-10.36
Services,etc			-5.13	-0.93	-13.85	23.47	16.86	-8.56	1.13	2.71
Relative Labor Absorption Ratio										
Total			-0.76	0.58	0.16	1.24	0.13	1.07	-0.51	-0.20
Agriculture			6.32	0.57	-2.87	4.21	0.84	3.13	-0.89	3.49
Industry			9.81	-0.12	6.66	-4.63	-0.67	1.34	1.53	3.73
Manufacturing			6.57	-0.20	6.45	-3.49	-1.02	1.11	2.50	2.49
Services,etc			2.15	1.11	4.25	-2.87	-1.16	2.01	0.86	0.65
YEAR	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979

Sources: a) The World Bank, World Tables 19[illegible]-89, Washington D.C., 1989
a) The World Bank, World Tables 1991, Washington D.C., 1991
b) International Labour Office, Yearbook of Labour Statistics, Geneva (various years)

II. STRUCTURE OF GROSS DOMESTIC PRODUCT AND EMPLOYMENT: 7. THAILAND, 1980 - 1989

YEAR	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
GDP (at constant 1980 market prices, in bil. of Baht) a)	658.5	699.8	728.0	780.1	835.3	865.0	904.8	966.5	1130.3	1271.1
Agriculture	152.9	161.1	166.0	173.4	183.1	194.2	196.9	192.0	214.3	227.8
Industry	203.0	214.7	221.3	239.3	259.7	259.3	276.2	303.7	370.7	434.0
Manufacturing	139.9	148.7	152.4	165.3	176.5	175.4	191.3	210.9	257.1	295.0
Services,etc	302.6	324.0	340.7	367.3	392.5	411.4	431.6	470.8	535.5	594.3
Distribution of GDP (%)										
Agriculture	23.22	23.02	22.81	22.23	21.92	22.45	21.77	19.86	18.96	17.92
Industry	30.83	30.68	30.39	30.68	31.09	29.98	30.53	31.43	32.79	34.15
Manufacturing	21.25	21.25	20.93	21.19	21.13	20.28	21.15	21.82	22.74	23.21
Services,etc	45.95	46.31	46.80	47.09	46.99	47.57	47.70	48.71	47.37	46.76
Annual Growth Rate of GDP (%)	4.66	6.27	4.03	7.16	7.09	3.55	4.61	6.82	16.95	12.45
Agriculture	1.81	5.34	3.07	4.48	5.56	6.08	1.40	-2.51	11.64	6.29
Industry	3.59	5.74	3.07	8.15	8.55	-0.17	6.53	9.95	22.03	17.10
Manufacturing	2.84	6.30	2.46	8.48	6.77	-0.61	9.08	10.24	21.89	14.74
Services,etc	6.91	7.09	5.14	7.82	6.86	4.82	4.91	9.07	13.75	10.99
Total Employment (in 000) b)	22523.1	20873.0	21611.4	22907.5	23802.4	24226.5	25219.5			
Agriculture	15942.7	13404.0	13294.3	14461.5	15320.4	15383.3	16068.8			
Industry	2321.3	2678.7	2986.3	2984.5	3111.6	3138.8	3152.4			
Mining	36.6	67.7	83.5	59.9	128.7	88.2	59.3			
Manufacturing	1788.9	1915.0	2205.7	2189.6	2188.2	2280.0	2300.0			
Construction	435.9	623.3	626.0	628.4	681.2	663.8	677.9			
Electricity, Gas & Water	59.9	72.7	71.1	106.6	113.5	106.8	115.2			
Services,etc	4259.1	4790.3	5330.8	5461.5	5370.4	5704.4	5998.3			
Transport and Communic.	455.9	418.4	522.9	577.0	559.8	574.6	589.2			
Trade and Finance	1915.9	2026.8	2352.6	2303.8	2355.2	2591.7	2707.1			
Community, Soc.& Personal	1886.8	2343.8	2453.8	2576.9	2452.0	2529.9	2688.0			
Others	0.5	1.3	1.5	3.8	3.4	8.2	14.0			
Annual Growth Rate of Employment (%)										
Total	18.41	-7.33	3.54	6.00	3.91	1.78	4.10			
Agriculture	29.08	-15.92	-0.82	8.78	5.94	0.41	4.46			
Industry	-9.35	15.40	11.48	-0.06	4.26	0.87	0.43			
Manufacturing	-8.31	7.05	15.18	-0.73	-0.06	4.20	0.88			
Services,etc	3.64	12.47	11.28	2.45	-1.67	6.22	5.15			
Absolute Productivity (mil. of Baht per worker)										
Total	29.24	33.52	33.68	34.05	35.09	35.70	35.88			
Agriculture	9.59	12.02	12.49	11.99	11.95	12.63	12.26			
Industry	87.45	80.14	74.09	80.18	83.47	82.61	87.63			
Manufacturing	78.20	77.66	69.08	75.49	80.66	76.93	83.19			
Services,etc	71.05	67.65	63.91	67.26	73.09	72.13	71.96			
Annual Growth Rate of Absolute Productivity (%)										
Total	-11.61	14.67	0.47	1.09	3.06	1.73	0.49			
Agriculture	-21.13	25.29	3.92	-3.96	-0.36	5.65	-2.93			
Industry	14.27	-8.36	-7.55	8.22	4.11	-1.03	6.07			
Manufacturing	12.17	-0.70	-11.04	9.28	6.84	-4.61	8.13			
Services,etc	3.16	-4.79	-5.52	5.24	8.67	-1.31	-0.23			
Relative Labor Absorption Ratio										
Total	3.95	-1.17	0.88	0.84	0.55	0.50	0.89			
Agriculture	16.06	-2.98	-0.27	1.96	1.07	0.07	3.18			
Industry	-2.60	2.68	3.74	-0.01	0.50	-5.16	0.07			
Manufacturing	-2.92	1.12	6.17	-0.09	-0.01	-6.86	0.10			
Services,etc	0.53	1.76	2.20	0.31	-0.24	1.29	1.05			
YEAR	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989

Sources: a) The World Bank, World Tables 1988-89, Washington D.C., 1989
a) The World Bank, World Tables 1991, Washington D.C., 1991
b) International Labour Office, Yearbook of Labour Statistics, Geneva (various years)

