CHAPTER XI
EDUCATION AND MANPOWER TRAINING

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I. INTRODUCTION

To develop the Indonesian economy rapidly, the labor force must be educated. It is also necessary, for the continued integration and perpetuation of the nation, to diffuse the Indonesian language to make it common among all races throughout the land, and to convince the people of the "PANCA SILA" spirit, or the five principles of the country. Thus the enrichment and expansion of education has been one of the most important issues for the country and much effort has been made to spread education (Republic of Indonesia 1983:535, Table 20-1).

From the viewpoint of the people there is a strong need for education because educational background greatly affects status and income. Since both the government and citizens agree on the need for strengthening education, education has expanded a great deal along with the economic development in the last ten years.

Needless to say, economic development is just one objective of education; social, cultural and human development are also important objectives. However, in this paper only issues concerning the expansion and the prospects of education from the viewpoint of demand and supply of manpower are discussed.

Unless otherwise specified, educational statistics cited here are based on the Annual School Survey conducted by the Ministry of Education and Culture (from kindergarten to upper secondary school: Statistik Persekolahan 1971-1984/85, for national universities: Data Perguruan Tinggi Negeri 1974-1983/84, for private universities: Data Perguruan Tinggi Swasta 1975-1983/84), and the Flow of Students (Departmen Pendidikan Dan Kebudayaan 1986a; 1986b; 1986c). Labor Statistics are generally based on the results of national censuses because they deal with a large number of samples (Biro Pusat Statistik 1975; 1983b).

II. MANPOWER AND EDUCATIONAL PLANNING

1. The Educational System of Indonesia

The formal educational system of Indonesia uses the "6-3-3" school-year system. In this system there are three main categories of schools.

Primary education consists of pre-school and elementary school. Pre-school is maximally a three-year program for children before they are seven years old. Pre-school is not a prerequisite for starting elementary school, in light of the financial considerations and the diversity of the social environment. The elementary school is a distinctly separate program lasting six years. It is basically for children in the seven to twelve age bracket. Education at the elementary school level is compulsory; and tuition fees are not charged at public schools.

The various kinds of lower secondary schools (general, SMP, technical or vocational) all last three years. Elementary school graduates are eligible for lower secondary school.

The upper secondary school system consists of general, technical, vocational, and teachers' schools. Each program is a three-year unit. Some technical upper secondary schools have four-year programs. All are open to lower secondary school graduates.

Above the upper secondary schools there are universities and academies with several courses: A diploma program (S0) for short-term special training; program (S1) for Sarjana degree (144-160 units in 4-7 years) and Sarjana Muda degree (110-120 units in 3-5 years) and graduate programs (S2,S3) for master's and doctor's degrees. There is also the Open University for workers and students in remote areas, which accepted its first students in 1984.

There are many schools which are not operated under the control of the Ministry of Education and Culture. Most are under the Ministry of Religion. Other Ministries, i.e., Agriculture, Health, Industry, Communication, Mining and Energy, Trade, and Defense, are responsible for the operation of some of the lower secondary schools and upper secondary schools (Biro Pusat Statistik 1984b).

These schools controlled by different authorities are somewhat interrelated. For example, the ratios of students who graduated from an elementary or a lower secondary school under the Minis-

try of Religion and enrolled in a lower or a upper secondary school under the Ministry of Education and Culture were 3.34% and 3.94% respectively in 1984.

The statistics collected by the Ministry of Education and Culture are accurate and available over a long period. Also, statistics on educational facilities are available, making it possible to check the numbers of pupils from the aspect of physical capacity of classrooms (Departmen Pendidikan Dan Kebudayaan 1985). Due to limitations of the data, this paper deals mainly with the schools under the Ministry of Education and Culture; schools controlled by other authorities are taken into consideration when necessary.

2. Expansion of Education

As the number of entrants to elementary schools increases, overall enrollment in all schools increases. Elementary school graduates are qualified to go to lower secondary schools, thus increasing enrollment. In turn, these graduates increase enrollment at upper secondary schools and then universities and academies. Thus the expansion of education at a certain level causes expansion at the next level.

Seventy percent of elementary school graduates and eighty percent of lower secondary school graduates go on to upper schools nowadays. But the net enrollment rate is still low at lower and upper secondary schools because the graduation rate is low. The rate has been increasing at the elementary level. The graduation rate of pupils who were in the first grade of elementary schools in 1971 was 45.2%, and that of pupils in the first grade in 1978 was 59.3%. At the same time the annual dropout rate has been decreasing as economic development proceeds. For example, it was 10.6% in 1971 and 3.0% in 1983/84. The ratio of repeaters, students remaining in the same grade, however, has not changed so much. It was 12.3% in 1971 and 10.2% in 1983/84.

The average graduation rate at lower secondary schools, which was 66.4% among first grade students in 1971, has increased to 86.2% among first grade students in 1980. On the other hand, the annual dropout rate has drastically decreased: It was 11.9% in 1971 and 5.2% in 1983/84. The ratio of repeaters decreased from 4.1% to 1.9% in the same period.

At the upper secondary school level the average graduation rate increased from 68.0% of the first grade students in 1971 to 84.1% in 1980. The annual dropout rate, which was 12.7% in 1971, decreased to 5.4% in 1983/84. The ratio of repeaters also decreased from 4.9% to 1.7% in the same period. In addition to the increase in the number of entrants, the lower dropout and higher graduation rates have dramatically boosted the number of students attending schools.

According to the national census taken in 1980, the ratio of university graduates to the total labor force (people aged over ten and economically active) is only 0.380% (Biro Pusat Statistik 1983b: 204, Table 43.9). The ratio is merely 0.811% when the number of academy graduates are added to university graduates. The number of people who graduated from universities in 1983 with the title of "Sarjana" was 24,552 and 4,124 at national and private universities respectively, or 28,676 in total. The percentage of the total to the 23-year-old population is only 0.990%. The number of people who graduated from private and national universities with the title of "Sarjana Muda" was 34,508 in total. Taken together, the percentage of people who have degrees to the 23-year-old population is 2.182%. Thus, those who earned degrees have scarcity value.

Better educational background leads to a better and more stable income. As Table 1 shows, the average income strongly depends upon the educational background of a worker, though the income difference is decreasing. Statistics on wages by age and educational background have not yet been issued by authorities, however, the difference is greater than indicated if the distribution of workers by age and educational background is taken into consideration as most of the workers with a strong educational background are young as described later. The fact that one has to graduate from at least from elementary school and be able to speak and write Indonesian in order to get a good job is the main factor promoting the enrollment rate.

Table 1 Educational Career and Average Incomer per Month of an Employee

Year	Sex	Not yet attended school	Not finished elementary	Elem. school graduate	Low.sec. school graduate	Upp.sec. school graduate	Academy graduate	Univ. graduate	Total
1976	Man	7,957	9,911	14,313	23,381	29,672	48,544	80,856	14,935
		(9.8)	(12.3)	(17.7)	(28.9)	(36.7)	(60.0)	(100.0)	(18.5)
	Woman	3,981	4,422	6,286	15,404	20,415	32,312	52.209	6,107
		(7.6)	(8.5)	(12.0)	(29.5)	(39.1)	(61.9)	(100.0)	(11.7)
	Total	5,877	8,348	12,998	22,329	27,560	46,149	77,745	12,284
		(7.6)	(10.7)	(16.7)	(28.7)	(35.4)	(59.4)	(100.0)	(15.8)
1982	Man	25,900	30,195	39,794	61,256	77,091	118,277	136,023	44,965
		(19.0)	(22.2)	(29.3)	(45.0)	(56.7)	(87.0)	(100.0)	(33.1)
	Woman	12,305	14,522	18,008	40,545	55,573	77,047	102,466	22,249
		(12.0)	(14.2)	(17.6)	(39.6)	(54.2)	(75.2)	(100.0)	(21.7)
	Total	19,168	26,112	35,834	58,221	71,552	109,081	130,412	38,704
		(14.7)	(20.0)	(27.5)	(44.6)	(54.9)	(83.6)	(100.0)	(29.7)

Calculated from Tables 3.3-3.5 of BPS 1984a. Tables 18.7-18.9 of BPS 1979.
Nominal prices in rupiah (when the income of of an university graduate is 100).

III. ESTIMATION OF MANPOWER

The educational sector provides the labor market with various qualities of manpower. Indonesian statistics show that the number of enrolled students and graduates is increasing very rapidly at all levels of elementary and secondary education. In this section a method for estimating manpower for years until 1990 is presented.

In this paper those people ten years old and over and not attending school are defined as the potential labor force. The potential labor force consists of the labor force and persons not in the labor force. In turn, the labor force consists of both employed and unemployed persons.

1. Factors of The Supply of Manpower

1.1 Population

The number of enrolled students and graduates is affected by the school age population, enrollment rate, dropout rate, repeater rate and graduation rate. Basic figures of five-year segments of the population are available in the BPS publications as shown in Table 2 [Biro Pusat Statistik 1984c: 84, Table 28.3]. For this study every age group from 6 to 24 years old from 1971 to 1990 was required. The following guidelines were adopted to estimate the population. [Shryock et. al. 1971]:

1) Estimation of the population in 1975 and 1970 is based on the assumption that the mortality rate decreases at a constant rate.
2) Subdivision of five-year groups into fifths based on the Sprague formula.
3) Interpolation between every given five years at intervals of one year is based on the Karup-King formula.

The result is shown in Table 3. However, there are some problems in estimating the population in this way.

Table 2 Population Estimation 1980-2000 (unit: 1,000 persons)

Age group	1980	1985	1990	1995	2000
0 - 4	22,382.0	23,558.6	24,778.8	25,829.6	26,645.3
5 - 9	19,759.6	21,611.3	22,923.7	24,276.7	25,460.8
10 - 14	17,441.7	19,516.9	21,394.3	22,741.6	24,131.2
15 - 19	15,515.0	17,320.9	19,304.0	21,206.0	22,585.7
20 - 24	13,971.0	15,226.9	17,051.8	19,058.1	20,990.5
25 - 29	11,403.2	13,654.8	14,937.8	16,786.6	18,822.2
30 - 34	8,926.1	11,112.4	13,363.0	14,676.0	16,553.1
35 - 39	8,275.2	8,662.8	10,834.9	13,086.9	14,432.9
40 - 44	7,555.8	7,982.0	8,399.1	10,557.3	12,810.9
45 - 49	6,308.3	7,223.2	7,672.9	8,116.6	10,254.5
50 - 54	4,982.3	5,941.8	6,846.1	7,316.1	7,785.1
55 - 59	3,659.9	4,585.9	5,509.5	6,393.5	6,879.8
60 - 64	2,833.7	3,247.3	4,106.3	4,977.4	5,827.6
65 - 69	2,099.8	2,373.8	2,751.5	3,520.3	4,315.7
70 - 74	1,439.5	1,607.2	1,843.6	2,168.4	2,813.9
75 - 79	860.3	955.0	1,086.2	1,269.9	1,520.5
80 +	517.9	574.0	654.3	767.1	922.9
Total	148,041.3	165,154.8	183,457.8	202,748.1	222,752.6

Source: BPS, 1984c.

Table 3 Population Estimation (by age and year)

Age	1970	1971	1972	1973	1974	1975	1976
5	3,352,563	3,431,155	3,513,685	3,599,024	3,683,158	3,758,597	3,838,661
6	3,267,386	3,336,637	3,413,671	3,493,798	3,575,843	3,653,878	3,726,871
7	3,194,405	3,252,809	3,323,405	3,399,463	3,477,507	3,555,354	3,631,339
8	3,130,378	3,181,091	3,240,213	3,312,067	3,387,265	3,462,756	3,539,487
9	3,072,067	3,120,541	3,169,076	3,228,995	3,301,823	3,375,814	3,450,915
10	3,020,826	3,066,647	3,110,872	3,157,947	3,218,550	3,291,872	3,365,954
11	2,978,009	3,017,361	3,060,094	3,101,245	3,147,289	3,208,273	3,282,749
12	2,917,404	2,974,920	3,012,005	3,052,609	3,091,537	3,136,688	3,198,569
13	2,826,580	2,913,916	2,969,522	3,005,162	3,044,392	3,081,622	3,126,420
14	2,716,082	2,822,049	2,907,994	2,962,352	2,997,240	3,035,644	3,701,584
15	2,612,027	2,710,057	2,815,279	2,900,230	2,953,946	2,988,644	3,026,232
16	2,512,967	2,640,067	2,702,207	2,806,824	2,891,211	2,944,840	2,979,104
17	2,406,710	2,502,564	2,594,798	2,692,993	2,797,241	2,881,529	2,934,676
18	2,291,034	2,394,619	2,491,500	2,584,561	2,682,872	2,787,083	2,870,790
19	2,172,661	2,278,619	2,382,356	2,479,964	2,573,697	2,672,304	2,775,981
20	2,057,398	2,160,790	2,266,208	2,369,994	2,468,147	2,562,544	2,660,983
21	1,940,310	2,045,835	2,148,900	2,253,832	2,357,610	2,456,239	2,550,878
22	1,854,193	1,929,042	2,034,298	2,137,023	2,241,522	2,345,277	2,444,113
23	1,814,767	1,843,099	1,917,864	2,022,803	2,125,190	2,229,308	2,332,946
24	1,806,312	1,803,564	1,832,139	1,906,771	2,011,364	2,113,433	2,217,169

Age	1977	1978	1979	1980	1981	1982	1983
5	3,916,294	3,993,928	4,071,109	4,144,944	4,222,132	4,293,425	4,362,741
6	3,814,517	3,892,309	3,969,821	4,044,922	4,119,575	4,201,240	4,272,642
7	3,707,737	3,795,508	3,872,890	3,984,604	4,024,571	4,103,173	4,184,783
8	3,618,009	3,696,495	3,779,791	3,855,602	3,932,211	4,012,170	4,092,470
9	3,530,171	3,610,183	3,688,447	3,765,528	3,842,069	3,922,577	4,004,550
10	3,443,355	3,524,512	3,604,154	3,678,894	3,753,944	3,833,912	3,916,800
11	3,358,525	3,438,019	3,519,615	3,596,216	3,668,650	3,746,267	3,828,697
12	3,274,986	3,352,266	3,432,855	3,512,585	3,586,732	3,660,849	3,740,656
13	3,189,839	3,267,783	3,345,912	3,425,806	3,503,454	3,578,174	3,654,268
14	3,116,760	3,181.479	3,260,340	3,338,200	3,416,767	3,494,152	3,569,996
15	3,061,506	3,107,296	3,172,885	3,251,858	3,329,020	3,407,109	3,484,631
16	3,016,022	3,051,263	3,097,612	3,163,452	3,242,204	3,319,213	3,396,989
17	2,968,349	3,005,214	3,040,731	3,087,295	3,153,034	3,231,909	3,308,947
18	2,923,098	2,956,784	2,994,010	3,029,784	3,076,194	3,142,034	3,221,176
19	2,858,601	2,910,642	2,944,817	2,982,610	3,018,261	3,064,584	3,130,672
20	2,763,565	2,845,551	2,897,843	2,932,854	2,970,840	3,006,244	3,052,692
21	2,648,603	2,750,390	2,832,230	2,884,238	2,920,726	2,958,565	2,993,977
22	2,538,470	2,635,622	2,737,010	2,819,229	2,872,683	2,908,165	2,946,048
23	2,431,642	2,525,662	2,622,501	2,723,982	2,806,428	2,859,820	2,895,419
24	2,320,567	2,419,017	2,512,793	2,609,698	2,711,209	2,793,435	2,846,866

Age	1984	1985	1986	1987	1988	1989	1990
5	4,428,344	4,483,406	4,532,412	4,576,630	4,619,172	4,662,716	4,709,959
6	4,341,751	4,404,046	4,457,748	4,509,899	4,555,484	4,599,481	4,644,034
7	4,256,191	4,323,437	4,385,205	4,440,131	4,492,230	4,538,188	4,582,134
8	4,171,157	4,241,650	4,309,756	4,373,775	4,427,847	4,477,733	4,522,840
9	4,084,199	4,158,760	4,230,634	4,302,667	4,366,824	4,418,189	4,464,733
10	3,998,540	4,075,091	4,148,661	4,224,756	4,299,233	4,361,421	4,408,451
11	3,911,977	3,990,970	4,065,818	4,141,928	4,221,595	4,296,515	4,354,633
12	3,823,992	3,905,205	3,982,184	4,058,558	4,136,958	4,218,731	4,291,575
13	3,735,272	3,817,361	3,896,581	3,974,295	4,052,304	4,132,148	4,213,745
14	3,647,683	3,728,272	3,808,776	3,888,040	3,966,788	4,046,051	4,125,896
15	3,561,648	3,639,874	3,719,582	3,799,856	3,879,438	3,959,147	4,038,792
16	3,474,845	3,552,585	3,630,726	3,710,429	3,790,650	3,870,627	3,950,857
17	3,386,566	3,464,748	3,542,676	3,621,056	3,700,925	3,781,204	3,861,462
18	3,298,386	3,375,997	3,454,204	3,532,287	3,611,031	3,691,186	3,771,564
19	3,210,201	3,287,696	3,365,138	3,443,243	3,521,612	3,600,821	3,681,325
20	3,119,166	3,199,186	3,276,724	3,353,884	3,432,070	3,510,844	3,590,596
21	3,040,745	3,107,736	3,187,990	3,265,360	3,342,451	4,420,888	3,500,178
22	2,981,705	3,028,967	3,096,266	3,176,478	3,253,834	3,331,058	3,409,900
23	2,933,552	2,969,671	3,017,271	3,084,610	3,164,863	3,242,372	3,319,921
24	2,882,740	2,921,340	2,957,810	3,005,505	3,072,942	3,153,356	3,231,205

a. Disagreement of statistics

Although the school-age population is the most fundamental factor in estimating the number of students in the future, methods to calculate that population have not yet been established. Educational statistics and vital statistics are based upon different sources, causing much difficulty.

Figures about schools are estimated by the respective governing authorities. Yet some figures are overlapping, because some students go to different schools under different ministries on a given single day for different morning and afternoon sessions.

The vital statistics are based upon national censuses. Still, some figures have to be estimated because the census is not always accurate due to the heaping phenomenon. Further it is impossible to cover all people in a census in Indonesia even nowadays. Thus certain coefficients for correction have been employed to adjust actual figures attained by a census.

Recently, the enrollment rate has increased at a high rate and revealed some disagreements among statistics. Soenardi has studied the difference between the school-age population estimates for the First Five Year Development Plan till the Fourth Five Year Development Plan, and the actual number of students (Soenardi 1983). This paper attempts to study these estimation problems and to propose alternatives.

b. Several vital statistics

The preliminary report of the census conducted in 1980 shows that the school-age population (from seven to twelve years old) was 24,692,291 (Biro Pusat Statistik 1981); however, it was 24,291,587 according to the final report (Biro Pusat Statistik 1983b). The difference is attributed to different samplings for estimation. Not these results, but estimated values for years from 1980-2000 from an old version of Table 2 (Biro Pusat Statistik 1983a) were employed in designing the Fourth Five Year Development Plan. That number was 22,357,500 or 92.0% of the value from the census. According to the Fourth Five Year Development Plan, elementary school enrollment was estimated to be 88.2%; however, it would be 81.1% if the value from the census were used.

The difference between the results of a census and the estimated population is considered to be caused by "smoothing". Vital statistics are not necessarily accurate enough in developing countries to use as a basis for calculation (Ewbank 1981). A census is based upon the information from the children or parents. In Indonesia, because of the cost and inconvenience of visiting offices, a registration system has not been established and some people do not know their own age, nor their children's ages, especially in rural areas. Thus, statistically the number of people whose ages are multiples of 5 or 10 is unrealistically large. Due to this "heaping phenomenon", it is necessary to smooth the population distribution to estimate "biological" ages of the people. Social surveys, biological and ethnographical, have been established to attain more accurate ages and numbers of people (Igarashi 1982a; 1982b); however, these methods are designed to get information about small areas and cannot be used on a nationwide scale.

Here, the ten-year-old population is estimated in a time series by several methods. One uses the value from Table 3, which is based on the 1980 census. Another is to observe the changes of the ten-year-old population in a time series from the results of the census. In this way population by age can be estimated directly from the results of the census by multiplying the results by a reasonable death rate. The death rate is estimated from Table 3. The newborn to one-year-old population in 1980 is not taken into consideration because it lacks reliability (Igarashi 1982b).

Next, the ten-year-old population estimated from educational statistics is examined. It is necessary to study various factors to do so.

c. Distribution of new entrants by age

Information about the distribution of new entrants by age is available only for 1983/84 and 1984/85. As for 1971, 72, 74, 75, and 76, the distribution of pupils by age for each grade has been estimated (the number of repeaters is not treated separately). For 1979/80 only statistics taking the grade of pupils as a whole is available.

Children in the first grade consist of new entrants and repeaters. Distribution of new entrants by age can be estimated if children in the first grade and that of repeaters are estimated. In this paper the distribution of repeaters by age is considered to be equal to that of the pupils in the first grade of the previous academic year; in other words the ratio of pupils who become repeaters is considered to be stable regardless of age. From the fact that the repeater rate at higher grades is lower, the repeater rate of elder pupils might be somewhat overestimated. The distribution of the new entrants by age of 1972, 75, 76 and 77 can be estimated on this premise.

The number of new entrants reaches a peak in 1979/80. The distribution of children by age changes drastically around that time -- the number of younger children becoming the majority. In 1979/80 all of the six-year-old children at schools are regarded as new entrants and their ratio to all entrants is established. The premise taken to attain values about children over seven years old is that their distribution by age ia the same as that in 1977. Basically the same method is employed to estimate figures in 1974, and linear interpolation is adopted to attain values in other academic years. The influence of the change of academic calendar conducted in 1980 is also taken into consideration.

It is not quite appropriate to consider all six-year-old children as new entrants. Though children reaching the age six are obliged to attend school in Indonesia, not very many children actually enter elementary school. Due to universalization of elementary school education, priority is given to children aged seven to twelve. Elementary schools accept seven-year-old children first, and then elder children before accepting six-year-olds.

Occasionally five-year-old children are accepted at an elementary school when their abilities meet requirements, yet their number does not appear in the statistics and is very small. All in all, it is satisfactory to assume that all six-year-olds are new entrants. Table 4 shows the distribution of new entrants by age estimated under premises described above. As for 1985/86 and years following, estimated values attained in two ways are presented. It is clear that the ratio of children entering elementary school at the age of eight or order is decreasing thanks to the effort of the government.

The percentage of six-year-old pupils to all entrants has increased rapidly. In other words, the expansiton of educational opportunities promoted by the supply of more schools is lowering the age of the entrants rather than decreasing the number of children who have not atended school.

d. People who have never attended school

In addition to children who enter school after becoming seven years old, there are some people who do not got to school at all. Since any values estimated from educational statistics do not include such people, their existence has to be reflected somehow. As observed in Table 4 almost all children enter school by age nine. It can be assumed that ten-year-old children who have not enrolled at school will never do so.

Table 4 Age Distribution of Entrants to Elementary Schools

(%)

Year/age		6	7	8	9	10+
1972		20.3734	45.0919	24.3717	7.8440	2.3190
1973		20.5388	44.2409	24.0556	8.4144	2.7503
1974		20.8723	43.3041	23.6914	8.9610	3.1712
1975		19.8934	43.0824	23.7191	9.6586	3.6466
1976		19.5118	43.1311	25.0043	8.7983	3.5545
1977		18.8806	46.9041	24.2282	7,5176	2.4696
1978		17.7653	47.5490	24.5613	7.6209	2.5035
79/80		16.0923	48.5163	25.0610	7.7760	2.5545
80/81		18.2584	49.7481	22.7090	6.8486	2.4358
81/81		20.4245	50.9790	20.3571	5.9213	2.3172
82/83		22.5906	52.2117	18.0051	4.9940	2.1986
83/84		24.7567	53.4435	15.6532	4.0667	2.0799
84/85		25.1524	55.9796	13.3974	3.5373	1.9333
85/86	I	26.7753	55.7989	12.4012	3.1468	1.8779
	II	26.4584	55.6076	12.7708	3.2610	1.9025
86/87	I	28.4528	56.7948	10.4430	2.5635	1.7460
	II	27.5646	56.3010	11.4540	2.8619	1.8186
87/88	I	29.6204	57.4087	9.1267	2.1913	1.6530
	II	27.9155	56.5018	11.0413	2.7438	1.7976
88/89	I	30.7109	57.9750	7.8975	1.8564	1.5602
	II	28.2638	56.7284	10.6090	2.6226	1.7763
89/90	I	31.7364	58.4509	6.7878	1.5602	1.4648
	II	28.6251	56.9314	10.1906	2.5013	1.7515
90/91	I	32.6881	58.8549	5.7870	1.3016	1.3684
	II	28.9978	57.1265	9.7729	2.3818	1.7211

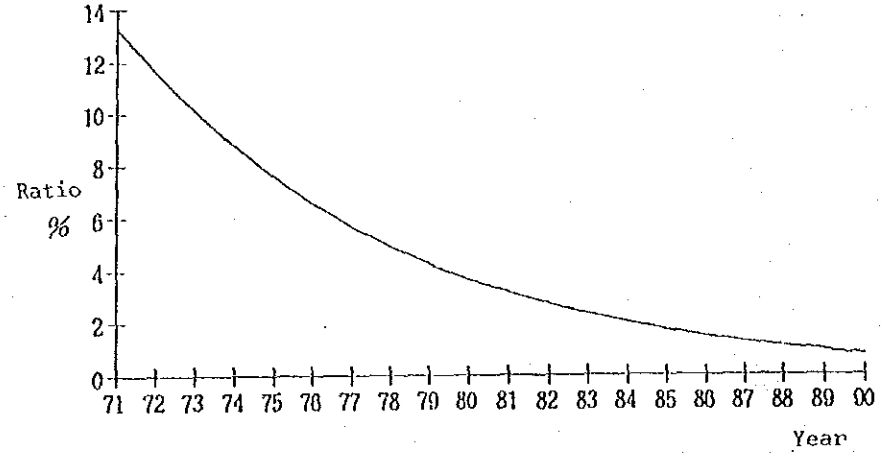
Data about such children without school education are shown in the census and labor force surveys, and their ratio has decreased. In this paper the decrease in the ratio of such children aged 10-14 is approximated by a logistic curve. Parameters can be estimated by the ordinary least square method as follows:

$$NAT = 1 / (1 + \exp(YEAR * 0.156588 - 9.55040)) \qquad R^2 = 0.912356$$

Where NAT is the ratio of children who have not attended school and YEAR is the dominical year.

Here, NAT is the average value of the age group, yet it is appropriate to consider it to be the ratio of the twelve-year-old group, which is the median age in the target group. Since one almost never goes to school if s/he is not enrolled at school when s/he is ten years old, the value in a certain year estimated by this formula can be regarded as the ratio of ten-year-old children not going to school two years before. Figure 1 shows values estimated in this way.

Figure 1 Ratio of the People Who Have Never Attended Schools



e. Ten-year-old population according to educational statistics

Now the numbers of new entrants by age can be estimated by multiplying the total number of new entrants by their distribution by age, which has been calculated. From the numbers of new entrants by age, the number of children who have enrolled at school before becoming eleven years old can be estimated for each year. Here, the death rate according to Table 3 is taken into consideration to improve accuracy.

.The values heretofore mentioned are all from elementary schools under the Ministry of Education and Culture. Although there are also schools under the Ministry of Religion and others, information about such schools is not sufficient. Thus the values attained from the figures of elementary school under the Ministry of Education and Culture is multiplied by a certain value for correction.

Table 5 shows the number of pupils at elementary schools under the Ministry of Education and Culture and the other ministries and also the net number of total pupils estimated for the Fourth Five Year Development Plan, in which the number of children who go to both kinds of schools is adjusted. Although the ratio of children who go to both kinds of schools has been increasing, the correction coefficient found by dividing the net total by the number of children enrolled at elementary schools under the Ministry of Education and Culture does not change so much. Thus the correction coefficient is employed for estimation. Since this can be used not only to find the net number of total pupils, but also new entrants, values found by the previous methods can be adjusted to produce the total number of ten-year-olds from educational statistics.

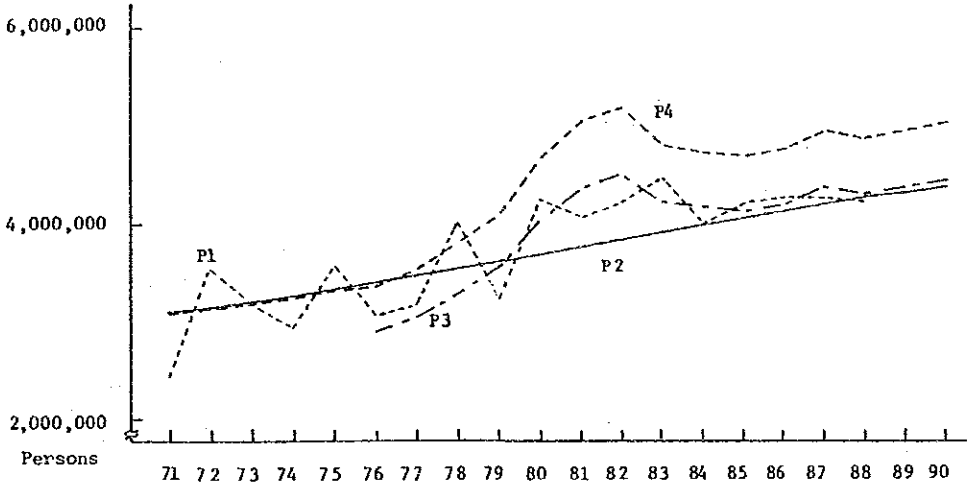
Table 5 Children Elementary School under Ministry of Education & Culture and Others

Year	A Other ministries	B Ed. & Cul. ministry	C Total	D Estimated value	D/B Correction coefficient	(C-D)/A Ratio overlap
1978	3,314,977	19,074,819	22,389,796	22,390,000	1.17380	-0.00006
1979	3,445,300	21,165,724	24,611,024	24,327,000	1.14936	0.08244
1980	3,160,356	22,551,870	25,712,226	25,664,000	1.13800	0.01526
1981	3,570,822	23,862,488	27,433,310	27,026,000	1.13257	0.11407
1982	4,209,862	24,700,075	28,909,937	28,093,000	1.13736	0.19405

f. Comparison of estimated values of ten-year-old population

Figure 2 shows estimated values of the ten-year-old population given by various ways previously described. (P1) is based upon the census in 1980 and (P2) shows the result of smoothing values in (P1). In producing (P3) the number of ten-year-old children who have not enrolled at school is taken into consideration, and (P4) is the revised value of (P3) where the number of children at school under the Ministry of Religion and other organizations are taken into account. As the figure shows, the school age is closer to (P1) rather than (P2).

Figure 2 Ten-Year-Old Population Estimated by Various Methods



Mothers who do not remember the ages of their children use a variety of ways to judge if they have become old enough to attend school (Igarashi 1982b). One method is to observe the losing of milk teeth. Children are regarded as seven years old when they strart losing milk teeth. Another way is to see if a child can put one of his arms over his head and reach the upper edge of the ear on the other side. Also many parents decide to send their children to school when other children near their ages are enrolled at school. Thus it is quite possible that children are considered to be seven years old when they start going to school. The age of a child is written on his birth certificate, which is to be submitted to school when he is enrolled, yet such registration is not reliable because the birth certificates tend to be made long after the birth, only when they are needed.

The difference of values estimated in various methods is significant. Comparing (P1) with (P2), it should be noted that smoothing has been effectively done, yet in the period 1980-83 (P2) is underestimated. There must be some factors causing this: The major one seems to be that estimation aberrations are caused at the ends of the data series which are younger groups, because smoothing is done not at each specific ages, but taking the whole as one group. In (P2) in Figure 2 the youngest group, in other words school-age population, is underestimated due to the above reason. (P4) is not too big considering that (P1) shows smaller than actual values. Since Table 3 shows smoothed values over a long period, the correction coefficient of each year is estimated by dividing (P4) by these values.

g. Net enrollment rate

With certain assumptions, net enrollment rate can be roughly estimated from educational statistics alone. Here the definition of net enrollment rate is the ratio of students from seven to twelve years old to the whole school-age population. Because some students dropout during the school year, the above ratio is higher when estimated at the beginning of an academic year than at the end. Some device has to be employed to get a reasonable figure.

To determine the net enrollment rate, the expected residual rates of all grades in the year 1983/84 are multiplied together first to find a rate for elementary school years; the result is 85.35%. Taking the value from Figure 1 into account as the average ratio of children aged between seven and twelve and not enrolled at school, the net enrollment rate of 1984/85 is calculated to be 83.67%.

More accurate values are found by employing the adjusted figures of pupils whose ages are between seven and twelve. When the figures are divided by adjusted school-age population, the net enrollment rate is calculated to be 87.53% in 1984/85, and 76.40% in 1980/81.

1.2 Income level of the nation

The enrollment rate may be considered as a function of the income level of the nation. GNP per capita is adopted as an index of income level and is used to adjust the enrollment rate.

GNP per capita affects enrollment in several ways. If it increases, the government can spend more of the educational budget on expanding the capacity or to increase the quality of education. Further, parents might be able to afford to spend more money on their children's education.

GNP per capita might fluctuate year by year. However, the tendency of expenditure for education or people's expectations for education seem rather stable and reflect the past trend of the income level of the nation. For these reasons the average figure of the last three years is used.

Before 1980 schools started in January and ended in December. Since 1980 schools have started in July and ended in June. To account for this difference, the moving average of GNP per capita before 1980 has been redefined as the average of the past two years' figures. Therefore, the moving average of GNP per capita is described in the following way:

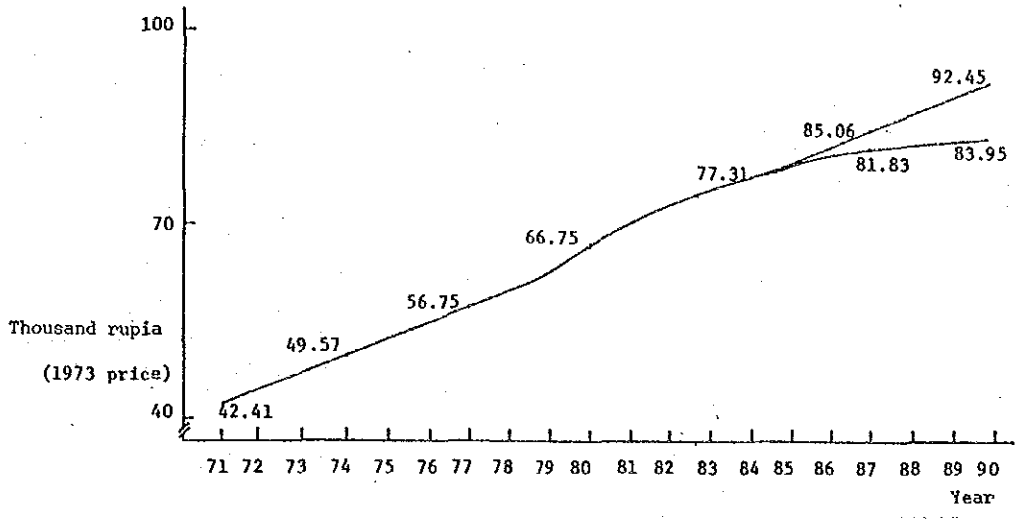
1971 - 1979 $GNPCA_t = GNPC_t/6 + (GNPC_{t-1} + GNPC_{t-2})/3 + GNPC_{t-3}/6$

1980 - $GNPCA_t = (GNPC_t + GNPC_{t-1} + GNPC_{t-2})/3$

where GNPC is GNP per capita, and GNPCA is the moving average GNP per capita deflated to 1973 prices (unit is 1,000 rupiah).

