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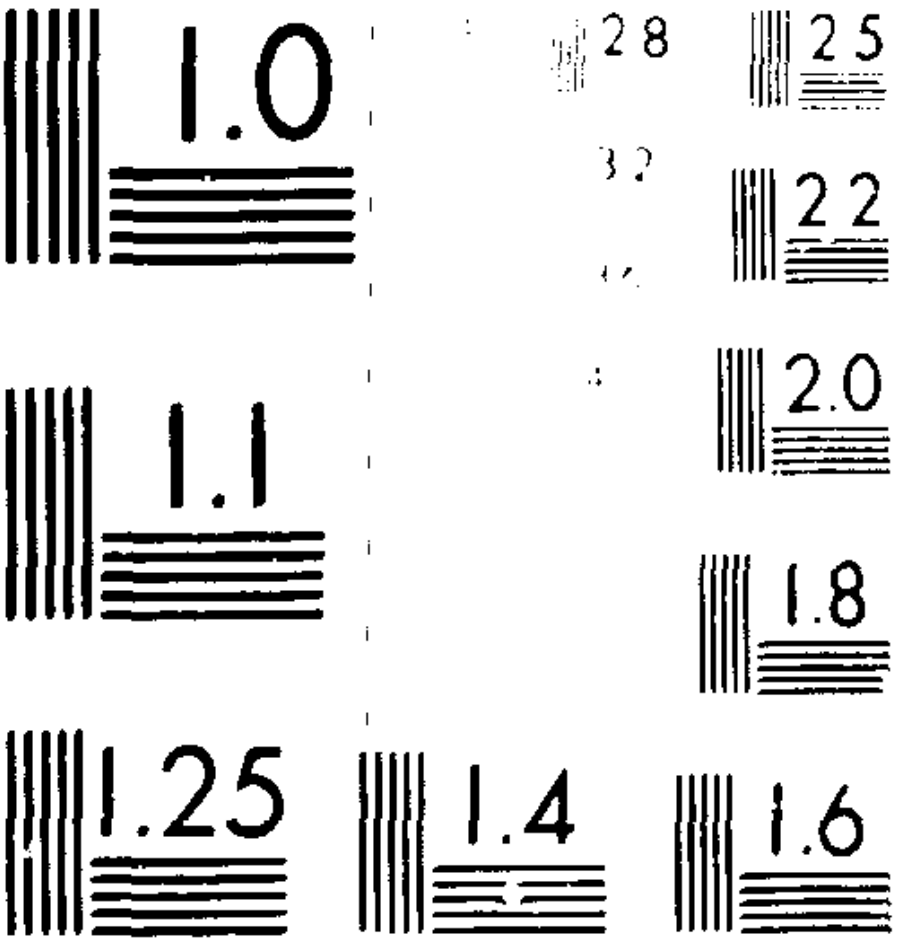
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COMPARATIVE SOCIO-ECONOMIC DEVELOPMENT IN THE NEWLY INDUSTRIALIZING COUNTRIES *

Social Aspects of Industrialization -
Working Papers

prepared by the
Global and Conceptual Studies Branch
Division for Industrial Studies

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3735

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Comparative Socio-economic Development in the
Newly Industrializing Countries

FOREWORD

As a reflection of deliberations at the Third General Conference of UNIDO in New Delhi in 1980, a reoccuring theme at recent sessions of UNIDO's Industrial Development Board has been the need to give proper attention to the examination of the social aspects of the industrial development process. Specifically, it has been stressed that successful industrialization requires a concomitant programme of socio-economic development and progressive socio-economic change. On the one hand, it is recognized that the economic growth resulting from industrialization can promote social progress by creating the means to meet socio-economic needs, including education, nutrition, health, housing and communications. On the other hand, socio-economic development can serve as an input into the industrialization process, and therefore can be a mechanism for fostering industrial development.

While continuing to examine the social aspects of industrialization as an integral part of a number of UNIDO research projects, a specific research programme in the area was instituted in 1982 which in its present phase has adopted the concept of socio-economic indicators as a means for providing a composite picture of the process of socio-economic development. The process is currently being investigated at the global level for 149 countries in both cross-section and time-series analyses. These global analyses are also being complemented with a number of case studies - for the least developed countries of Africa, for a group of NICs in Asia and Latin America, and for the countries of the EEc and the European CMEA.