II. STRUCTURE OF GROSS DOMESTIC PRODUCT AND EMPLOYMENT: 8. UNITED STATES, 1970 - 1979

YEAR	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
GDP (at constant 1980 market prices, in bil. of US $) a)	2055.9	2111.4	2214.9	2323.3	2308.0	2284.2	2393.6	2503.1	2660.3	2688.0
Agriculture	65.4	66.7	67.3	68.3	67.1	69.7	67.1	66.7	67.6	71.8
Industry	745.6	745.2	791.5	855.3	823.3	771.1	822.6	869.8	918.3	932.2
Manufacturing	445.6	450.0	490.1	544.1	519.2	478.9	524.8	563.9	598.7	612.6
Services,etc	1244.9	1299.5	1356.1	1399.7	1417.6	1443.4	1503.9	1566.6	1674.4	1684.0
Distribution of GDP (%)										
Agriculture	3.18	3.16	3.04	2.94	2.91	3.05	2.80	2.66	2.54	2.67
Industry	36.27	35.29	35.74	36.81	35.67	33.76	34.37	34.75	34.52	34.68
Manufacturing	21.67	21.31	22.13	23.42	22.50	20.97	21.93	22.53	22.50	22.79
Services,etc	60.55	61.55	61.23	60.25	61.42	63.19	62.83	62.59	62.94	62.65
Annual Growth Rate of GDP (%)		2.70	4.90	4.89	-0.66	-1.03	4.79	4.57	6.28	1.04
Agriculture		1.99	0.90	1.49	-1.76	3.87	-3.73	-0.60	1.35	6.21
Industry		-0.05	6.21	8.06	-3.74	-6.34	6.68	5.74	5.58	1.51
Manufacturing		0.99	8.91	11.02	-4.58	-7.76	9.58	7.45	6.17	2.32
Services,etc		4.39	4.36	3.22	1.28	1.82	4.19	4.17	6.88	0.57
Total Employment (in 000) b)	78678	79367	82156	85063	86792	85848	88751	92016	96044	98819
Agriculture	3567	3510	3598	3572	3613	3505	3453	3426	3549	3509
Industry	26080	25182	25830	27258	27213	25302	26310	27343	30135	31149
Mining			608	642	671	752	794	842	859	900
Manufacturing	20746	19606	19943	21054	21025	19457	20261	20889	21784	22458
Construction			5279	5562	5517	5093	5255	5612	6166	6437
Electricity, Gas and Water									1326	1354
Services,etc	49031	50675	52728	54233	55966	57041	58988	61207	62360	64161
Transport and Communications			5491	5558	5772	5692	5735	5929	4945	5174
Trade and Finance			20930	21582	22202	22448	23190	24177	27322	28250
Community, Social & Personal			26307	27093	27992	28901	30063	31141	30093	30737
Other Branches										
Annual Growth Rate of Employment (%)		0.88	3.51	3.54	2.03	-1.09	3.38	3.68	4.38	2.89
Agriculture		-1.60	2.51	-0.72	1.15	-2.99	-1.48	-0.78	3.59	-1.15
Industry		-3.44	2.57	5.53	-0.17	-7.02	3.98	3.93	10.21	3.36
Manufacturing		-5.50	1.72	5.57	-0.14	-7.46	4.13	3.10	4.28	3.09
Services,etc		3.35	4.05	2.85	3.20	1.92	3.41	3.83	1.82	2.89
Absolute Productivity (Output per worker)										
Total	26.13	26.60	26.96	27.31	26.59	26.61	26.97	27.20	27.70	27.20
Agriculture	18.33	19.00	18.70	19.12	18.57	19.89	19.43	19.47	19.05	20.46
Industry	28.59	29.59	30.64	31.38	30.25	30.48	31.27	31.81	30.47	29.93
Manufacturing	21.48	22.95	24.58	25.84	24.69	24.61	25.90	27.00	27.48	27.28
Services,etc	25.39	25.64	25.72	25.81	25.33	25.30	25.50	25.58	26.85	25.25
Annual Growth Rate of Absolute Productivity (%)										
Total		1.81	1.34	1.31	-2.64	0.06	1.36	0.86	1.82	-1.80
Agriculture		3.64	-1.57	2.22	-2.87	7.08	-2.28	0.19	-2.16	7.42
Industry		3.51	3.55	2.40	-3.58	0.73	2.59	1.74	-4.21	-1.79
Manufacturing		6.86	7.07	5.16	-4.44	-0.33	5.24	4.22	1.81	-0.75
Services,etc		1.00	0.29	0.35	-1.86	-0.10	0.75	0.33	4.97	-2.25
Relative Labor Absorption Ratio										
Total		0.32	0.72	0.72	-3.09	1.05	0.71	0.80	0.70	2.77
Agriculture		-0.80	2.79	-0.49	-0.65	-0.77	0.40	1.31	2.66	-0.18
Industry		64.18	0.41	0.69	0.04	1.11	0.60	0.68	1.83	2.22
Manufacturing		-5.56	0.19	0.51	0.03	0.96	0.43	0.42	0.69	1.33
Services,etc		0.76	0.93	0.89	2.50	1.06	0.81	0.92	0.26	5.04
YEAR	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979

Sources: a) The World Bank, World Tables 1988-89, Washington D.C., 1989
a) The World Bank, World Tables 1991, Washington D.C., 1991
b) International Labour Office, Yearbook of Labour Statistics, Geneva (various years)