The result is shown in Figure 3. After 1984 the annual growth rate of GNP is assumed to be 5% as targeted in the Fourth Five Year Development Plan (hereinafter referred to as Case I). A more pessimistic viewpoint with an average growth rate of 3% a year (hereinafter referred to as Case II) is considered as well.

Figure 3 GNP per Capita (Moving Average)



1.3 Transition rates of grade cohorts

The gross grade cohort transition rate can be defined as the result of dividing the number of students of a certain grade by that of the previous grade. The transition rate is affected by mortality rate, dropout rate and the ratio of repeaters. Generally speaking, it rises along with the increase of the explanatory variables and converges to an asymptotic value. The following logistic function is assumed:

$$COH_t = k / (1 + \exp(a * GNPCA_{t-1} + b))$$

$$\ln(k / COH_t - 1) = a * GNPCA_t + b \quad \text{---------- (1)}$$

Where COH is the grade cohort transition rate, and K is an asymptotic value. When K is given, "a" and "b" can be estimated by the ordinary least square method. Of course, there are other variables which describe the ratio; however, the more variables the function has, the less the degree of freedom. This formula uses only the most important variables.

2. Elementary Schools

Though all the children reaching the age of six are obliged to attend schools, not very many children actually enter elementary schools because there are not enough schools. Each elementary school accepts seven-year-olds first; then older children have priority. Only when a school still has space, does it accept six-year-old children. Usually children from seven to twelve are considered to be in the elementary school-age population, but in fact the ages of the children attending elementary schools ranges wider.

According to the statistics from 1977, the majority of the pupils in the first grade were seven years old. However, the next biggest group is nine-year-old children, followed by six-year-olds and then eight-year-olds. There are even some thirteen-year-old pupils in the first grade. In the sixth grade 0.18% of the pupils are seventeen years old or more. The reason that the pupil's age ranges so much is that children enter elementary school at different ages and some repeat grades.

Thus in 1984/85 the ratio of the pupils between seven and twelve to total enrollment was only 83.49%. This ratio increased from 82.55% in 1971 to 85.22% in 1977, then decreased gradually,

mainly because the proportion of six-year-old pupils to all entrants has been increasing.

2.1 Estimation of the first grade pupils

The distribution of entrants to elementary school by age can be estimated by multiplying the total number of the entrants by the ratio. To study future conditions the ratio of entrants of each age group to the total population shown in Table 3 is estimated.

Here, children under six years old are regarded as six years old and those over ten years old ones as ten years old. The enrollment rate is considered to differ by age according to formula (1). The maximum value (k) is decided under the premise that the trend of increase (decrease) observed from 1980 to 1984 continues rectilinearly till 1990.

The enrollment rate of a certain year provides that of the following year; for example, the enrollment rate of six-year-olds affects that of seven-year-olds in the following year. Such influence, however, is ignored in this paper because it can be considered to be small and is difficult to present accurately due to lack of statistics.

The ratio of new entrants of an age group to the whole population of the same age is found and thus the number of new entrants from a different age group can be estimated using Table 3. The total number of new entrants is determined by adding up these values. Table 4 shows the distribution of new entrants by age based upon these calculations.

The students in the first grade include repeaters from the previous year as well as new entrants. The ratio of repeaters to all students in the first grade is not stable. Economic growth of the country may cause the ratio to decrease; however, growth may also increase the number of children going to school without scholastic aptitude, bringing a higher rate of repeating if requirements to advance to the next grade remain the same.

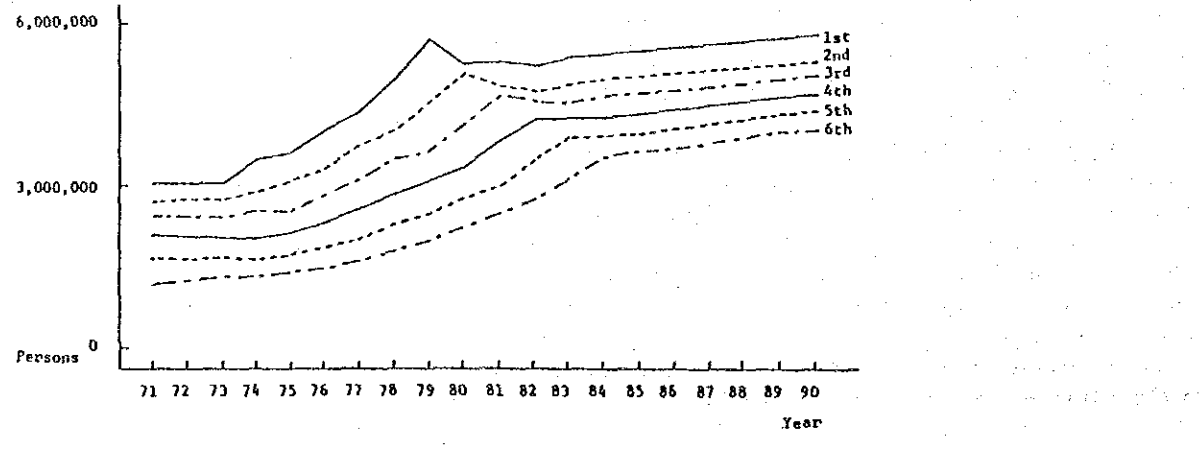
Because the ratio of the new entrants to all the students in the first grade has been almost stable recently, the average rate of the three years from 1982/83-84/85, i.e., 0.833911, is employed in calculating the number of the students in the first grade in 1985/86 and later.

2.2 Cohort transition rate

The number of pupils from second to sixth grade can be estimated when the ratio of decrease and increase of grade cohorts are obtained. The ratio is 1 when there is no repeater, dropout or the death. Mainly because of the decrease in the dropout rate, the ratio is gradually getting closer to 1. To estimate parameters 1 can be substituted for K in function (1).

The changes in the number of pupils are shown in Figure 4. Because school age population has been increasing, even a small rise in the enrollment rate brings about drastic increase in pupils. Efforts should be made by the government to meet the needs of anticipated students.

Figure 4 Number of Elementary School Children (Case I)



2.3 Dropouts

In order to estimate the rate of dropouts, first the sum of the dropouts from all the grades in a year is divided by the number of total students enrolled in that year. On the assumption that this amount converges at 0, the ratio is estimated by function (1).

This paper aims to estimate labor force by age. To make the estimation agree with existing statistics, it is necessary to deal with figures of people aged over ten. The distribution of dropouts by age is not available, however, if dropouts are produced from different age groups evenly, their distribution will agree with that of all the students by age. Children over ten years old among the total dropouts of a certain year, and the ones who dropped out from school before then but reach age ten in that year, can be considered in the potential labor force in that year. The number of elementary school dropouts that join the potential labor force each year up to 1990 can be estimated in this way.

2.4 Elementary school graduates in labor market

The number of pupils who enter the labor market directly after graduating from elementary schools can be estimated similarly. Assume that elementary school graduates who do not go to lower secondary school become "new potential labor force". Formulating a logistic function where the asymptotic limit of the graduation rate (result of dividing the number of graduates by that of pupils in the sixth grade) is 1, the graduation rate can be estimated until 1990.

The number of graduates is the result of multiplying the estimated number of students in the sixth grade by the graduation rate. The new potential labor force is comprised of the people who do not enter lower secondary school after graduating from elementary school. The number of people who go on to lower secondary school is forecast by estimating the number of students in the first grade at lower secondary school in a method which will be described later. Here, estimates are made on the assumption that the rate of repeaters in the first grade is the same as the average of that in the past three years and will not change in the future.

Numbers of elementary school graduates and lower secondary school entrants have to be adjusted to include pupils in schools under authorities other than the Ministry of Education and Culture. The figure which was employed to adjust the total number of students at elementary school is used.

Since lower secondary school education is not compulsory, and thus is not free, students do not attend two different schools. The value found by dividing the total number of students at all kinds of lower secondary schools by the number of students at lower secondary schools under the Ministry of Education and Culture does not change much in different years, and the average in 1981 and 1982 was 1.11208. For years after 1983/84 that figure is employed as correction coefficient in estimating the number of students attending schools under authorities other than the Ministry of Education and Culture.

3. Lower Secondary Schools

3.1 Number of students

The same method is applied to estimate the number of students in lower secondary school. The kind of lower secondary school, for example, general, home economics, or technical, is not taken into consideration.

The grade cohort transition rate between the sixth grade of elementary school and the first grade of lower secondary school, which had been increasing, reached a peak in 1979/80 and 1980/81 and has been decreasing even since. This seems to be because the capacity of lower secondary schools has not caught up with the number of elementary school graduates. At present the increase of the first grade students correlates closely with the efforts of the government, given the large number of applicants. Thus, it is assumed that the number of students in the

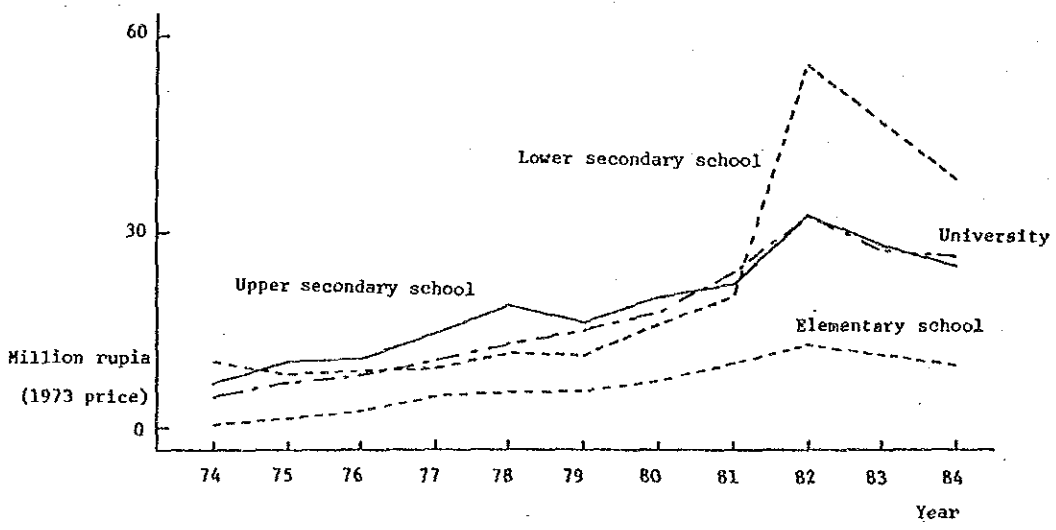
first grade of lower secondary school is estimated by the following formula, where the moving average of GNP per capita of that year and the development budget of the previous year are employed as explanatory variables:

$$\ln(SMTP1_t)=2.11640*\ln(GNPCA_t)+0.0376292*\ln(PDBGT_{t-1})+4.59881 \quad R^2=0.994178$$

Where SMPT1 is the number of the first grade students, and PDBGT is the development budget for lower secondary schools at 1973 prices (unit is 1,000 rupiah). After 1984, it is assumed that the real amount invested in 1984 continues until 1990.

Two thirds of the lower secondary schools are private institutes, which are established based on the needs of the people. They are subsidized by the government to some extent. Yet, unlike elementary schools, which are founded by local authorities, the money that the national government spent for lower secondary schools is notable. Figure 5 shows the development budget spent by the Ministry of Education and Culture for elementary schools, lower secondary schools, upper secondary schools and universities at 1973 prices. Clearly, great investment has been made to establish lower secondary schools recently.

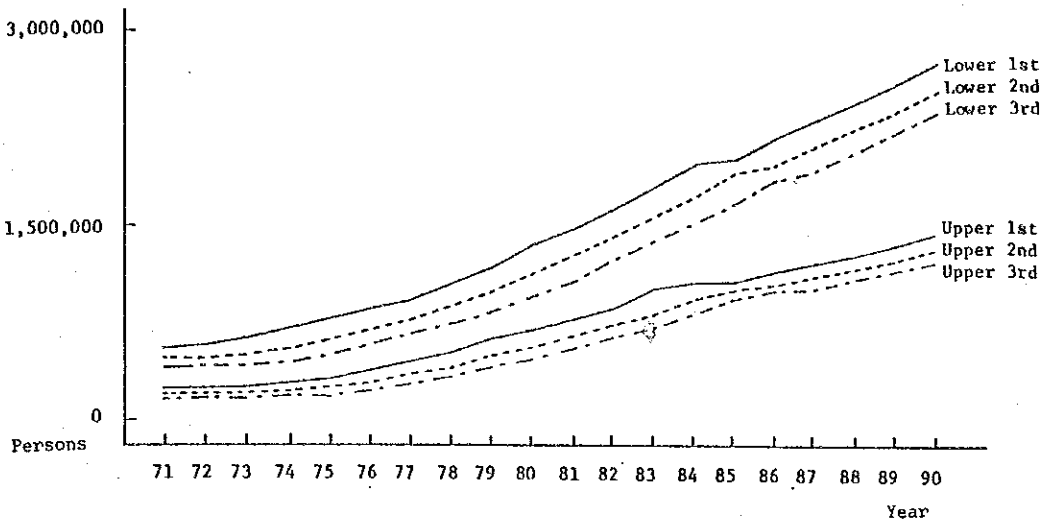
Figure 5 Development Budget by Programs



The total number of students in lower secondary school can be projected with the grade cohort transition rates from the first to second, and second to third grades. The cohort transition rate is estimated as previously described.

Figure 6 shows the estimated number of students of lower secondary school (Case I). The gross enrollment rate, or the ratio of the total students to the population from 13 to 15 years old rises drastically. It estimated at 59.96% in 1990 in Case I, if the adjusted population and schools of various ministries are considered. The rise in the enrollment rate and the increase of school age population will bring about an increase of 2.11 million in Case I and 0.92 million in Case II from 1985 to 1990.

Figure 6 Number of Lower and Upper Secondary School Students (Case I)



3.2 Dropouts and graduates

The number of dropouts from lower secondary schools in the future is estimated on the assumption that the dropout rate approaches 0 as GNPCA increases.

The number of students who join the potential labor force right after graduation from lower secondary school is determined by subtracting the number of students who go on to upper secondary school from total graduates. First the ratio of the graduates to all the students in the class is estimated. Graduation rate (result of dividing the number of the graduates by that of students in the third grade) is estimated by formula (1) assuming that the ratio gradually approaches 1 with the increase in GNPCA. The number of graduates is found by multiplying the estimated number of students in the third grade by the graduation rate. The number of entrants to upper secondary school is determined from the estimated number of students in the first grade and on the assumption that the ratio of new entrants to all the students in the first grade continues to equal the average of the past three years, i.e. 98.5049%.

Again also students of lower and upper secondary schools under authorities other than the Ministry of Education and Culture must be taken into consideration. As the correction coefficient, the value obtained by dividing the number of all of the students at upper secondary schools under several ministries in 1978-82 by the number of students at upper secondary school under the Ministry of Education and Culture is employed, i.e., 1.08512.

4. Upper Secondary Schools

4.1 Number of students

The same method is applied to estimate the number of students of upper secondary schools.

The grade cohort transition rate from the third grade of lower secondary school to the first grade of upper secondary school reached a peak in 1978-79/80 and has since decreased. The increase in the capacity of upper secondary school has not caught up with the number of lower

secondary school graduates. Thus, the number of students in the first grade of upper secondary school is estimated by the following formula where the moving average of GNP per capita and the development budget are employed as explanatory variables:

$$\ln(SMTA1_t)=1.97524*\ln(GNPCA_t)+0.260926*\ln(ADBGT_{t-1})+0.811539 \quad R^2=0.996066$$

Where SMAT1 is the number of the students at the first grade of upper secondary school, and ADBGT is the development budget for upper secondary school at 1973 prices (unit is 1,000 rupiah). After 1984 the development budget is assumed to continue at 1984 levels.

The number of students in each grade can be obtained if the grade cohort transition rates from the first to second, and second to third grades of upper secondary schools are projected. The grade cohort transition rates are estimated in the way previously described; however, as the transition rate from the second to the third grade of upper secondary school exceeds 1 at 1978-79/80, formula (1) cannot be employed in this case. Thus the average of three years, including years before and after this, are used to make the estimate.

Table 6 shows the estimated and actual value of the grade cohort transition rates at elementary, lower and upper secondary schools.

Table 6 Transition Rate of School Year Cohort

Year	Ele.1-2	2-3	3-4	4-5	5-6	6-7
1971-72	0.89817	0.89317	0.84507	0.78303	0.78268	0.50963
1972-73	0.89787	0.89043	0.84399	0.79422	0.78643	0.50608
1973-74	0.93300	0.92287	0.83358	0.80450	0.79805	0.54859
1974-75	0.88997	0.88802	0.83931	0.83958	0.83946	0.59791
1975-76	0.91593	0.92021	0.88249	0.86280	0.85767	0.62609
1976-77	0.93622	0.95883	0.89936	0.87715	0.87425	0.63289
1977-78	0.91330	0.92507	0.88786	0.88329	0.87952	0.66904
1978-79/80	0.91519	0.91227	0.86728	0.86811	0.87046	0.68530
79/80-80/81	0.89334	0.92053	0.89883	0.89938	0.89553	0.69240
80/81-81/82	0.92882	0.92128	0.89612	0.90153	0.89443	0.68676
81/82-82/83	0.89053	0.93945	0.89979	0.91297	0.90900	0.67391
82/83-83/84	0.93386	0.95652	0.92536	0.91149	0.90341	0.67862
83/84-84/85	0.92337	0.95251	0.93750	0.92998	0.91294	0.64607
84/85-85/86 I	0.92113	0.95002	0.92727	0.93105	0.92298	0.57914
II	0.92095	0.94948	0.92632	0.92984	0.92178	0.57109
85/86-86/87 I	0.92214	0.95303	0.93249	0.93763	0.92957	0.60639
II	0.92161	0.95147	0.92979	0.93424	0.92617	0.58268
86/87-87/88 I	0.92291	0.95521	0.93624	0.94225	0.93424	0.63837
II	0.92184	0.95213	0.93094	0.93569	0.92762	0.59111
87/88-88/89 I	0.92369	0.95737	0.93992	0.94670	0.93879	0.65842
II	0.92207	0.95282	0.93213	0.93718	0.92911	0.58934
88/89-89/90 I	0.92449	0.95948	0.94349	0.95093	0.94314	0.67568
II	0.92230	0.95350	0.93330	0.93863	0.93058	0.58596
89/90-90/91 I	0.92530	0.96156	0.94696	0.95496	0.94732	0.70230
II	0.92254	0.95417	0.93446	0.94007	0.93203	0.59075

Year	1-2	2-3	3-U.S.1	1-2	2-3	3-Grad.
1971-72	0.85210	0.88241	0.66101	0.85132	0.88962	0.82092
1972-73	0.85714	0.89039	0.64779	0.85936	0.90776	0.84391
1973-74	0.87737	0.89721	0.69248	0.87439	0.92213	0.88005
1974-75	0.88749	0.90925	0.75261	0.87914	0.92664	0.89017
1975-76	0.90106	0.93769	0.77711	0.90407	0.96136	0.89306
1976-77	0.89009	0.95025	0.78709	0.92198	0.97061	0.91412
1977-78	0.95902	0.97051	0.78847	0.91389	0.96335	0.88827
1978-79/80	0.92436	0.94926	0.85845	0.98407	1.01274	0.98066
79/80-80/81	0.95054	0.96650	0.83697	0.90320	0.93435	0.90229
80/81-81/82	0.94024	0.95106	0.83951	0.94736	0.99218	0.93830
81/82-82/83	0.95301	0.97082	0.82205	0.93968	0.97646	0.92503
82/83-83/84	0.96630	0.97833	0.83959	0.95029	0.97228	0.94229
83/84-84/85	0.94076	0.95806	0.78762	0.91583	0.99164	0.92014
84/85-85/86 I	0.96396	0.97661	0.71898	0.95472	0.98846	0.94915
II	0.96319	0.97607	0.70965	0.95400	0.98808	0.94836
85/86-86/87 I	0.96813	0.97953	0.70456	0.95866	0.99044	0.95345
II	0.96599	0.97804	0.67837	0.95663	0.98945	0.95123
86/87-87/88 I	0.97098	0.98151	0.65837	0.96144	0.99172	0.95649
II	0.96691	0.97868	0.61134	0.95750	0.98988	0.95218
87/88-88/89 I	0.97368	0.98336	0.67585	0.96413	0.99286	0.95945
II	0.96784	0.97933	0.61439	0.95839	0.99031	0.95315
88/89-89/90 I	0.97620	0.98507	0.65653	0.96671	0.99388	0.96229
II	0.96875	0.97996	0.59233	0.95926	0.99072	0.95411
89/90-90/91 I	0.97855	0.98666	0.65140	0.96918	0.99477	0.96501
II	0.96964	0.98058	0.59102	0.96013	0.99113	0.95506

Figure 6 also shows the estimated number of students of upper secondary schools (Case I). The gross enrollment rate, or the ratio of the total students to the age population from 16 to 18 years, increases rapidly and is estimated at 30.66% in Case I in 1990, considering all schools under various ministries and adjusting for the population. The rise of this ratio and the increase of the population will cause the number of students to increase by 0.98 million in Case I, and 0.40 million in Case II in the five years from 1985 to 1990.

4.2 Dropouts and graduates

The number of dropouts from upper secondary schools in the future is estimated assuming that the dropout rate decreases to 0 with the increase of GNPCA.

The graduates who do not go to universities or academies are considered part of the potential labor force from upper secondary schools. The graduation rate is estimated by formula (1) under the assumption that it is gradually approaching 1 as GNPCA increases. The number of graduates is found by multiplying the estimated number of students in the third grade by the graduation rate. The number of entrants to universities and academies is calculated later. Of course, there are some people who take a few years to prepare to go to those upper schools after the graduation. Yet there are others who become workers first and then go to universities or academies. The former are considered to cancel out the latter.

Again, students in schools under authorities other than the Ministry of Education and Culture must be taken into consideration. The correction coefficient for upper secondary school has been found.

found.

Due to the restriction of the data only the universities and academies under the Ministry of Education and Culture are considered, so no correction coefficient is needed at this school level.

5. Universities and Academies

Some students study in S1 programs to be awarded degrees such as "Sarjana" or "Sarjana Muda", but there are others who study in S0 short-term, special training programs and graduate with a diploma. The number of those graduates with S0 diplomas is becoming large. However, those graduates are not taken into consideration here because the labor statistics do not include S0 diploma-holders among university graduates. The number of students in S2 or graduate programs are not considered as they are a few.

Although the number of new entrants to the Open University was 42,000 in S1 program alone in 1984, when the university was started, it need not be taken into account in estimating the labor force in the short term because the first graduate will not be produced until 1989, and because most of the students at the Open University are already working.

5.1 Entrants

Because the number of students who enter national universities to be students in S1 programs has not been increasing recently, a past maximum, that is 58,483 from 1982/83, is assumed to continue after 1983/84. Although the national budget for development of universities has increased as Figure 5 shows, this has not contributed to the expansion of S1 programs.

Since entrants to private universities is likely to increase with the demand for education, that increase is estimated on the assumption that the ratio of the increase in GNPCA to entrants is stable. Thus, following result is obtained:

$$\ln(UNVE_t) = 3.51126 * \ln(GNPCA_t) - 3.34285 \qquad R^2=0.995248$$

Where UNVE is the number of entrants to private universities.

The number of entrants to schools of higher education each year is the total of the above factors. The ratio of the entrants to the graduates of upper secondary schools was 31.33% in 1984, and gradually decreases to 29.91% in Case I and 25.09% in Case II in 1990 as shown in Figure 7. This is not because fewer students are attracted to universities or willing to study. As shown in the same figure, the ratio of entrants to the eighteen-year-old population increases from 6.34% in 1984 to 9.04% in Case I and 6.895 in Case II in 1990. The ratio of entrants to universities and academies to graduates of upper secondary schools is expected to decrease because of the imbalance between the increase of the graduates of upper secondary schools and the limited capacity of universities and academies.

5.2 Graduates

Here, graduates are people who left universities and academies with a title of "Sarjana" or "Sarjana Muda". It is assumed that the graduation rate, or the ratio of graduates to the number of students who were in the class when they entered, is stable. As for the S1 programs of national and private universities, the graduation rate of 4 to 5 years ago is used, and it is assumed that the average of this ratio for the previous three years continues to be constant to 1990. That ratio is 38.15% and 25.82% in the case of national and private universities respectively.

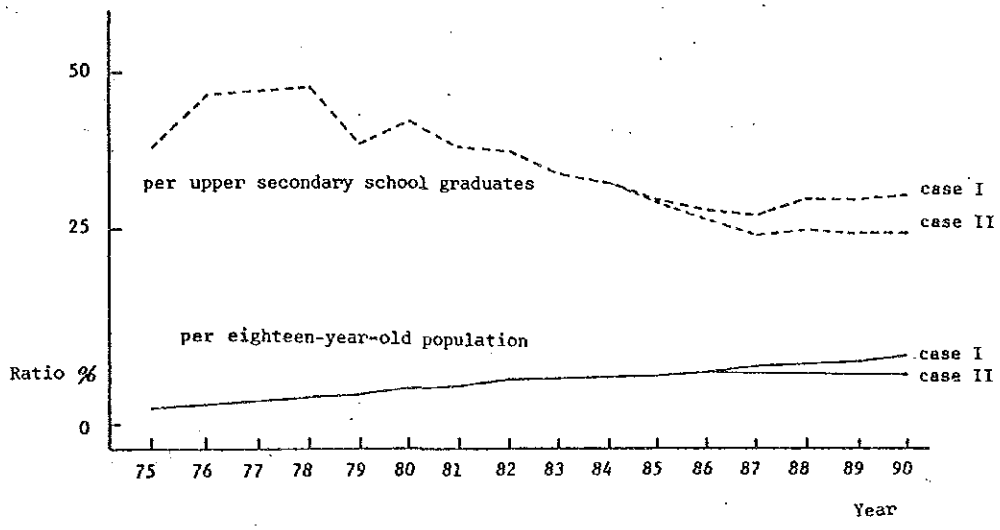
5.3 Dropouts

It is necessary to know the number of enrolled students to estimate the number of dropouts. Here we use the ratio of students actually attending school to the number of students who shoud be.

For S1 programs, this ratio of the last five years is calculated, and the average for the last three years is assumed to be stable. The number of dropouts is estimated by the following formula:

$$Dropouts_t = Total\ Students_{t-1} + New\ Entrants_t - Graduates_{t-1} - Total\ Students_t$$

Figure 7 Enrollment Rate in Universities and Academies



IV. DEMAND AND SUPPLY OF MANPOWER

1. Educational Career and Manpower

Various segments of the potential labor force over nine years old which will appear have been estimated for each year to 1990. For consistency, dropouts from lower and upper secondary schools, and universities and academies are counted as graduates of elementary, and lower and upper secondary schools respectively. Table 7 shows the new potential labor force appearing each year from 1980.

The total new potential labor force from 1980 is the total of the above, yet mortality rate has to be considered. For people with no experience of schooling, elementary school dropouts, elementary school graduates and lower secondary school dropouts, the death rate of ages 10-14 is applied. For graduates of lower secondary schools, and dropouts and graduates of upper secondary schools, the mortality rate of ages 15-19 is applied. For dropouts and graduates of universities and academies the mortality rate of ages 20-24 is applied. The annual mortality rates are considered to be stable throughtout the period 1980-1990 and are calculated according to Table 2.

Table 7 New Potential Labor Force in a Year After 1980 by Educational Attainment (unit: 1,000 persons)

Year	Never enrolled	Elem. dropout	Elem. graduate	Low. sec. graduate	Upp. sec. graduate	Univ. graduate	Total
1981	157.6	1,317.4	919.6	149.8	376.7	56.7	2,977.8
1982	139.2	1,336.2	976.6	279.3	386.1	71.7	3,189.0
1983	110.5	1,102.8	1,014.6	286.4	492.4	63.2	3,069.9
1984	93.0	984.9	1,421.6	403.8	600.3	82.8	3,586.0
1985 I	79.4	988.4	1,753.7	495.0	674.2	93.9	4,084.6
II	79.4	999.7	1,785.5	510.3	676.3	93.9	4,145.2
1986 I	69.1	917.0	1,706.5	566.3	791.0	104.2	4,154.1
II	69.2	951.2	1,800.4	612.4	797.6	104.2	4,335.1
1987 I	61.6	877.7	1,598.2	726.8	874.1	113.0	4,251.3
II	62.1	948.6	1,782.0	817.8	886.9	113.0	4,610.3
1988 I	52.0	829.3	1,561.3	713.2	878.7	118.8	4,153.4
II	52.9	939.9	1,826.6	821.9	884.9	118.8	4,645.0
1989 I	45.3	777.9	1,541.1	817.6	950.0	126.9	4,258.8
II	46.5	929.2	1,883.9	911.8	934.5	125.9	4,831.7
1990 I	39.4	728.8	1,459.1	882.9	1,003.5	137.4	4,251.2
II	40.4	919.4	1,882.6	932.1	953.8	133.2	4,861.5

Table 8 shows the total new potential labor force from 1980 considering mortality rates. The ehtire potential labor force does not actually belong to the labor force. The labor force participation rate, or the ratio of labor force to potential labor force, is based on the 1980 census and assumed to be stable until 1990. In general the better the educational background of worker is, the higher the ratio is.

Table 8 Accumulated New Potential Labor Force after 1980 by Educational Attainment

Year	Never enrolled	Elem. dropout	Elem. graduate	Low. sec. graduate	Upp. sec. graduate	Univ. graduate	Total
1981	157.6	1,317.4	919.6	149.8	376.7	56.7	2,977.8
1982	296.3	2,649.8	1,893.5	428.6	761.3	128.1	6,157.6
1983	406.0	3,745.0	2,902.7	713.4	1,250.8	190.8	9,208.5
1984	497.8	4,719.0	4,315.9	1,114.5	1,846.3	272.8	12,766.4
1985 I	575.8	5,693.8	6,057.2	1,605.3	2,513.5	365.5	16,811.0
II	575.8	5,705.2	6,089.0	1,620.5	2,515.6	365.5	16,871.5
1986 I	643.2	6,594.4	7,746.2	2,165.4	3,294.8	468.0	20,912.1
II	643.4	6,639.9	7,871.9	2,226.8	3,303.5	468.0	21,153.5
1987 I	703.0	7,453.1	9,322.0	2,884.0	4,156.2	578.9	25,097.3
II	703.7	7,569.3	9,631.1	3,036.1	4,177.7	578.9	25,696.9
1988 I	752.9	8,260.9	10,856.4	3,586.3	5,019.0	695.2	29,170.7
II	754.6	8,487.4	11,429.9	3,486.5	5,046.6	695.2	30,260.1
1989 I	796.1	9,015.0	12,366.2	4,390.3	5,949.6	819.0	33,336.2
II	798.9	9,392.1	13,280.8	4,743.7	5,961.7	818.0	34,995.2
1990 I	833.2	9,717.8	13,789.6	5,256.6	6,930.3	952.8	37,480.2
II	837.0	10,284.3	15,125.1	5,657.9	6,892.6	947.6	39,744.4

The estimates calcualted above are added to the number of people who left school before 1980. People who are ten years old or over and are working or are looking for jobs are considered to be in the labor force. According to the national census in 1980, 52,421,000 are in the labor force; and 51,553,000 are actually working. The total labor force for each year is estimated by adding our calculations to the 1980 labor force figures. The basic labor force for each year up to 1990 is estimated by applying the mortality rate from Table 2 from 1980 to 1990.

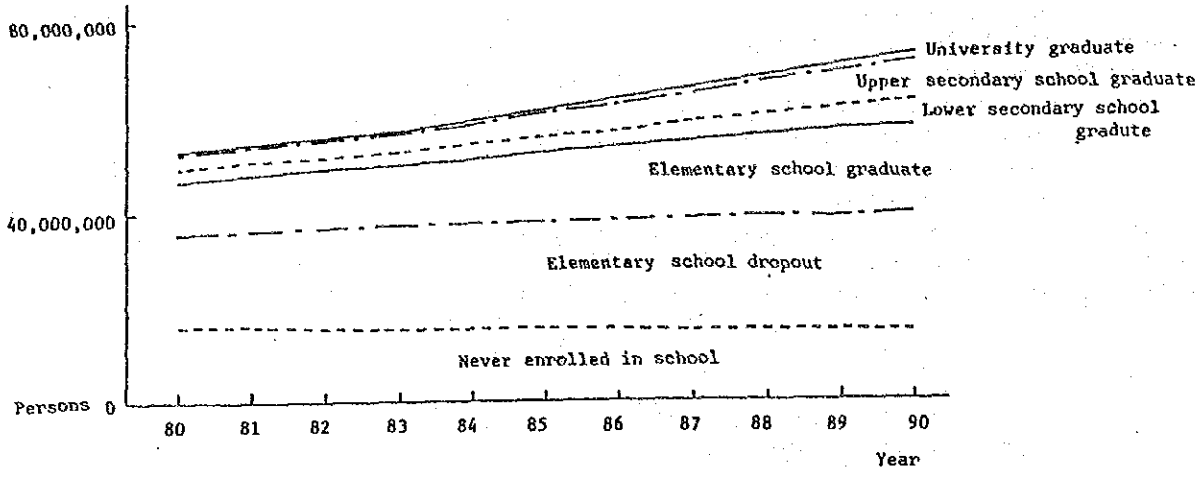
Table 9 shows the ratio of the new labor force produced during the period of 1980-1990 to the total labor force. The number of the unidentified is added to that of the people who have never attended schools. As for the graduates of upper secondary schools, universities and academies, the majority of those workers with high educational backgrounds in 1990 are graduates produced after 1980. The educational background of workers is improving at a high rate. Compared to other Asian countries, the ratio of workers with high educational background to the whole labor force has been low in Indonesia (Kaneko 1983: 101-114). However, clearly the quantity of manpower with a strong educational background is increasing rapidly.