The present study examines comparative socio-economic development in the newly industrializing countries. It commences with a general survey of economic development in the NICs in 1978 and then examines, using nineteen different socio-economic indicators, the state of socio-economic development in these countries in the same year. Rank correlation analysis is next used to quantitatively compare the ranking of the countries on both economic and socio-economic indicators, followed by a time series analysis of industrial and socio-economic development over the period 1960-1978. To see the NICs in an international perspective, the EEC, the CMEA and African LDCs, are discussed and compared to the group under study. Socio-economic development in the NICs is then examined through the use of a number of alternative

composite indices of socio-economic development, and the study concludes with an examination of the intertemporal relationship and the direction of causality between economic and socio-economic development.

This study was prepared by the UNIDO Secretariat, with research assistance from E. Egger and G. Brennand.

INTRODUCTION

What is the nature of the socio-economic development process currently taking place in the developing countries? What is the nature of the relationship between the industrial development being carried out as part of the attempts to accelerate (their) economic development and the process of socio-economic development? Previous considerations of these questions have not produced definitive answers. This paper will examine the process of socio-economic development in a group of developing countries and discuss the effect of economic development on socio-economic development. Using socio-economic indicators, an attempt will then be made to make general statements about the level of development of these countries and the effects of industrialization and economic development on socio-economic development.

The countries under investigation are the Newly Industrializing Countries (NICs), a group of countries which have carried out extensive programmes of industrialization which are progressively leading them to evolve interest patterns, attitudes and forms of economic behaviour convergent with those of the countries of the North. These countries are also of key importance to the industrialization aspirations of the South, since they represent the major source of capital goods and technology within the South.

The paper begins by describing their geographical, physical, demographic, and macroeconomic characteristics. These countries are first ranked on nineteen different socio-economic indicators for 1978 (each measuring one of seven different dimensions of socio-economic development) and the rank of each country on each indicator is discussed. Spearman rank correlation analysis is next used, first, to compare rankings between socio-economic indicators and economic indicators in 1978 and then intertemporally in an attempt to highlight the paths of economic and socio-economic development the NICs have followed over the last two decades. After calculating the value of the best known index of socio-economic development (the Physical Quality of Life Index), rank correlation is then carried out between the index and a reduced set of socio-economic and economic indicators. Finally, a series of lagged rank correlations is used to explore the direction of causality between various socio-economic indicators and economic development.

NICs IN WORLD PERSPECTIVE

The importance attached to the social and economic development of the newly industrializing countries extends beyond the concern for this specific category of developing countries. The point is, that the countries which are the focus of this paper can be seen as a 'link' between the developed and developing nations of the world 1/, and as such an examination of socio-economic development in these countries can provide insight into the prospect of development for lesser developed countries as well as a fuller understanding at the nature of the socio-economic development in the NICs themselves.

Table 1 suggests that the NICs could be viewed as an 'average group' for world social development; this is rather misleading, however, since this group's range of values for socio-economic indicators on Table 1 (infant mortality, literacy, and life expectancy) is extremely broad. This in turn illustrates not only the enormous gap between developed and developing countries but also the diversity of experience within the NICs. Thus, infant mortality in Hong Kong and Singapore (see Appendix A) is lower than in some EEC countries, while Brazil, and more particularly India and Pakistan, have rates near or above the average for all developing countries.

Note, however, that the levels attained by the NICs for each of the three result indicators in Table 1, although being close to the world averages, is distinctly closer to the performance of the EEC group of countries, than it is to the least developed countries (LDCs). This is a clear illustration of the skewed distribution of global socio-economic welfare; perhaps more importantly, for our present purpose, it suggests a remarkable degree of success of the NICs in advancing their socio-economic development. When seen in this perspective, the potential of an analysis of the NICs for shedding light upon the development process becomes clear.

1/ For a discussion of economic relations between the NICs and many European countries see Louis Turner, Colin I. Bradford, Jr., Lawrence G. France, Neil McMullen, and Stephen Wolcock, "Living with the Newly Industrializing Countries", The Royal Institute of International Affairs (London: 1981).

Table 1 Infant mortality, literacy rates and life expectancy for EEC, CMEA, NICs, LDCs and the World, 1978.