II. STRUCTURE OF GROSS DOMESTIC PRODUCT AND EMPLOYMENT: 8. UNITED STATES, 1980 - 1989

YEAR	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
GDP (at constant 1980 market prices, in bil. of US $) a)	2684.4	2737.1	2669.7	2769.2	2963.0	3069.9	3163.4	3285.3	3430.5	3526.0
Agriculture	70.2	81.0	82.3	66.7	76.0	87.4	94.6	90.5		
Industry	901.0	905.9	858.2	893.2	987.6	1022.5	1034.6	1069.8		
Manufacturing	585.5	595.1	558.9	591.9	663.1	693.3	712.9	740.7		
Services,etc	1713.2	1750.2	1729.2	1809.3	1899.4	1960.0	2034.2	2120.2		
Distribution of GDP (%)										
Agriculture	2.62	2.96	3.08	2.41	2.56	2.85	2.99	2.76		
Industry	33.56	33.10	32.15	32.25	33.33	33.31	32.71	32.56		
Manufacturing	21.81	21.74	20.93	21.37	22.38	22.58	22.54	22.55		
Services,etc	63.82	63.94	64.77	65.34	64.10	63.85	64.30	64.54		
Annual Gr. Rate of GDP (%)	-0.13	1.96	-2.46	3.73	7.00	3.61	3.05	3.85	4.42	2.79
Agriculture	-2.23	15.38	1.60	-18.96	13.94	15.00	8.24	-4.31		
Industry	-3.35	0.54	-5.27	4.08	10.57	3.53	1.18	3.40		
Manufacturing	-4.42	1.64	-6.08	5.90	12.03	4.55	2.83	3.90		
Services,etc	1.73	2.16	-1.20	4.63	4.98	3.19	3.79	4.23		
Total Employment (in 000) b)	99301	100397	99529	100833	105005	107150	109598	112441	114968	117342
Agriculture	3529	3519	3571	3541	3469	3338	3350	3400	3326	3378
Industry	30541	30421	28498	28480	30116	30291	30585	30748	31227	31557
Mining	979	1118	1028	921	957	939	880	818	753	719
Manufacturing	21942	21817	20286	19946	20995	20879	20962	20935	21320	21652
Construction	6215	6060	5756	6149	6665	6987	7288	7456	7603	7680
Electricity, Gas & Water	1405	1426	1428	1464	1499	1486	1455	1539	1551	1506
Services,etc	65231	66457	67460	68812	71420	73521	75663	78293	80415	82407
Transport and Comm.	5120	5207	5124	5524	5859	6062	6195	6341	6513	6588
Trade and Finance	28542	29175	29824	30882	32359	33301	34520	35861	36635	37507
Community, Soc.& Personal	31569	32075	32512	32406	33202	34158	34948	36091	37267	38312
Other Branches										
Annual Gr. Rate of Empl.(%)	0.49	1.10	-0.86	1.31	4.14	2.04	2.28	2.59	2.25	2.06
Agriculture	0.57	-0.28	1.48	-0.84	-2.03	-3.78	0.36	1.49	-2.18	1.56
Industry	-1.95	-0.39	-6.32	-0.06	5.74	0.58	0.97	0.53	1.56	1.06
Manufacturing	-2.30	-0.57	-7.02	-1.68	5.26	-0.55	0.40	-0.13	1.84	1.56
Services,etc	1.67	1.88	1.51	2.00	3.79	2.94	2.91	3.48	2.71	2.48
Absolute Productivity (Output per worker)										
Total	27.03	27.26	26.82	27.46	28.22	28.65	28.86	29.22	29.84	30.05
Agriculture	19.89	23.02	23.05	18.84	21.91	26.18	28.24	26.63		
Industry	29.50	29.78	30.11	31.36	32.79	33.76	33.83	34.79		
Manufacturing	26.68	27.28	27.55	29.68	31.58	33.21	34.01	35.38		
Services,etc	26.26	26.34	25.63	26.29	26.59	26.66	26.89	27.08		
Annual Growth Rate of Absolute Productivity (%)										
Total	-0.62	0.85	-1.61	2.39	2.75	1.53	0.74	1.23	2.12	0.71
Agriculture	-2.78	15.71	0.13	-18.27	16.31	19.51	7.85	-5.71		
Industry	-1.42	0.94	1.13	4.14	4.56	2.94	0.21	2.86		
Manufacturing	-2.18	2.22	1.00	7.71	6.43	5.14	2.42	4.04		
Services,etc	0.07	0.28	-2.67	2.58	1.15	0.24	0.85	0.73		
Relative Labor Absorption Ratio										
Total	-3.64	0.56	0.35	0.35	0.59	0.57	0.75	0.67	0.51	0.74
Agriculture	-0.26	-0.02	0.92	0.04	-0.15	-0.25	0.04	-0.35		
Industry	0.58	-0.72	1.20	-0.02	0.54	0.16	0.82	0.16		
Manufacturing	0.52	-0.35	1.15	-0.28	0.44	-0.12	0.14	-0.03		
Services,etc	0.96	0.87	-1.26	0.43	0.76	0.92	0.77	0.82		
YEAR	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989

Sources: a) The World Bank, World Tables 1988-89, Washington D.C., 1989
a) The World Bank, World Tables 1991, Washington D.C., 1991
b) International Labour Office, Yearbook of Labour Statistics, Geneva (various years)

II. STRUCTURE OF GROSS DOMESTIC PRODUCT AND EMPLOYMENT: 9. TAIWAN, 1970 - 1979

YEAR	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
GDP (at constant 1980 market prices, in mil.of NT $)	582408	657267	744877	841107	850330	891178	1013824	1115373	1266599	1369929
Agriculture	96408	97155	99603	102405	103993	100306	108490	112445	110672	115816
Industry	233175	277970	332299	387405	384507	407233	489654	549128	651284	703547
Manufacturing	184439	223374	269532	317904	306796	319627	385828	434468	524690	568695
Services,etc	252825	282142	312976	351297	361830	383639	415679	453799	504643	550566
Distribution of GDP (%)										
Agriculture	16.55	14.78	13.37	12.18	12.23	11.26	10.70	10.08	8.74	8.45
Industry	40.04	42.29	44.61	46.06	45.22	45.70	48.30	49.23	51.42	51.36
Manufacturing	31.67	33.99	36.18	37.80	36.08	35.87	38.06	38.95	41.43	41.51
Services,etc	43.41	42.93	42.02	41.77	42.55	43.05	41.00	40.69	39.84	40.19
Annual Growth Rate of GDP (%)		12.85	13.33	12.92	1.10	4.80	13.76	10.02	13.56	8.16
Agriculture		0.78	2.52	2.81	1.55	-3.55	8.16	3.65	-1.58	4.65
Industry		19.21	19.54	16.58	-0.75	5.91	20.24	12.15	18.60	8.02
Manufacturing		21.11	20.66	17.95	-3.49	4.18	20.71	12.61	20.77	8.39
Services,etc		11.60	10.93	12.24	3.00	6.03	8.35	9.17	11.20	9.10
Total Employment (in 000 persons)	4576	4738	4949	5327	5487	5522	5671	5981	6227	6423
Agriculture	1681	1665	1632	1624	1697	1681	1641	1597	1553	1380
Industry	1278	1417	1576	1795	1882	1928	2065	2251	2447	2684
Mining	72	65	61	59	62	62	65	62	66	63
Manufacturing	958	1053	1218	1419	1479	1518	1628	1767	1886	2078
Construction	231	281	277	296	319	325	348	398	470	517
Electricity, Gas and Water	17	18	20	21	22	23	24	24	25	26
Services,etc	1617	1656	1741	1908	1908	1913	1965	2133	2227	2359
Transport & Communications	248	250	257	296	293	314	326	337	343	378
Trade and Finance	688	702	766	846	866	863	871	970	1029	1106
Public Adm. and Defense	681	704	718	766	749	736	768	826	855	875
Annual Growth Rate of Employment (%)										
Total		3.54	4.45	7.64	3.00	0.64	2.70	5.47	4.11	3.15
Agriculture		-0.95	-1.98	-0.49	4.50	-0.94	-2.38	-2.68	-2.76	-11.14
Industry		10.88	11.22	13.90	4.85	2.44	7.11	9.01	8.71	9.69
Manufacturing		9.92	15.67	16.50	4.23	2.64	7.25	8.54	6.73	10.18
Services,etc		2.41	5.13	9.59	0.00	0.26	2.72	8.55	4.41	5.93
Absolute Productivity (thousands of NT $ per worker)										
Total	127.27	138.72	150.51	157.90	154.97	161.39	178.77	186.49	203.40	213.28
Agriculture	57.35	58.35	61.03	63.06	61.28	59.67	66.11	70.41	71.26	83.92
Industry	182.45	196.17	210.85	215.82	204.31	211.22	237.12	243.95	266.16	262.13
Manufacturing	192.52	212.13	221.29	224.03	207.44	210.56	237.00	245.88	278.20	273.67
Services,etc	156.35	170.38	179.77	184.12	189.64	200.54	211.54	212.75	226.60	233.39
Annual Growth Rate of Absolute Productivity (%)										
Total		8.99	8.50	4.91	-1.85	4.14	10.77	4.31	9.07	4.86
Agriculture		1.74	4.59	3.32	-2.82	-2.63	10.80	6.50	1.21	17.77
Industry		7.52	7.48	2.36	-5.34	3.38	12.26	2.88	9.10	-1.51
Manufacturing		10.18	4.32	1.24	-7.41	1.51	12.56	3.75	13.15	-1.63
Services,etc		8.97	5.51	2.42	3.00	5.75	5.48	0.57	6.51	3.00
Relative Labor Absorption Ratio										
Total		0.28	0.33	0.59	2.74	0.13	0.20	0.55	0.30	0.39
Agriculture		-1.23	-0.79	-0.17	2.90	0.27	-0.29	-0.74	1.75	-2.40
Industry		0.57	0.57	0.84	-6.48	0.41	0.35	0.74	0.47	1.21
Manufacturing		0.47	0.76	0.92	-1.21	0.63	0.35	0.68	0.32	1.21
Services,etc		0.21	0.47	0.78	0.00	0.04	0.33	0.93	0.39	0.65
YEAR	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979