Table 9 Ratio of Labor Force Enrolled after 1980 among Total Labor Force by Educational Attainment (%)

Year	Never enrolled	Elem. dropout	Elem. graduate	Low. sec. graduate	Upp. sec. graduate	Univ. graduate
1981	0.55	4.18	5.04	3.43	8.71	10.53
1982	1.04	8.14	9.94	9.31	16.32	21.19
1983	1.44	11.24	14.61	14.72	24.47	28.81
1984	1.78	13.88	20.45	21.43	32.59	36.90
1985 I	2.07	16.43	26.73	28.42	39.95	44.20
II	2.07	16.46	26.83	28.61	39.97	44.20
1986 I	2.33	18.71	32.05	35.12	46.85	50.63
II	2.33	18.82	32.40	35.76	46.91	50.63
1987 I	2.57	20.82	36.45	42.16	52.92	56.18
II	2.57	21.08	37.21	43.42	53.05	56.18
1988 I	2.78	22.76	40.31	47.81	57.84	60.88
II	2.78	23.24	41.56	49.56	57.97	60.88
1989 I	2.96	24.53	43.74	53.14	62.18	64.96
II	2.97	25.30	45.51	55.06	62.23	64.93
1990 I	3.13	26.16	46.71	57.85	65.94	68.55
II	3.14	27.27	49.02	59.63	65.82	68.43

Figure 8 shows the labor force by educational background in Case I. Workers who have not finished even elementary school do not increase much, while workers with good educational backgrounds do. The ratio of the latter is high because the labor force participation rate of those people is high and their number is increasing. For example, the ratio of workers who are graduates of universities or academies rises from 0.81% in 1980 to 1.69% (Case I) or 1.65% (Case II) in 1990. The ratio of upper secondary school graduates rises from 5.76% in 1980 to 11.06% (Case I) or 10.80% (Case II) in 1990. The ratio of lower secondary school graduates rises from 5.17% in 1980 to 8.02% (Case I) or 8.21% (Case II) in 1990. However, although the ratio of people who have not finished even elementary school decreases, their percentage is still large in 1990 (53.15% in Case I and 52.61% in Case II).

Figure 8 Labor Force by Educational Attainment (Case I)



2. Industry, Occupation and Educational Career

There are two factors which cause the number of university and academy graduates to increase in various industries. One is the growth of the industries themselves. Even if the ratio of university and academy graduates to the labor force is the same, their number in an industry would increase along with the number of workers. The other is the increase in university and academy graduates in the total labor force. Even without the expansion of the industry, university and academy graduates would replace the others.

According to the censuses taken in 1971 and 1980, the number of university and academy graduates increased by 220,000 in nine years from 1971. A majority (74.82%) worked as civil servants or service workers. From a survey of the National Personnel Authority and the census, 52.56% of the workers who have "Sarjana" or "Sarjana Muda" degrees are actually civil servants. The number of university and academy graduates increased in the trade and sales, manufacturing and the forestry and fishing industry. Table 10 shows factors affecting the increase of university and academy graduates among employed people by industry. In general the university and academy graduates among employed people by industry have increased due to the expansion of industries themselves, yet the influence of the rise in the ratio of university and academy graduates to all employed people is undeniable. In the mining and financing industry the ratio dropped only because the industries grew rapidly. The number of workers in mining and financing industry in 1980 were respectively 4.51 times and 3.23 times what they were in 1971. These industries were not able to absorb the necessary number of highly educated workers.

Table 10 Factor Analysis of Increase of University and Academy Graduates among Employees

Industry	1980 Total Number	Increase	1971-1980 Industrial factor	Educational factor	Both
Agriculture etc.	13,551	8,574	444	7,465	665
Mining etc.	6,782	3,848	10,304	-1,431	-5,025
Manufacturing	26,321	16,530	7,294	5,293	3,943
Electricity etc.	3,174	2,009	896	629	484
Construction	10,785	7,510	4,724	1,141	1,645
Sales, trade etc.	23,241	9,891	7,573	1,479	839
Transportation etc.	12,986	5,051	4,313	478	260
Financing etc.	22,655	13,417	20,647	-2,235	-4,995
Public Service etc.	293,938	162,571	96,462	38,119	27,990
Others	4,131	-12,131	-13,368	6,947	-5,710
Total	417,564	212,270	139,289	57,885	20,096

Industry	1971-1980 Industrial factor (%)	Educational Factor (%)	Both (%)
Agriculture etc.	5.18	87.07	7.76
Mining etc.	267.78	-37.19	-130.59
Manufacturing	44.13	32.02	23.85
Electricity etc.	44.60	31.31	24.09
Construction	62.90	15.19	21.90
Sales, Trade etc.	76.56	14.95	8.48
Transportation etc.	85.39	9.46	5.15
Financing etc.	153.89	-16.66	-37.23
Public Service etc.	59.34	23.45	17.22
Others	110.20	-57.27	47.07
Total	64.11%	26.64%	9.25%

Source: Biro Pusat Statistik, 1975, 1983b.
Notes: Addends may not total sum due to rounding.

L_t : Total number of employees at t(time).
L_{tu} : Number of university and college graduates among employees at t(time).

Table 11 shows factors affecting the increase in the upper secondary school graduates among employed people by industry. The results are similar to those of university and academy graduates. That more than half of the upper secondary school graduates produced in the nine years became civil servants or service workers is remarkable. From a survey of the National Personnel Authority and the census, 53.82% of the workers in the category of civil servant and service worker are actually civil servants. If the private sector cannot absorb more highly edu-

cated workers, the economy of Indonesia will not grow. Highly educated people become civil servants primarily because private enterprises have not yet offered them suitable jobs. Still, the apparent preference of highly educated people for the public over the private sector is problematic. It is vital that the private sector draws those workers with high educational background.

Table 11 Factor Analysis of Increase of Upper Secondary School Graduates among Employees

Industry	1980 Total number	1971-80 Increase	Industrial factor	Educational factor	Both
Agriculture etc.	238,920	162,663	6,800	143,103	12,760
Mining etc.	39,265	28,710	37,069	-1,853	-6,506
Manufacturing	258,267	198,574	44,472	88,310	65,792
Electricity etc.	21,412	14,439	5,362	5,131	3,946
Construction	93,301	71,681	31,186	16,580	23,915
Sales, trade etc.	288,673	175,665	64,104	71,182	40,379
Transportation etc.	125,493	83,702	22,714	39,513	21,475
Financing etc.	115,608	81,802	75,555	1,931	4,316
Public Service etc.	1,686,511	1,134,483	405,352	420,419	308,712
Others	26,113	-70,286	-79,241	50,311	-41,356
Total	2,893,563	1,881,433	613,373	834,627	433,433

Industry	1971-80 Industrial factor (%)	Educational factor (%)	Both (%)
Agriculture etc.	4.18	87.98	7.84
Mining etc.	129.12	-6.45	-22.66
Manufacturing	22.40	44.47	33.13
Electricity etc.	37.14	35.54	27.33
Construction	43.51	23.13	33.36
Sales, trade etc.	36.49	40.52	22.99
Transportation etc.	27.14	47.21	25.66
Financing etc.	92.36	2.36	5.28
Public Service etc.	35.73	37.06	27.21
Others	112.74	-71.58	58.84
Total	32.60%	44.36%	23.04%

Source: Biro Pusat Statistik, 1975, 1983b.

The ratio of highly educated workers varies between industries; however, it is rising in general. One of the reasons for this tendency is that the development of industries brings about the increase of jobs suitable for highly educated workers. Table 12 shows the relationship between occupations and educational careers. It is obvious that education is connected

with certain occupations. Because a large part of the university, academy and upper secondary school graduates take professional or clerical jobs, the percentage of those people will increase as the ratio of those kinds of jobs increases in each industry. For example in agriculture, forestry and fishing industry, where there is no major need for professional workers, the ratio of professional workers increased to 0.0717% (1980) from 0.0414% (1971). The ratio itself is small; however, because the number of workers in the industry is large, the abdsolute increase is in fact large. The ratio of those in that industry to all highly educated people is 1.36%. Their number is less than that in the public and private service, manufacturing and transportation & communication sectors.

Table 12 Occupation and Educational Attainment

Occupation	Elem. not completed (%)	Elem. graduate (%)	Low.sec. graduate (%)	Upp. sec. graduate (%)	Univ. graduate (%)	Total (%)
Professional	7.52	7.69	12.28	61.53	10.98	100.00%
Managerial	13.26	10.33	10.44	34.48	31.49	100.00%
Clerical	11.94	19.39	18.72	41.47	8.48	100.00%
Sales	64.31	24.83	6.58	4.01	0.26	100.00%
Services	62.34	25.36	6.96	4.95	0.38	100.00%
Farmers	78.65	18.47	2.05	0.79	0.04	100.00%
Production	58.91	28.12	7.77	4.94	0.26	100.00%
Others	9.57	28.96	36.09	21.78	3.61	100.00%
Not stated	62.94	21.62	6.58	7.59	1.27	100.00%
Total	67.24	21.23	5.10	5.61	0.81	100.00%

Occupation	Elem. not completed	Elem. graduate	Low.sec. graduate	Upp.sec. graduate	Univ. graduate	Total
Professional (%)	0.33	1.07	7.08	32.26	39.91	2.94
Managerial (%)	0.02	0.05	0.21	0.63	3.99	0.10
Clerical (%)	0.62	3.17	12.74	25.67	36.40	3.47
Sales (%)	12.30	15.04	16.58	9.19	4.06	12.86
Services (%)	3.98	5.13	5.86	3.79	2.04	4.29
Farmers (%)	65.27	48.56	22.39	7.83	2.93	55.80
Production (%)	16.65	25.18	28.93	16.72	6.17	19.01
Others (%)	0.10	1.00	5.19	2.85	3.27	0.73
Not stated (%)	0.74	0.80	1.01	1.06	1.23	0.79
Total (%)	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Source: Biro Pusat Statistik, 1983b.

3. Balance of the Demand and the Supply of Manpower

The distribution of workers by educational background in each industry has to be examined. The number of workers needed with a particular educational background can be estimated precisely if the length of time required to train workers suitable for jobs in a given industry and the number of workers which will demanded by that industry can be supplied by a macro econometric model or other ways. However, it is impossible to determine all necessary factors now. In this paper the labor force as calculated previously is used.

Here, the demand and the supply of the labor force as a whole is discussed from the viewpoint of educational background. Different results would be observed when focusing upon specific industries or occupations. Estimations made for a specific area, however, tend to be incorrect because of the influence of technological innovation. Moreover, the skills and knowledge that one acquired at school do not necessarily correspond with those needed for an occupation.

Not all the people in labor force get a job. On the assumption that employment rate by educational background (ratio of employed persons among labor force) based on 1980 census continues to be constant up to 1990, the working population in 1990 is estimated at 70,583,000 and 71,989,000 in Case I and II respectively.

On the other hand, it is assumed that the change of occupational structure observed in the period 1971-1980 continues. Thus the distribution ratios of employed persons among industries are estimated. Here, the "others" category is not taken into consideration because of different definitions in 1971 and 1980. Multiply the number of total employed persons by the ratio, and the product is the number of employed persons in each industry.

Next, when the number of employed persons by industry is found, the amount and kinds of labor force necessary for each industry can be estimated if a suitable ratio of workers by educational background is given. It is assumed that the educational background of workers for all industries in 1990 will be better than it was in 1980. It is also assumed that the improvement observed in the period 1971-1980 in each industry continues to occur at the same rate. For mining and financing, where the average educational background of workers did not improve, it is assumed that there have been no changes since 1980. Because the sum of the changes of the percentages of labor force by educational background in each industry may not total 100, the changes by educational background were estimated and adjusted so that the total became 100.

In this way, employed persons by industry and by educational career can be found when the number of employed persons in total is given. The value is considered to be the demand of the industry world.

Tables 13 and 14 show the results of such calculation in Case I and Case II respectively. All industries except the agriculture, forestry and fishing group increase their ratio of workers to the whole. Workers in the service industry, most of them are government officials, increase at an immense rate. The ratio of upper secondary school graduates is increasing notably in the electricity and gas industry and the service industry. The percentages of university and academy graduates, upper secondary school graduates, lower secondary school graduates and elementary school graduates to the whole are 1.28%, 10.34%, 6.10% and 20.21% respectively.

Table 13 Demand and Supply of Manpower (Case I in 1990) (Unit: 1,000 persons)

Industry	Elem. not completed	Elem. graduate	Low.sec. graduate	Upp.sec. graduate	Univ. graduate	Total
Agriculture etc.	24,139.9	5,599.0	960.9	445.5	24.4	31,169.6
Mining etc.	584.4	187.9	69.8	96.9	16.7	955.7
Manufacturing	4,578.0	2,124.7	747.7	759.3	64.7	8,274.3
Electricity etc.	28.0	11.1	14.7	56.1	7.9	117.8
Construction	1,969.3	921.2	260.5	289.6	29.1	3,469.7
Sales, trade etc.	6,671.7	2,654.1	899.5	676.1	42.3	10,943.8
Transportation etc.	906.9	741.0	394.3	312.9	22.4	2,377.5
Financing etc.	126.4	132.8	117.1	265.2	52.0	693.5
Public Services etc.	4,803.6	1,889.6	844.4	4,396.4	647.0	12,580.9
Demand total	43,808.3	14,261.3	4,308.8	7,298.0	906.3	70,582.7
Supply	37,728.0	18,434.1	5,603.5	7,625.3	1,191.8	70,582.7
Difference	-6,080.3	4,172.8	1,294.7	327.3	285.5	0.0

Table 14 Demand and Supply of Manpower (Case II in 1990)

(Unit: 1,000 persons)

Industry	Elem. not completed	Elem. graduate	Low.sec. graduate	Upp.sec. graduate	Unv. graduate	Total
Agriculture etc.	24,620.9	5,710.5	980.0	454.3	24.9	31,790.7
Mining etc.	596.1	191.6	71.2	98.8	17.1	974.7
Manufacturing	4,669.2	2,167.0	762.5	774.5	66.0	8,439.2
Electricity etc.	28.6	11.3	15.0	57.3	8.0	120.1
Construction	2,008.6	939.6	265.7	295.3	29.6	3,538.8
Sales, trade etc.	6,804.7	2,707.0	917.4	689.6	43.1	11,161.8
Transportation etc.	925.0	755.7	402.2	319.1	22.8	2,424.9
Financing etc.	128.9	135.5	119.5	270.4	53.0	707.3
Public Service etc.	4,899.3	1,927.3	861.2	4,484.0	659.8	12,831.6
Demand total	44,681.2	14,545.5	4,394.7	7,443.4	924.4	71,989.2
Supply	38,089.7	19,268.0	5,851.0	7,597.9	1,182.6	71,989.2
Difference	-6,591.5	4,722.5	1,456.3	154.5	258.2	0.0

Industry

As shown at the bottom of Tables 13 and 14, the shortage of workers who have not finished elementary schools is covered by workers with better educational background. In other words, the labor force with good educational background will be oversupplied, in a sense, for the following reasons:

1) A major assumption about the demand for labor force is that the changes in industrial structure and employed persons which took place in the period 1971-1980 continue to be observed. The increase of highly educated workers in this period was mainly because of the changes in the industrial structure as can be judged from Tables 10 and 11; however, the number of graduates of upper secondary schools, universities and academies produced then was not so large. Nevertheless their number increased a great deal since 1980 as shown in Figure 8. The factor which causes the ratio of those highly educated people to all workers to increase in each industry seems to be educational rather than industrial. This shift of the factors does not affect the demand for labor force in Tables 13 and 14.

2) Although the rate of labor force participation is assumed to be stable, it may be affected by educational or industrial factors. In general the ratio of female workers is lower than male workers. When the ratio of women who go to upper secondary schools and universities and academies increases, the ratio of female graduates to the total graduates rises consequentially. The average labor force participation rate would then decrease. Given that situation, the more upper school graduates produced, the less the rate can be. The manpower of those graduates might be overestimated in this paper.

3) The moving average of GNP per capita, which is employed as the explanatory variable in estimating the ratio of students who go to schools of the next level, is assumed to increase 5% or 3% a year from 1984. If this figure is high, the actual number of highly educated workers will be smaller than the estimated amount.

4) The employment rate of highly educated people is low, and unemployment rate of upper secondary school graduates is high in big cities (Rucker, 1985). Although the ratio of people who have been given secondary education or more is only 13.6% of the total labor force, their ratio to unemployed people is 38.3%. This is a tendency frequently observed in developing countries in general (Dore, 1976). One reason their unemployment rate is high is that there are not many jobs suitable for their academic background, and also that their families are rich enough to leave them unemployed. The employment rate may decrease due to an imbalance between demand and supply, yet it may possibly increase when children of poor families also go to upper secondary school.

5) Conditions which affect expansion of education, such as educational cost and availability of resources, were not taken into consideration. Values determined here are close to the largest estimates of the educational population. They can be regarded as some indication of the goal of educational expansion.

6) It is very difficult to decide the optimal ratio of highly educated workers for each industry. It is doubtful that the ratio of well-educated workers was optimal in 1971 or in 1980. Thus it cannot be concluded that the number of graduates of upper secondary schools, universities and academies will be oversupplied in 1990, nor that figures shown in Tables 13 or 14 are ideal. It is uncertain how many taxi drivers and shopkeepers are likely to be university graduates. The situation in other countries should be studied and taken into consideration.

7) Although economic growth effects a greater demand for labor, the speed at which the educational system is developing is higher than that at which the economy is growing.

It should be stressed that the specialities of students, their actual learned skills, are not considered in this analysis due to lack of data. The specialities of highly educated workers being produced may not match the skills demanded by the industrial world. Though the labor market tends to demand workers who studied science and engineering, most university graduates studied humanities or social sciences largely because these programs are less expensive for schools to offer and, therefore, are more available. Not only because of this mismatch of skills, but also because of shortcomings in the quality and level of education, workers may not be equipped with skills and knowledge actually demanded in the private sector. Thus some types of highly educated workers may be still undersupplied in 1990.

It is not preferable that most of the highly educated people work in the public sector. As a servant is in the most stable occupation, it is quite reasonable that workers with good educa-

tional backgrounds are attracted to it. Yet, economic growth of the country depends greatly upon the development of private enterprise.

The educational background of workers has been improved significantly, but it should be noted that this is partly because the original educational level was very low. The highly educated labor force, which may be considered to be oversupplied by traditional standards, will raise the intellectual level of labor force in the private sector and contribute to economic growth.

Certainly, the educational background of the labor force will be improved rapidly in all industries. Taking the present tendency in to account, workers with better educational backgrounds will continue to replace others. This can be regarded as the improvement of the quality of labor force; nonetheless, if the overall employment situation does not improve, the increase of highly educated workers will lead to the decline of employment of workers without a good educational background. The correspondence between jobs and educational backgrounds of workers will change accordingly. The pay differential, which is too big at this point, will be narrowed to some extent.

V. POLICY IMPLICATIONS

The enrollment rate at elementary schools has increased rapidly recently, though it seems to be stabilizing. Nevertheless, because of the growing school-age population the number of enrolled students will continue to increase. Due to the effort of the government to expand the capacity of elementary schools, a substantial number of students will soon reach the lower secondary and upper secondary school level. At lower and upper secondary schools both the enrollment rate and the school-age population are growing, so the number of students has been increasing dramatically. Clearly, from now on the government will have to extend its efforts not only for compulsory elementary education, but also for increasing the capacity of secondary and higher education. Absorption of Elementary school graduates into lower secondary schools is a major part of government policy in 1987.

Expansion of education at one level affects the subsequent levels for a long period. The number of highly educated workers will increase rapidly before 1990 mainly because of the efforts to increase the enrollment rate at elementary schools made in the late 1970's.

Diffusion of education helps to develop abilities of people and improves productivity to bring about economic growth. However, it is impossible to produce a large number of workers with good educational backgrounds instantly. Certain steps have to be followed to expand education. As it takes long to develop a labor force at formal educational institutions, an educational plan should be based upon the long-term prospects of the Indonesian economy and society. Though highly educated workers might be generally oversupplied at some stage, there may be a shortage of specialists such as medical doctors and system engineers. Or, in some cases, the quality of workers may not be satisfactory though their number is. This paper deals only with the flow of students as a whole, and not with the fields of study or the quality of education. Still, the fields of science and engineering have to be enhanced for national development and the necessity of improving quality has been pointed out (Beely, 1979). If the educational system is expanded without regarding national development or educational quality, it would simply increase the keenness of the competition for jobs.

To expand capacity it has been necessary to increase the number of teachers as well as schools. However, most teachers of private lower and upper secondary schools are part-time. It is doubtful that it is possible to have enough qualified full-time teachers when more schools are built, and thus the number of part-time teachers seems likely to increase judging from existing tendencies. It is necessary to draw qualified people to educational circles by improving working conditions. A scheme to develop teachers is needed immediately.

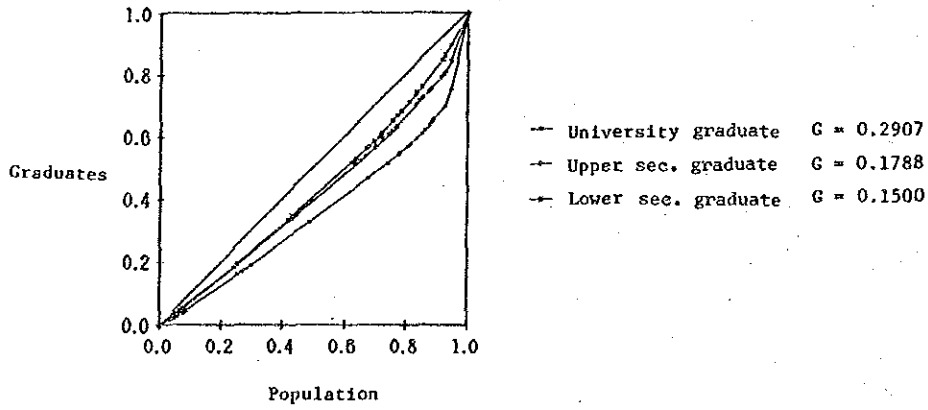
Expanding capacity at the secondary school level, however, involves a difficult problem, namely, how to set the proportion of vocational schools to the whole. As it becomes more common to go to schools of higher education, many students may prefer these to vocational training. As a result vocational schools may tend to be for students with lower scholastic ability. Another

problem is that vocational schools cost much to construct. Yet, if only the number of upper secondary schools of general education is increased, the desire to go to universities or academies will be stimulated making competition very keen. It is necessary to maintain a certain percentage of vocational schools not only to produce skilled workers, but also so as not to increase the number of highly educated students too quickly.

Even though the number of highly educated workers has increased, most people in the labor force have not completed elementary school. The necessity for formal and informal education and training of those people cannot be stressed too much. For these people, informal educational centers are provided at community centers, homes and shops. Various kinds of text books and work books called "learning modules" have been distributed. Also tutors visit them once or twice a week to guide them. From April 1981 to March 1982, 624,000 people studied with these modules; the average hours spent for study was 14 hours. Among them, the proportions of people in groups below 10 years old, 10 to 24 years old, 25 to 45 years old and over 45 years old were 1.48%, 47.82%, 46.26% and 4.44% respectively (Departmen Pendidikan Dan Kebudayaan 1984c). This scheme is conducted to give them knowledge necessary for their jobs and is, in a way, symptomatic treatment. Nonetheless, it plays an important role as a form of lifelong education and should continue to be enriched and expanded.

The educational situation of Indonesia as a whole has been discussed. However, different conditions can be observed in different areas. The geographic distribution of highly educated workers is not even. To contribute actively to regional development it is necessary to analyze the conditions in each area separately. The distribution of the labor force by educational background shows that the higher the workers' educational level the larger the difference in their distribution as seen in Figure 9. It might be true that jobs suitable for upper school graduate are concentrated in a few areas; however, it can be said that this may be because the institutions are concentrated there.

Figure 9 Regional Distribution of School Graduates (Lorenz Curve and Gini Coefficient)



Source: Biro Pusat Statistik, 1983b

Universities and academies are overly concentrated in Jakarta, while manpower with a good educational background is insufficient in other regions. To conduct well-balanced regional development it is necessary to examine the flow of graduates of institutions of secondary and tertiary education and to seek the best locations for such institutions.

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CHAPTER XII
PRICE CHANGES

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I. INTRODUCTION

The Indonesian economy went through triple-digit hyper-inflation amounting to 131.6 per cent per annum in the 1960's, as shown in Table 1. Although the rates of inflation in Indonesia decreased in the 1970's and 80's, they have been still higher than those of other Asian developing countries.

This chapter addresses the development of inflation in Indonesia since 1969, when the first five year development plan (REPELITA I) of the Soeharto government came into effect.

The New Order Government of Soeharto, after taking effective control over the country in 1966, gave the first priority to suppressing hyper-inflation with economic policies prepared and implemented by American-educated technocrats. It applied extreme austerity to the budget: The ratio of deficit against government revenue declined from 174 per cent in 1965 to 117 percent in 1966. Foreign aid became available in significant amounts in 1967. This helped the government reduce the budget deficit, which had been the major force behind hyper-inflation. The ratio of deficit against revenue was drastically reduced to 3 percent in 1967. But the reduction of the budget deficit was superficial: At the same time the government was making extra budgetary expenditures directly or indirectly to suppress the prices of rice, sugar and utilities. These expenditures were financed by borrowing from the central bank, which accounted for Rp.32.9 billion of the increase in money supply (M1) of Rp.31.2 billion in 1967. Also the central bank extended loans to importers who purchased foreign exchange from the government which was provided by foreign countries as aid. This further contributed to the growth of the money supply. As a result, money supply increased as much as 152 per cent, although this rate was much lower than the 696 percent in the previous year.

Table 1 Inflation in Asian Developing Countries

	1965-70	1970-75	1975-80	1980-84
Indonesia	131.6	19.4	15.5	11.0
Korea	12.5	15.3	17.2	8.3
Malaysia	1.3	7.2	4.5	5.8
Philippines	5.9	23.1	4.7	25.3
Singapore	1.2	3.8	9.1	4.0
Thailand	2.5	9.8	9.7	5.5

Note: Figures are rates of change in consumer price index.

Source: IMF, International Financial Statistics (Year Book, 1986)

Indonesia experienced the first rice crisis in the latter half of 1967. Rice prices started to rise in September in response to the news of a poor secondary harvest. As the government had not built up sufficient reserves of rice in the first half of the year, and as it could not procure rice abroad on account of world-wide rice shortages, it failed to deal with the rise in rice prices. Rice prices in Jakarta shot up by 142.0 per cent from August through December and by 271.4 per cent for the year. The Jakarta cost of living index rose by 112 per cent in 1967.

Rice prices peaked in February 1968, having risen by 92 per cent since December. With imports and a domestic harvest flowing into the market, rice prices eventually began to fall. As a result, the rate of increase in rice prices in 1968 was 26.9 per cent, far smaller than the previous year.

The experience of the rice crisis made the government realize the need to assure adequate supplies of rice by stockpiling rice during the harvest season and by importing rice. The government also came to understand that farmers should be paid a price for paddy which gave them adequate incentive to buy fertilizer, insecticide and pesticide.

Table 2 Rates of Changes in Consumer Price Indices (%)

	Total	Rice Price Index	Administered Price Index	Free Market Commodity Price Index
67	112.2	271.4	177.8	39.6
68	85.1	26.9	49.7	156.7
69	9.9	6.1	21.4	11.2
70	8.9	-5.3	50.8	12.6
71	2.5	-7.5	1.4	7.2
72	25.8	104.9	2.0	-2.4
73	27.3	-1.2	24.8	51.0
74	33.3	6.4	24.1	48.6
75	19.6	38.8	24.1	12.0
76	14.3	-6.2	36.0	21.9
77	11.8	3.3	16.2	14.5
78	6.7	0.1	2.2	9.3
79	24.0	19.3	13.6	25.7
80	17.1	8.6	21.5	17.6
81	7.3	1.8	0.0	8.6
82	10.0	5.2	36.3	7.9
83	12.0	3.7	45.2	8.7
84	9.1	- 5.9	33.7	6.3

Note: On an end-to-end year basis.
The Jakarta cost of living index for 1967 to 1968.
The Consumer Price Index for Indonesia (Composite of 17 cities) for 1979 - 1984.
Source: Central Bureau of Statistics.

Owing to the steep inflation during the latter half of 1967 and early 1968, administered prices had lagged behind the general rise in prices: The administered price index[1)] rose by only 7.5 per cent from July 1967 to March 1968, whereas the free market commodity price index[1)] rose by 461.5 per cent during the same period (Table 2). The government, which aimed at establishing a substantial balanced budget and attaining monetary stabilization, decided to raise administered prices to reduce large-scale subsidies and introduced extra-budgetary expenditures to compensate for losses incurred from keeping down the prices of consumer goods and services. As a result, the administered price index rose by 49.7 per cent in 1968. The policy introduced in June, which aimed at stabilizing the BE rate[2)], helped keep down the prices of essentials, especially rice. On the other hand, as the DP rate[2)] was left rising steeply, the prices of luxury goods went up.

The prices of clothing, which were stabilized by large scale imports in 1967, rose sharply because higher import duties were imposed on textiles in April 1968 and certain finished textiles were shifted from the favourable BE rate import list to the DP rate import list in June to protect the domestic textile industry. The free market commodity index rose by 156.7 per cent in 1968.

Money supply (M1) increased by 122 per cent in 1968, while the Jakarta cost of living index

rose by 85.1 per cent. The principal expansionary factor of the money supply was the credit provided by the central bank to Bulog[3] to finance its market operations of rice.

The government succeeded in establishing the basis for stabilization of the level of overall prices by 1969 as follows: (1) control of the rice market, (2) management of BE the rates, (3) balancing the budget and controlling money supply, (4) adjustment of administered prices which had fallen behind the rises in other prices, and (5) increases in domestic production and imports.

II. INFLATION DURING THE REPELITA PERIOD

1. The REPELITA 1 Period (1969-1973)

Public confidence in price stability, which the New Order Government had created by successful management of economic policy before REPELITA I was put into effect, continued during REPELITA 1. High growth rates of money supply were compatible with the relative stability of prices. However, inflation in the international markets in combination with rapid monetary growth accelerated the rate of increase in free market commodity prices in 1973.

Although rice prices were largely stabilized, the government could not effectively control the seasonal fluctuations of rice prices as indicated by high coefficents of variance for the REPELITA 1 period (Table 3).

Table 3 Coefficients of Variance in Medium-quality Rice in Jakarta

(%)

Year	Coefficient
1969	13.70
70	8.11
71	7.52
72	22.32
73	14.12
74	6.70
75	10.97
76	3.45
77	2.26
78	3.53
79	11.08
80	6.23
81	1.92
82	3.06
83	5.05
84	2.74

Source: Bulog.

1969

The rate of increase in the Jakarta cost of living index drastically declined to 9.9 per cent in 1969 from 85.1 per cent in 1968. Rice prices increased by only 6.1 per cent, and the ad-

ministered price index decelerated its rate of increase to 21.4 percent. The rate of increase in the free market commodity price index remained 11.2 percent compared to 104.7 per cent in 1968.

Although the rate of increase in rice prices was small on an end-to-end year basis, rice prices fell by 21.9 per cent from March to July with the wet season harvest reaching the market, and rose by 40.0 per cent from August to December with the news that the dry season harvest would be below average. These fluctuations of rice prices reflected that rice price support policies did not work as intended because of inadequate understanding of the policy by those who were charged with implementing it. In October the government realized that they should sell its stock in markets and place large orders for commercial rice imports. The rise in rice prices quickly subsided with these measures being taken.

As the price stabilization policy of the government rested on the assumption that expansion of money supply need not cause concern, provided that rice prices and the foreign exchange rates for essential goods could be kept stable (Bulletin of Indonesian Economic Studies 1969 March:4). Money supply (M1) increased as much as 57.9 percent in 1969, although this rate was far smaller than 121.7 per cent in the previous year. The compatibility between the moderate rate of inflation of 10.0 per cent and the high rate of money growth was because the public had become more willing to hold money, having increased confidence in the stability of the rupiah. The expansion in Bulog's purchase of rice promoted the remonetization in the agricultural sector by reducing the volume of barter transaction, which had become widespread during the period of hyper-inflation.

Table 4 Rates of Increase in Money Supply (%)

Year	M1	M2
68	119.2	133.3
69	58.9	82.5
70	35.0	40.4
71	28.8	42.8
72	50.5	41.4
73	42.5	55.2
74	40.5	45.7
75	35.2	37.8
76	25.6	31.0
77	25.4	18.9
78	24.0	24.1
79	33.3	34.9
80	51.1	52.4
81	29.1	25.8
82	10.0	20.6
83	6.4	20.9
84	13.2	30.0

Note: On an end-to-end year basis.
M1 = Currency + Demand deposits.
M2 = M1 + Time and savings deposits.
Source: IMF, International Financial Statistics (Yearbook, 1986).

1970

Domestic fuel prices were raised on 6 January, and the administered price index rose by 50.8 per cent in January. Rice prices in Jakarta also shot up by 16.7 percent in January because of insufficient supply of rice to the market. Faced with this situation, Bulog intervened in the rice market eventually driving down rice prices. Since Bulog had adequate stock of rice at hand, the tardy response of Bulog was attributed to management problems.

Prices were remarkably stable after January; the Jakarta cost of living index rose by only 1.4 per cent from February to December.

On 17 April the two foreign exchange rates --- the BE rate and the DP rate --- were merged into the DU (General Exchange) rate. As the DU rate was set at Rp.378 per dollar, the exchange rates for essential commodity imports were devaluated by 16.0 percent to Rp.326 per dollar. In spite of the devaluation of the rupiah, prices of imported goods did not rise significantly, and the Jakarta cost of living index was not affected by the devaluation. The rate of increase of the Jakarta cost of living index remained at 9.9 per cent.

Monetary policy was implemented based on the assumption that the public confidence in price stability had been secured. The growth rate of money supply (M1) in 1970 was 34 per cent in contrast with 57.9 per cent in 1969. Most of the money growth came from an expansion of bank credit to the private sector (Tables 4 and 5).

1971

The rate of price inflation in 1971, measured by the Jakarta cost of living index, was only 2.5 per cent. This is due to the overall price stability: Rice prices declined by 7.5 per cent, the administered price index remained almost unchanged and the free market commodity price index increased by 7.2 per cent during the year.

Table 5 Factors Affecting Changes in Money Supply (M1)

(Billion of Rupiah; End of period)

Year	M1	Net Foreign Assets	Claims on Government	Claims on Public Enterprises	Claims on Private Sector	Other Items	Time and Saving Deposits
1969	38	4	-11	30	88	-7	-66
	(100)	(10)	(-28)	(80)	(232)	(-19)	(-175)
70	30	24	-9	3	135	-61	-61
	(100)	(78)	(-29)	(9)	(446)	(-203)	(-202)
71	71	11	55	18	99	-44	-68
	(100)	(15)	(77)	(26)	(141)	(-63)	(-96)
72	154	212	-51	-3	184	-116	-72
	(100)	(138)	(-33)	(-2)	(119)	(-75)	(-47)
73	194	75	-43	67	408	-215	-98
	(100)	(39)	(-22)	(34)	(210)	(-110)	(-50)

74	269	364	-117	280	146	-209	-196
	(100)	(139)	(-43)	(104)	(54)	(-78)	(-73)
75	313	-589	-253	926	298	143	-213
	(100)	(-188)	(-81)	(296)	(95)	(46)	(-68)
76	353	345	-342	402	361	-114	-300
	(100)	(98)	(-97)	(114)	(102)	(-32)	(-85)
77	403	569	-208	35	284	-180	-97
	(100)	(141)	(-51)	(9)	(70)	(-45)	(-24)
78	482	50	-223	349	546	-128	-112
	(100)	(10)	(-46)	(72)	(113)	(-27)	(-23)
79	896	1654	-742	371	557	-427	-516
	(100)	(185)	(-83)	(41)	(62)	(-48)	(-58)
80	1610	3101	-1919	489	1178	-380	-859
	(100)	(193)	(-119)	(30)	(73)	(-24)	(-53)
81	1490	118	-524	593	1756	83	-535
	(100)	(8)	(-35)	(40)	(118)	(6)	(-36)
82	636	-1529	532	689	2260	-593	-724
	(100)	(-240)	(84)	(108)	(355)	(-93)	(-114)
83	448	1069	-1057	-42	2183	815	-2520
	(100)	(239)	(-236)	(-9)	(487)	(182)	(-563)
84	1012	2769	-2471	190	3646	-858	-2262
	(100)	(274)	(-244)	(19)	(360)	(-85)	(-224)

Note: Figures in brackets are ratios against M1 (M1=100).
Source: Central Bureau of Statistics

On 23 August, the rupiah exchange rate was devaluated by 9.8 per cent from Rp.378 per dollar to Rp.415 to encourage exports and put a brake on the demand for imports. The devaluation did not have any significant unfavourable effect on domestic prices. The fact that the devaluation was timed to coincide with currency realignments throughout the world seemed to minimize adverse confidence reactions to the stability of prices [Bulletin of Indonesian Economic Studies 1971 November:4].

Money supply (M1) increased by 30 per cent. Loans to the private sector accounted for most of the increase. The compatibility between a 20.8 per cent growth rate of money supply (M1) and a 2.5 per cent inflation rate demonstrates the confidence in the stability of the rupiah among the public, which was also illustrated by the accelerated growth of both twelve-month and six-month time deposits (Table 6).

Under this favourable environment there were arguments such as follows: Price policy is too rigid and the lack of price elasticity is hampering growth. There is no need for Indonesia to pursue self-sufficiency in basic commodities such as rice. It is time to accelerate development through expansionary monetary and fiscal policy [Bulletin of Indonesian Economic Studies 1972 March:15].

1972

The Jakarta cost of living index rose by 25.8 per cent during 1972. Rice prices, which shot up by 104.9 per cent during the year, were the sole contributor to the rise in the overall price index; The administered price index rose by only 2.0 per cent and the free market commodity price index declined by 2.4 per cent during the year. The fact that the prices of non-rice commodities remained stable, not being affected by the sharp rise in rice prices, was considered to reflect the expectation of price stability among the public formed by the continuing stability of prices since 1969.

Table 6 Time Deposits (Millions of Rupiah)

	12-month	6-month	3-month	1-month	Total
1970 December	38,263	6,824	4,755	587	50,429
	(52.3)	(1.9)	(217.8)	(128.4)	(50.2)
1971 December	75,514	15,522	12,598	993	104,627
	(97.4)	(127.5)	(164.9)	(69.2)	(107.5)
1972 December	107,576	28,699	8,819	731	145,825
	(42.5)	(84.9)	(-30.0)	(-26.4)	(39.4)

Note: Figures in brackets are rates of change from the previous year.

As Bulog started the purchase of rice later than usual in 1972, the total procurement of rice by Bulog amounted to less than 72,000 tons by the middle of the year, far smaller than the 240,000 tons in the corresponding period in 1972 (Table 7). But the delay in procurement was not given much heed to because Bulog had relatively large stocks of rice at this point of time. The estimation made in June and July concerning the amount of rice production, however, revealed that Bulog would have to supply the market with far more rice than it had previously planned. Bulog also realized that the strict policy of rice procurement of rice: The reduction of maximum permissible ratio of content of broken rice from 35 percent to 25 percent made it difficult to procure rice in June and July, especially since small mills could not meet the enhanced quality requirement. Faced with this situation, President Soeharto ordered to revert to the former quality standard for rice in August so that the procurement of rice could be expadited. But the price of rice had already begun to rise with poor harvest of the wet season rice and the anticipatiobn of poor harvest of dry season rice (Table 8). Moreover, Bulog was reluctant to purchase rice in the market where the price had already risen, and Bulog's purchase of rice amounted to only 160,000 tons by September, one third of the amount procured in the same period in the previous year.

Bulog, therefore, could not intervene effectively in retail rice markets where speculation and hoarding had been pushing up prices until a significant amount of imported rice arrived in September. Rice prices in Jakarta rose by 105.2 per cent from August through December and the overall price index rose by 24.1 per cent during the latter half of the year. It had only risen by 1.4 per cent during the first half of the year.

Money supply (M1) increased by 50.5 per cent, far higher than 35.0 per cent in 1970 and 28.8 per cent in 1971. Expansion of net foreign assets, which was brought about by a rapid increase in exports owing to a rise in the international price for Indonesia's oil, a large inflow of foreign capital into high-interest time deposits and increased overseas borrowings by Pertamina and the private sector, contributed to half of the increase in money supply. Expansion of credit to the private sector, which was made possible by large excess reserves that the banks had built up with a foreign capital inflow into time deposits and borrowing overseas, contributed to the other half of the increase in money supply.

Table 7 Bulog's Rice Operations (tons)

	1969/70	1970/71	1971/72	1972/73	1973/74	1974/75	1975/76	1976/77	1977/78	1978/79	1979/80	1980/81	1981/82	1982/83	1983/84	1984/85
(1)Opening Stock	366,414	236,134	397,461	387,477	198,216	417,963	778,005	521,523	572,027	470,252	707,851	885,665	1,191,950	1,593,212	911,062	1,441,654
(2)Procurement																
(a)Domestic	244,158	531,440	561,629	137,852	268,254	536,050	539,033	410,435	404,065	881,350	430,780	1,635,342	1,953,169	1,933,359	1,210,698	2,382,092
(b)Import	(805,452)	(773,374)	(527,179)	(1,229,536)	(1,229,007)	(1,129,745)	(667,386)	(1,505,865)	(2,308,347)	(1,267,400)	(2,579,276)	(1,213,150)	(437,131)	(505,445)	(1,109,677)	(186,624)
PL-480	398,523	356,392	237,073	246,363	23,136	-	-	401,193	239,843	304,293	352,512	100,952	45,914	2,500	65,375	53,822
Grant	-	-	-	24,930	286	-	6,000	12,000	5,557	8,689	13,850	-	30,711	200	-	-
Food Aid	38,699	270,549	250,125	337,693	144,887	168,730	-	10,000	192,700	11,936	313,374	198,001	17,051	-	140,022	2,104
Commercial	368,230	146,433	39,981	620,550	1,060,698	961,015	661,386	1,082,672	1,870,247	942,562	1,899,540	914,197	343,455	505,745	904,280	130,698
Total Supplies	1,416,024	1,540,948	1,486,269	1,754,865	1,695,372	2,083,748	1,984,424	2,437,823	3,289,439	2,619,082	3,717,907	3,734,157	3,582,250	4,032,016	3,231,437	4,010,370
(1)Budget Group & Sale Enterprises	873,751	834,510	767,415	726,525	751,728	757,858	749,218	755,408	717,039	719,026	756,327	737,765	900,673	1,415,802	1,366,409	1,414,817
(2)Market Operations	204,140	227,712	202,492	768,468	417,681	342,533	559,460	979,319	2,086,472	1,031,512	2,053,195	1,646,273	1,033,188	1,528,548	398,902	87,710
(3)Others	49,276	45,343	92,514	32,395	54,815	155,581	110,722	97,437	74,739	115,055	15,869	146,619	38,684	160,057	14,906	103,497
Total Releases	1,127,167	1,107,565	1,062,421	1,527,388	1,224,224	1,255,972	1,419,400	1,832,164	2,774,265	1,865,593	2,824,591	2,530,657	1,972,545	3,104,407	1,780,217	1,606,024
Losses	52,723	35,922	36,371	29,261	53,195	49,771	43,501	33,632	39,922	45,638	7,651	11,550	16,493	16,547	9,566	4,846
Closing Stock	236,134	397,461	387,477	198,276	417,953	778,005	521,523	572,027	470,252	707,851	885,665	1,191,950	1,593,212	911,062	1,441,654	2,399,500

Source: Bulog

Table 8 Prices for Medium-quality Rice in Jakarta
(In rupiah per kilogram)

	1972	1973
Jan.	47.32	67.50
Feb.	48.10	71.85
Mar.	47.66	67.77
Apr.	46.97	54.61
May	45.12	53.72
Jun.	44.05	76.35
Jul.	44.36	79.43
Aug.	46.20	80.78
Sept.	50.38	82.85
Oct.	55.77	79.06
Nov.	69.21	78.60
Dec.	82.01	84.12

Note: The movement of the price for medium-quality rice investigated by Bulog differs from that of rice prices investigated by Central Bureau of Statistics which is a basis for the Jakarta cost of living index.
Source: Statistik Bulog 1969 - 1984.

1973

The Jakarta cost of living index increased by 27.3 per cent in 1973. This rate of increase was almost the same as in 1972, but there was a big difference between the two years. The price rise in 1972 was mainly due to the hike in rice prices with other prices relatively remaining stable. In 1973 the administered price index rose by 24.8 per cent and the free market commodity price index rose by 51.0 per cent, whereas rice prices declined by 1.2 per cent.

International prices of Indonesia's major export commodities shot up in the latter half of 1972 due to the phenomenal boom in world commodity markets concomitant with a cyclical upswing of the economy in the industrial countries. Prices of Indonesian exports rose sharply: The wholesale price index of export commodities increased by 82.0 per cent in 1973 as against 18.3 per cent in 1972. Rapid inflation in the industrial countries also affected the prices of Indonesia's import goods with the wholesale price index of import commodities increasing by 40.5 per cent in 1973 compared with 10.8 per cent in 1972. Thus, overseas factors contributed to pushing up domestic prices in Indonesia. For example, the price of cooking oil in Jakarta went up from Rp.85 per bottle in December 1972 to Rp.252.5 in December 1973 with the rise in international prices of copra --- one of the major export commodities of Indonesia --- from US$ 140 per ton to US$ 600 during the same period. Moreover, corresponding to the rise in the international prices of crude oil, domestic prices of petroleum products were raised in May, and this brought about a rise in administered prices such as transport and electricity charges.

The rapid growth of money supply combined with external factors pushed up domestic prices. Money supply (M1) increased by 42.5 per cent during 1973 following rapid growth of 50.5 per cent in 1972. A major contributing factor to money growth was the expansion of bank credit to the private sector. Although Bank Indonesia attempted to hold down commercial bank lending by limiting its refinancing of commercial bank loans, which had been a major element in allowing

bank credit expansion, the commercial banks that had sufficient liquidity could use their own funds to expand credit. Commercial banks were no longer dependent on Bank Indonesia funds and were not effectively controlled by changes in refinancing policies (Bulletin of Indonesian Economic Studies 1974 March:25-26).

The price of rice, which began to skyrocket in August 1972 and hit a peak in December, gradually decreased with the wet season harvest flowing into the market; Its rate declined by 28.0 per cent from December 1972 through May 1973. However, after May the price began to go up and ended the year at almost the same level as in December 1972 despite the fact that the 1973 rice harvest was 10.8 per cent over the previous year. This could be attributed mainly to the failure of rice procurement policy.

The government adopted a new rice marketing and procurement scheme to avoid repeating the failure it made in 1972, and decided that the BUUD[4] would play a central role in rice processing and marketing. The BUUD, however, could not fulfill the role. Since rice imports of 1.37 million tons, which had been planned at the beginning of the year, were found to be impossible by May, the domestic procurement target was raised from 600 thousand tons to 900 thousand tons, and the BUUD had to meet an unrealistically high procurement target. In addition, the price paid by the BUUD to farmers was set lower than the prevailing market prices, so the farmers were reluctant to sell rice to the BUUD. As it became clear that sufficient rice had not been stockpiled, efforts to accomplish the target were intensified. In early June, the governments imposed bans on interprovincial flows of rice in order to force farmers to sell rice to local BUUD. The result was, however, just the opposite of what had been desired. Rice prices fell for producers in rural areas and rose for consumers in cities, and finally it was realized that nothing could be achieved by holding firm to the national stockpile target and the BUUD system. The procurement scheme was revised on 3 July. By this time rice prices in Jakarta had risen by 47.9 per cent from Rp.53.72 per kg in May to Rp.79.43, and the prices remained at almost the same level for the rest of the year.

2. The REPELITA II Period (1974-1978)

In 1974 the government, which re-realized that the rapid increase in money supply (M1) was a potential threat to the stability of prices, introduced new monetary measures aiming at controling the expansion of bank credits. However, money supply continued to expand at high rates mainly led by the increase in net foreign assets brought about by petroleum exports. The free market commodity price index rose at high rates amounting to the annual average of 14.4 per cent from 1975 through 1978. (The free market commodity price index rose by 48.6 per cent because of higher priced imports in 1974.)

Although the price of kerosene was fairly well controlled amid the drastic hike in international petroleum prices -- the annual average rate of increase was 11.4 per cent during the REPELITA II period -- other administered prices increased rapidly: Electricity, water and oplet (mini-bus) charges went up at the annual average rate of 16.7 per cent, 29.8 per cent and 20.1 per cent respectively. As a resutl, the administered price index increased at the annual rate of 20.0 per cent.

As for rice prices, both the rate of increase and the degree of seasonal fluctuations were smaller compared with in the REPELITA I period because the government was more competent in managing domestic rice markets.

1974

The Jakarta cost of living index increased by 15.6 per cent during the first quarter of 1974, equivalent to an annual rate of 78.7 per cent. As rice prices rose by only 2.6 per cent and the rate of increase in the administered price index remained at 13.2 per cent during the corresponding period, 22.8 per cent quarterly rate of increase in free market commodities was the main contributor to the large increase in the overall price index.

The import price index rose by only 3.7 per cent between January and April compared with an average quarterly rate of increase of 8.9 per cent in 1973. The export price index (excluding petroleum) declined by 5.6 per cent during the same period against 16.2 per cent of the average quarterly rate of increase in 1973. Inflation in foreign counties, which was the main cause of Indonesia's inflation in 1973, was beginning to subside at the beginning of 1974. The government, which judged that the sharp increase in money supply was the primary factor causing the acceleration of price inflation, announced a wide-ranging package of anti-inflationary measures on 9 April as follows:

(1) A ceiling on the increase in bank loans and on other assets which had a monetary impact similar to that of credit expansion. The ceiling was set at 30 per cent of the outstanding position at the end of the previous fiscal year.

(2) Requirements for private enterprises and non-bank financial institutions to report on certain overseas borrowings and to deposit 30 per cent of the value of these borrowings in Bank Indonesia's interest-free accounts.

(3) Higher minimum reserve requirements on rupiah time deposits and saving accounts and larger foreign exchange denominated reserves which banks were required to deposit with Bank Indonesia.

(4) Higher interest rates on time deposits and savings accounts and new 18-month and 24-month time deposits.

Since lending to the private sector was the major factor of the increase in money supply, the restriction of bank loans to the private sector, along with absorbing surplus funds by increasing time deposits and savings accounts, was quite adequate.

Bank lending to the private sector decelerated in 1974: The net increase in bank lending to the private sector declined to Rp.147 billion in 1974 from Rp.408 billion in 1973. However, a surplus in the balance of payments amounting to US$ 1,004 million owing to a sharp rise in petroleum prices brought about an increase in net foreign assets of Rp.364 billion and caused an increase in money supply. The government increased its deposits in Bank Indonesia to offset the expansionary effect on money supply, but the net increase of the government's deposits amounting to Rp.117 billion was far smaller than the increase in net foreign assets. Consequently, money supply increased by 40.5 per cent, almost the same as 40.8 per cent in the previous year.

Free market commodity prices remained relatively stable; the rate of increase was 12.6 per cent and 3.6 per cent in the second and the third quarters respectively. Rice prices actually declined by 11.0 per cent and 2.0 per cent in the second and third quarters respectively. The rate of increase in the Jakarta cost of living index decelerated to 5.3 per cent in the second quarter and to 2.5 per cent in the third quarter. Stability of the overall price index, under strong demand pressure caused by increasing money supply, was accomplished by the import of certain necessities such as rice, wheat, sugar and palm oil with the government's abundant foreign exchange and revenues brought about by a sharp rise in the international petroleum prices.

Table 9 Rates of Change in Food Component of the Jakarta Cost of Living Index

(%)

	Food	Total
1973 Sept.	10.9	8.5
Dec.	10.9	8.8
1974 Mar.	16.7	15.6
Jun.	1.8	5.3
Sept.	2.0	2.5
Dec.	9.2	6.9

Note: Figures are quarterly rates of change.

These goods were then released in the domestic markets at subsidized prices. The food component of the Jakarta cost of living index increased by only 1.8 per cent and 2.0 per cent in the second and third quarters respectively, considerably smaller than 16.7 per cent in the first quarter (Table 9).

On 19 November the government announced a new rice and fertilizer subsidy policy, which aimed at reducing the cost of the subsidies for both of these commodities and enhancing price incentives for rice producers by improving their terms of trade. The price of fertilizer was immediately increased. (For example, the price of urea was raised by 50 per cent from Rp.40 per kg to Rp.60 per kg.) Although the floor price of dry unmilled rice paid to farmers was scheduled to be raised by 37.5 per cent from Rp.30.4 per kg to Rp.41.8 per kg on February 1975, the price of rice, which had been low, immediately began to rise, increasing 18.2 per cent from October to December. The food component of the Jakarta cost of living index recorded a 9.2 per cent increase and the total index increased by 6.9 per cent in the fourth quarter. Consequently the Jakarta cost of living index increased by 33.3 per cent in 1974, exceeding the rate of 27.3 per cent in 1973.

1975

Unlike previous years, Bulog did not set a minimum target for procurement in 1975, and instead they intervened the rice market to prevent the prices of dry unmilled rice paid to farmers from declining lower than the floor prices. So rice prices were kept stable from April to June, when paddy prices usually decline significantly with the wet season crop appearing on the market. On 28 October, the government announced that the floor prices of dry unmilled rice and fertilizer would be raised on 1 February 1976. After the accouncement rice prices started to rise, increasing by 14.2 per cent during the two months from October to December, and by 38.8 per cent for the year.

The government raised various prices especially during April and May; and the administered price index rose by 24.1 per cent in 1975. Import prices rose by only 7.2 per cent and export prices (excluding petroleum) declined by 0.6 percent in 1975 because of the global recession; thus overseas factors did not work to push up the domestic price level. In addition, the national stock scheme, which started in April 1974 to stabilize the prices of principal commodities, contributed to stable prices. The increase in the free market commodity index decelerated to 12.0 per cent in 1975 from 48.6 per cent in 1974. As a resut, the Jakarta cost of living index increased by 19.7 per cent in 1975.

As exports increased by only 1.8 per cent, while imports increased by 18.1 per cent, the current account of the balance of payments moved from a surplus of US$ 26 million in 1974 to a deficit of US$ 1,164 million in 1975. The capital account changed from an inflow of US$ 382 million in 1974 to an outflow of US$ 1,493 million in 1975 because of a massive outflow of capital to serve the short-term debts of the state oil company Pertamina. Therefore, net foreign assets, which declined by Rp.589 billion, had a contracting effect on money supply. On the other hand, since Pertamina borrowed Rp.704 billion from Bank Indonesia to pay off its foreign debts and finance its domestic activities, claims on official entities and public enterprises increased by Rp.926 billion and had a large expansionary effect on money supply. Consequently, money supply increased by 33.4 per cent in 1975.

1976

Although the administered price index and the free market commodity price index accelerated their rates of increase in 1976, the increase in the Jakarta cost of living index decelerated to 14.2 per cent in 1976 from 20 per cent in the previous year. This was due to the stabilization of rice prices. The Indonesian government procured 1.5 million tons of rice at low prices from foreign countries, and Bulog actively engaged in market operations. As a result, rice prices fell by 6.2 per cent in 1976, compared with an increase of 38.8 per cent in 1975, although the

rice harvest in 1976 was a disappointing 2.3 per cent increase over the previous year.

Net credit of Bank Indonesia to the central government decreased by Rp.353 billion, and the net increase in claims on official enterprises and entities of Rp.402 billion was less than half that of the previous year, reflecting a sharp reduction in credits to Pertamina and Krakatau Steel Projects. On the other hand, net foreign assets, which increased by Rp.345 billion after a decrease of Rp.589 billion in 1975 because of general strengthening of the balance of payments, had an expansionary effect on money supply, which increased by 25.6 per cent.

1977

Inflation further abated during 1977. The Jakarta cost of living index rose by 11.8 per cent compared with 14.2 per cent and 20 per cent in 1976 and 1975 respectively.

The rice harvest in 1977 was disappointing with only a 0.2 per cent increase over the previous year because of prolonged drought and continued plagues of wereng (brown grasshopper) (Table 10). The government imported a large amount of rice and intervened in the market with imported rice. Consequently, the rate of increase in rice prices only rose 3.3 per cent for the year.

Since prices of petroleum products were not raised, the increase in the administered price index decelerated to 16.3 per cent in 1977 from 26.6 per cent in the previous year.

The free market commodity index also decelerated with a rate of increase of 14.5 per cent in 1977 from 17.1 per cent in 1976.

The amount of increase in credit to public enterprises and official entities was considerably less in 1977 than in 1976 mainly because the outstanding credits to Pertamina were reduced with the significant improvement of Pertamina's financial position. Also net increase in credits to the private sector slowed in 1977.

Table 10 Rice Production
(In thousand tons)

Year	Production
1969	12,249
1970	13,140 (7.3)
1971	13,724 (4.4)
1972	13,183 (-3.9)
1973	14,607 (10.8)
1974	15,276 (4.6)
1975	15,185 (-0.6)
1976	15,845 (4.3)
1977	15,876 (0.2)
1978	17,525 (10.4)
1979	17,872 (2.0)
1980	20,163 (12.8)
1981	22,286 (10.5)
1982	22,837 (2.5)
1983	24,005 (5.1)
1984	25,825 (7.6)

Note: Figures in brackets are the rates of change over the previous year.
Source: Bulog.

However, the contractive effect on money supply of the Rp.208 billion increase in the central government's deposits in Bank Indonesia was far smaller. As a result, the rate of increase in money supply (M1) was 25.1 per cent in 1977, almost the same rate as in 1976.

1978

Rice production in 1978 increased by 10.4 per cent over the previous year because of the following: (1) a new wereng-resistant seed controlled the wereng plague, and (2) weather was favourable in that there was abundant rain during the dry season. In addition 1,267 thousand tons of rice were imported in fiscal 1978. Rice prices remained quite stable, increasing by only 0.07 per cent. Except for city water charges, administered prices were not raised in 1978. And its index rose by only 2.2 per cent during the year.

The government's financial policy continued to provide a contractive influence on money supply (M1) in 1978. The central government's deposits in Bank Indonesia increased by Rp.223 billion (excluding the effects of the October 15 devaluation), and more than offset the expansionary effect of the increase in net foreign assets which amounted to Rp.50 billion. Therefore, net claims both on public enterprises and official entitities and on the private sector increased more rapidly in 1978 than in 1977, the rate of growth of money supply (M1) declined a bit further from 25.4 per cent in 1979 to 24.0 per cent in 1978.

The movement of the Jakarta cost of living index was stable reflecting the above-mentioned moderate pressures on prices both from the demand and the supply sides until the rupiah devaluation in November. The overall index increased by only 4.6 per cent from December 1977 to October 1978.

The rupiah was devaluated by 50.6 per cent from Rp.415 per dollar to Rp.625 on 15 November. This immediately induced rises in prices of imported goods, and rises in a wide range of goods and services followed. Faced with this situation, the government ordered that all prices be lowered to pre-devaluation levels until pre-devaluation stocks were exhausted. Bulog was actively engaged in the open market operation, releasing stocks of rice, sugar and flour.

Rupiah-denominated export prices of non-oil commodities increased by 41.6 per cent from October to December compared to 11.7 per cent from January to October, inducing a rise in domestic wholesale prices of exportable commodities. The wholesale price index of import commodities accelerated its rate of increase from 7.0 per cent between January and October to 9.5 per cent between October and December. These brought about the acceleration of the increase in free market commodity prices, although rice and administered prices remained stable owing to the measures implemented by the government. The free market commodity price index increased by 6.0 per cent from October to December, equivalent to 26.2 per cent per annum, compared to 3.2 per cent between January and October. On the other hand, rice prices declined by 0.3 per cent and the administered price index rose by 1.1 per cent from October to December.

Consequently, the Jakarta cost of living index increased by 17.9 per cent per annum from October to December, although it recorded a single-digit rate of increase of 6.7 per cent for 1978 as a whole.

3. The REPELITA III period (1979 - 1983)

The main feature of price development during Repelita III was the rapid increase in the administered prices led by the raise in the domestic petroleum prices, which were made to reduce the oil subsidies brought about by the larger gap between the domestic and international petroleum price levels.

Increased domestic production of rice, which exceeded 20 million tons in 1980, contributed to the stability of rice prices both in terms of annual rates of increase and seasonal rates of fluctuation.

1979

The 2.0 per cent increase in rice production in 1979 was quite modest compared with 10.4 per cent in 1978. This was mainly due to the recurrence of wereng plague. The government took the unusual step of raising the floor price of unmilled dried rice from Rp.85 to Rp.95 per kg on 3 May 1979 subsequent to the usual revision of the floor price on 1 February from Rp.75 to Rp.85 per kg, aiming to stimulate rice production by improving farm income and compensating for higher costs associated with the devaluation. The government also raised Bulog's market intervention prices in May, and rice prices shot up and continued to rise steadily afterward. As a result, rice prices increased by 19.3 per cent during the year.

In an effort to reduce oil subsidies, which had grown because of increases of the international oil price, the government raised domestic fuel prices in May for the first time since 1976. The administered price index rose by 13.6 per cent.

Wholesale prices of export commodities (excluding crude oil) increased by 46.4 per cent in 1979, pushing up domestic prices of exportable commodities. Since the effect of the 50.6 per cent devaluation had already passed through to the 56.2 per cent increase in wholesale prices of export commodities from October to December, the increase in wholesale prices of export commodities in 1979 were attributed to rising world market prices. As for imported commodities, the 50.6 per cent devaluation was not fully passed through to domestic prices, and the concomitant reductions in the margins of importers were gradually restored in 1979. This, together with the increasing prices in the world markets, pushed up the domestic prices of imported goods. The wholesale price index of imported goods rose by 29.8 per cent in 1979.

Net foreign assets increased by Rp.1,654 billion in 1979, more than twice as large as Rp.700 billion in 1978, owing to rising international oil prices and expansion of non-oil exports. The build-up of Rp.742 billion in the central government's deposits in Bank Indonesia could only offset under half the expansionary impact on money supply (M1) from net foreign assets. Consequently, money supply (M1) accelerated its rate of increase from 24.0 per cent in 1978 to 33.3 per cent in 1979.

These cost-push and demand-pull factors accelerated the rate of increase in the free market commodity price index from 9.3 per cent in 1978 to 25.7 per cent in 1979. The overall price index rose by 24.0 per cent.

1980

Rice production in 1980 was 20,163 million tons, 12.8 per cent above the previous year's level. Bulog's rice procurement in the domestic market increased drastically to 1,635 thousand tons in fiscal 1980 from 430 thousand tons in the previous fiscal year. The increase in rice prices decelerated to 8.6 per cent in 1980 from 19.3 per cent.

With the increase of international oil prices, the government subsidy to fuel oil increased to Rp.535 billion in fiscal 1979, accounting for 13.2 per cent of the routine expenditure of Rp.4,062 billion. To cope with this problem the government raised fuel oil prices by 50 per cent in May in 1980 and raised various other administered prices later that month. The administered price index in May shot up by 21.5 per cent over the previous month.

With the slowdown of the increase in primary commodity prices in international markets, the wholesale price index of export commodities (excluding crude oil) decelerated its rate of increase to 2.7 per cent in 1980 from 42.5 per cent in 1979, moderating their impact on the increase of domestic prices. Also the wholesale price index of imported commodities decelerated its rate of increase to 13.5 per cent from 26.2 per cent in 1979, contributing to the stability of domestic prices. The rate of increase in the free market commodity price index declined to 17.6 per cent from 25.7 per cent in the previous year. The overall consumer price index increased by 17.1 per cent in 1980.

The increase of Rp. 3,101 billion of net foreign assets, which far surpassed the build-up of Rp. 1,919 billion of the central government's deposits, had an expansionary effect on money

supply. Also credit to the private sector, which increased by Rp. 1,178 billion following an expansionary credit policy, contributed to the monetary expansion. Consequently, the rate of growth of money supply (M1) accelerated drastically to 51.1 per cent.

1981

Rice production in 1981 reached 22,286 thousand tons, exceeding the previous year's record-breaking crop by 9.1 per cent. Bulog also carried over a large amount of stock of 1,192 thousand tons to fiscal 1981 from the previous fiscal year. Rice prices remained quite stable all through the year, increasing by only 1.8 per cent from the beginning to the end of the year. Administered prices, which were raised in 1980, were not raised in 1981. With the world economy entering recession in 1980, prices in the international markets declined, and Indonesia's wholesale prices of import and export commodities remained fairly stable in 1981: The former increased by 4.6 per cent and the latter by 2.4 per cent. Thus, cost-push pressure of prices was weakened in 1981.

The drastic decline in export commodity prices during 1981, as well as the unexpected stagnation in oil prices, brought the current account of the international balance of payments in 1981 into a deficit of US$ 816 million. Net foreign assets, which had been the major factor expanding money supply, increased by only Rp.118 billion and the expansion of money supply (M1) in 1981 decelerated to 27.9 per cent in 1981. The decrease in both the demand and the cost pressures resulted in a slowdown of the rate of increase in the free market commodity price index to 8.6 per cent. The overall consumer price index rose by 7.3 per cent in 1982 --- a single-digit rate of increase for the first time since 1978.

1982

Rice production increased by only 2.4 per cent in 1982, far less than the more than 10 per cent in the previous two years, because the dry season in 1982 was very dry. However, rice prices increased by no more than 5.2 per cent in 1982, which was quite different from the past experiences. For example, in 1972 a severe drought brought about a rice crisis, and rice prices doubled in several months. The stability of rice prices amidst a drought was due to the efforts made by the government all through the 1970's aiming at securing reserves large enough to meet short-term erratic fluctuations in domestic supply. Also the government had become able to operate its market-monitoring mechanism far more efficiently than in the 1970's.

Indonesia's petroleum exports decreased from US$ 18,417 million in 1981 to US$ 15,869 million in 1982, because petroleum production was cut from 1.60 million barrels per day in 1981 to 1.34 million barrels per day in 1982 in accordance with the quota of 1.3 million barrels per day set at the meeting of OPEC ministers held in Vienna in March 1982. At the same time, Indonesia's imports continued to increase in 1982. Consequently, Indonesia's balance of payments became a deficit of US$ 5,418 million and net foreign assets decreased by Rp. 1,919 million. This brought about a low rate of increase in money supply of 10.0 per cent in 1982.

The price of the petroleum products and charges for transportation and electricity were raised in January and February. The administered price index increased by 36.3 per cent in 1982. However, owing to the stability of rice prices and the weakness of demand pressure, the increase in administered prices did not induce a rise in the prices of free market commodities. The free market commodity index increased by no more than 7.8 per cent and the consumer price index recorded a modest rate of increase of 9.5 per cent in 1982.

1983

Subsequent to the raises in petroleum product prices in January, various transportation fees were raised. The administered price index increased by 45.2 per cent during the January and

February period.

On March 30 the rupiah was devalued by 37.1 per cent from Rp.707 to Rp.970 per US dollar. Consequently, wholesale prices of import and export commodities increased by 16.7 per cent and 32.2 per cent respectively in April. Although the increase in export commodity prices induced an increase in domestic prices of exportable commodities, for example a 12.8 per cent increase in retail prices of cooking oil, the increase in import commodity prices was transmitted to domestic prices only to a limited extent. The free market commodity index increased by only 3.1 per cent in April and by 5.9 per cent from April to December since money supply was maintained so as not to accommodate increases in other commodities and services.

Although the current account of Indonesia's balance of payments recorded a deficit of US$ 6,442 million in 1983, larger than US$ 5,458 million in 1982, the capital, which had flown out before the devaluation, returned and official borrowings also increased. This turned net foreign assets into a Rp. 1,069 billion increase from a Rp. 1,529 billion decrease in 1982, making a positive contribution to monetary growth. However, an increase in the central government's deposits at Bank Indonesia more than offset the expansionary effect of the net foreign assets. Credit to the public sector declined mainly because capital intensive projects were re-phased. The increase in credit to the private sector was almost the same as in the previous year. As a result, the rate of increase in money supply (M1) was kept at 6.4 per cent, the first single-digit figure since the New Order Government had been established.

In addition to the moderate increase in free market commodity prices, rice prices remained almost stable showing an annual rate of increase of 3.7 per cent. Consequently, the consumer price index increased by only 12 per cent in 1983, almost the same as in 1982.

4. The REPELITA IV period (1984 - 1988)

Petroleum exports, whose rapid increase had continuously worked as driving force behind inflation and economic growth in the 1970's and early 1980's, are stagnating. Prices are expected to remain stable during the period.

1984

In the January-April period, the consumer price index rose by 6.8 per cent. This is due to the January adjustments in domestic petroleum project prices amounting to a 37 per cent increase on average, and the consequent hikes in utilities prices. The administered price index rose by 33.7 per cent during these four months, while the free market commodity price index increased by 3.9 per cent and rice prices declined by 11.1 per cent.