Sources: ROC (Taiwan), Statistical Yearbook 1987

II. STRUCTURE OF GROSS DOMESTIC PRODUCT AND EMPLOYMENT: 9. TAIWAN, 1980 - 1989

YEAR	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
GDP (at constant 1980 market prices, in mil.of NT $)	1470175	1560197	1602655	1726439	1892098	1973017	2182869			
Agriculture	114556	114130	115574	116343	118470	120495	119032			
Industry	756393	797905	800975	874727	977323	1006564	1145755			
Manufacturing	610590	648617	654707	722922	817668	836010	965645			
Services,etc	599226	648161	686106	735370	796305	845959	918082			
Distribution of GDP (%)										
Agriculture	7.79	7.32	7.21	6.74	6.26	6.11	5.45			
Industry	51.45	51.14	49.98	50.67	51.65	51.02	52.49			
Manufacturing	41.53	41.57	40.85	41.87	43.21	42.37	44.24			
Services,etc	40.76	41.54	42.81	42.59	42.09	42.88	42.06			
Annual Growth Rate of GDP (%)	7.32	6.12	2.72	7.72	9.60	4.28	10.64			
Agriculture	-1.09	-0.37	1.26	0.66	1.83	1.71	-1.21			
Industry	7.51	5.49	0.38	9.21	11.73	2.99	13.83			
Manufacturing	7.37	6.23	0.94	10.42	13.11	2.24	15.51			
Services,etc	8.84	8.17	5.85	7.18	8.29	6.24	8.53			
Total Employment (in 000 persons)	6548	6672	6810	7070	7308	7430	7732			
Agriculture	1277	1257	1284	1317	1286	1297	1317			
Industry	2774	2814	2808	2907	3090	3078	3206			
Mining	65	63	69	79	41	35	33			
Manufacturing	2129	2137	2151	2272	2494	2488	2614			
Construction	553	585	557	523	521	521	525			
Electricity, Gas and Water	27	29	31	33	34	34	34			
Services,etc	2497	2601	2718	2846	2932	3055	3209			
Transport & Communications	387	387	389	384	378	388	407			
Trade and Finance	1185	1260	1324	1403	1462	1526	1594			
Public Adm. and Defense	925	954	1005	1059	1092	1141	1208			
Annual Growth Rate of Employment (%)										
Total	1.95	1.89	2.07	3.82	3.37	1.67	4.06			
Agriculture	-7.46	-1.57	2.15	2.57	-2.35	0.86	1.54			
Industry	3.35	1.44	-0.21	3.53	6.30	-0.39	4.16			
Manufacturing	2.45	0.38	0.66	5.63	9.77	-0.24	5.06			
Services,etc	5.85	4.16	4.50	4.71	3.02	4.20	5.04			
Absolute Productivity (thousands of NT $ per worker)										
Total	224.52	233.84	235.34	244.19	258.91	265.55	282.32			
Agriculture	89.71	90.80	90.01	88.34	92.12	92.90	90.38			
Industry	272.67	283.55	285.25	300.90	316.29	327.02	357.38			
Manufacturing	286.80	303.52	304.37	318.19	327.85	336.02	369.41			
Services,etc	239.98	249.20	252.43	258.39	271.59	276.91	286.10			
Annual Growth Rate of Absolute Productivity (%)										
Total	5.27	4.15	0.64	3.76	6.03	2.56	6.31			
Agriculture	6.89	1.21	-0.86	-1.86	4.28	0.85	-2.71			
Industry	4.02	3.99	0.60	5.49	5.11	3.39	9.28			
Manufacturing	4.79	5.83	0.28	4.54	3.04	2.49	9.94			
Services,etc	2.82	3.84	1.30	2.36	5.11	1.96	3.32			
Relative Labor Absorption Ratio										
Total	0.27	0.31	0.76	0.49	0.35	0.39	0.38			
Agriculture	6.86	4.21	1.70	3.86	-1.29	0.50	-1.27			
Industry	0.45	0.26	-0.55	0.38	0.54	-0.13	0.30			
Manufacturing	0.33	0.06	0.70	0.54	0.75	-0.11	0.33			
Services,etc	0.66	0.51	0.77	0.66	0.36	0.67	0.59			
YEAR	1970	1981	1982	1983	1984	1985	1986	1987	1988	1989