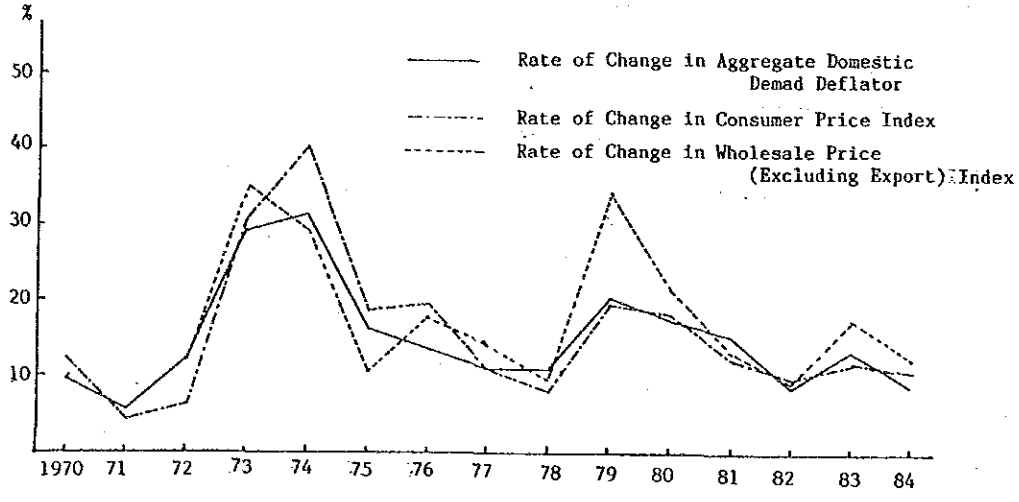
The cost-push pressure originating from administered prices did not induce rises in other commodity prices because of restrained demand management policies along with stable rice prices and excess capacity in domestic industries. Rice prices increased by only 5.8 per cent, and the free market commodity price index rose by only 2.4 per cent in the period from May through December respectively. As a result, the annual rate of increase in the consumer price index in 1984 was 9.1 per cent.

An increase of Rp.2,768 billion in net foreign assets had an expansionary effect on monetary growth. This increase was mainly brought about by the reduction in the deficit of the balance of payments from US$ 6,442 million in 1983 to US$ 1,920 million in 1984, which was due to (1) an increase of non-oil/LNG exports led by the expansion of the world economy, especially the US economy, (2) the start of LNG exports to Japan and (3) a decline in imports. Since an increase of Rp.2,471 billion in the central government's deposits in Bank Indonesia account offset the expansionary impact of the net foreign assets, money supply (M1) grew by 13.2 per cent in 1984.

III. CONCLUDING REMARKS

Higher input costs and increased value added per output both cause rises in the price of an individual commodity. Therefore, the rises in import prices and in value added per unit of domestic production for domestic use bring about domestic inflation. The inflationary impact from the latter factor is called "home-made inflation" because it is generated domestically.

Figure 1 Trends of Rate of Change in Aggregate Domestic Demand Deflator, Consumer Price Index and Wholesale Price (Excluding Export) Index



Source: Central Bureau of Statistics

The degree of domestic inflation is expressed by the change in the deflator of the aggregate domestic demand (the sum of private and government consumption and domestic investment). The rises in import price and value added per unit of production for domestic use are expressed by rises in the import deflator and the (GDP-Export) deflator respectively. The deflator of the aggregate domestic demand is supposed to move in step with the consumer price index and the wholesale price (excluding export) index (Figure 1).

Table 11 shows the degree of contribution of the (GDP-Export) deflator and the import deflator to the rise in the deflator of the aggregate domestic demand. In 1973, 1974 and 1979 the import deflator recorded high contribution rates of 8.6, 10.8 and 10.3 per cent, reflecting the skyrocketed commodity prices in the international markets. An estimated 8.7 per cent of the contribution in 1983 was due to a 37.1 per cent devaluation of the Rupiah on 31 March 1983. Except for these three years the degree of contribution of the import deflator was not significant. On the other hand, the (GDP-Export) deflator contributed considerably to the rise in the aggregate domestic demand deflator all through the years, and "home-made inflation" is considered to be a major factor of domestic inflation in Indonesia.

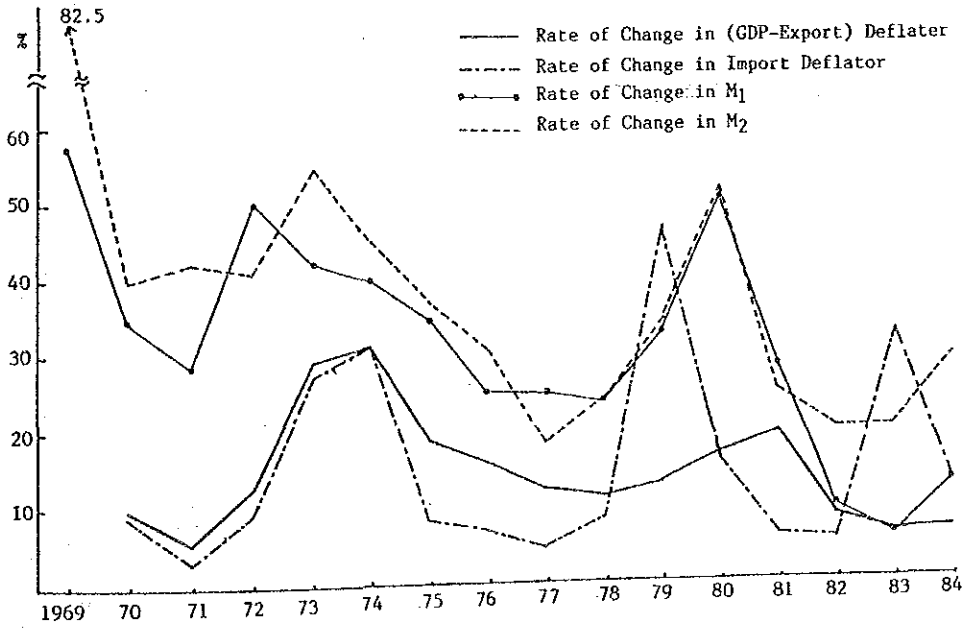
Figure 2 shows that the rise in the (GDP-Export) deflator correlates with the growth in Money Supply (M1) and the import deflator. The following regression indicates that both the rise in import prices and the expansion of M1 has induced "home-made inflation".

Table 11 Degree of Contribution of (GDP-Export) Deflator and Import Deflator to Rise in Aggregate Domestic Demand Deflator

	Aggregate Domestic Demand Deflator	(GDP-Export) Deflator	Import Deflator
1970	9.9	7.8	2.2
71	5.7	3.8	1.7
72	12.3	9.7	2.6
73	29.2	20.6	8.6
74	31.7	20.9	10.8
75	16.5	13.7	2.9
76	13.8	10.1	3.7
77	11.2	10.7	0.4
78	11.1	8.7	2.3
79	20.4	10.3	10.3
1980	17.2	14.6	2.6
81	15.4	8.8	6.7
82	8.2	7.9	0.3
83	13.4	4.6	8.7
84	8.6	10.8	-2.1

Note: The old national account series for 1970 to 1978.
The new national account series for 1979 to 1984.
Change in stock excluded from aggregate domestic demand and GDP for 1979 to 1984.
Source: Central Bureau of Statistics.

Figure 2 Trends of Rate of Change in (GDP-Export) Deflator, Import Deflator, M_1 and M_2



Source: Central Bureau of Statistics

RVAX=0.3379*RM11+0.2417*RMD
(5.97) (2.40)

R^2=0.651

S=5.8648
DW=0.85

RVAX: Annual rate of change in (GDP-Export) deflator
RM11: Annual rate of change in M1 with one year lag
RMD : Annual rate of change in import deflator

Table 5 shows factors affecting changes in M1. Credit to the private sector had been the principal factor in expanding M1 until 1973. In April 1974 the Indonesian government, faced with a rapidly increasing money supply caused by expanding international reserves owing to the first oil crisis, set a ceiling on the rate of expansion of bank credit aiming to control money supply. However, the increase in net foreign assets brought about by oil exports continued to have an expansionary effect on M1, except in 1975 when a large amount of repayment of the debt of Pertamina was made to foreign countries, and in 1982 when both oil and non-oil exports declined significantly. As indicated by the continuous increase in the government's deposits at Bank Indonesia, the government deliberately pursued a policy of sterilizing the expansionary effect of the rise in international reserves on money supply, while the principle of a balanced budget was formally maintained. However, as an oil company tax, received in the form of foreign exchange, was the primary domestic revenue source (Table 12), it was impossible for the government to sterilize the expansionary impact on money supply of the increase in net foreign assets brought about by oil exports.

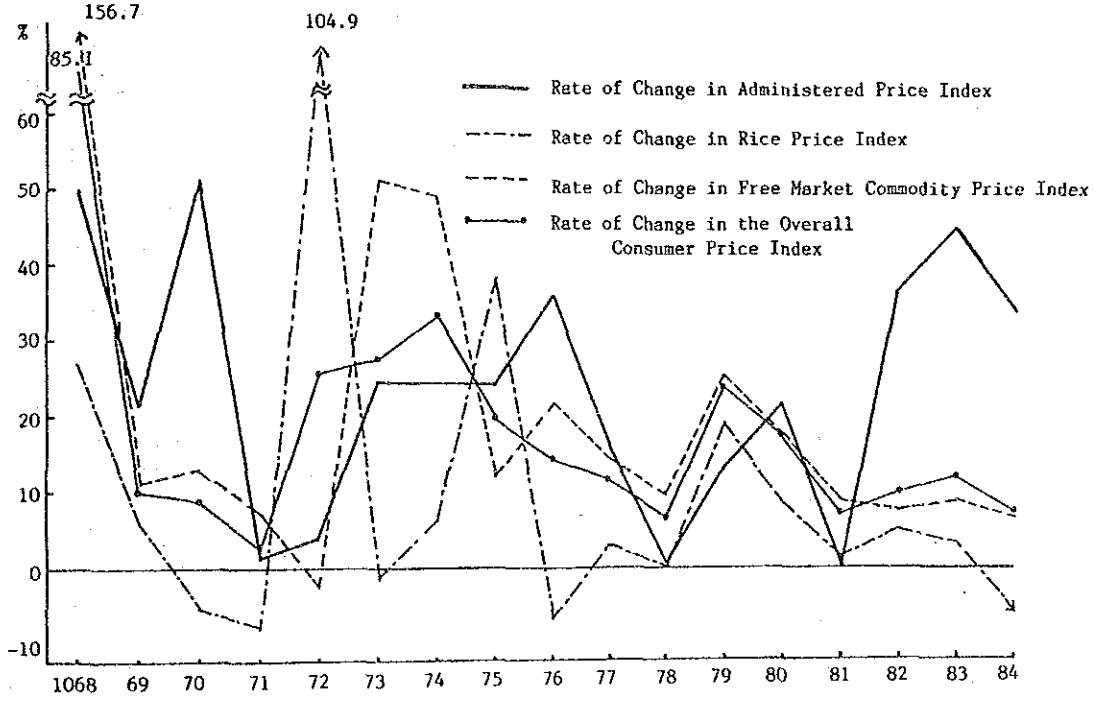
Table 12 Oil Company Tax and Domestic Revenue
(Billions of Rupiah)

Year	Oil Company Tax	Domestic Revenue
1969	42.6 (19.3)	220.6
70	63.6 (20.5)	310.6
71	97.2 (23.6)	411.1
72	176.9 (32.5)	543.6
73	276.1 (33.4)	827.8
74	890.6 (53.9)	1,652.7
75	1,085.9 (54.5)	1,991.1
76	1,500.8 (55.4)	2,707.4
77	1,931.2 (57.1)	3,384.4
78	2,126.2 (57.2)	3,963.6
79	3,206.9 (62.2)	5,515.7
80	6,833.5 (69.2)	9,876.7
81	7,922.2 (69.7)	11,358.5
82	8,211.1 (67.7)	12,130.3
83	9,093.7 (65.4)	13,905.0
84	11,637.6 (70.5)	16,498.4

Note: Figures in brackets are percentage of oil company tax/domestic revenue.
Source: Department of Finance.

Although oil producing countries might be regarded as immune to inflationary pressures from increasing international prices of oil, these countries also have to raise domestic oil product prices so as to keep their domestic price structure consistent with the international price structure. For this reason, Indonesia had to raise its domestic oil product prices eventually to keep in step with higher international oil prices. As Figure 3 shows, the administered price index consisting of oil product prices and public utility charges which were significantly affected by oil product prices has been the primary factor pushing up the overall consumer price index. The rise in the administered price index accelerated especially after 1982 because the government raised domestic oil product prices to reduce its oil subsidies in light of lower oil export revenues.

Figure 3 Trends of Rate of Change in Administered Price Index, Rice Price Index, Free Market Commodity Index and Overall Consumer Price Index



Source: Central Bureau of Statistics

Structural inflation, which is the result of bottlenecks in social and economic structure, is one of the common causes of domestic inflation in developing countries. Chronic increases in rice prices resulting from low productivity and high population pressure is a typical example of structural inflation. In Indonesia, rice prices have beem relatively stable: Their annual rates of increase have been smaller than those of the administered prices and free market commodity prices (Figure 3). Rice prices in particular have been stable in the 1980's because the continuous efforts of the government in the 1970's to develop irrigation and spread the use of fer-

tilizer, insecticide and pesticide resulted in the enhancement of productivity of rice production.

The Indonesian government failed to control domestic inflation within the range of the rate of increase which the cost-push factor of the rise in international oil prices would likely have effected. This is because that the Indonesian government could not adequately sterilize the expansionary effect on money supply of the increase in international reserves caused by the rise in international oil prices.

It is difficult to forecast future international oil prices. But it is generally believed that the international oil market will tighten in the 1990's, and international oil prices will rise correspondingly. The Indonesian government should prepare various measures to manage money supply so that future international oil price hikes will not bring about a large increase in money supply and accelerate domestic inflation.

NOTES

1) The methods for calculating the administered price index and the free market commodity price index are as follows:

1. The administered price index.

(1) For 1967 to 1978.

Kerosene, electricity, water and oplet (mini-bus), which are considered to be administered price items, are selected from the 62 basic items of the Jakarta cost of living index. The prices of these four items are integrated into an index using the same weight as for calculating the Jakarta cost of living index.

The weights of these four items are:

Kerosene = 2.20/100
Electricity = 0.20/100
Water = 1.14/100
Oplet = 1.43/100

(2) For 1979 - 1984.

Five administered price items -- kerosene, electricity, water, gasoline, city-bus and inter-city train -- are selected from the 152 basic items of the consumer price index for Jakarta. The prices of these five items are integrated into an index using the same weight as for calculating the consumer price index for Jakarta.

The weights of these five items are:
Kerosene = 2.16/100
Electricity = 1.78/100
Water = 0.78/100
Gasoline = 1.70/100
City-bus = 3.60/100
Inter-city train = 0.62/100

Although the price indices and weights of individual items for the consumer price index for Indonesia as a whole should be used for calculating the administered price index, they are not available because the consumer price index for Indonesia is calculated by integrating price indices of an aggregated level of 13 cities including Jakarta.

Therefore, the administered price index compiled with the above-mentioned method is not consistent with the overall consumer price index for Indonesia in the strict sense.

2. The free market commodity price index.

(1) For 1967 - 1978.

Since the weights for the administered price index and the rice price index are 8.94/100 and 31.26/100 respectively, the free market commodity price index is derived by the following formula:

(The Jakarta cost of living index -4.97/100 * the administered price index
- 31.26/100 * the rice price index) /63.77.

(2) For 1979 - 1984.

The weights for the administered prices and the rice price index for the consumer price index for Jakarta are 10.64/100 and 10.44/100 respectively. The free market commodity price index is derived by the following formula:

(The consumer price index for Indonesia - 10.64/100 * the administered price index
- 10.44/100 * the rice price index) /78.92.

2) The BE (Export Bonus Foreign Exchange) rate was applied to imports of essential commodities, and the DP (Complementary Foreign Exchange) rate was applied for other foreign transactions. The BE rate, which was lower than the DP rate, was more favourable to importers.

3) BADAN URUSAN LOGISTIC, Goverment rice purchasing agency.

4) BUUD is an abbriviation of Badan Usaha Unite Desa (Village Unite Organization), which was a rural cooperative intended to perform the function of extension of credit, fertilizer distribution and rice milling and marketing.

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CHAPTER XIII
REGIONAL ECONOMIC DEVELOPMENT

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INTRODUCTION

This chapter has three purposes. The first is to furnish the overall basic knowledge which would be useful, though not explicitly associated with spatial development, for obtaining better insights into the characteristics of regional development in Indonesia. We begin with describing the historical and geographic background and general socio-economic setting, and then proceed to the review of industrial activities with special emphasis on the transportation sector. It is taken up here not only because it plays an important role for regional development, but also it is not touched upon in any other chapters of this book.

The second is to provide an overview of the states of recent regional economic development in Indonesia. With this aim, three attempts are made; first to discuss regional development policies since the First Five-Year Development Plan (Repelita 1: 1969-74), secondly to comment on the studies so far conducted on regional economic development in Indonesia, and thirdly to analyze the intertemporal changes in the magnitude of interregional economic disparities.

The third is to show an extremely unsophisticated but reasonably robust method which can be used for the projection of regional population and gross domestic product as well as for the estimation of regional consumption and production functions. This method serves as a handy tool for getting a rough underlying idea of regional demographic and economic tendency in particular when the availability of regional data is surpassingly limited. The calculated results obtained through the application of this method to regional data of Indonesia are also shown.

In short, this chapter tries to address the importance of regional scopes in both designing and assessing national comprehensive development plans. This objective is pursued by combining three fundamental research approaches; study reports on macroscopic socio-economic facets which are to be disaggregated into corresponding regional facets, quantitative analysis on a process of regional economic development, and construction of a simple methodological framework for the first-approximation investigation on various regional activity levels.

I. MACROSCOPIC SOCIO-ECONOMIC SPHERES FOR REGIONAL DISAGGREGATION

1. Geographical Background

Indonesia extends over the world's largest archipelago, between two continents, Asia and Australia. The nation's location as important trade routes has long influenced its political and economic development.

It has a land area of 741,101 square miles and territorial waters nearly four times that size. In total, the country comprises some 13,700 islands, stretching 3,200 miles from east to west (roughly the distance from Moscow to London) and 1,100 miles from north to south.

The population of approximately 160 million people are concentrated on six main islands: Sumatra, Java, Bali, a major part of Kalimantan (the island formerly known as Borneo), Sulawesi and Irian Jaya (the western part of New Guinea). In addition, there are two large groups of islands: Maluku (the Moluccas) and the Nusa Tenggara Islands.

Sumatra, with the area of 182,859 square miles, is the largest island. It is the westernmost of the 3,200-mile chain. Lying opposite the southern flank of the Malay Peninsula, it forms the southern boundary of the long and strategic Malacca Straits. The island represents some 25 percent of Indonesia's area and is home of 18 percent of the country's population.

Java is Indonesia's principal island in terms of population and land use. Together with the island of Madura, which is part of the province of East Java, it has an area of 51,037 square miles and the population of more than 91 million. It is one of the most densely populated areas in the world.

The island of Bali, Indonesia's fabled tourist destination, is 2,147 square miles in area and is the home of more than 2.4 million people.

Kalimantan is the Indonesian portion of the island formerly known as Borneo. Two East Malaysian states and the nation of Brunei are also located on Borneo. Totaling 208,286 square miles, Kalimantan represents about 28 percent of Indonesia's land area, but with only 4.4 percent of the country's population.

Sulawesi, a large island east of Kalimantan, has an area of 73,056 square miles, some 10 percent of Indonesia's total land area. Formerly known as the Celebes, the island is inhabited by about 7 percent of Indonesia's population.

Irian Jaya, totaling 162,927 square miles, is the Indonesian portion of the island of New Guinea, which shares with the independent nation of Papua New Guinea. Irian Jaya is Indonesia's easternmost territory, lying directly north of Australia. It represents 22 percent of the nation's land area but is the home of less than 1 percent of the population.

Maluku, an island group once known as the Spice islands, lies between Sulawesi and Irian Jaya. The Nusa Tenggara group, including Lombok, Sumbawa, Sumba, Timor and others, extends eastward from Bali.

There are many important straits in the Indonesian archipelago, including the Sunda Straits (between Sumatra and Java), the Makasar Straits (between Kalimantan and Sulawesi), the Lombok Straits (between Bali and Lombok) and the Malacca Straits (between Sumatra and Peninsula Malaysia).

More than half of Indonesia's land is forested and a significant amount is mountainous and volcanic. Java alone has 112 volcanoes, 15 of them are active. One of history's greatest volcanic eruptions occurred on the island of Krakatau (between Sumatra and Java) was in 1883. Volcanic activity through the ages has given the soils of Java and Bali a much higher degree of fertility than in most other parts of Indonesia. Some mountains in Sumatra and Irian Jaya exceed 10,000 feet in height. Large tidal swamps are found in Sumatra, Kalimantan and Irian Jaya.

Most of the Indonesian archipelago lies along or just below the equator. The country has a tropical, monsoon-type climate, featuring slight changes of season and temperature, low winds, high humidity and periodically heavy rainfall. Except at higher elevations, temperatures

generally range between 68 and 86 degrees Fahrenheit (20 and 30 degrees Celsius). Humidity ranges from 60 to 90 percent. Rainfall varies throughout Indonesia, totaling at least 28 inches (706 millimeters) yearly. Annual rainfall of up to 90 inches (2,286 mm) is found along the equatorial rain belt, which passes through Sumatra, Kalimantan and Sulawesi. It reaches 160 inch (4,064 mm) in the higher elevations of these islands.

Rainfall may occur year-round in Java but the heaviest is between October and April. Many parts of western Indonesia experience distinct periods of exceptionally heavy rain, when either the northeast or southwest monsoon winds blow onshore. The eastern part of Java, Bali, southern Sulawesi and Nusa Tenggara, which like farther south, are generally drier during the southeast monsoon period (from July to October).

There are many rivers scattered throughout the country. They serve as substantial transportation means in certain islands: the Musi, Batanghari, Indragiri and Kampar rivers in Sumatra; the Kapuas, Barito, Mahakam and Rajang rivers in Kalimantan; and the Memberano and Digul rivers in Irian Jaya. In Java, rivers are very important for irrigation, for instance the Bengawan Solo, Citarum and Brantas rivers.

2. Review of the Socio-Economic Setting

The population of Indonesia in 1980 was 147.5 million, up from 119 million in 1971 and 79 million in 1961. With the present population of 160 million, Indonesia is the fifth most populous nation in the world, exceeded only by China, India, the Soviet Union and the United States. Although the population is widely dispersed throughout the archipelago, the heaviest concentrations are located in the fertile islands of Java, Madura and Bali, where the population density is 690 per km^2.

The present growth rate is just over 2.3 percent per year. It is predicted that the population will rise to about 250 million by the year 2000. The Government has undertaken a comprehensive family-planning programme to reduce the growth rate of the population.

The population are at present mostly of rather young people with more than half are under 20 years of age. Life expectancy is approximately 54 years for males, 55 years for females.

The Indonesian people are basically of Malay heritage and are divided into approximately 300 ethnic groups, with about 365 languages and dialects.

Bahasa Indonesia is the national language. English is the country's second language taught in all secondary schools. Other languages commonly used are Arabic, Chinese and Dutch, while Javanese and Sundanese dialects are also widely used. Chinese, Arab and Eurasian groups as well as small Indian and Pakistani groups, live in the country.

Approximately 90 percent of the Indonesian people are Moslem. Islam has been the main religion in Indonesia for centuries. About 5 percent of the people are Christian. Hinduism, which is still practiced in Bali, retreated during the spread f Islam centuries ago. Less than 1 percent of the Indonesian people are Hindu. Buddhism and other religions also exist in the Indonesian society, although the number is very small.

The Government has put great emphasis on education as an important factor in social and economic development, particularly as a means of remedying the country's skilled-manpower shortage. Education and regular training are the main programmes to promote the 60 million Indonesian workforce. The Government has started operating 15 vocational training centers. Another 17 are scheduled to be opened soon. The vocational training centers are located in urban areas throughout the country. In addition to operating mobile training units, the Government is establishing 120 regional centers to provide training in skills development for rural residents.

The labour force is primarily engaged in work related to agriculture. Indonesian economy is based on small-holder agriculture, export-oriented estate agriculture and mineral and oil exploitation. Manufacturing is also becoming increasingly important to the economy. Most of Indonesia's labour force, which is estimated to increase by some 9.3 million during REPELITA IV, is employed in small-holder agriculture, mainly producing food crops for domestic consumption

and rubber, coffee, pepper and tobacco for export. Estate agriculture, developed during the colonial period, produces rubber, palm oil, coffee, tea. Although fishing is relatively less developed, it has in recent years become an important source of foreign exchange earnings. Tin has historically been Indonesia's primary mineral export, although the importance of crude oil relative to the economy has been increasing steadily, and it is now the nation's biggest earner of foreign exchange. The importance of wood products and copper as export products has also increased, while in the manufacturing sector production for the domestic economy, such as textiles, pharmaceuticals, fertilizer and cement has expanded rapidly.

The projected annual growth rates for each sector of the economy during REPELITA IV are as follows:

(a) Agriculture	3 %
(b) Mining	2.4%
(c) Industry	9.5%
(d) Construction	5 %
(e) Transport and Communications	5.2%
(f) Other	5 %

3. Industrial Activities

3.1 Agriculture, fishery and forestry

Of the total land area of 741,101 square miles, approximately 90,000 square miles, or 12 percent, is under cultivation. The agricultural sector received 21.7 percent and 19.1 percent of Government development expenditures during the first and second REPELITAs respectively. During the third plan period, 14 percent of the Government's development budget was earmarked for the agricultural sector.

Intensive farming is carried out in Java, Madura and Bali, where most of Indonesia's people live. The area under cultivation in these three islands is approximately 40,000 square miles and accounts for almost one-half of Indonesia's total cultivated area, although the combined land area of these three islands accounts for only 7 percent of Indonesia's total land area. An additional 77,000 square miles of potentially arable land exists in Sumatra and Kalimantan: The development of these areas is a primary goal of the Government's transmigration programme.

Current Government policy emphasizes the extension of irrigation facilities, primary for rice production. The Government believes that agricultural development should be integrated within regional and rural development policies and programmes. Rural development programmes consider the various land-use systems and the variations in population density throughout the country. In the less densely populated areas in the outer islands, the policy is to increase agricultural production through expansion of productive land and improved local infrastructure.

Government efforts in the agricultural sector also concentrate on water-resource development and the role of such development in the expansion of rain-fed agriculture. By the end of Repelita III, the total average of restored and improved irrigated land covered 1.8 million hectares.

Apart from that new irrigation networks covered 482,525 hectares of previously rain water for land. During REPELITA III land converted into rice-fields covered 170,000 hectares. Attention given during REPELITA IV, among others to:

(a) Expansion of irrigation network;
(b) Exploitation and maintenance of irrigation infrastructure;
(c) The criteria relating to various technical requirements and the choice of location, and
(d) Efforts of benefiting from water resources in the interest of national developments in various sectors. The Government also encourages the adoption of high-yield varieties of rice and other crops.

The Government is considering the use of food-crop nucleus estates, where mechanized agriculture techniques will support food production by small-holders in transmigration or resettlement areas.

Development of the livestock production sector is aimed at improving traditional production practices and stimulating investments in medium and large-scale ranches.

Perhaps not surprising for a country of 13,000 islands, Indonesia's reserves of fish are another great natural resource and the country's fishing industry has immense potential. Currently, more than 40,000 tons of fresh and frozen shrimp are shipped overseas, 95 percent to Japan. About 10,000 tons of tuna/skipjack are also exported. The Government believes that the development of the fishery sector is an important element in sustaining economic growth and regional development. Development is centered on traditional fishing techniques as well as modern deep-sea methods.

More than 60 percent (approximately 300 million acres) of Indonesia's total landmass is covered by tropical forest, making Indonesia the richest nation in forest resources in Southeast Asia. The country's forestry industry is often called the "green gold mine" and, if fully exploited, could provide more than 1 million jobs. While natural forests are considered valuable, the Government also supports the development of cultivated forests.

Forestry product exported -- primarily to Japan, Singapore, Taiwan and Italy -- are the nation's second largest foreign-exchange earner after petroleum and natural gas.

For achieving and annual rate of 5% in economic growth during REPELITA IV, a 3% increase in the annual production in the agricultural sector is considered imperative.

3.2 Mining

Indonesia is richly endowed with energy resources such as oil, gas, coal, hydropower and geothermal energy. Since its earnings from oil have been declining since 1981, a major objective of the government's energy policy has been to maintain the level of export earnings by diverting the domestic energy consumption away from oil (which accounts for 79% of commercial energy consumption) towards alternative and more economic resources such as coal, hydropower, geothermal and gas. The Government's strategy has been to use the State Electric Power Company (PLN) as the principal agent for the implementation of this policy. The other major objective of the sector is to increase the welfare of the population by increasing the number of electrified households, and by the extension of power supply to productive users in urban and rural areas. The extension of electricity supply will also contribute to the energy diversification through substitution of diesel oil and kerosene consumption where electricity is more economical.

The power sector of Indonesia is regulated through the Ministry of Mines and Energy (MME). The MME has a broad range of responsibilities including energy policy and planning, resources delineation and development, of the power, coal, oil, gas and geothermal supplies. The only energy resources which are not covered by the MME are nuclear energy, which is under the BATAN, hydropower resources surveys, which are under the Ministry of Public Works, and forestry, which belongs to the Ministry of Forestry. The coordination of all matters relating to energy resources is at ministerial level through the National Energy Coordinating Authority (BAKOREN).

The electricity subsector is regulated by MME through the Director General of Electric Power and New Energy (DGEP). The subsector includes (a) PLN, the State Electric Power Company, (b) captive plants installed by private parties for their own use, and (c) a number of small unregulated private companies and cooperatives which were set up to provide electricity in certain rural areas remote from PLN supply system. Legislation was enacted in 1979 to provide for private and cooperative franchise participation in the electricity sector. The DGEP is the chairman of the supervisory board which oversees PLN's operations and reviews PLN's investment plans, budgets and tariffs.

The supply of electricity is mainly undertaken by PLN, which was created in 1961, when the Government nationalized three Dutch owned power utilities on Java. Until 1972, PLN was a

department of the Ministry of Public Works and Electric Power. In 1972, a Presidential Decree transformed PLN into an autonomous body under the control of MME, with the responsibility of the generation, transmission and distribution of electricity as well as the planning, construction and operation of electricity supply facilities. PLN is managed by a board of directors headed by a President Director, who is appointed by the President and is accountable to the Minister of Mines and Energy. The President Director has the authority of all day-to-day operations of PLN. The board comprises of five directors with functional responsibility respectively for planning, construction, operations, finance and administration. Operational responsibility devolves to 17 regions (wilayah/distribusi), and responsibility for major construction to 14 project managers. Also reporting to the board are several staff units responsible for power research, education and training, management services, and audit unit called the Corporation Inspectorate, and the Java system operation and control unit. PLN's staff are now totally about 45,000, up from 29,000 in 1978 and 20,000 in 1974.

In addition to PLN, large share of electricity supply is provided by captive (private) power plants, with the installed capacity is about half of the total. After growing rapidly in the early 1970's as a result of PLN's inability to meet the demand, captive capacity has stabilized for a few years as PLN's capacity increased. Since the captive power generation is largely diesel-based and generally more expensive than PLN's supply, especially in Java, it is the policy of the Government to favor the replacement of captive generation by PLN's supply rapidly, and to license new captive plants only where PLN can not make the supply.

3.3 Manufacturing Sector

The major part of Indonesia's Manufacturing Sector is devoted to the production of consumer goods, such as food, beverages, tobacco products, textiles and related products. They are mostly carried out by private enterprises. Cement, fertilizer, petrochemicals and basic metal products have gained relative important only in recent years and are produced primarily by state-owned industrial enterprises, either alone or in joint ventures with foreign firms. Some industries may be mentioned here, as they have direct relations with some regions.

This sector has recorded an annual growth rate of approximately 20 percent since 1977. New investments both foreign and domestic, in the manufacturing of fine chemicals for the pharmaceuticals industry are encouraged by the Government.

The construction of an aromatic center at Plaju, South Sumatra, and a methanol plant in Bunyu Island, East Kalimantan started. The aromatics center will produce raw materials needed by the country's synthetic fiber industry. An Olefins centre will be established in Aceh, near the Arun LNG facilities, for the production of ethylene and such derivatives as LDPE, HDPE and VCM from ethane extracted from natural gas.

Aluminum also represents a growth industry. The Asahan aluminum smelter in North Sumatra has begun its operation with a production capacity of 135,000 tons of ingots per year. Maximum production of 225,000 tons per year should be reached by 1985, with one-third of production going to the domestic market. By 1985 total demand for aluminum products will be 73,400 tons.

The Government has also announced plans to establish an aluminum industrial estate near the Asahan smelter. Firms will be encouraged to establish facilities to produce aluminum rods, billets, wire plate, sheet and foil.

Development of railway industries is aimed to meeting the demand for transportation means, the need for freight cars and passenger coaches. For this purpose, expansion of the programme of increasing the manufacturing process will be carried out, the utilization of installed capacities and to develop service and maintenance stations. Projects to be promoted cover passenger coaches, diesel engines, electric trains and locomotives as well as increasing the capacity of freight cars. The development of the shipping industry is directed to meet the need for a national shipping fleet, both for new production and repairs through developing the mastering of the technology, the rehabilitation of equipment and the building of new shipyards.

The development of the aircraft industry near Bandun is directed to meet the domestic need for

aircrafts as well as for exports, both in its manufacturing, repairs and as a means for the transfer of technology. Priorities will be given to the production of the C-212 type aircraft, the BO 105 helicopters, the PUMA and the CN-235 airplanes, and also the BK-117 helicopters. The transfer of technology is carried out through the cooperation programme with Spain, West Germany, France and the USA.

3.4 Service Sector

Science and Technology Policies in the Transportation Sector are directed toward capability development in providing transportation services within the integrated transportation system in which each mode should optimally be operated.

The development on traffic and road transportation include the promotion of infrastructures, traffic safety measures and transportation means, giving priority to the observance of traffic regulations and enhancement of safety on the roads. The policies also include efforts to economize petrol consumption, reduce accidents and air pollution, promote safety standards and legal order by users of road facilities, prevent damage of environment including road infrastructures and improve services to users.

During the period of 1979-1982 road transportation service increased by an annual average of 11.8% for passenger cars, 24.65% for buses and 19.8% for trucks.

Railway Transportation

The development in the railway sector carried out during REPELITA III succeeded in enhancing the flow of goods and passengers. The results achieved thus far included rehabilitation and improvement of 1,595 kilometers of railway, rehabilitation of 42 steam locomotives, 593 diesel locomotives and 72 electric locomotives, 79 diesel trains, 1,532 passenger trains and 11,294 wagons. Furthermore, there were additions of 77 diesel locomotives, 360 passenger trains, 400 freight wagons, 60 electric rail trains and 112 diesel trains.

During REPELITA III, some 43,975,000 passengers were transported by trains, or an annual average increase of 8.3 % freight carried amounted to 1,033 million ton kilometers or an annual average increase of 2.3%.

The development of rail road transportation will be further directed to providing cheap, orderly and safe public transportation. During REPELITA IV, production growth of railway transportation is expected to reach 14% per year for passengers train and 21 % per year for cargo trains. Preparations for the electrification of railway are being made, especially on the main rail-lines in Java, to increase the capacity and utilization of railways infrastructures and facilities.

Sea Transportation

The development of sea-transportation had increased the capacity of domestic shipping armada. At the end of REPELITA III, the number of interinsular shipping armada totaled 397 ships with a capacity of 503,731 DWT, 1,049 ships of local shipping armada with a capacity of 129,476 DWT, 3,486 ships of smallholders shipping armada with a capacity of 180,447 BRT, pioneering shipping armada of 20,805 DWT, 2,501 ships of special domestic shipping armada with a capacity of 2,267,740 DWT, barges with 587,875 BRT and tug-boats with 379,603 HP. Likewise, the number and capacity of the shipping armada for overseas shipping had been increased. By the end of REPELITA III, the general and special overseas shipping armada were respectively recorded at 62 ships with a capacity of 827,227 DWT and 96 ships with a capacity of 774,306 DWT.

The development of harbor facilities covering the rehabilitation and construction of piers had provided, up to the end of REPELITA III, a total of 21,555 meters of piers, 113,160 square-meters of warehouses and 321,840 square-meters of piling areas, while the increase of piers' productivity had reached 700 - 800 tons/meter/year.

To step up harbor services and dredging, 4 public enterprises of port administration and public enterprises of dredging were established in 1983. Dredging of harbors and shipping lanes during REPELITA III by 39 dredging ships of various types with a total capacity of 39,000,000 m3 of mud per year, had dredged out 61,873,000 m3 of mud in routine dredging and 23,350,000 m3 of mud in sea-bed dredging.

For the promotion of maritime services, a number of shipyards were built and rehabilitated. By the end of REPELITA III, the total capacity of shipyards had reached 163,800 DWT.

The development of sea transportation during REPELITA IV is directed to promoting orderly, regular, safe, smooth, cheap and efficient sea-transportation services.

It is estimated that the demand for sea-transportation services, both domestic as well as overseas, will continuously be growing. To meet the growing demand, expansion will be made on the shipping fleet, dredging and harbor facilities, navigation safety facilities and maritime industries.

The projected increase of the domestic shipping fleet is expected to be able to accommodate the increasing demand of shipping cargo estimated to reach, by the end of REPELITA IV, 14,750,000 tons for inter-insular shipping, 4,200,000 tons for local shipping and 3,400,000 tons smallholders shipping.

During REPELITA IV, rejuvenation and new additions will be made to the fleet. The inter-insular shipping will reach 757,781 DWT at the end of REPELITA IV, the local shipping 218,999 DWT and the smallholders shipping 230,000 BRT.

In the four main harbors of Belawan, Tanjung Priok, Tanjung Perak, and Ujung Pandang, piers with a total length of 3,690 meters will be constructed during REPELITA IV in addition to 117,000m2 of container yards, 13,000 m2 of piling yards and 39,000 m2 of warehouses.

In the fourteen collector harbors, piers with a total length of 5,230 meters will be constructed, equipped with 53,000 m2 of container yards 138,620 m2 of piling yards and 124,600 m2 of warehouses. Whereas for the 25 distribution harbors, pier with a length of 3,645 meters will be built, coupled with 117,380 m2 of piling yards and 26,000 m2 of warehouses. For other harbors, including pioneer harbors, a total of 6,250 meters of piers and 165,900 m2 of warehouses will be built.

The development of harbors facilities and dredging during REPELITA IV will cover routine dredging of 140.6 million m3 of mud and sea-bed dredging of 55 million m3 of mud in addition to the rejuvenation of dredging ships and supporting facilities.

The development of facilities for navigation safety is projected to cover the increase of escort-ships by 76 units, port operational equipments by 338 units, watch-towers by 52 units, technical capability promotion of Indonesia's Classification Bureau, courses and trainings for 2,500 port-masters, rehabilitation and construction of 108 lighthouses, 150 beacons, increase of telecommunication and coastal radio equipments in 89 locations, rejuvenation of lighthouses-ship fleet and other supporting means, map-making on 71 locations of shipping lanes, increase of patrol boats by 22 units and other supporting facilities including for search-and-rescue activities.

During REPELITA IV, the development of maritime industry will cover rehabilitations of shipyards with total capacity of 101,200 DWT and construction of new ones with a total capacity of 136,000 DWT.

River, Lake and Ferry Transportation

Promotion of river, lake and ferry transportation facilities covers the development armada, improvement of quays and terminals, construction of river and lake beacons, and the clearing and dredging of waterways. The results achieved during REPELITA III included the provision of 10 ferry boats, 2 river boats and 1 lake boat, construction of 29 ferry-quays, 32 river quays, and 1 lake quay. The construction of land facilities consisted of 20 ferry terminals, 21 river terminals and 1 lake terminal. To promote shipping safety, 879 river beacons and 4 sea-beacons had been constructed, while 935 kilometers of waterways were cleared and 880,996 cubic-meters of mud

dredged. The crossing operations were served by 78 ferry boats, consisting of 15 Government ferries and 63 private ferries. In connection with river and lake transportation, some 44,000 boats of various sizes have been put into operation to serve on 46 rivers.

The development of river, lake and ferry transportation will include not only the promotion of services but also the opening of new lines, particularly in regions not yet served by other transportation means.

During REPELITA IV, it is projected to add 22 units of quays and terminals in 18 ferry crossings, 8 units of 1 lake quays and 25 river quays. Rehabilitations will also be undertaken for 22 units of quays and terminals in 14 ferry crossings, 5 units of lake quays and 24 units of river quays. Furthermore, some 5,775 beacons will be installed in addition to 51 seabeacons, clearing of 2,350 kilometers river-waterways, dredging of 2,500,000 m3 of waterways and channels, construction of 60 kilometers of "talud" (break-water), addition of 13 ferry boats with a capacity of 2,300 GRT, and rehabilitation of 18 ferry boats with a capacity of 2,000 GRT.

The provisions of river, lake and ferry transportation facilities will invite participation of private business enterprises and cooperatives, promote the traditional means of transportation, and at the same time foster entrepreneurship.

Air Transportation

During REPELITA III, realization of domestic air transportation, including pioneering flights, increased by an annual average of 10% for passenger transportation and by 26.03 % for cargo transportation. Foreign operation of air-transportation increased by an annual average of 11.89 % for passengers 32.7% for cargo.

Haj flights also increased continuously; some 290,305 haj pilgrims were air-transported during REPELITA III. Likewise, as many as 399,929 transmigrant families were transported to various settlements by air.

Furthermore, the capacity of air fleet also increased. The number of airplanes operated in Indonesia was 762. Of this, 174 airplanes were operated by 4 regular airlines namely the Garuda Indonesian Airways, Merpati Nusantara Air Lines, Mandala and Bouraq. Garuda operated 82 jet airplanes consisting of various types like F-28, DC-9, DC-10, Boeing 747 and Air-Bus 300. Some 40 airplanes were operated for the pioneer air-transportation for transmigration flights.

During REPELITA III, pioneering flights carried 240,087 passengers and 1,550 tons of cargo. Development of airports during REPELITA III also increased, covering the capacity of runways, vital navigation equipments and lighting facilities of runways.

The development of air communication will be directed to providing adequate, smooth, regular, safe and efficient air transportation. Domestic air communication will be stepped up and pioneering air transportation will be expanded to reach remote ares not yet connected by other means of transportation.

In addition, air transportation services for transmigration and haj pilgrimage purpose will also be increased. Likewise, international flights will be upgraded both in quality as well as in capacity to increase its competitiveness.

During REPELITA IV, plans have been drawn-up for the improvement of flight network pattern on all routes in the effort to increase the quality of domestic air transportation services.

Notes

1) For a comprehensive overview of Indonesia's energy situation and the development prospects of its indigenous energy resources, see Indonesia: Issues and Options in the Energy Sector Report No. 3543-IND, World Bank (Nov. 1981), and its update Indonesia: Energy Assessment Status Report, Report No. 022/84, Joint UNDP/World Bank Energy Sector Management Assistance Program (September 1984).

2) For a review of the country's recent economic performance and medium-term perspectives, see Indonesia: Policies and Prospect for Economic Growth and Transformation. Report No. 5066-IND, World Bank, (April 1984).

II. RECENT ECONOMIC DEVELOPMENT

Indonesia has shown an interesting spatial profile in population and economic activity. One of the most astonishing fact is that Jawa island, constituting merely 6.9% of the total land area, accommodates 62% of the total population while accounting for about 50% of the gross national domestic product (GDP) in 1980. This implies, with the total current population of 163 million and the total current GNDP of 96 trillion Rp., that the vast majority of the land area is still underdeveloped. Java's 1985 population density of 755 people per km^2 contrasts with only 36 per km^2 registered in the other islands. It is not very surprising therefore that the government has adopted the removal of regional disparity in population and economic activities as its major national policy objective.

The cultural and ethnic diversity, however, poses tremendous challenges for regional development. Indonesia comprises a mixture of races and people, which could be classified into around 300 different ethnic groups, with about 365 languages and dialects. While approximately 90 percent of the Indonesian people are Moslems, the remaining 10 percent are Christians, Catholics, Hindus, and Buddhists. Upon its independence on August 17, 1945, after more than 350 years of colonial occupation by the Dutch government, the Republic of Indonesia thus adopted "Unity through diversity" as its political slogan.

The purpose of this section is to provide an overview of recent regional economic development in Indonesia. The following provides a review of regional development policies and regional studies. An analysis is made extensively in the third section to elicit the spatial pattern of economic development since the 1970s. A particular emphasis is placed here on the analysis of striking phenomena of regional income inequalities by using Williamson's weighted coefficient of variation 'Williamson, 1965'. The inverted U-hypothesis suggested by Williamson is examined with respect to the interregional income differential in Indonesia. The third subsection also summarizes and concludes with some policy suggestions.

1. Regional Development Policies since REPELITA I

Despite the growing awareness of the issues related to balanced and equitable regional development, an explicit and strong interest in regional development policies emerged only in the beginning of the Second Five-year Development Plan (Repelita II: 1974-1979). In Repelita I (1969-1974) emphasis was placed in large part on the rehabilitation of production capacities with the aim of achieving the stabilization of the national economy and the targeted overall economic growth. Increased agricultural production, improved irrigation and transportation systems were particularly stressed. Regional policy and planning were thus kept relatively simple by the central government, and therefore left mostly to the regions' own initiatives. This resulted in regional disparity in planning activities and capacities, however.

Based on the experience with Repelita I and with the realization that, to achieve regional balance in economic development, regional planning had to be organized in a more uniform and consistent way, Repelita II introduced several regional development policies and programs.[1] Though initiated in Repelita I, the Presidential Instruction (Inpres) regional development subsidy program was substantially expanded in this period to provide increased opportunities for the exercise of local judgment in planning and implementing development programs.[2] By the end of Repelita III, six new different regional development subsidy programs were added and currently there are a total of eight different programs, involving different sectors and levels of local government.[3] In 1980/1981 fiscal year, about 22.3% of the national development budget (APBN: Anggaran Pendapatan dan Belanja Negara) were transferred to various levels of regional governments, of which the Inpres programs account for approximately 90%,[4] while in the total revenue for provincial and Kabupaten (& Kotamadya) governments the Inpres programs constitute about 23.3%.[5] As pointed out by Uppal and Suparmoko '1986', if the 'sectoral' allocations from

the central government to the provinces (i.e., direct development expenditures through the various departments of the central government) are taken into account, the central government transfers and expenditures can play a dominant role in achieving balanced regional development by removing regional disparities in income. In fact, the experience with Repelita I through III suggests that these central government outlays tend to assist in reducing regional disparities.

Another major program introduced in this period to enhance planning capacities at regional and local levels was the establishment of Provincial Development Planning Boards (Bappeda). This with the later introduced district level Bappeda (established in Repelita III (1979-1984)) has provided an institutional framework for the regional development planning. However, it should be noted that there is some skepticism about the effectiveness of the Bappeda in the formulation of regional development plans. On this point, Morfit (1986) argues: "The Bappeda have virtually no control over national programs in their regions. The budget is largely under the control of the kanwil (central government's regional representative offices), and the Bappeda frequently are not even informed about nationally funded development projects in their province or Kabupaten.... they are practically excluded from knowledge of or control over a large number of projects which should be an integral part of their planning and development supervision function."[6]

The regional development studies described in this section constitute another major activity of regional development planning during Repelita II. Two objectives were stated explicitly in the terms of reference for all the studies: One was to provide a systematic compilation of information required for development planning in the concerned region, and the other was to recommend general development strategies for the subject region in both sectoral and spatial terms. While a great amount of information was collected to serve the first objective, the recommendations for spatial strategies were generally weak in most of the studies.[7] It should be noted that in Repelita II a national spatial hierarchy was delineated, reaching from Jakarta through four major regional centers and ten regional centers to 88 development centers. However, the theoretical bases for the delineation of this so-called 'regionalization' framework were not at all clear, and its practical role in the regional development planning was not succinctly defined. In addition to these activities, regular annual national and regional consultations in the formulation of regional development projects were established involving Bappenas, various Bappedas, and central government departments, in which Bappenas with its Regional Development Division has emerged as the pivotal national agency in development planning.

With the accomplishment made in Repelita II and based on the Broad Guidelines of State Policies (GBHN) adopted in 1978 by the People's Consultative Assembly,[8] the equity goal changed in Repelita III from third to first priority. In accordance with this shift in policy emphasis, several new regional development programs were introduced in Repelita III. Firstly, kabupaten and Kotamadya level Bappeda were established (Bappeda Dati II) to further strengthen the planning capacities at the district level. Secondly, to achieve a better distribution of development benefits to the backward regions especially, a new Inpres program was introduced to provide funds for the development of rural roads which could facilitate interregional communication and transportation. Moreover, to further enhance the financial capacities at the local level, the existing Inpres programs were also strengthened. Finally, urban development as well as rural development at the kecamatan and desa (sub-district) level was emphasized explicitly in Repelita III, in which the role of medium- and small-sized cities was stressed.

Indonesia is currently under the fourth five-year development plan (Repelita IV: 1984-1989), in which more emphasis has been placed on the equity objective. With the achievement made in the necessary administrative infrastructure for regional development, the equity objective calls for the better distribution of development benefits within each region as well as across regions. In this respect, the plan gives special attention to isolated areas, less fertile areas, densely or sparsely populated areas, island areas and other problem areas. Rural development is stressed also with the understanding that the large proportion of people are still living in rural areas. Finally, streamlining efforts in the regional development planning and implementation are in process.

It should be noted that the transmigration program has been seen as an integral part of regional development planning, at least according to the basic law promulgated in 1972 (i.e., Law No.3 of 1972), in which the main goals of transmigration are set out as regional development, more balanced population distribution, and an equitable distribution of development across the country. It aims particularly at easing the population pressure on Java. Transmigration is defined in Indonesia as the (largely) government-planned and financed movement of farming people (usually) from Java, Bali, and Lombok (highly densely populated) to agriculture-based settlements on the other islands. The term 'transmigration' also covers self-motivated and self-financed ('spontaneous') migrants who move into or near already established transmigration projects and open up land on their own.[9] During Repelita I, some 200,000 people were moved under the transmigration program; in Repelita II the number reached 250,000. Repelita III set a very ambitious target of over two million people; by the end of 1984 it had somehow succeeded in resettling 535,000 families, or about 2.6 million people (using the average family size of 4.9 persons/family in 1980), though this figure includes substantial numbers of so-called spontaneous transmigrants (about 170,000 families).

For the current five-year development plan (Repelita IV), the government set its transmigration target at the resettlement of 750,000 families. Though the target number was reduced substantially from Repelita III, the task appears to be formidable if we recognize the paucity of suitable land available for agriculture. It should be noted that there are some doubts about the cost effectiveness of the program in achieving the stated goals. Some feel that "the transmigration program to date has not meaningfully affected the immense problems of population and poverty in the sending provinces and despite massive investments has had only very limited success in stimulating agricultural and other production in the receiving areas."[10] It may be also pointed out that, with few exceptions, transmigration projects were insufficiently designed in any consistent and coordinated manner as parts of integrated regional development programs.[11]

2. Review of Regional Economic Studies

Due largely to the lack of consistent regional data, studies on regional economic development in Indonesia have been undertaken only quite recently. It was in 1970 that the Regional Income Research Group was established to collect 'consistent' data on gross regional domestic product (GRDP) by province. These data, though still subject to many problems, provided the first insight into regional economic development. Regional studies undertaken since then could be classified broadly into two types: Studies for individual regions, and studies in an interregional framework. Among the former type of studies was a series of regional development studies undertaken by the Indonesian government with the assistance of foreign donors. The project commissioned in 1972 by the government of Indonesia at the suggestion of the National Development Planning Board (Bappenas) has produced 18 regional studies. These studies prepared at the provincial and multi-provincial level covered most of the country and were to assist provinces in establishing and strengthening their Provincial Development Planning Board (Provincial Bappeda).[12]

Besides these studies, a number of region-specific studies have appeared, but they were mostly small-scale in cost and size and their research scope was rather narrow.[13] Quite recently, the Australian National University initiated a research project on provincial economic development with financial assistance from the Australian Development Assistance Bureau. In the first conference held in February 1987, a total of 22 interim research papers covering 27 provinces (including East Timor) were presented, and a number of interesting issues concerning regional development were raised. A summary of the conference result was provided by Mubyarto (1987).

To the author's knowledge, the first attempt in the direction of interregional perspective was the 1975 paper by Esmara (1975). By using the GRDP data compiled by the aforementioned Regional Income Research Group and employing the Williamson's weighted coefficient of variation, he es-

timated the degree of regional income disparities for the years 1968-1972. According to this pioneering article, the Williamson's inequality index for the years from 1968 to 1972 increased sharply from 0.571 to 0.945 if oil income is included, but when oil income is excluded from the GRDP in oil-rich provinces (such as Riau and East Kalimantan) it was from 0.340 to 0.522. After comparing the oil-adjusted figures with Williamson's estimates for a range of countries in Europe, Asia, and the Americas, Esmara found that in 1972 the degree of regional income inequality in Indonesia was of the same order of magnitude as for the Philippines, Columbia and Puerto Rico (0.556, 0.541, and 0.520, respectively). But he also pointed out that, after excluding Riau, East Kalimantan, and timber-rich Central Kalimantan, Williamson's index falls to the same level as France, India and Japan (0.283, 0.275, and 0.244, respectively). He showed further that the provinces with higher money per capita GRDP also had a higher cost of living, so that if the per capita GRDP was corrected for regional price differences the inequality index would drop considerably.

The most recent attempt at estimating of regional income disparity was made by Uppal and Budiono (1986). Based on the 1975-1980 provincial GRDP data published by the Central Bureau of Statistics, they estimated, by excluding income from the mining sector, the weighted coefficient of variation for the years 1976-1980. During 1976-1980, no particular pattern was observed in the series of the inequality coefficients. The coefficients ranged from 0.434 to 0.524, but the 1979 figure was exceptionally high at 0.524 and the other figures fell in somewhere around 0.45.[147] By using the coefficient of rank correlation, they further identified several factors as important in explaining regional difference in per capita non-mining GRDP. Among the statistically significant factors with positive rank correlation with per capita non-mining GRDP were the magnitude of total investment under Repelita I through III and the value added per worker in medium- and large-scale industries. In contrast, central government transfers (such as the Inpres programs) and the central government expenditures in provinces showed a statistically significant negative coefficient of rank correlation, suggesting that provinces with lower per-capita GRDP tended to receive larger subsidies and sectoral allocations from the central government.

It is well known that the per capita GRDP would not be appropriate as an indicator of regional differences in welfare levels. The most crucial drawback is that the GRDP data show the amount of income generated in a region, but not necessarily present income received by the region. Resource-rich provinces could generate more gross domestic product, but in often cases, most of the value created in the provinces does not 'trickle-down' to the provinces but goes to the other regions or abroad. The bulk of income derived from oil and timber accrues to the central government, foreign and indigenous companies and not to the governments and people of the producing regions. Another possible weakness of the per capita GRDP is that it can only suggest the average income level for the province, not income distribution within the province. Usually, the level of poverty in a region depends not only on the average income, but also on the variance and skewness of the income distribution function. The level of inequality in a region concerns only the variational aspect of the income distribution. The study by Islam and Khan (1986) took into account these drawbacks explicitly and used the per capita monthly expenditure data from the 1976 National Socio-Economic Survey (Susenas) instead of per capita GRDP data. After adjusting the nominal expenditures for regional price differences based on a provincial price index, they ranked 25 provinces (excluding Irian Jaya) in terms of the per capita real monthly expenditures. Intra-regional income inequality and poverty level were also estimated for each province by using various inequality and poverty indices. The rank correlation analysis revealed that provinces with high average expenditure tend to have a significantly lower degree of absolute impoverishment and a lower (though not very statistically significant) intra-regional inequality level.

3. Spatial Pattern of Economic Development Since the 1970s

The main objective of this section is to provide a general overview of the regional economic

development since the 1970s with particular attention on the examination of interregional income inequality in Indonesia. With the regional disparity observable in socio-economic conditions and structures, the major national policy objective of the Indonesian government has been to achieve a better distribution of the development benefits throughout the country. Table 1 summarizes the spatial distribution of key economic indicators. As clearly seen from the table, economic resources and economic opportunities are very unevenly distributed among the five main regions. If the mining sector is excluded in the calculation, this uneven pattern of distribution becomes more pronounced with Java island generating almost 60% of GNDP. Even more surprisingly, 86% of the employment in medium- and large-scale industry are on this island. Java's 1985 population density of 755 per km^2 provides a sharp contrast with the average density of only 36 per km^2 in the outer islands. This figure is higher than any other Asian countries except Singapore and Hong Kong.

Table 1 Spatial Distribution of Key Economic Indicators (%)

	Main Islands					
	Suma.	Java	Kali.	Sula.	Others	Total
1. Land Area (%)	24.9	6.9	28.3	9.9	29.9	100.0
2. Population (%)						
1971 (Census)	17.5	63.8	4.3	7.2	7.2	100.0
1980 (Census)	19.1	62.1	4.6	7.1	7.2	100.0
1985 (SUPAS)	20.0	61.1	4.7	7.1	7.2	100.0
3. Population Density 1985 (per square KM)	68.8	755.4	14.3	61.1	20.5	85.8
4. GRDP without Mining (%)						
1975	20.9	61.1	6.1	6.3	5.6	100.0
1980	21.7	59.8	6.4	6.3	5.8	100.0
1983	21.0	60.5	6.6	5.9	6.0	100.0
5. GRDP with Mining (%)						
1975	32.1	50.2	7.1	5.0	5.6	100.0
1980	29.3	50.6	9.2	5.4	5.6	100.0
1985	27.4	53.4	8.3	5.2	5.7	100.0
6. GRDP Primary Sector (%)						
1975	22.7	54.2	6.4	8.3	8.3	100.0
1980	23.3	53.3	5.9	9.0	8.6	100.0
1983	24.0	52.6	5.6	8.8	9.0	100.0
7. GRDP Secondary Sector (%)						
1975	24.9	63.6	5.9	2.7	2.9	100.0
1980	29.1	59.4	5.9	2.3	3.2	100.0
1983	24.6	61.7	7.5	2.7	3.6	100.0
8. GRDP Tertiary Sector (%)						
1975	18.4	66.1	5.9	5.5	4.1	100.0
1980	18.1	64.5	6.8	5.8	4.8	100.0
1983	17.9	64.8	6.8	5.4	5.0	100.0

Sources: Census, SUPAS, Provincial Income in Indonesia, and Statistical Year Book of Indonesia, Central Bureau of Statistics.

Note: Secondary Sector includes manufacturing and construction sectors but does not include mining sector.

Table 2 Per Capita GRDP by Province at 1975 Constant Prices Including Mining Sector 1975 - 1983 (in 1000 Rp. per capita)

Province	1975	1980	1983	Annual Growth Rate	
				75-80 (%)	80-83 (%)
D.I. ACEH	85.1	269.5	298.1	25.92	3.42
NORTH SUMATRA	93.0	129.9	141.2	6.90	2.83
WEST SUMATRA	72.7	95.2	120.6	5.53	8.18
RIAU	969.0	763.4	677.7	-4.66	-3.89
JAMBI	79.6	92.8	91.2	3.10	-0.55
SOUTH SUMATRA	146.6	213.2	215.2	7.78	0.31
BENGKULU	56.6	81.0	104.1	7.44	8.74
LAMPUNG	65.8	68.0	69.7	0.65	0.86
D.K.I. JAKARTA	193.8	259.3	301.9	6.00	5.20
WEST JAVA	71.8	95.9	110.9	5.97	4.96
CENTRAL JAVA	50.7	67.7	87.2	5.94	8.82
D.I. YOGYAKARTA	56.2	68.1	77.0	3.94	4.16
EAST JAVA	69.6	98.4	113.7	7.17	4.94
BALI	67.4	111.5	150.0	10.60	10.39
WEST NUSA TENG.	41.6	52.9	63.7	4.94	6.42
EAST NUSA TENG.	37.8	52.7	61.8	6.85	5.43
WEST KALI.	76.9	105.4	118.5	6.51	3.99
CENTRAL KALI.	81.9	143.4	150.9	11.85	1.71
SOUTH KALI.	67.2	89.7	104.0	5.95	5.07
EAST KALI.	527.8	871.8	777.4	10.56	-3.75
NORTH SULAWESI	79.3	114.2	130.7	7.57	4.60
CENT. SULAWESI	50.3	72.2	83.4	7.50	4.92
SOUTH SULAWESI	64.5	91.0	95.6	7.12	1.65
S.E. SULAWESI	48.2	80.0	97.6	10.67	6.88
MALUKU	83.9	117.0	124.5	6.88	2.09
IRIAN JAYA	207.0	229.6	214.8	2.09	-2.19
TOTAL	91.2	122.3	136.8	6.04	3.81

Source: Calculated from Provincial Income in Indonesia, Central Bureau of Statistics.

Note: Inter-censal provincial population are estimated by using an interpolation technique.

Since Repelita I several regional development policies and programs have been implemented with a view to alleviating the regional imbalance in economic development. These policies and programs have directly or indirectly affected the regional economies. Since the seminal work by Williamson (1965), there have been a spate of studies on regional inequality and national economic development in developing as well as developed countries.[15] As stated in the previous section, the first attempt in the estimation of interregional inequality in Indonesia was made by Esmara (1975) for the years 1968-1972, and recently this was followed by Uppal and Budiono (1986) using an updated set of the GRDP data (1976-1980). Both studies employed Williamson's weighted coefficient of variation. A similar attempt was made by Islam and Khan (1986), but they used the per capita expenditure data. Their purpose was to investigate intraregional in-

equality and poverty levels for each province. It is reported that one of the most important features of Indonesia's development is that rural-urban differences within regions appear to be greater than differences among regions.

Table 2 presents per capita GRDP by province for 1975, 1980, and 1983 (at 1975 constant prices including the mining sector). As easily seen from the table, per capita GRDP shows a large variation among provinces. We could see at the same time that this has resulted mostly from exceptionally large figures registered by two oil-rich outer island provinces, i.e., Riau and East Kalimantan. This point is easily supported by the provincial figures based on non-mining GRDP data are given by Table 3. Generally speaking, there is an indication of a lowering growth rate in per capita GRDP. While this has been caused to a large extent by a world-wide depression in the oil market, some regional particularities in the economic performance are observed during this period reflecting differences in the mix of natural resources. For example, Bali, which is one of the most famous tourist sites in Asia, has kept a steady and relatively high growth rate during this period due in large part to the world-wide expansion of tourism during the 1970s. It is interesting to note that Lampung, which is in the lowest per capita GRDP category, recorded the highest population growth since 1970 due mostly to 'spontaneous' transmigration (see Table 4), which indicates the problem of overpopulation and poverty which have long plagued Java provinces, especially rural Java.[16]

Since the early 1970s, Indonesia has undergone a significant structural change in the national economy, entailing a concurrent change in the spatial pattern of population and economic activities, reflecting the geographical distribution of human and natural resources. Table 5 provides the industrial gross national domestic product for the years 1975, 1980, and 1983 (at 1975 constant prices). It is not difficult to see that while Indonesia is still largely based on agriculture with about a quarter of GNDP being from the agricultural sector, the contribution of agriculture has been steadily declining; The manufacturing industry and associated trading activities appear to have replaced agriculture. Now, to see a historical change in the degree of spatial variation in per capita GRDP, a weighted coefficient of variation (hereafter, denoted by CV_w) is calculated for the years from 1975 to 1983. According to Williamson ´1965`, the index is defined as follows:

$$CV_w = \frac{1}{Y} \sum_{i=1}^{n} (Y_i - Y)^2 \frac{P_i}{P} ,$$

where P_i = population of the i-th region,
P = national population,
Y_i = per capita income or GRDP of the i-th region,
Y = national per capita income or GRDP, which is given by:

$$\bar{Y} = \frac{1}{P} \sum_{i=1}^{n} Y_i P_i .$$

Table 3 Per Capita GRDP by Province at 1975 Constant Prices Excluding Mining Sector (in 000Rp. per capita) 1975 - 1983

Province	1975	1980	1983	Annual Growth Rate	
				75-80 (%)	80-83 (%)
D.I. ACEH	70.9	99.3	131.3	6.95	9.76
NORTH SUMATRA	84.6	116.8	133.1	6.67	4.45
WEST SUMATRA	72.4	94.7	119.6	5.50	8.10
RIAU	108.9	128.3	129.8	3.34	0.39
JAMBI	73.6	87.8	86.6	3.59	-0.45
SOUTH SUMATRA	108.8	186.8	189.6	11.43	0.48
BENGKULU	56.5	80.5	103.4	7.33	8.70
LAMPUNG	65.7	67.9	69.6	0.65	0.84
D.K.I. JAKARTA	193.8	259.3	301.9	6.00	5.20
WEST JAVA	64.2	86.8	102.3	6.22	5.63
CENTRAL JAVA	50.4	67.5	86.9	5.99	8.80
D.I. YOGYAKARTA	56.0	67.9	76.6	3.92	4.09
EAST JAVA	69.4	98.1	113.4	7.16	4.94
BALI	67.0	110.8	149.1	10.59	10.38
WEST NUSA TENG.	41.0	51.3	61.9	4.61	6.45
EAST NUSA TENG.	37.8	52.6	61.5	6.85	5.34
WEST KALI.	76.7	105.0	118.0	6.48	3.95
CENTRAL KALI.	81.7	142.8	150.2	11.81	1.71
SOUTH KALI.	66.8	89.2	103.4	5.93	5.06
EAST KALI.	237.3	292.4	371.6	4.27	8.32
NORTH SULAWESI	79.0	112.6	129.9	7.35	4.88
CENT. SULAWESI	50.2	71.2	82.2	7.26	4.91
SOUTH SULAWESI	64.5	89.8	94.8	6.84	1.81
S.E. SULAWESI	38.4	63.4	81.4	10.57	8.67
MALUKU	82.0	108.3	117.2	5.71	2.67
IRIAN JAYA	80.5	122.2	139.2	8.70	4.44
TOTAL	72.4	100.5	117.8	6.77	5.46

Source: Calculated from Provincial Income in Indonesia, Central Bureau of Statistics.

Note: Inter-censal provincial populations are estimated using an interpolation technique.

Table 4 Population Change by Province 1971, 1980, 1985

Province	Population (in 1000) 1971	1980	1985	Annual Growth Rate 71-80 (%)	80-85 (%)
D.I. ACEH	2008.6	2611.3	2972.0	2.96	2.62
NORTH SUMATRA	6621.8	8360.9	9422.0	2.62	2.42
WEST SUMATRA	2793.2	3406.8	3698.0	2.23	1.65
RIAU	1641.5	2168.5	2548.0	3.14	3.28
JAMBI	1006.1	1446.0	1745.0	4.11	3.83
SOUTH SUMATRA	3440.6	4629.8	5370.0	3.35	3.01
BENGKULU	519.3	768.1	943.0	4.44	4.19
LAMPUNG	2777.0	4624.8	5905.0	5.83	5.01
D.K.I. JAKARTA	4579.3	6503.4	7885.0	3.97	3.93
WEST JAVA	21623.5	27453.5	30830.0	2.69	2.35
CENTRAL JAVA	21877.1	25372.9	26945.0	1.66	1.21
D.I. YOGYAKARTA	2489.4	2750.8	2930.0	1.12	1.27
EAST JAVA	25517.0	29188.9	31262.0	1.51	1.38
BALI	2120.3	2469.9	2649.0	1.71	1.41
WEST NUSA TENG.	2203.5	2724.7	2995.0	2.39	1.91
EAST NUSA TENG.	2295.3	2737.2	3061.0	1.98	2.26
WEST KALI.	2019.9	2486.1	2819.0	2.33	2.55
CENTRAL KALI.	701.9	954.4	1118.0	3.47	3.22
SOUTH KALI.	1699.1	2064.6	2273.0	2.19	1.94
EAST KALI.	733.8	1218.0	1512.0	5.79	4.42
NORTH SULAWESI	1718.5	2115.4	2313.0	2.34	1.80
CENT. SULAWESI	913.7	1289.6	1511.0	3.90	3.22
SOUTH SULAWESI	5180.6	6062.2	6610.0	1.76	1.75
S.E. SULAWESI	714.1	942.3	1120.0	3.13	3.52
MALUKU	1089.6	1411.0	1609.0	2.91	2.66
IRIAN JAYA	923.4	1174.0	1371.0	2.70	3.15
TOTAL	119208.2	146935.0	163416.0	2.35	2.15

Sources: Census 1971, Census 1980, and SUPAS 1985, Central Bureau of Statistics.