Sources: PAOC (Taiwan), Statistical Yearbook 1987

III. POPULATION AND GROSS SCHOOL ENROLLMENT RATIO: INDONESIA AND JAPAN, 1950 - 1977

YEAR	1950	1960	1965	1970	1971	1972	1973	1974	1975	1976	1977
1. INDONESIA											
Population (millions)	76.00	92.70	105.07	119.47	122.53	125.64	128.80	132.00	135.67	133.53	136.63
Annual Pop. Growth Rate (%)		2.01	2.54	2.60	2.56	2.54	2.52	2.48	2.78	-1.58	2.32
Gross School Enrollment Ratio:											
First Level:											
Total	37	71	72	77	66	62	80	79	86	84	86
Male		86	79	83			87	87	94	89	91
Female		58	65	71	61	57	72	71	78	79	81
Second Level:											
Total	4	6	12	15	13	12	18	18	20	20	21
Male		10	18	20			22	22	25	25	25
Female		3	7	10	9	9	13	14	15	16	17
First and Second Level:											
Total	27	40	47	49	42	40	52	52	55	55	57
Male		51	55	55			58	58	62	59	61
Female		31	40	43	38	36	46	45	49	50	52
Third Level:											
Total		0.70	1.47	2.80	2.78		2.55	2.43	2.40	2.46	
Male		1.16	2.47	4.30			3.88	3.62		3.58	
Female		0.29	0.65	1.30	1.28		1.35	1.33		1.37	
YEAR	1950	1960	1965	1970	1971	1972	1973	1974	1975	1976	1977
2. JAPAN											
Population (millions)	83.59	94.10	98.88	104.34	105.70	107.19	108.71	110.16	111.57	112.77	113.86
Annual Pop. Growth Rate (%)		1.19	1.00	1.08	1.30	1.41	1.42	1.33	1.28	1.08	0.97
Gross School Enrollment Ratio:											
First Level:											
Total	100	103	100	99	98	97	97	98	99	99	99
Male		103	100	99			97	98	99	99	99
Female	97	102	100	99	98	97	97	98	100	99	99
Second Level:											
Total	71	74	82	86	91	94	90	91	92	92	93
Male		75	82	86			90	91	91	92	93
Female	64	73	81	86	91	94	91	92	92	93	92
First and Second Level:											
Total	86	89	90	92	94	96	94	95	96	96	96
Male		89	90	93			94	95	95	96	96
Female	82	88	89	92	94	96	94	95	96	96	96
Third Level:											
Total		9.45	12.90	17.00	17.15	18.52	20.03	22.14	24.6	26.1	28.6
Male		15.13	19.63	24.50			27.98	30.27	33.0	34.6	38.2
Female		3.88	6.28	9.60	9.62	10.63	12.07	13.95	16.0	17.4	16.8
YEAR	1950	1960	1965	1970	1971	1972	1973	1974	1975	1976	1977

Sources: International Monetary Fund, International Financial Statistics 1990 (data on population)
UNESCO, Statistical Yearbook, various years (data on school enrollment ratio)

III. POPULATION AND GROSS SCHOOL ENROLLMENT RATIO: INDONESIA AND JAPAN, 1978 - 1989

YEAR	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
1. INDONESIA												
Population (millions)	139.80	143.04	147.49	151.31	154.66	158.08	161.58	164.05	168.35	172.02	175.59	179.14
Annual Pop. Growth Rate (%)	2.32	2.32	3.11	2.59	2.21	2.21	2.21	1.53	2.62	2.18	2.08	2.02
Gross School Enrollment Ratio												
First Level												
Total	99	107	107	117	120	115	118	118	118	118	119	
Male	105	114	115	123	124	118	121	121	120	121	121	
Female	92	99	100	11	116	112	115	114	115	115	117	
Second Level												
Total	22	24	29	30	33	37	39	41	46	48	48	
Male	27	29	35	36	38	42	45			53	53	
Female	18	20	23	25	27	31	33			42	43	
First and Second Level												
Total	63	68	72	76	78	79	81	81	83	84	84	
Male	68	74	79	82	83	83	85			88	87	
Female	57	62	65	70	74	75	77			80	80	
Third Level												
Total				3.9	4.1	5.6	6.5					
Male				5.3	5.5	7.8	8.8					
Female				2.4	2.7	3.5	4.2					

YEAR	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
2. JAPAN												
Population (millions)	114.90	115.87	116.78	117.65	118.45	119.26	120.02	120.75	121.49	122.09	122.61	123.12
Annual Population Growth Rate (%)	0.91	0.84	0.79	0.74	0.68	0.68	0.64	0.61	0.61	0.49	0.43	0.42
Gross School Enrollment Ratio												
First Level												
Total	99	101	101	100	100	101	101	102	102	102	102	
Male	100	101	101	100	100	101	101	102	102	102	102	
Female	99	101	101	100	100	101	101	102	102	102	101	
Second Level												
Total	91	92	93	92	94	94	94	95	95	95	95	
Male	93	91	92	92	93	93	94	95	94	94	94	
Female	90	93	94	93	96	96	95	97	96	96	96	
First and Second Level												
Total	96	97	97	97	97	98	98	99	98	98	98	
Male	96	96	97	96	97	97	97	98	98	98	98	
Female	95	97	98	97	98	98	98	99	99	99	99	
Third Level												
Total	29.3	29.8	30.5	30.3	90.3	30.2	29.8	28.7	28.9	29.7	30.1	
Male	38.9	39.6	40.6	39.9	39.9	39.4	38.5	36.8	36.4	36.5	36.6	
Female	19.5	19.8	20.2	20.3	20.5	20.7	20.8	20.3	21.2	22.5	23.3	

YEAR	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989

Sources: International Monetary Fund, International Financial Statistics 1990 (data on population)
UNESCO, Statistical Yearbook, various years (data on school enrollment ratio)

III. POPULATION AND GROSS SCHOOL ENROLLMENT RATIO: MALAYSIA AND PHILIPPINES, 1950 - 1977

YEAR	1950	1960	1965	1970	1971	1972	1973	1974	1975	1976	1977
3. MALAYSIA											
Population (millions)	6.10	8.11	9.24	10.39	10.70	11.00	11.31	11.65	11.90	12.30	12.58
Annual Pop. Growth Rate (%)		2.89	2.64	2.37	2.98	2.80	2.82	3.01	2.15	3.36	2.28
Gross School Enrollment Ratio:											
First Level:											
Total	71	96	90	91			92	92	91	94	93
Male		108	96	95			94	94	93	95	94
Female		83	84	87			89	90	89	92	92
Second Level:											
Total	6	19	28	35			40	43	43	47	50
Male		25	34	40			45	47	48	52	54
Female		13	22	29			35	38	39	43	46
First and Second Level:											
Total	43	64	61	64			66	67	67	70	71
Male		74	67	68			70	71	70	73	74
Female		54	55	59			62	64	63	67	68
Third Level:											
Total		1.21	1.94	1.99			2.66	3.21	2.8	3.1	2.9
Male		1.57	2.57	2.77			3.60	4.15	4.0	4.2	3.9
Female		0.84	1.32	1.19			1.69	2.25	1.6	2.0	2.0
YEAR	1950	1960	1965	1970	1971	1972	1973	1974	1975	1976	1977
4. PHILIPPINES											
Population (millions)	20.28	27.41	31.77	36.85	37.9	38.99	40.12	41.3	42.07	43.41	44.58
Annual Pop. Growth Rate (%)		3.06	3.00	3.01	2.85	2.88	2.90	2.94	1.86	3.19	2.70
Gross School Enrollment Ratio:											
First Level:											
Total	126	95	113	114	110	117	108	107	105	103	100
Male		98	115	115			110	109	106		
Female		93	111	113	112	115	107	106	103		
Second Level:											
Total	23	26	41	50		49	51	55	56	60	63
Male		28	42	50			59	54	55		
Female		25	40	50		51	43	56	57		
First and Second Level:											
Total	89	70	87	91		93	88	88	87	88	87
Male		72	88	92			92	89	88		
Female		69	85	91		92	84	88	87		
Third Level:											
Total		12.65	18.82	19.94	19.70	19.53	20.56	19.50	18.4	20.6	23.7
Male		12.11	16.93	17.11			18.16	17.35			
Female		13.20	20.82	22.98	22.49	22.08	23.05	21.71			
YEAR	1950	1960	1965	1970	1971	1972	1973	1974	1975	1976	1977

Sources: International Monetary Fund, International Financial Statistics 1990 (data on population)
UNESCO, Statistical Yearbook, various years (data on school enrollment ratio)

III. POPULATION AND GROSS SCHOOL ENROLLMENT RATIO: MALAYSIA AND PHILIPPINES, 1978 - 1989

YEAR	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
3. MALAYSIA												
Population (millions)	12.91	13.45	13.76	14.10	14.46	14.82	15.19	15.68	16.11	16.53	16.92	
Annual Pop. Growth Rate (%)	2.62	4.18	2.30	2.47	2.55	2.49	2.50	3.23	2.74	2.61	2.36	
Gross School Enrollment Ratio:												
First Level:												
Total	92	92	92	92	92	96	98	100	101	102	102	
Male	93	93	93	94	94	96	98	101		102	102	
Female	91	90	91	91	91	95	97	100		102	102	
Second Level:												
Total	49	51	51	53	55	50	53	53	54	59	57	
Male	52	53	52	54	56	51	53	53	55	59	56	
Female	47	48	49	51	53	50	53	53	54	59	57	
First and Second Level:												
Total	70	70	71	72	73	72	74	75	77	79	78	
Male	72	72	72	73	74	73	75	75		79	78	
Female	68	69	69	70	72	72	74	75		79	78	
Third Level:												
Total	3.9	3.9	4.1	4.6	4.7	5.2	5.1	6.0	6.9	6.6	6.7	
Male	4.9	4.7	5.0	5.2	5.4	6.1	5.9	6.7		6.8	7.1	
Female	2.9	3.0	3.2	4.0	4.2	4.4	4.3	5.3		6.4	6.2	
YEAR	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
4. PHILIPPINES												
Population (millions)	45.79	47.04	48.32	49.54	50.78	52.06	53.35	54.67	56.00	57.36	58.72	60.10
Annual Pop. Growth Rate (%)	2.71	2.73	2.72	2.52	2.50	2.52	2.48	2.47	2.43	2.43	2.37	2.35
Gross School Enrollment Ratio:												
First Level:												
Total	101	107	113	108	109	109	107	106	107	109	110	
Male			113	109	109	108	107	106	107	107	109	
Female			113	107	110	109	108	107	106	110	111	
Second Level:												
Total	63	64	65	62	66	67	68	64	67	68	71	
Male			61	60	63	64	65	63	66	67	71	
Female			69	64	68	69	71	66	69	68	71	
First and Second Level:												
Total	88	91	95	91	93	93	92	91	92	93	95	
Male			94	90	92	92	91	90	92	93	95	
Female			96	91	94	94	94	92	93	94	96	
Third Level:												
Total	26.6	24.8	27.7	26.6	29.1	31.8	34.1	30.8	30.0	28.9	28.2	
Male	24.7	23.0	26.8	24.4		30.2	32.2					
Female	28.6	26.6	28.5	28.9		33.2	35.9					
YEAR	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989

Sources: International Monetary Fund, International Financial Statistics 1990 (data on population)
UNESCO, Statistical Yearbook, various years (data on school enrollment ratio)

III. POPULATION AND GROSS SCHOOL ENROLLMENT RATIO: SINGAPORE AND SOUTH KOREA, 1950 - 1977

YEAR	1950	1960	1965	1970	1971	1972	1973	1974	1975	1976	1977
5. SINGAPORE											
Population (millions)	1.02	1.63	1.89	2.07	2.11	2.15	2.19	2.23	2.26	2.29	2.33
Annual Pop. Growth Rate (%)		4.80	3.00	1.84	1.93	1.90	1.86	1.83	1.35	1.33	1.75
Gross School Enrollment Ratio:	(1951)										
First Level:											
Total	80	111	105	106	106	105	108	109	110	111	110
Male		121	110	110			111	112	113	114	114
Female	55	101	100	102	102	101	104	106	107	108	107
Second Level:											
Total	8	32	45	46	69	72	52	51	52	54	55
Male		38	49	47			52	51	51	54	55
Female	5	26	41	45	68	71	52	52	52	55	56
First and Second Level:											
Total	47	78	79	77	91	91	79	78	78	80	80
Male		86	84	79			80	80	80	81	81
Female	32	70	74	74	88	88	77	77	77	79	79
Third Level:											
Total		6.41	9.93	6.80	6.50	6.96	7.29	7.66	9.00	9.00	9.10
Male		9.48	12.74	9.30			10.13	10.25	10.70	11.10	11.00
Female		3.10	7.14	4.20	4.13	4.28	4.33	4.96	7.30	6.80	7.10
YEAR	1950	1960	1965	1970	1971	1972	1973	1974	1975	1976	1977
6. SOUTH KOREA											
Population (millions)	20.36	24.70	28.33	32.24	32.88	33.51	34.10	34.69	35.28	35.85	36.41
Annual Pop. Growth Rate (%)		1.95	2.78	2.62	1.99	1.92	1.76	1.73	1.70	1.62	1.56
Gross School Enrollment Ratio:											
First Level:											
Total	83	94	101	103	106	105	108	108	107	108	109
Male		99	103	104			107	107	107	108	109
Female		89	99	103	103	103	108	108	107	109	109
Second Level:											
Total	17	27	35	42	45	47	51	55	56	61	65
Male		38	44	50			60	63	64	70	73
Female		14	25	32	35	38	42	46	48	53	57
First and Second Level:											
Total	54	64	74	76	77	77	79	81	81	84	86
Male		72	78	80			84	85	85	88	90
Female		56	68	71	71	71	75	76	77	80	82
Third Level:											
Total		4.58	6.17	7.90	7.75	8.07	9.19	9.59	10.30	10.00	10.30
Male		7.50	9.01	11.60			13.26	13.75	14.60	14.40	15.00
Female		1.57	3.17	3.90	4.02	4.36	4.97	5.30	5.90	5.40	5.40
YEAR	1950	1960	1965	1970	1971	1972	1973	1974	1975	1976	1977

Sources: International Monetary Fund, International Financial Statistics 1990 (data on population)
UNESCO, Statistical Yearbook, various years (data on school enrollment ratio)