First, by using the non-mining GRDP data, the coefficients of variation are estimated for the years from 1975 to 1983 in which inter-censal population are derived by employing a simple interpolation technique. Table 6 along with Figure 1 presents these estimates. To see longer trends in inter-regional inequality, the results are given with the estimates obtained by Esmara (1975) and Uppal and Budiono (1986). Due to differences in the data set used (i.e., inter-censal population estimation methods differed), there is a slight difference between our estimates and the figures given by Uppal and Budiono in the coefficients for 1976-1980. Nevertheless, they offer a similar pattern in which there is neither significant upward nor downward trend. This pattern is true for the years at least between 1975 and 1983. There are some fluctuations during this period, but the coefficients are closely concentrated around 0.46. A question arises as to whether this pattern will persist in the future. Considering the continuing weak oil market and resulting slowing of regional economic development, it is not so risky to say that, at least in the very short run, the coefficient will remain somewhere around 0.45. Whether the value is high by international standards is not clear, since the coefficient is not sensitive to the size of country, the extent of regional division, kinds of data used, and so forth. However, the ratio between the largest and smallest per capita non-mining GRDP (East Kalimantan

and East Nusatenggara, respectively) is around 6.0, indicating that, at least as far as the non-mining GRDP data are concerned, large regional income disparities do exist in Indonesia.

Table 5 Gross National Domestic Product by Industry at 1975 Constant Prices, 1975 - 1983

(in billion Rp.)

Industry	1975	Share %	1980	Share %	1983	Share %	Growth Rate 75-80 %	Growth Rate 80-83 %
Agriculture	3698.6	31.0	5017.6	27.9	5547.0	25.9	6.29	3.40
Mining	2453.7	20.6	3207.5	17.8	2975.9	13.9	5.50	-2.47
Manufacturing	923.1	7.7	1774.3	9.9	2238.4	10.4	13.96	8.05
Electricity	49.4	0.4	109.8	0.6	175.7	0.8	17.32	16.99
Construction	269.3	2.3	660.9	3.7	1044.7	4.9	19.66	16.49
Trade	2254.4	18.9	3504.4	19.5	4403.5	20.6	9.22	7.91
Transport/comm.	579.2	4.9	1038.1	5.8	1409.5	6.6	12.38	10.73
Finance	195.0	1.6	313.9	1.7	563.5	2.6	9.99	21.54
Real estate	309.2	2.6	404.6	2.3	487.6	2.3	5.53	6.41
Public admin.	831.1	7.0	1488.4	8.3	2005.6	9.4	12.36	10.45
Services	356.4	3.0	450.2	2.5	572.8	2.7	4.78	8.36
TOTAL	11919.5	100.0	17969.6	100.0	21424.2	100.0	8.56	6.04

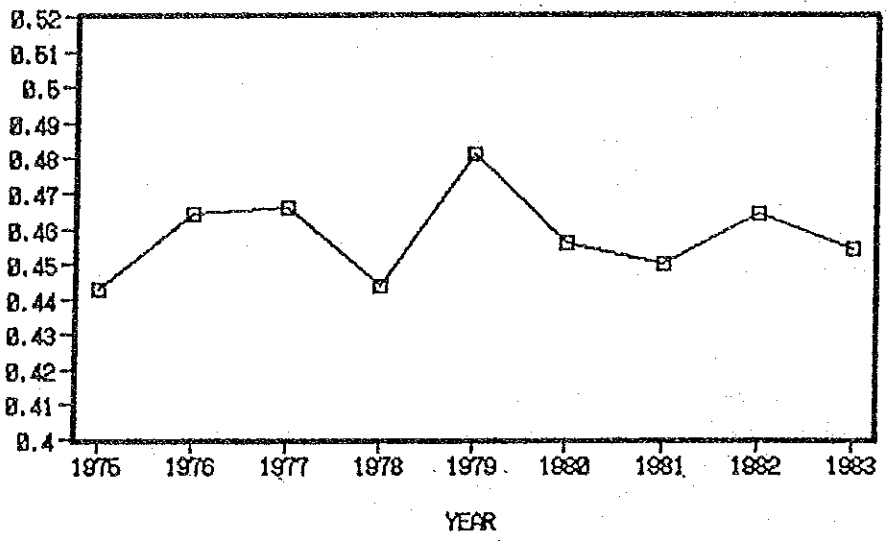
Source: Provincial Income in Indonesia, Central Bureau of Statistics.

Table 6 Weighted Coefficient of Variation for Per Capita GRDP by Province without Mining Sector, 1968 - 1983

YEAR	Estimated by Author	Esmara	Uppal & Budiono
1968		0.340	
1972		0.522	
1975	0.443		
1976	0.464		0.4631
1977	0.466		0.4609
1978	0.444		0.4344
1979	0.481		0.5240
1980	0.456		0.4435
1981	0.450		
1982	0.464		
1983	0.454		

Sources: Derived from sources listed in Tables 3 and 4.
Figures by Esmara and Uppal & Budiono are taken from Esmara '1975' and Uppal & Budiono (1986).

Figure 1 Weighted Coefficient of Variation
Total GRDP/Capita Excluding Mining Sector



It should be noticed that Esmara's estimate for 1972 is higher than any of our estimates for the years between 1975 and 1983. But this should not be so exaggerated, since the 1972 value may result from some large industrial developments having occurred in one province. The relatively large estimate for 1979 (0.481 by the author and 0.524 by Uppal & Budiono) was mostly caused by the expansion of a large-scale fertilizer manufacturing plant in South Sumatra. Table 7 along with Figures 2 and 3 presents weighted coefficients of variation for the primary, secondary, and tertiary sectors (where the secondary sector excludes the mining sector).[17] As seen from Figure 3, between 1978 and 1979 there is a jump in the coefficient for the secondary sector (from 0.728 to 0.964); this is due in large part to that expansion activity in South Sumatra.[18] It is interesting to observe that since 1979 there has been a downward trend in the secondary sector, and this coincides with the declining GDP growth rate in that sector since 1979/1978 (see Figure 4). The tertiary sector has shown a consistent downward trend since 1975, whereas the coefficient of the primary sector seems to have remained relatively stable around 0,32.

To examine the extent to which these three industrial sectors contribute to overall regional inequality in per capita non-mining GRDP, a decomposition analysis for the weighted CV_w is conducted. By the definition of the coefficient, it is not difficult to determine that the squared CV_w is composed of six components, of which three components concern the sector's own variation and the other three concern covariations between sectors, i.e.,

$$CV_w = W_1 CV_{w1} + W_2 CV_{w2} + W_3 CV_{w3} + 2W_1W_2\text{cov}(X_1,X_2) + 2W_1W_3\text{cov}(X_1,X_3) + 2W_2W_3\text{cov}(X_2,X_3)$$

where W_i = income share of sector i,

CV_{wi} = weighted coefficient of variation of sector i,

X_i = per capita GRDP of sector i, and

$\text{cov}(X_i,X_j)$ = weighted coefficient of covariation between sector i and sector j.

Table 7 Weighted Coefficient of Variation for Per Capita GRDP by Province Primary, Secondary, and Tertiary Sector, 1975 - 1983

Year	Industry Total	Primary Sector	Secondary Sector	Tertiary Sector
1975	0.443	0.302	0.766	0.803
1976	0.464	0.335	0.819	0.801
1977	0.466	0.357	0.775	0.781
1978	0.444	0.327	0.728	0.751
1979	0.481	0.331	0.964	0.788
1980	0.456	0.313	0.945	0.752
1981	0.450	0.294	0.855	0.739
1982	0.464	0.295	0.869	0.726
1983	0.454	0.302	0.752	0.715

Source: Derived from Census, SUPAS, and Provincial Income in Indonesia, Central Bureau of Statistics.

Note: Secondary sector includes manufacturing and construction, but excludes the mining sector.

Figure 2 Weighted Coefficient of Variation Primary Sector

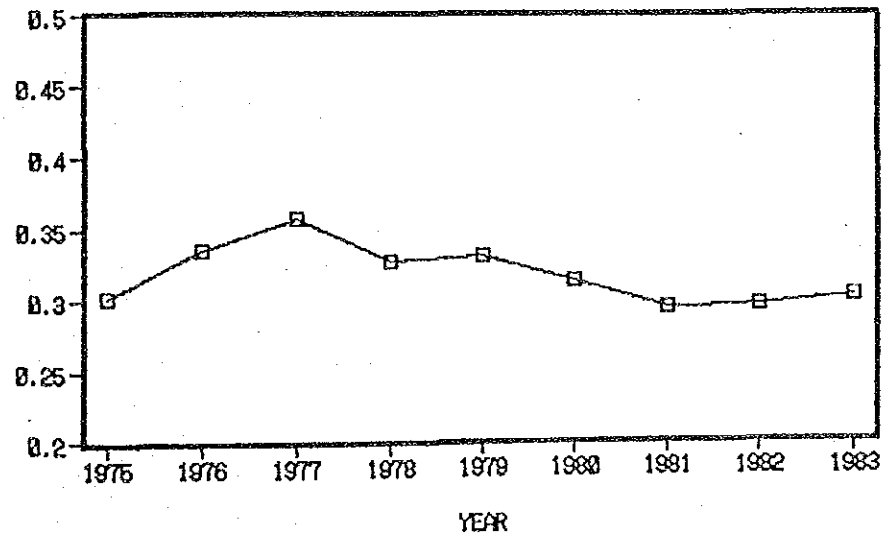


Figure 3 Weighted Coefficient of Variation
Secondary and Tertiary Sector

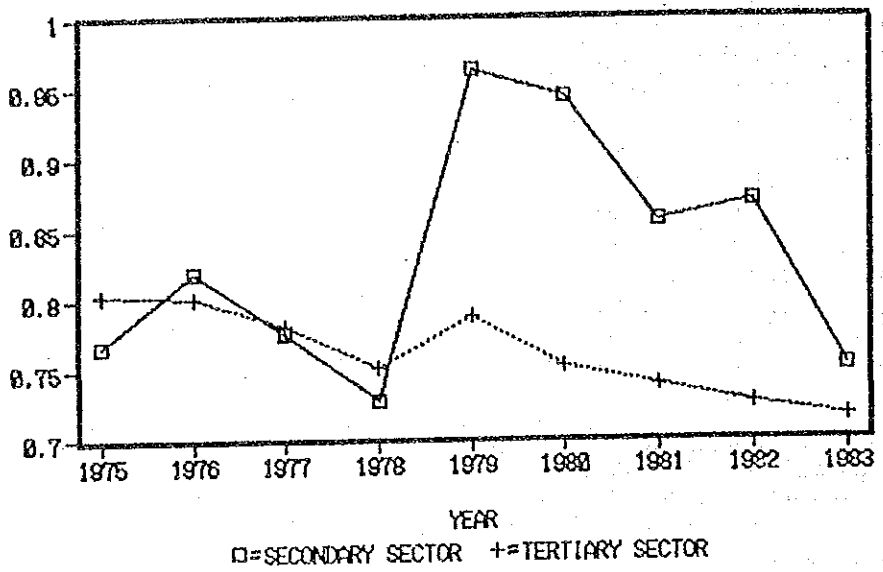
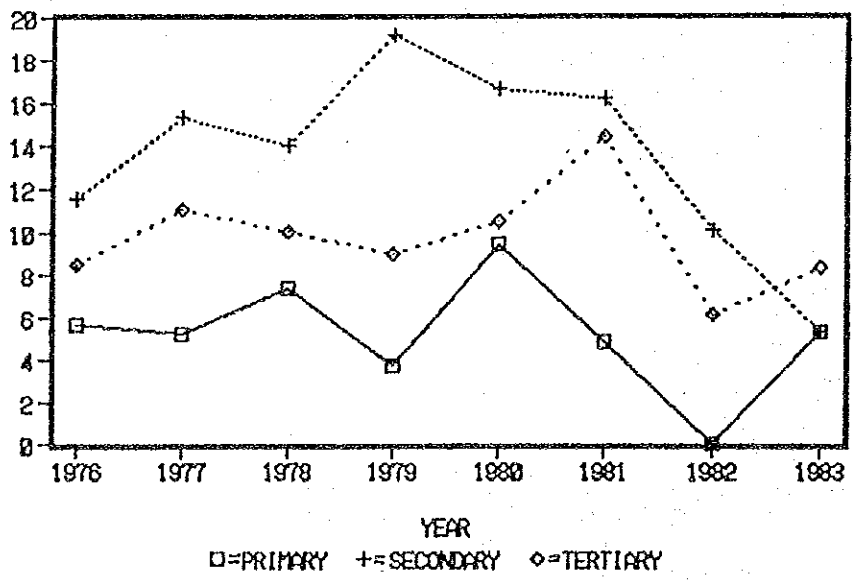


Figure 4 Growth of GDP
Primary, Secondary, and Tertiary Sector



The results for 1975-1983 are given in Table 8. Mostly due to the large income share (around 50% during this period), the tertiary sector was dominant, accounting for about 65-70% of the squared CV_w, indicating the significance of the sector in determining the overall level of regional income inequality (measured by the per capita non-mining GRDP). Although the tertiary

sector showed a slight increase in income share (about 2 percentage points have been gained between 1975 and 1983), the decreasing CV_w more than offset it, leading to the declining absolute level of the contribution (figures under (3) in Table 8). On the other hand, the contribution of the primary sector is small and gradually decreasing, reflecting its declining income share. For the secondary sector, the coefficient almost doubled in 1979 (from 5.5 to 9.9%)[19] and as a result the sector has surpassed the primary sector in the contribution. From these observations, it seems that the secondary sector will play an increasingly important role in the determination of the overall interregional income disparity levels.

Table 8 Decomposition of Overall Income Inequality Based on Per Capita Non-Mining GRDP, 1975 - 1983

		Industrial Sector						
Year	CV_w Squared	Primary (1)	Primary (A) (%)	Secondary (2)	Secondary (B) (%)	Tertiary (3)	Tertiary (C) (%)	Total A+B+C
1975	0.1962	0.0139	7.1	0.0093	4.7	0.1506	76.7	88.6%
1976	0.2152	0.0164	7.6	0.0114	5.3	0.1518	70.6	83.5%
1977	0.2171	0.0173	8.0	0.0113	5.2	0.1488	68.6	81.8%
1978	0.1971	0.0139	7.1	0.0108	5.5	0.1386	70.4	82.9%
1979	0.2313	0.0130	5.6	0.0229	9.9	0.1538	66.5	82.1%
1980	0.2079	0.0113	5.4	0.0243	11.7	0.1386	66.7	83.8%
1981	0.2025	0.0088	4.4	0.0216	10.7	0.1411	69.7	84.7%
1982	0.2152	0.0081	3.8	0.0246	11.4	0.1394	64.8	80.0%
1983	0.2061	0.0082	4.0	0.0179	8.7	0.1389	67.4	80.1%

Sources: Derived from Census, SUPAS, and Provincial Income in Indonesia, Central Bureau of Statistics.

Notes: 1. (1), (2), and (3) are the square of (CV_w) (Income Share) for the primary, secondary, and tertiary sectors, respectively.
2. (A), (B), and (C) are the % contribution of the primary, secondary, and tertiary sectors to the squared overall weighted coefficient of variation, respectively.

To understand the spatial aspects of the industrial development (especially, the development of medium- and large-scale manufacturing industries which they account for most of the value added created in the secondary sector), the following points[20] are of use:

1. The outer islands provinces are still in the early stage of industrial development, and generally rich in natural resources which are unevenly distributed relative to the population distribution, so they specialize mostly in resource-based, upstream industries. These industries are often large scale and capital intensive, leading to the so-called 'enclave' regional developments with most of the development benefits transferred somewhere else.[21]
2. In many respects Java provinces offer overwhelmingly better manufacturing environments, so that, with the promotion of import-substituting, consumer-oriented industries, the 1970s saw an unbalanced industrial development which favors Java island. The 1980 industrial statistics show that about 86% of the medium- and large-scale manufacturing employment was on Java island.
3. There is a tendency for larger-scale industries to concentrate in particular regions, especially in the vicinity of relatively big cities, to enjoy scale economies and

agglomeration economies.[22] This, along with the uneven distribution of natural resources, contributes to inter-regional disparities. In 1980, 47% of the total medium- to large-scale manufacturing employment was concentrated in kotamadyas (urban areas) as a whole.

4. Manufacturing in the early part of the 1980s demonstrates a structural transformation towards relatively export-oriented, intermediate goods industries and this is likely to entail spatial shifts in manufacturing activities towards regions with international ports.

These observations suggest that at least in the short- and medium-terms, it is likely that the regional disparity measured by per capita GRDP will remain relatively high. However, as the national development proceeds with appropriate central government's income transfer programs, and with the geographical spread of large-scale manufacturing industries and certain 'trickle-down' effects, the disparity may well decrease in the long run. As suggested by Williamson '1965' with the inverted U-hypothesis, regional disparities pass through three distinct stages as a national economy moves from early development to maturity. In brief, regional disparities increase in the early stage of national development due largely to disequilibrating effects in factor mobility, and this is followed by a period of stable, relatively high level of disparity. Finally, a lessening of regional disparities sets in as the national economy matures and the equilibrating force comes into effect. This overall process, if plotted against national economic development, would result in a bell-shaped, or inverted U-shaped curve.[23] From various points of view, Indonesia is thought to be in a relatively early stage of development, and this means, according to the inverted U-hypothesis, that it may still take some time to reach the lessening of regional disparities. However, this should not be taken too seriously, since it is per capita real distributed income but not output that policymakers should be concerned with in Indonesia. With the uneven distribution of economic resources and opportunities, some regional disparities in output are inevitable.

As pointed out in section 3, the per capita GRDP data used in the analysis shows income produced in a region, but not necessarily income received by the region. Therefore, it is desirable to use per capita distributed income data to measure real interregional income inequality. Due to the lack of reliable regional income data, however, Islam and Khan (1986) used monthly expenditure data from SUSENAS 1976 as a proxy for distributed monthly income. Here, drawing on their estimate of per capita monthly expenditures[24], the CV_w is calculated (0.224 for the year 1976). This is substantially smaller than that obtained using per capita GRDP data (i.e., 0.464). A part of the difference may be attributable to the fact that the per capita GRDP data used in our analysis do not take into account inter-provincial price differential. A positive correlation exists between per capita GRDP and provincial price index, i.e., higher per capita GRDP provinces tend to have higher price levels. However, it is highly likely that the difference would remain even after the price adjustment, and this suggests that some inter-regional income transfers (through taxes and subsidies) should exist and be effective in removing the difference. As a matter of fact, inter-governmental income transfers in the form of grants (e.g., Inpres programs) and direct central government expenditures in provinces have served to narrow this difference. Still, it is probable that large-scale industrial developments which have occurred in the outer island provinces have not brought much benefit to the people living within the provinces. Finally, household survey data in SUSENAS do not fully indicate the consumption of higher income households, meaning that income inequalities are understated in the CV_w estimated using per capita monthly expenditure data.

To see the extent to which three industrial sectors contribute to the overall interregional disparities, a decomposition analysis was performed in this subsection. The followings are the summary of the results and some policy suggestions.

1. Reflecting the uneven geographical distribution of economic resources and economic opportunities, the 1970s and early 1980s saw relatively large regional disparities in per capita non-mining GRDP. Williamson's weighted coefficient of variation (CV_w) ranges from 0.443 to 0.481 for the years between 1975 and 1983. However, there is neither an upward nor

downward trend during this period. The relatively large estimate for 1979 (0.481) is caused mostly by the expansion of a large-scale fertilizer manufacturing plant in South Sumatra.

2. In the overall (CV_w), the tertiary sector contributes most, accounting for 65-70% of the squared CV_w, indicating the significance of the sector in determining the overall level of regional disparities in per capita non-mining GRDP. However, it is likely that the secondary sector will play an increasingly important role in the determination of the disparities.
3. The regional disparities in per capita non-mining GRDP are likely to remain relatively high in the short and medium term. In the long run, however, as national development proceeds with appropriate government income transfer programs and with the geographical spread of large scale manufacturing industries along with certain 'trickle-down' effects, the interregional disparities may well decrease, although it may take some time to reach lessening disparities in income in relation to regional development and the inverted U-shaped curve.
4. There is a large difference between CV_w estimated by the per capita monthly real expenditure data (after being adjusted for provincial price differentials) and per capita non-mining GRDP data for the following reasons: (1) Higher per capita GRDP provinces tend to have higher average price levels, so that the per capita GRDP data should be adjusted for inter-provincial price differentials before calculating CVw; (2) Inter-governmental income transfers in the form of grants (e.g., Inpres programs) and direct central government expenditures in provinces have served to narrow interregional income disparities; (3) Large-scale industrial developments which have occurred in the outer island provinces have not brought much benefit to the people living within the provinces; and (4) Household survey data in SUSENAS do not fully reflect the consumption of higher income households, meaning that income inequalities are understated in CVw estimated using per capita expenditure data.
5. Per capita GRDP has certain drawbacks as an indicator of regional differences in welfare levels. The most crucial drawback is that the GRDP data show the amount of income produced in a region, but do not necessarily indicate income received by the region. Therefore, regional income disparities measured by per capita GRDP should not be taken too seriously. Policy-makers should be more concerned with per capita real distributed income levels, than per capita output levels in formulating appropriate policies to reduce regional income inequalities. With the uneven distribution of economic resources and opportunities, some regional disparities in output are inevitable in Indonesia and may be desirable for national development from the efficiency point of view. The question is how development benefits are to be equitably distributed throughout the country. Household expenditure data are better than GRDP data in measuring national welfare levels, but, as stated in 4 above, they tend to underestimate the real distributed income levels.

NOTES

1) After the establishment of the New Order government, the first major articulation of the government's policies with respect to the development of local government capacities was the Basic Law No. 5 of 1974, and this provided the legal framework for all subsequent programs and policies affecting the development of local government [Morfit, 1986, p. 58].

2) The Inpres grants are allocated to each local government on a lump sum basis, and then the local government authorities decide their use base on the judgment of the local governments.

3) These Inpres programs are Inpres Desa (Villages), Inpres Kabupaten (Districts), Inpres Propinsi (Provinces), Inpres Sekolah Dasar (Primary Schools), Inpres Kesehatan (Health), Inpres Pasar (Markets), Inpres Penghijauan (Regreening), and Inpres Jalan (Roads), in which Inpres Sekolah Dasar claims the largest share in the allocation of Inpres funds with 34.8%. For the structure of inter-governmental finance involving (1) the Inpres programs (2) the central governmental grants for routine regional budget (Subsidi Daerah Otonom) and (3) the 'sectoral' allocations to the provinces through the various departments of the central governments, see Up-

pal and Suparmoko (1984), Morfit (1986), and Booth (1986). Here, Subsidi Daerah Otonom represents the single largest subsidy from the central government to local governments (about 46% of the total revenue in the budget of local governments in 1980/1981 fiscal year).

4) The reallocation of the central government land tax (Ipeda: Iuran Pembangunan Daerah) and special regional allocations constitute the remaining 10%. (Morfit, 1986, p. 65)

5) See Uppal & Suparmoko, 1984, p. 421.

6) See Morfit, 1986, p. 61.

7) The review and evaluation of these studies were provided by a paper by Ibrahim and Fisher (1979) and recently by Donahue and Douglass (1984).

8) The five-year development plans have been based on so-called 'Development Trilogy (Trilogi Pembangunan),' i.e., growth, stability, and equity.

9) See Babcock (1986).

10) Babcock (1986).

11) For the general evaluation of the transmigration program since Repelita I, see Arndt (1983), Babcock (1986), and Hardjono (1986).

12) See Ibrahim and Fisher (1979).

13) Among them are some 146 urban "outline" plans and 46 urban "master" land-use plans completed since 1968, 18 Kabupaten level "area development" plans completed or initiated since 1974, and approximately a dozen river-basin studies (Ibrahim and Fisher, 1979).

14) They erroneously concluded that "the figures on the Williamson coefficients of regional inequality show a declining trend in Indonesia during the period 1976-1980." (Uppal and Budiono, 1986, p. 296) However, no such trend is observed by the author, at least in the statistical sense. This point will be confirmed in a later section.

15) These are, for example, Alonso (1986), Green (1969), Fields and Schultz (1980), and Mathur (1983).

16) Facing with these problems, since 1980, Lampung has been closed for the sponsored transmigration program, and in Repelita IV the government of Lampung has started to undertake a local transmigration program within the province.

17) Here, the per capita industrial GRDP are used in the calculation.

18) Between 1978 and 1979, per capita GRDP increased from 137.2 to 175.0 in South Sumatra.

19) This is again attributable to the fertilizer plant in South Sumatra.

20) For the geographical characteristics of manufacturing industries, see Akita (1985 and 1986), in which the spatial development patterns of the manufacturing industry and the locational factors were investigated for the 1970s.

21) Java has better general industrial infrastructures, such as electricity and water supply, as well as urban services. A number of large consumer and intermediate goods markets are interspersed on Java along with an interconnected network of roads and railroads. Population is greater on Java than the outer islands, so it is easier to secure relatively high quality labor.

22) This is usually termed the 'polarization' effect.

23) Japan reached a peak of the inverted U-shaped curve in 1961 with 0.277 (if the interregional income disparity is measured by the unweighted coefficient of variation of per capita distributed income by prefecture) and the coefficient is currently around 0.15 (Mera, 1986).

24) Monthly expenditures were adjusted for regional price differential.

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III. TOWARD THE CONSTRUCTION OF REGIONAL MODELS

This section explores the potential relevance of a simple analytical approach to the practical study on regional development when regional data are limited. LIPI Project for Indonesian Regional Model (LIPIRM) was launched at LIPI in April, 1983 with two primary objectives. The first objective was to examine the trends in spatial distribution of economic activities in Indonesia. The second one was to provide the junior research staff of LIPI with the opportunities to learn elements of regional econometric model-building.

This section is composed of five subsections, the contents of which are the outcomes of LIPIRM programme. The first subsection carries out the projection of regional population for 1989 by use of both "Absolute-Value Adjustment Method (AVAM)" and "Difference-Value Adjustment Method (DVAM)," while the projection of gross regional domestic product (GRDP) by sector for 1989 is made in the second subsection. Estimation of a simple regional consumption function for households is attempted in the third subsection followed by the projection of regional consumption levels for 1989. In the fourth subsection, regional production function is estimated and used for the projection of regional employment levels for 1989. The last subsection presents a short conclusion.

As to the regional delineation, the nation is geographically divided into six regions in our study. They are:

Sumatra (Region I),
Java and Madura (Region II),
Kalimantan (Region III),
Sulawesi (Region IV),
Bali, NTT, NTB and Timor Timur (Region V), and
Irian Jaya and Maluku (Religion VI).

1. Population Projection for the Year 1989

The two characteristics of Indonesia's population are (1) a high annual growth rate of population and (2) a large population share (about 60% of national population) of Jawa-Madura Region (Region II). Under these circumstances, the Indonesian government is now implementing the following two population programs:

1. "Family Planning Program" to reduce the annual growth rate of population,
2. "Transmigration Program" to reduce the population share of Region II.

Taking these two programs into consideration, we project the population level of each region for 1989. For this purpose, the following growth rates of national population are assumed by use of population census of 1971 and 1980 as our basic data;

2.32 % for the period of 1980-83
1.90 % for the period of 1983-89.

Then, we apply two kinds of the projection methods. One is the Absolute-Value Adjustment Method, and the other is the Difference-Value Adjustment Method.

1.1 Absolute-Value Adjustment Method (AVAM)

Principle requires the following steps.

Step-1 From the population census of 1971 and 1980, we get the average annual growth rate of population for each region.

Step-2 We project the population for the year 1989 for each region by using the 1980 census population and the annual growth rate obtained at Step.1. We refer this projected population as to the "Projected regional population for the year 1989 without adjustment." The "projected national population for the year 989 without adjustment" is defined as the sum of each region's "projected population for the year 1989 without adjustment."

Step-3 We project the national population for the year 1989 by using the 1980 census population and the annual growth rates set in our scenario.

Step-4 Dividing the projected national population for the year 1989 obtained at Step-3 by the "projected national population for the year 1989 without adjustment" obtained at Step-2, we get the adjustment factor a.

Step-5 Multiplying the adjustment factor a to the projected regional population obtained at Step-2 (i.e., the projected regional population for the year 1989 without adjustment), we get the projected regional population for the year 1989. We refer this projected population as to the "projected regional population for the year 1989 with adjustment."

The projected results are shown in Table 1.

Table 1 Population Projection for the Year 1989 by AVAM (Unit: 1,000 persons)

	Actual Population				Population with Adjustment		
Region	1971	1980	Share 1980 (%)	Annual Growth Rate 1971-1980 (%)	1989	Share 1989 (%)	Annual Growth Rate 1980-1989 (%)
I	20,808	28,016	19.0	3.36	36,487	20.6	2.98
II	76,086	91,270	61.9	2.04	105,883	59.9	1.66
III	5,154	6,723	4.5	2.99	8,483	4.8	2.62
IV	8,526	10,410	7.0	2.24	12,292	6.9	1.86
V	6,619	8,487	5.7	2.80	10,526	5.9	2.42
VI	2,013	2,585	1.7	2.82	3,211	1.8	2.44
Nation	119,206	147,491	99.8	16.25	176,882	99.9	2.04

Note 1. The scenario for the annual growth rate of national population;
2.32% for 1980-83
1.90% for 1983-89.
2. AVAM: Absolute-Value Adjustment Method.

1.2 Difference-Value Adjustment Method (DVAM) or Delta-Value Adjustment Method

This principle requires the following steps.

Step-1 From the population census of 1971 and 1980, we get the average annual growth rate of population for each region.

Step-2 We project the population for the year 1989 for each region by using 1980 census population and the annual growth rate obtained at Step-1. We refer this projected population as to the "projected regional population for the year 1989 without

adjustment."

Step-3 Subtracting the 1980 census population from the projected 1989 population obtained at Step-2 for each region, we get so called "delta-population without adjustment" for each region. The "delta-population without adjustment" for the nation is defined as the sum of each region's "delta-population without adjustment.

Step-4 We project the national population for the year 1989 by using the 1980 census population and the annual growth rates set in our scenario.

Step-5 Subtracting the 1980 national population from the projected 1989 national population obtained at Step-4, we get the "delta-population with adjustment" for the nation.

Step-6 Dividing the "delta-population with adjustment" obtained at Step-5 by the nation's "delta-population without adjustment" obtained at Step-3, we get the adjustment factor a.

Step-7 Multiplying the adjustment factor b to each region's "delta-population without adjustment" obtained at Step-3, we get the "delta-population with adjustment" for each region.

Step-8 By adding each region's "delta-population with adjustment" obtained at Step-7 to each region's 1980 census population, we get the projected regional population for the year 1989. We refer this projected population as to the "projected regional population for the year 1989 with adjustment."

1.2.2 Results

The projected results are shown in Table 2.

Table 2 Population Projection for the Year 1989 by DVAM (Unit; 1,000 persons)

	Actual Population				Population with Adjustment		
Region	1971	1980	Share 1980 (%)	Annual Growth Rate 1971-1980 (%)	1989	Share 1989 (%)	Annual Growth Rate 1980-1989 (%)
I	20,808	28,016	19.0	3.36	36,082	20.4	2.85
II	76,086	91,270	61.9	2.04	106,390	60.1	1.71
III	5,154	6,723	4.5	2.99	8,426	4.8	2.54
IV	8,526	10,410	7.0	2.24	12,319	7.0	1.89
V	6,619	8,487	5.7	2.80	10,478	5.9	2.37
VI	2,013	2,585	1.7	2.82	3,193	1.8	2.37
Nation	119,206	147,491	99.8	2.39	176,888	100.0	2.04

Note 1. The scenario for the annual growth rate of national population;

2.32 % for 1980-83
1.90 % for 1983-89.

2. DVAM: Difference-Value Adjustment Method.

1.3 Analyses

The main difference between AVAM and DVAM is that AVAM makes adjustment with respect to the ab-

solute level of population while DVAM makes adjustment with respect to the growth or decline portion of population.

(1) Both AVAM and DVAM generate almost the same results.
(2) Projected annual growth rate for the period 1980-1989 is lower than the annual growth rate for the period of 1971-80 in every region.
(3) Region I shows the highest annual growth rate for the period 1980-89 among all regions, while region II shows the lowest annual growth rate for the same period.
(4) For our scenario (i.e., national population grows annually at the rate of 2.32 % for 1980-83 1.90 % for 1983-89), the average annual growth rate turns out to be 2.04 % for the period 1980-89.
(5) Population share of Region II drops from 61.9 % in 1980 to 59.9 % by AVAM or to 60.1 % by DVAM in 1989 due to the (expected) more successful implementation of Family Planning Program and Transmigration Program in Region II than any other region.
(6) Population shares of all regions except Regions II and IV, increase during the period of 1980 through 1989. Especially in Region I, the population share increases from 19.0 % in 1980 to 20.6 % (projection by AVAM) or 20.4 % (projection by DVAM) in 1989. For Region IV, its population share slightly drops from 7.0 % in 1980 to 6.9 % in 1989 according to the projection by AVAM, or remains at the same level of 7.0% during the period of 1980 through 1989 according to the projection by DVAM.

2. GRDP (Gross Regional Domestic Product) Projection by Sector for the Year 1989

We project GRDP in 1989 by economic sectors (agriculture, mining, manufacturing and service sectors) for six regions. The projected GRDP excludes petroleum contribution but includes LNG (Liquid Natural Gas) contribution. The reason for this is that both petroleum revenue and LNG revenue directly go into the Central Government Budget however that the regional data on petroleum is not available yet for us while the regional data on LNG is available.

We set the following "opti-moderate (between optimistic and moderate)" scenario on the annual growth rate of GDP for the period 1982-89;

4.5 % for total economy
3.0 % for agriculture sector
2.1 % for mining sector
9.0 % for manufacturing sector
4.3 % for services sector.

2.1 Projection of GRDP by Difference-Value Adjustment Method (DVAM)

2.1.1 Methodology

The projection method applied here is basically similar to that used for population projection by DVAM. Only the difference is that the 1989 GRDP should be projected by sector, which requires the use of four adjustment factors. The detailed explanation on DVAM applied for the projection of GRDP is given in Table A-3-1 (Appendix A) and Appendix B.

2.1.2 Results

The projected results are shown in Table 3.

Table 3 GRDP Projection for the Year 1989 by DVAM -- Excluding Petroleum but Including LNG
(Unit: Million Rp in 1975 constant price)

Region	Sector	Actual GRDP 1975	Actual GRDP 1979	Share in 1979 to Region (%)	Share in 1979 to Sector (%)	Annual Growth Rate (%) 1975-79	GRDP with Adjustment 1989	Share in 1989 to Region (%)	Share in 1989 to Sector (%)	Annual Growth Rate(%) 1979-89
	1	812526	1025305	31.3	23.1	5.9	1471312	25.9	24.2	3.6
	2	196459	464913	14.2	53.3	24.0	746313	13.1	63.5	4.8
I	3	217551	354712	10.8	22.5	13.0	1101318	19.4	27.6	11.9
	4	953996	1429814	43.7	20.0	10.6	2345934	41.4	19.3	5.8
	Total	2180527	3274744	100.0	23.4	10.7	5664877	99.8	24.2	5.6
	1	1969679	2289422	28.6	51.6	3.8	2871019	23.0	47.3	2.2
	2	195426	230596	2.9	26.5	4.2	239950	1.9	20.4	0.4
II	3	767843	1089253	13.5	69.2	9.1	2419320	19.4	60.7	8.3
	4	3031091	4409166	55.0	61.8	9.8	6922644	55.6	57.0	4.6
	Total	5964039	8018437	100.0	57.2	7.7	12452933	99.9	53.3	4.5
	1	244167	324024	33.8	7.3	7.3	510314	21.1	8.4	4.6
	2	1489	2404	0.3	0.3	12.7	2845	0.1	0.2	1.7
III	3	44980	83333	8.7	5.3	16.6	350327	14.5	8.8	15.4
	4	266875	547780	57.2	7.7	19.6	1554725	64.3	12.8	10.9
	Total	557511	957541	100.0	6.8	14.5	2418211	100.0	10.3	9.7
	1	308550	406395	47.0	9.2	7.1	631502	44.1	10.4	4.5
	2	8788	14813	1.7	1.7	13.9	17971	1.2	1.5	1.9
IV	3	20759	28427	3.3	1.8	8.1	57886	4.0	1.4	7.3
	4	265498	413831	48.0	5.8	11.7	722431	50.5	5.9	5.7
	Total	603595	863466	100.0	6.2	9.4	1429790	99.8	6.1	5.1
	1	199213	236968	49.6	5.3	4.4	308431	39.9	5.0	2.6
	2	2443	6036	1.3	0.7	25.3	10144	1.3	0.8	5.3
V	3	9155	15358	3.2	1.0	13.8	51033	6.6	1.3	12.7
	4	136332	219534	46.0	3.0	12.6	403683	52.2	3.3	6.3
	Total	347143	477896	100.0	3.4	8.3	773291	100.0	3.3	4.9
	1	107792	152992	36.4	3.4	9.1	272435	43.6	4.5	5.9
	2	132291	152717	36.4	17.5	3.6	157881	25.2	13.4	0.3
VI	3	2235	2956	0.7	0.2	7.2	5565	0.9	0.1	6.5
	4	72697	111277	26.5	1.6	11.2	188818	30.2	1.5	5.4
	Total	315021	419942	100.0	3.0	7.4	624699	99.9	2.6	4.0
	1	3641927	4435106	33.6	99.9	5.0	6065008	26.0	99.8	3.2
	2	536877	871479	6.2	100.0	12.9	1175317	5.0	99.8	3.0
Nation	3	1062523	1574041	11.2	100.0	10.3	3985394	17.0	99.9	9.7
	4	4726475	7131402	50.9	99.9	10.8	12138786	51.9	99.8	5.5
	Total	9967822	14012028	99.9	100.0	8.9	23364505	99.9	99.8	5.2

Notes: 1. The scenario for the annual growth rate of GDP for 1982-1989;

4.5 % for total economy
3.0 % for agriculture sector
2.1 % for mining sector
9.0 % for manufacturing sector
4.3 % for service sector.

2. DVAM: Difference-Value Adjustment Method.

2.2 Analyses (for Table 3)

(1) For our scenario, the average annual growth rate of GDP for the period 1979-89 turns out to be 5.2 % with the growth rates of 3.2 % for agriculture sector, 3.0 % mining sector, 7.9 % for manufacturing sector, and 5.5 % for services sector.
(2) Projected annual growth rate of GRDP for any sector of any region is lower for the period 1979-89 than for the period 1975-79. (This tendency is implied in our scenario).
(3) Region III shows the highest annual growth rate (9.7%) of total GRDP for the period 1979-89 among all regions, while Region VI shows the lowest annual growth rate (4.0%) of total GRDP for the same period.
(4) For GRDP accruing from agriculture sector, Region VI shows the highest annual growth rate (5.9%) among all regions for the period 1979-89, while Region II shows the lowest annual growth rate (2.2%) for the same period.
(5) For GRDP accruing to mining sector (excluding petroleum), Region V shows the highest annual growth rate (5.3%) among all regions for the period 1979-89, while Region VI shows the lowest annual growth rate (0.3%) for the same period.
(6) For GRDP accruing to manufacturing sector, Region III shows the highest annual growth rate (15.4%) among all regions for the period 1979-89, while Region VI shows the lowest annual growth rate (6.5%) for the same period.
(7) For GRDP accruing to services sector Region III shows the highest annual growth rate (10.9%) among all regions for the period 1979-89, while Region II shows the lowest annual growth rate (4.6%) for the same period.
(8) The decrease in the average annual growth rate from the period 1975-79 to the period 1979-89 is the highest in Region I (5.1 point) and the lowest in Region II (3.2 point).
(9) The GDP-share drops by 3.9 point (from 57.2 % to 53.3 %) in Region II, by 0.4 point in Region VI, and by 0.1 point in Regions IV and V during the period 1979-89. Meanwhile, the GDP-share increases by 3.5 point (from 6.8 % to 10.3 %) in Region III and by 0.8 point in Region I during the same period.
(10) Sectoral share of GDP decrease during the period 1979-89 by 7.9 point (from 33.6 % to 26.0 1%) for agriculture sector and 1.2 point for mining sector, while it increases during the same period by 5.8 point (from 11.2 % to 17.0 %) for manufacturing sector and 1.0 point for services sector.
(11) In every region but Region VI, the GRDP-share of agriculture sector decreases during the period 1979-89, ranging from by 2.9 point for Region IV to by 12.7 point for Region III. In Region VI, it increases by 7.2 point during the same period.
(12) All regions but Region V lose the GRDP-share of mining sector during the period 1979-89 ranging from by 0.2 point for Region III and to by 11.2 point for Region VI. Region V slightly gains the share during the same period.
(13) All Regions increase the GRDP-share of manufacturing sector during the period 1979-89 ranging from by 0.2 point for Region VI to by 8.6 point for Region I.
(14) All regions but Region I increase the GRDP-share of services sector during the period 1979-89 ranging from by 0.6 point for Region II to by 7.1 point for Region III. Region I loses the share by 2.3 point during the same period.
(15) The sectoral economic structure changes rather significantly during the period 1979-89 in Region I (The relative positions in GRDP-share between sectors 2 and 3 alternate.), Region

V (The relative positions in GRDP-share between sectors 1 and 4 alternate.) and Region VI (The relative positions in GRDP-share between sectors 2 and 4 alternate.).

2.3 Other Projections for GRDP

Table 4 and 5 show the results of the GRDP projections obtained through AVAM for the year 1989 based on the following "moderate" scenario for the annual growth rate of GDP for the period 1979-89;

% for total economy
2.7 % for agriculture sector,
1.5 % for mining sector,
6.5 % for manufacturing sector,
5.6 % for services sector.

The projection in Table 4 is for GRDP excluding petroleum but including LNG, while the projection in Table 5 is for GRDP including both petroleum and LNG (See Tables A-4 and A-5 for more detailed information necessary for the construction of Tables 4 and 5 respectively.).

Notice about the projections shown in Tables 4 and 5;

(1) Both tables show that the average annual growth rate for the period 1979-89 is negative for agriculture sector in Regions II and V and for mining sector in Regions II and VI (and Region I in Table 5).
(2) Table 5 shows a drastic increase in GDP-share of Region III from 9.8 % in 1979 to 24.5 % in 1989 to exceed that of Region I which drops from 29.6 % in 1979 to 22.1 % in 1989.

Note that those results are not necessarily due to the fact that we applied DVAM in our study but primarily due to the fact that we applied identical adjustment factors for the projection of each sectoral GRDP's. The use of different adjustment factors for each sectors would provide, under our scenario, positive growth rate for any sector of any region, and would consequently make the GDP-share of Region III in 1989 smaller than that of Region I.

Table 4 GRDP Projection for the Year 1989 by AVAM -- Excluding Petroleum but Including LNG
(Unit: Million Rp. in 1975 constant price)

		Actual GRDP					GRDP with adjustment			
		1975	1979	Share in 1979 to Region (%)	Share in 1979 to Sector (%)	Annual Growth Rate (%) 1975-1979	1989	Share in 1989 to Region (%)	Share in 1989 to Sector (%)	Annual Growth Rate (%) 1979-89
Region	Sector									
	1	812526	1025305	31.3	23.1	5.9	1163357	16.6	19.6	1.27
	2	196459	464913	14.2	53.3	24.0	2555577	36.5	226.4	18.58
I	3	217551	354712	10.8	22.5	13.0	770124	11.0	22.7	8.06
	4	953996	1429814	43.7	20.0	10.6	2504559	35.8	18.9	5.76
	Total	2180527	3274744	100.0	23.4	10.7	6993617	99.9	29.5	7.88
	1	1969679	2289422	28.5	51.6	3.8	2126179	19.0	35.8	-0.73
	2	195426	230596	2.9	26.5	4.2	222550	2.0	19.7	-0.35
II	3	767843	1089253	13.6	69.2	9.1	1664473	14.9	49.1	4.33
	4	3031091	4409166	55.0	61.8	9.8	7182577	64.2	54.3	5.00
	Total	5964039	8018437	100.0	57.2	7.7	11195779	100.0	47.2	3.39

	1	244167	324024	33.8	7.3	7.3	419251	15.1	7.1	2.61
	2	1489	2404	0.3	0.3	12.7	5082	0.2	0.5	7.77
III	3	44980	83333	8.7	5.3	16.6	247572	8.9	7.3	11.50
	4	266875	547780	57.2	7.7	19.6	2098062	75.7	15.8	14.37
	Total	557511	957541	100.0	6.8	14.5	2769967	99.9	11.7	11.20
	1	308550	406395	47.0	9.2	7.1	516111	37.1	8.7	2.42
	2	8778	14813	1.7	1.7	13.9	34816	2.5	3.1	8.92
IV	3	20759	28427	3.3	1.8	8.1	39617	2.8	1.2	3.37
	4	265498	413831	48.0	5.8	11.7	800304	57.5	6.0	6.82
	Total	603595	863466	100.0	6.2	9.4	1390848	99.9	5.9	4.88
	1	199213	236968	49.6	5.3	4.4	233109	30.4	3.9	-0.16
	2	2433	6036	1.3	0.7	25.3	36826	4.8	3.3	19.80
V	3	9155	15358	3.2	1.0	13.8	35781	4.7	1.1	8.80
	4	136332	219534	45.9	3.1	12.6	460030	60.0	3.5	7.68
	Total	347143	477896	100.0	3.4	8.3	765746	99.9	3.2	4.83
	1	107792	152992	36.4	3.4	9.1	233785	40.1	3.9	4.33
	2	132291	152717	36.4	17.5	3.6	139119	23.9	12.3	-0.92
VI	3	2235	2956	0.7	0.2	7.2	3788	0.6	0.1	2.51
	4	72697	111277	26.5	1.6	11.2	205759	35.3	1.6	6.3
	Total	315021	419942	100.0	3.0	7.4	582451	99.9	2.5	3.32
	1	3641927	4435106	31.7	99.9	5.0	5942428*	25.0	79.0**	2.97
	2	536877	871479	6.2	100.0	12.9	1128773*	4.8	265.3**	2.62
Nation	3	1062523	1574041	11.2	100.0	10.0	3387919*	14.3	81.5**	7.97
	4	4726477	7131402	50.9	100.0	10.8	13239308*	55.9	100.1**	6.38
	Total	9967822	14012028	100.0	100.0	8.9	23698428*	100.0	100.0**	5.39

Note: 1. The scenario for the annual growth rate of GDP for 1982-1989;
% for total economy
2.7 % for agriculture sector
1.5 % for mining sector
6.5 % for manufacturing sector
5.6 % for services sector.
2. AVAM: Absolute-Value Adjustment Method.
3. *: Directly calculated from the scenario.
**: Summation over regional figures (Note that some are significantly away from 100.0.)

Table 5 GRDP Projection for the Year 1989 by AVAM -- Including both Petroleum and LNG
(Unit: Million Rp. in 1975 Constant Price)

		Actual GRDP					GRDP with Adjustment			
		1975	1979	Share in 1979 to Region (%)	Share in 1979 to Sector (%)	Annual Growth Rate (%) 1975-1979	1989	Share in 1989 to Region (%)	Share in 1989 to Sector (%)	Annual Growth Rate 1979-89
Region	Sector									
	1	812526	1025305	21.5	23.1	5.9	1142825	20.1	19.2	1.1

	2	1902155	1959926	41.1	65.6	0.7	1320387	23.2	42.5	-3.8
I	3	217551	354712	7.4	22.5	13.0	756532	13.3	22.3	7.9
	4	953996	1429814	30.0	20.0	10.6	2460356	43.3	18.6	5.6
	Total	3886228	4769757	100.0	29.6	5.25	5680100	99.9	22.1	1.8
	1	1969679	2289422	28.6	51.6	3.8	2088654	19.0	35.1	-0.9
	2	195426	230596	2.9	7.7	4.2	218623	2.0	7.0	-0.5
II	3	767843	1089253	13.6	69.2	9.1	1635096	14.9	48.3	4.1
	4	3031091	4409166	55.0	61.8	9.8	7055810	64.1	53.3	4.8
	Total	5964039	8018437	100.0	49.7	7.7	10998183	100.0	42.8	3.2
	1	244167	324024	20.5	7.3	7.3	411852	6.5	6.9	2.4
	2	256226	622270	39.5	20.8	24.8	3583371	56.9	115.5	19.1
III	3	44980	83333	5.3	5.3	16.6	243204	3.9	7.2	11.3
	4	266875	547780	34.7	7.7	19.6	2061033	32.7	15.5	14.2
	Total	812248	1577407	100.0	9.8	18.0	6299460	100.0	24.5	14.8
	1	308550	406395	47.1	9.2	7.1	507002	37.1	8.5	2.2
	2	8788	14813	1.7	0.5	13.9	34201	2.5	1.1	8.7
IV	3	20759	28427	3.3	1.8	8.1	38918	2.8	1.1	3.2
	4	265498	413831	47.9	5.8	11.7	786180	57.5	5.9	6.6
	Total	603595	863466	100.0	5.4	9.4	1366301	99.9	5.3	4.7
	1	199213	236968	49.6	5.3	4.4	229014	30.4	3.8	-0.3
	2	2443	6036	1.3	0.2	25.3	36176	4.8	1.2	19.6
V	3	9155	15358	3.2	1.0	13.8	35150	4.7	1.0	8.6
	4	136332	219534	45.9	3.1	12.6	451911	60.0	3.4	7.5
	Total	347143	477896	100.0	3.0	8.3	752251	99.9	2.9	4.6
	1	107792	152992	36.4	3.4	9.1	229659	40.1	3.9	4.1
	2	132291	152717	36.4	5.1	3.6	136663	23.9	4.4	-1.1
VI	3	2235	2956	0.7	0.2	7.2	3722	0.6	0.1	2.3
	4	72697	111277	26.5	1.6	11.2	202125	35.3	1.5	6.1
	Total	315021	419942	100.0	2.6	7.4	572169	99.9	2.2	3.1
	1	3641927	4435106	27.5	99.9	5.0	5942428*	23.1	77.4**	3.0
	2	2497329	2986358	18.5	99.9	4.6	3101131*	12.1	249.1**	0.4
Nation	3	1062523	1574041	9.8	100.0	10.3	3387919*	13.2	80.0**	8.0
	4	4726477	7131402	44.2	100.0	10.8	13239308*	51.6	178.2**	6.4
	Total	11928256	16126907	100.0	100.1	7.8	25670786*	100.0	99.8**	4.7

Note: 1. The scenario for the annual growth rate of GDP for 1982-1989;
% for total economy
2.7 % for agriculture sector
1.5 % for mining sector
6.5 % for manufacturing sector
5.6 % for services sector.
2. AVAM: Absolute-Value Adjustment Method.
3. *: Directly calculated from the scenario.
**: Summation over regional figures (Note that some are significantly away from 100.0.)

3. Construction of Regional Consumption Functions and Projection of Regional Consumption Expenditures for the Year 1989

Consumption expenditures are generally grouped into three categories; (1) consumption expenditures by government, (2) consumption expenditures by firms and (3) consumption expenditures by households.

Nevertheless, only the data on consumption expenditures by households are available for us. Accordingly, we try to construct regional consumption function of the household in this Section.

3.1 Input Data

Input data consist of actual data on Gross Regional Domestic Project (Y) and Personal Consumption (C) for years of 1976, 1978, and 1980 without petroleum contribution (unit: million Rp. in 1975 constant Price).

(1) Original data by province (see Appendix C)
(2) Aggregated regional data (see Appendix C)
(3) Data sources: (i) For household consumption: National Social-Economic Survey (SUSENAS), Central Bureau of Statistics (BPS), for years of 1976, 1978 and 1980 (February-March), unpublished.
(ii) For GRDP: Provincial Income in Indonesia 1975-79, Central Bureau of Statistics (BPS), June 1982, pp. 64-121.
For the year 1980, the data are obtained from Mr. Kusmadi Saleh, M.A., Department of Consumption Balance and Accumulation, Central Bureau of Statistics (BPS), June 1983, (Telephone: 374908).

Following characteristics of our data should be, meanwhile, noted here.

(i) Since Jambi's data for 1980 is unavailable for both GRDP and Consumption, we estimate these values through the "average-growth-rate method" by use of the growth rate of Region I (i.e., average growth rate of all provinces except Jambi in Region I) for the period 1978-80.
(ii) Liquid Natural Gas (LNG) contribution to GRDP accruing from mining sector is included in our GRDP data. It would be, however, possible for us to get more reasonable results if we exclude the contribution of petroleum and LNG to GRDP. Regarding this, LNG are produced in Regions I and III, which requires us to additionally collect the data on LNG only for these two regions.

3.2 Methodology

3.2.1 Estimation of coefficients

Step-1 For each region, we apply "Ordinary Least Squares Method with Zero-Intercept (OLSZ)" in order to estimate the coefficient β_1 of the following equation (data size = 3 ; e = error term)

$$C_1 = \beta_1 Y + e \text{ ---------- (1)}$$

Step-2 For each region, we apply "Ordinary Least Squares Method (OLS)" in order to estimate the coefficient of the following equation;

$$C_2 = \alpha_2 + \beta_2 Y + e \text{ --------- (2)}$$

Step-3 We adopt the following formulation to set a consumption function for the household of each region;

$$C = a + b Y \text{ --------- (3)}$$

where $b = \dfrac{b_1 + b_2}{2}$

b_1 = estimate of β_1
b_2 = estimate of β_2

We impose to (3) the condition that the line for the consumption function passes through the point $(\bar{Y}, \bar{C})$ in order to get the value of intercept a by means of the following equation;

$$a = \bar{C} - b\bar{Y},$$

where $\bar{C}$ and $\bar{Y}$ are means of C and Y respectively.

3.2.2 Rationale

(1) We do not use the regression equation obtained by OLS method as a consumption function for households since the marginal propensity to consume (= dC/dY) estimated by OLS looks excessively low as compared with that observed in other countries' experience at the same economic development stage of theirs as that of Indonesia at present.
(2) We do not use the regression equation obtained by OLSZ since the marginal propensity to consume estimated through this method seems too high.
(3) Therefore we adopt our own approach, as shown in the above-mentioned Step-3, where the marginal propensity to consume (MPC) is the arithmetic mean of MPC estimated by OLS and MPC estimated by OLSZ. The other rationales for this approach than those expressed in the above 1 and 2 are;

(i) We have only three points of time for our actual data on C and Y.
(ii) "Non-zero intercept regression line" must theoretically exists.

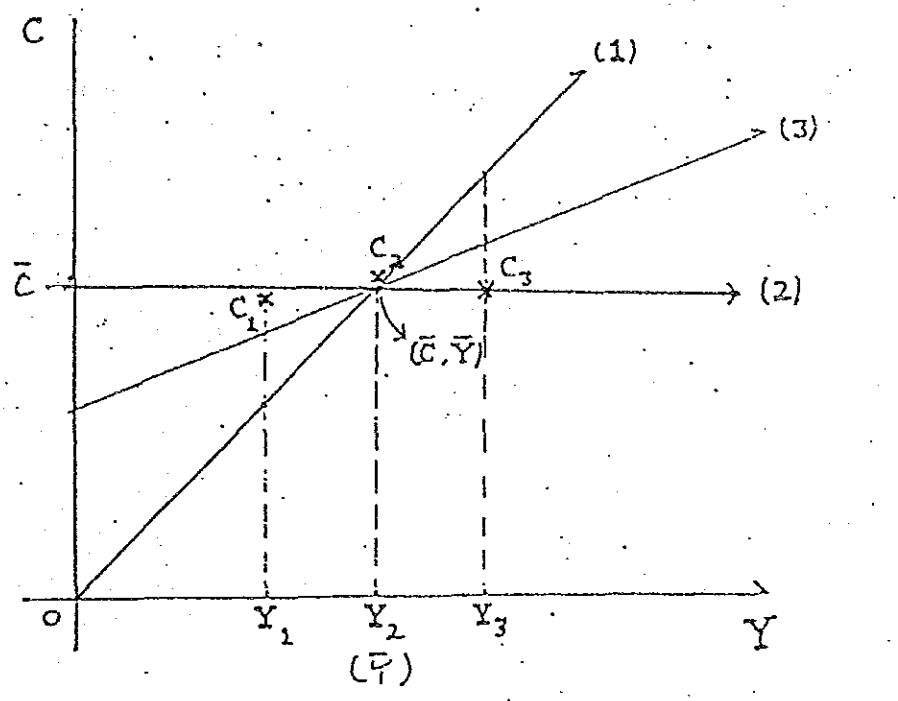
3.3 Computer Programs

(1) For equations (1), (2) and (3), we develop computer programs with the file-names of CONSF-1, CONSF-2, and CONSF-3 respectively. They are written in Basic. See Appendix D for CONSF-1, CONSF-2 and CONSF-3.
(2) Remarks on R^2 of zero-intercept regression. ($0 \leqq R^2 \leqq 00$ instead of $0 \leqq R^2 \leqq 1$)
For the regression line obtained by (OLSZ) which is expressed by equation (1), the square of correlation coefficient (R^2) is;

$$R^2 = \frac{\sum_{i=1}^{3} (\hat{C}_i - \bar{C})^2}{\sum_{i-1}^{3} (C_i - \bar{C})^2}$$

where $\bar{\hat{C}} = \frac{\sum_{i=1}^{3} \hat{C}_i}{3}$ and $\bar{C} = \frac{\sum_{i=1}^{3} C_i}{3}$

Thus, if C_i varies in the close vicinity of C, then R^2 can become larger than 1.0. (See graph below. See also R^2 in Table D-1 of Appendix D especially R^2 for Region V.)



3.4 Results

(1) Estimates of coefficients are shown, in Appendix D, by Table D-1 for b_1, by Table D-2 for b_2, and by Table D-3 for a and b. These estimates are summarized in Table 6.

Table 6 Estimates of Coefficient

Region	b_1	b_2	a_2	$b = \frac{b_1 + b_2}{2}$	a
I	0.4967	0.2525	760326.3549	0.374602	39799.0
II	0.4862	0.2706	166353.1494	0.378391	845222.0
III	0.5435	0.2797	215488.7042	0.411552	111700.0
IV	0.6149	0.2335	327223.7580	0.424177	170035.0
V	0.6119	0.1122	239381.1664	0.362016	123252.0
VI	0.8464	0.3361	72269.0276	0.591251	36989.4

(2) Regional consumption function of the household.
From Table 6, we can get the following regional consumption functions;

Region I : C = 397990 + 0.374602 Y
Region II : C = 845222 + 0.378391 Y
Region III : C = 111700 + 0.411552 Y
Region IV : C = 170035 + 0.424177 Y
Region V : C = 123252 + 0.362016 Y
Region VI : C = 36989.4 + 0.591251 Y,

where Y = GRDP without petroleum contribution but with LNG contribution.

(3) Projection of regional consumption expenditures of the households are shown in Table 7.

Table 7 Projection of Regional Consumptions Expenditure of the Household (Unit: Million Rp. in 1975 Constant Price)

Region	1989 Regional Consumption	1989 GRDP*	APC
I	2520064	5664877	0.4449
II	5557300	12452933	0.4463
III	1106920	2418211	0.4577
IV	776519	1429790	0.5431
V	403196	773291	0.5214
VI	406326	624669	0.6505
Nation	10770325	23363771	0.4610

APC = Average Projection of Consume
* From the results shown in Table 3 with minor adjustment of the total figure.

3.5 analyses

(1) Region VI has the highest MPC (0.5913), while Region V has the lowest one (0.3620).
(2) Region VI has the highest APC (0.6506) in 1989, while Region I has the lowest one (0.4449). APC stands for the average propensity to consume.
(3) Region II shows the highest level of regional consumption expenditures of households (5,557,300 million Rp.) in 1989, while Region V shows the lowest level (403,196 million Rp.) in the same year.
(4) The average annual growth rate of consumption expenditures of each region is as follows for the period 1980-89; R-I = 4.43 %; R-II = 3.78 %; R-III = 9.4 %; R-IV = 3.97 %; R-V = 3.34 % and R-VI = 13.66 %. Therefore, Region VI shows the highest average annual growth rate (13.66 %), while Region V shows the lowest rate (3.34 %).

4. Construction of Regional Production Functions and Projection of Regional Employment Level for the Year 1989

In this subsection, we first try to develop a very simple regional production function within the limits of data availability. Then some policy implications shall be briefly discussed in conjunction with the results on the ratio of employment to population obtained through the regional production function.

4.1 Cobb-Douglas Production Function

The relationship between factor inputs and their output is shown by a mathematical formulation which is often called production function;

$$Q = f(X_1, X_2, ---, X_n)$$

where Q : Output

X_i : i-th factor input.

One of the typical production functions is the Cobb-Douglas production function as expressed by ;

$$Q = AK^{\alpha} L^{\beta} \text{ ---------(4)}$$

where Q : Output

K : Capital Stock

L : Labor (number of employees or employment)

A, α, β : Parameters.

Output Q in equation (4) presents gross regional domestic product in our case.

4.2 Data Availability and Necessary Adjustment

We need regional data on Q, K and L in order to estimate parameters, A, and in equation (4). Unfortunately, no data is available for capital stock of any region at present.

As to the employment level, the regional data (except Region VI) on the total employment (but not on the sectoral employment) is available from SUSENAS for 1976 and 1978 and from Census for 1980. It should be, however, noted that the SUSENAS data is arranged based on sampling surveys while the Census data is arranged based on complete survey on general principles and seems to reflect more reality as compared with the SUSENAS data.

We, therefore, have to adjust the SUSENAS data to make it consistent with the Census data through the following steps (Refer to Table 8);

Step-1 Calculate average annual growth rate of provincial employment based on the SUSENAS data for 1976 and 1978.

Step-2 Calculate 1980 employment for each provinces based on the SUSENAS data for 1978 and the annual growth rate obtained at Step-1.

Step-3 Divide the figure of 1980 Census data by 1980 figure obtained at Step-2 to get the adjustment factor.

Step-4 Multiply the adjustment factor to the figures of SUSENAS data for 1976 and 1978 in order to get the adjusted employment for those two years.

Step-5 Sum up provincial employment levels to get regional employment for years 1976, 1978 and 1980. Regarding the data on output, we use the gross regional domestic product (GRDP) already obtained in the previous work of this study.

Table 8 Employment (1976, 1978 and 1980) (Unit: 1,000 employees)

Spatial Unit	SUSENAS data 1976	SUSENAS data 1978	Estimated employment 1980 (X)	Census Data 1980 (Y)	Adjustment factor (Y/X)	Employment after Adjustment 1976	Employment after Adjustment 1978	Employment after Adjustment 1980
Aceh	686	889	1152	833	0.723	496	643	833
Sumut	2630	2951	3311	2947	0.890	2341	2626	2947
Sumbar	996	1127	1275	1104	0.866	863	976	1104
Riau	584	616	650	687	1.057	617	651	687
Jambi	340	389	445	496	1.115	379	434	496
Sumsel	1570	1404	1256	1623	1.292	1448	1625	1623
Bengkulu	207	216	225	279	1.240	257	268	279
Lampung	1171	1301	1371	1536	1.120	1312	1457	1536
Region I	8184	8893	9685	9505	8.302	7713	8680	9505
DKI	1509	1799	2145	1928	0.899	1357	1617	1928
Jabar	8016	9173	10497	8501	0.810	6493	7430	8501
Jateng	9804	10387	11005	9966	0.906	8882	9411	9966
DIY	1437	1455	1473	1234	0.838	1204	1219	1234
Jatim	11109	11520	11946	11396	0.954	10598	10990	11396
Region II	31875	34334	37066	33025	4.407	28534	30667	33025
Kalbar	924	968	1014	982	0.968	894	937	982
Kalteng	319	352	388	365	0.941	300	331	365
Kalsel	665	770	891	731	0.820	545	631	731
Kaltim	280	331	391	373	0.954	267	316	373
Region III	2188	2421	2684	2451	3.683	2006	2215	2451
Sulut	611	580	550	660	1.200	611	696	660
Sulteng	337	352	367	417	1.136	383	400	417
Sulsel	1626	1702	1782	1602	0.899	1462	1530	1602
Sultengg.	332	252	191	273	1.429	332	360	273
Region IV	2906	2886	2890	2952	4.664	2788	2925	2952
Bali	936	995	1058	950	0.898	841	896	950
NTB	1001	1045	1110	892	0.804	805	847	892
NTT	1021	1075	1132	1018	0.899	918	966	1018
Region V	2958	3124	3300	2860	2.601	2564	2709	2860
Maluku	NA	NA	-	NA	-	353	374	400
Irian Jaya	NA	NA	-	NA	-	325	340	358
Region VI	-	-	-	-	-	678	714	758
Nation	-	-	-	-	-	44,283	47,910	51,551

Sources: - SUSENAS data for 1977 and 1978.
- Census data for 1980.

NA: Not available.

4.3 Modification of the Formulation of Production Function

Due to the unavailability of regional data on capital stock, we substitute the Cobb-Douglas production function by the following simple linear formulation;

$$Q = A + bE \quad \text{---------} \quad (5)$$

where Q : Gross regional domestic product
E : Employment
a,b : Parameters.

The above production function is considered as a special case of the symmetric type of production function with the following general formulation;

$$Q = aK^{\alpha}L^{\beta} + b_1K + b_2L$$

$$\text{or } Q = aK^{\alpha}L^{\beta} + b_1K^{h} + b_2L^{h} \quad (h = \alpha+\beta)$$

It should be kept in mind that the production function expressed by equation (5) does not allow us to examine substitution effects between K and L.

4.4 Estimation of Parameters

Parameters of the production function expressed by equation (5) can be estimated by use of the time series data on employment (after adjustment) for 1976, 1978 and 1980 in Table 8 and the data on GRDP in Table 3. The results obtained by means of the OLS method are shown in Table E-1 of Appendix E.

4.5 Projection of Regional employment in 1989

We project the regional employment level through the following steps (Refer to Table 9);

Step-1 Substitute 1989 GRDP for Y in regional production function.
Step-2 Solve for E the equation of regional production function.

The manipulation at Step-2 may not be thoroughly justified since the parameters of production functions in Table 9 are obtained by regressing E to Y. In this sense, Step-2 is an approximation.

Table 9 Projection of Employment in 1989

Region	GRDP 1989 (bill. Rp)	Region Production Function	Employment 1989 (1,000 employees)	Employment 1980 (1,000 employees)	Annual Growth Rate	Population (1,000 persons) 1989	Population (1,000 persons) 1980	Employment/ Population 1989	Employment/ Population 1980
I	5665	Y=-3057 + 0.678E	12864	9505	3.4	36082	28016	0.357	0.339
II	2453	Y=-8727 + 0.531E	39887	33025	2.1	106390	91270	0.375	0.362
III	2418	Y=-1084 + 0.882E	4159	2451	6.0	8426	67230	0.494	0.365
IV	1430	Y=-3945 + 0.642E	3273	2952	1.2	12319	10410	0.266	0.284
V	773	Y=-1325 + 0.660E	3180	2860	1.2	10478	8487	0.303	0.337
Nation	22739	-	63363	50793	2.5	23363771	144906	0.365	0.351

4.6 Ratio of Employment to Population

Table 10 shows the ratio of employment to population by region for 1976, 1978, 1980 and their average ($\bar{r}^{76-80}$) as well as for 1989 (r^{89}).

Among policy implications suggested by Table 10 are (in case the policy aims to decrease the interregional economic discrepancies);

(1) Promotion of the migration of working population from i-th region to j-th region when $r_i^{89} > r_j^{89}$.

(2) Implementation of larger investment to increase the employment in i-th region when $r_c^{89} < r_n^{89}$.

Table 10 Ratio of Employment to Population

Region	Employment/Population				
	1976 X	1978 Y	1980 Z	$\frac{X+Y+Z}{3} = \bar{r}^{76-80}$	1989 ($= r^{89}$)
I	0.312	0.331	0.339	0.327	0.357 ($= r_I^{89}$)
II	0.343	0.355	0.362	0.353	0.357 ($= r_{II}^{89}$)
III	0.324	0.344	0.365	0.344	0.494 ($= r_{III}^{89}$)
IV	0.283	0.287	0.284	0.285	0.266 ($= r_{IV}^{89}$)
V	0.342	0.349	0.337	0.343	0.303 ($= r_V^{89}$)
VI	0.292	0.292	0.293	0.292	0.125 ($= r_{VI}^{89}$)
Nation	0.331	0.344	0.346	0.340	0.360 ($= r_N^{89}$)

4.7 Analyses (for Table 10)

(1) In Regions I, II and III, $\bar{r}^{76-80} < r^{89}$. The difference between the two ratios is the largest (0.150) in Region III.

(2) In Region IV, V and VI, $\bar{r}^{76-80} > r^{89}$ and $r_i^{89} < r_N^{89}$.

(3) In 1989, Region III has the larger value of r^{89} than any other region.

5. Concluding Remarks

In order to search for better policy instruments to, for example, decrease interregional economic discrepancies, it is necessary to examine the difference among regions with respect to, in addition to the ratio of employment to population, (1) per capita GRDP, (2) labor productivity, (3) capital productivity, and (4) age structure of working-age population. In light of this, among the works with us which have to be conducted in future are;

(1) Estimation of the coefficients of regional production functions,

(2) Analysis of per capita GRDP, per capita regional consumption, labour productivity and age structure for each regions, and

(3) Study of the effects of changes in regional consumption expenditures upon regional economies.