III. POPULATION AND GROSS SCHOOL ENROLLMENT RATIO: SINGAPORE AND SOUTH KOREA, 1978 - 1989

YEAR	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
5. SINGAPORE												
Population (millions)	2.35	2.38	2.41	2.44	2.47	2.5	2.52	2.56	2.59	2.61	2.65	2.68
Annual Pop. Growth Rate (%)	0.86	1.28	1.26	1.24	1.23	1.21	0.80	1.59	1.17	0.77	1.53	1.13
Gross School Enrollment Ratio:												
First Level:												
Total	109	106	108	106	109	113	115		114	112	111	109
Male	111	108	109	107	112	115	118		116	114	112	110
Female	107	105	106	105	107	111	113		113	111	110	107
Second Level:												
Total	57	59	58	62	65	69	71		67	68	69	69
Male	56	57	56	61	64	68	70		66	67	68	68
Female	58	61	59	63	65	69	73		68	69	70	71
First and Second Level:												
Total	80	81	81	83	86	90	92		87	87	87	87
Male	81	81	81	83	87	90	93		87	87	87	87
Female	80	81	81	83	85	89	92		87	87	87	87
Third Level:												
Total	8.8	7.5	7.9	8.6	10.3	11.8						
Male	10.3	8.8	9.3	10.0	11.9	13.3						
Female	7.2	6.0	6.4	7.1	8.6	10.3						

YEAR	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
6. SOUTH KOREA												
Population (millions)	36.97	37.53	38.12	38.72	39.33	39.93	40.51	40.80	41.18	41.57	41.97	42.38
Annual Pop. Growth Rate (%)	1.54	1.51	1.57	1.57	1.58	1.53	1.45	0.72	0.93	0.95	0.96	0.98
Gross School Enrollment Ratio:												
First Level:												
Total	111	111	110	107	104	100	99	96	98	101	104	108
Male	111	112	109	108	106	102	99	96	98	101	104	107
Female	111	111	111	105	103	99	99	97	98	101	104	108
Second Level:												
Total	70	76	76	84	86	89	91	89	89	88	87	86
Male	77	82	81	88	90	94	94	92	91	91	89	88
Female	62	70	71	79	82	85	88	87	87	86	84	83
First and Second Level:												
Total	90	94	93	95	95	95	95	93	94	94	95	96
Male	93	97	95	98	98	98	97	94	95	95	96	97
Female	86	90	90	92	93	92	94	92	92	93	93	95
Third Level:												
Total	10.9	12.4	15.8	17.5	21.0	23.7	29.4	34.0	35.3	36.0	36.5	37.7
Male	15.9	18.3	23.0	25.5	30.1	33.1	39.1	46.3	47.8	48.6	49.0	50.2
Female	5.6	6.2	8.1	9.0	11.2	13.5	18.9	20.9	21.7	22.2	22.9	24.2

YEAR	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989

Sources: International Monetary Fund, International Financial Statistics 1990 (data on population)
UNESCO, Statistical Yearbook, various years (data on school enrollment ratio)

III. POPULATION AND GROSS SCHOOL ENROLLMENT RATIO: THAILAND AND UNITED STATES, 1950-1977

YEAR	1950	1960	1965	1970	1971	1972	1973	1974	1975	1976	1977
7. THAILAND											
Population (millions)	19.64	26.39	31.03	36.37	37.49	38.59	39.69	40.78	41.87	42.96	44.04
Annual Pop. Growth Rate (%)		3.00	3.29	3.23	3.08	2.93	2.85	2.75	2.67	2.60	2.51
Gross School Enrollment Ratio:											
First Level:											
Total	76	83	78	83		84	85	85	84	83	82
Male		88	82	86			89	88	87	86	85
Female	72	79	74	79	79	80	81	81	80	79	78
Second Level:											
Total	7	13	14	17			22	24	25	27	28
Male		16	16	20			25	27	28	28	29
Female		10	11	15			19	20	22	26	27
First and Second Level:											
Total	48	59	56	58			61	62	62	62	62
Male		63	60	61			65	65	65	65	64
Female		55	53	55			58	58	58	59	59
Third Level:											
Total		1.92	1.54	1.7	2.2	2.3	3.34	3.86	3.5	4.5	5.3
Male		2.67	2.05	1.9			4.1	4.74	4.3	5	6.1
Female		1.17	1.03	1.4	1.79		2.6	3.02	2.7	3.9	4.5
YEAR	1950	1960	1965	1970	1971	1972	1973	1974	1975	1976	1977
8. UNITED STATES											
Population (millions)	152.27	180.68	194.3	205.05	207.66	209.9	211.91	213.85	215.97	218.04	220.24
Annual Pop. Growth Rate (%)		1.73	1.46	1.08	1.27	1.08	0.96	0.92	0.99	0.96	1.01
Gross School Enrollment Ratio:											
First Level:											
Total	88	99		101		100	99	101	99	101	101
Male	89	100		102		101	100	101	100	101	101
Female	87	98		101		100	99	101	99	100	100
Second Level:											
Total	63	92		92		92	92	91	92	94	94
Male	63	92		91		92	92	91	91	94	94
Female	62	93		94		93	91	92	92	93	95
First and Second Level:											
Total	80	97		99		98	97	98	96	98	98
Male	81	98		99		98	97	98	97	99	98
Female	80	96		99		98	96	98	96	98	98
Third Level:											
Total	19	32.07	40.18	49.40	49.54	50.66	51.53	53.60	57.30	56.10	56.00
Male	27	40.22	48.89	57.70			57.31	57.31	62.50	58.80	57.20
Female	12	23.84	31.40	41.10	41.54	43.97	45.67	45.67	52.00	53.30	54.90
YEAR	1950	1960	1965	1970	1971	1972	1973	1974	1975	1976	1977

Sources: International Monetary Fund, International Financial Statistics 1990 (data on population)
UNESCO, Statistical Yearbook, various years (data on school enrollment ratio)
United States, Bureau of Census, Historical Statistics for the United States: 1950 - 1970
United States, Bureau of Census, Statistical Abstract for the United States, various years

III. POPULATION AND GROSS SCHOOL ENROLLMENT RATIO: THAILAND AND UNITED STATES, 1978-1989

YEAR	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
7. THAILAND												
Population (millions)	45.10	46.14	46.72	47.74	48.74	49.73	50.71	51.68	52.65	53.60	54.54	55.45
Annual Pop. Growth Rate (%)	2.41	2.31	1.26	2.18	2.09	2.03	1.97	1.91	1.88	1.80	1.75	1.67
Gross School Enrollment Ratio:												
First Level:												
Total	92	95	99	96		97	97	96	96	95	87	
Male	95	98	100									
Female	89	92	97									
Second Level:												
Total	28	28	29	29		30	31	30	30	28	28	
Male	30	30	30									
Female	25	26	28									
First and Second Level:												
Total	62	64	66	64		64	64	63	63	62	58	
Male	65	67	67									
Female	60	62	65									
Third Level:												
Total	8.9	11	13.1	19.9	21.8	22.5		19.6		15.9		
Male												
Female												
YEAR	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
8. UNITED STATES												
Population (millions)	222.59	225.06	227.76	230.14	232.52	234.80	237.00	239.28	241.62	243.93	246.33	249.41
Annual Pop. Growth Rate (%)	1.07	1.11	1.20	1.04	1.03	0.98	0.94	0.96	0.98	0.96	0.98	1.25
Gross School Enrollment Ratio:												
First Level:												
Total	100	101	99	101	101	101	99	99	100			
Male	101	102	100	101	102	101	100	99	101			
Female	100	100	99	101	100	100	99	100	100			
Second Level:												
Total	94	93	89	94	94	94	94	97	98			
Male	93	93	88	93	94	93	94	98	96			
Female	94	94	90	94	93	95	94	97	99			
First and Second Level:												
Total	98	98	95	99	98	98	98	99	100			
Male	98	99	95	99	99	98	98	99	100			
Female	96	98	96	99	98	98	97	99	99			
Third Level:												
Total	55.6	54.9	56.0	56.3	56.4	57.1	56.7	57.7	59.6			
Male	56.4	53.3	54.0	53.6	53.8	54.4	53.6	54.4	55.5			
Female	54.8	56.5	58.1	59.1	59.2	59.9	59.9	61.2	63.7			
YEAR	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989

Sources: International Monetary Fund, International Financial Statistics 1990 (data on population)
UNESCO, Statistical Yearbook, various years (data on school enrollment ratio)
United States, Bureau of Census, Historical Statistics for the United States : 1950 - 1970
United States, Bureau of Census, Statistical Abstract for the United States, various years

III. POPULATION AND GROSS SCHOOL ENROLLMENT RATIO: HONG KONG AND TAIWAN, 1950 - 1977

YEAR	1950	1960	1965	1970	1971	1972	1973	1974	1975	1976	1977
9. HONG KONG											
Population (millions)	1.91	3.06	3.60	3.94	4.02	4.11	4.20	4.30	4.40	4.44	4.51
Annual Pop. Growth Rate (%)		4.84	3.27	1.84	2.08	2.14	2.21	2.26	2.33	1.07	1.51
Gross School Enrollment Ratio:											
First Level:											
Total		91	106	117	120	120	122	123	119	114	111
Male				118			123	124	122	115	113
Female		85	104	115	118	120	121	122	117	112	110
Second Level:											
Total		24	34	36	57	62	42	46	49	52	56
Male				40			44	48	51	54	58
Female		20	30	31	52	58	39	44	47	49	54
First and Second Level:											
Total		62	71	76	91	94	77	79	78	77	78
Male				79			79	81	80	79	80
Female		58	68	73	89	92	76	77	76	75	76
Third Level:											
Total		4.38	5.40	7.30	6.80	7.86	8.60	9.32	10.10	9.70	
Male				8.80			12.10	13.06	14.70	13.40	
Female		3.85	4.49	4.60	4.00	4.58	4.74	5.22	5.30	5.50	

YEAR	1950	1960	1965	1970	1971	1972	1973	1974	1975	1976	1977
10. TAIWAN											
Population (millions)		10.79	12.63	14.68	14.99	15.29	15.56	15.85	16.15	16.51	16.81
Annual Pop. Growth Rate (%)			3.19	3.05	2.17	1.96	1.80	1.85	1.88	2.22	1.85
Gross School Enrollment Ratio:											
First Level:											
Total		96	97	98	98	98	98	99	99	99	100
Male											
Female											
Second Level:											
Total		30	38	54	58	62	62	63	66	74	74
Male		39	46	64	69	71	69	70	72	78	78
Female		21	29	45	48	52	54	57	60	70	71
First and Second Level:											
Total											
Male											
Female											
Third Level:											
Total		3.1	6.7	8.3	8.4	9.1	9.4	9.5	9.3	9.4	9.8
Male		4.9	9.8	10.2	10.2	11.1	11.7	11.8	11.5	11.6	11.8
Female		1.3	3.5	6.4	6.5	7.0	7.1	7.1	7.0	7.1	7.8

YEAR	1950	1960	1965	1970	1971	1972	1973	1974	1975	1976	1977

Sources: International Monetary Fund, International Financial Statistics 1990 (data on population)
Republic of China (Taiwan), Statistical Yearbook 1987 (data for Taiwan)
UNESCO, Statistical Yearbook, various years (data on school enrollment ratio)

III. POPULATION AND GROSS SCHOOL ENROLLMENT RATIO: HONG KONG AND TAIWAN, 1978 - 1987

YEAR	1978	1979	1980	1981	1982	1984	1985	1986	1987
9. HONG KONG									
Population (millions)	4.60	4.98	5.04	5.10	5.16	5.28	5.34	5.41	5.48
Annual Pop.Growth Rate (%)	1.93	8.31	1.21	1.15	1.16	1.15	1.16	1.37	1.28
Gross School Enrollment Ratio:									
First Level:									
Total	113	111	106	106	106	104	104	104	106
Male	115	113	107	107	107	105	105	105	106
Female	111	109	105	105	105	103	103	103	105
Second Level:									
Total	57	60	64	66	67	72	72	73	74
Male	57	59	63	64	64	69	70	71	71
Female	58	61	65	68	70	74	75	76	76
First and Second Level:									
Total	79	79	81	82	84	86	87	87	88
Male	79	79	81	82	82	85	85	86	87
Female	78	80	82	83	85	87	88	88	89
Third Level:									
Total	10.0	10.0	10.5	10.8	11.9	13.2			
Male	13.8	13.4	14.2	14.2	15.2	16.8			
Female	6.0	6.1	6.4	7.2	8.3	9.3			
YEAR	1978	1979	1980	1981	1982	1984	1985	1986	1987
10. TAIWAN									
Population (millions)	17.14	17.48	17.81	18.14	18.46	19.01	19.26	19.45	
Annual Pop. Growth Rate (%)	1.92	2.01	1.86	1.86	1.78	1.49	1.29	1.02	
Gross School Enrollment Ratio:									
First Level:									
Total	100	100	100	100	100	100	100	100	
Male									
Female									
Second Level:									
Total	76	78	80	83	86	89	91	92	
Male	79	80	81	83	85	88	89	91	
Female	74	77	80	83	86	90	92	94	
First and Second Level:									
Total									
Male									
Female									
Third Level:									
Total	10.2	10.3	10.5	11.0	11.4	12.5	13.1	14.2	
Male	11.9	11.9	11.9	12.2	12.5	13.4	14.1	15.0	
Female	8.5	8.7	9.1	9.7	10.2	11.5	12.0	13.3	
YEAR	1978	1979	1980	1981	1982	1984	1985	1986	1987

Sources: International Monetary Fund, International Financial Statistics 1989 (data on population)
Republic of China (Taiwan), Statistical Yearbook 1987
UNESCO, Statistical Yearbook, various years (data on school enrollment ratio)

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