	Range		Median	Mean	Standard deviation	Number of observations
	High	Low				
Infant Mortality						
EEC	9	17.1	12	12.5	2.5	9
CMEA	13	31	22	21.8	5.4	6
NICs	12	125	37	55.3	55.3	11
LDCs (1980)	97	211	146	143.1	27.8	16
World	7.6	211	71	50.2	44.7	124
Literacy Rates						
EEC (1977)	100	98	99	98.9	0.5	9
CMEA (1976)	98	98	98	98	0	3
NICs	94	21	76	71.6	21.6	11
LDCs[1/]	58.6	5.2	15.8	24.1	22.4	18
World	100	5.2	62	75.2	27.1	99
Life Expectancy						
EEC	74	72	73	72.9	0.7	9
CMEA	72	70	70.5	70.8	0.9	6
NICs	72	51	67	64.9	6.8	11
LDCs	53	39	43	45.2	3.4	17
World	76	39	61	63.4	9.9	123

Note: 1/ Various years around 1978.
CMEA = East European CMEA only.

Sources. Infant Mortality for OECD: WHO, World Health Statistics 1981 (Geneva, WHO, 1981) pp.17-20; for LDCs: World Bank, World Development Report 1982 (Washington D.C.: World Bank 1982) pp. 150-151; for CMEA: World Bank, World Development Report 1981 (Washington D.C.: World Bank 1981); Literacy Rates: for OECD and CMEA: Ibid.; for LDCs: UNESCO, Statistical Yearbook 1981 (Paris: UNESCO, 1981) Life expectancy: World Bank. World Development Report 1980 (Washington D.C.: World Bank, 1980); NICs: as Table 2.

	Singapore	Hong Kong	Yugoslavia	Argentina	Brazil	Taiwan	Mexico	Korea	Malaysia	Pakistan	India
Physical											
1. Area (thousands of sq. km)	1	1	256	2767	8512	36	1973	99	330	804	3288
2. Population density (number per sq km)	2300	4600	79.9	9.5	14.0	475	33.2	369.7	40.3	96.1	195.8
3. Urban population (percentage of total population)	94	82	41	81	62	71 2/	65	49	31	29	22
Demographic											
4. Population (millions)	2.3	4.6	22.0	26.4	119.5	17.1	65.4	36.6	13.3	77.3	643.9
5. Crude birth rate (per 1000 population)	17	19	18	21	36	21	38	21	29	45	35
6. Crude death rate (per 1000 population)	6	6	8	8	9	5	8	8	6	15	14
7. Natural population increase (rate per 1000-net)	11	13	10	13	27	16	30	13	23	30	21
Economic											
8. GNP per capita (1978 US$)	3290	3040	2380	1910	1570	1400	1290	1160	1090	230	180
9. Growth rate of real GNP per capita, 1977-78 (per cent)	14.2	17.4	21.4	10.4	15.4	19.7	15.2	41.5	17.2	21.1	20.0
10. Average growth rate 1970-78 (per cent)	8.5	8.2 4/	5.6 4/	2.3	9.2	8.0	5.0	9.7	7.8	4.4	3.0
11. Industrial production per capita (1978 US$)	1151.5	940.4 1/	1071	859.5 1/	580.9	672.0	477.3	406.0	348.8	55.2	46.8
12. Exports per capita (1978 US$)	4349	2494	258	243	110	748	91 12/	343	572	20 12/	10
13. Manufacturing value-added per capita (1978 US$)	855	674 1/	74 11/	641 1/	440	532	361	278	185	37	31
14. Exports of Manufactures per capita (1978 US$) 13/	2001	2402 8/	182 9/	64	37	174 10/	20 3/2/	304	176 2/	14	6/
15. Totally economically active population of which (1978):											
Thousands	918	2125	10114	10127	37638	6333 6/	18886	13786	4394	21163	256305
In agriculture (per cent)	2.5	2.9	39.8	13.6	39.7	37.1 2/	37.8	41.1	49.3	54.5	64.6

Notes:
1. 1977.
2. Estimated value.
3. 1975, or most recent estimate.
4. 1970-77.
5. 1980.
6. Council For Economic Planning and Development, Taiwan Statistical Data Book 1981 (Republic of China: 1981), p.15.
7. Ibid., p.58.
8. Share of manufactured goods exports in total consists mainly of the export of unworked precious and semi-precious stones.
9. Share of manufactured goods exports in total consists mainly of the export of non-ferrous base metals.
10. Republic of China, Directorate General of Budget, Accounting, and Statistics, Statistical Yearbook of the Republic of China 1981 (The Republic of China: 1981) p.417.
11. United Nations, Department of Economic and Social Affairs Statistical Office, Yearbook of Industrial Statistics, 1979 ed. (New York: United Nations, 1981) p.566.
12. Business International, Worldwide Economic Indicators (New York: Business International Corp., 1981), p.159.
13. Exports of manufactures may of course exceed value-added in manufacturing because the former are values of total output and the latter value-added.

Sources:
Rows 1-2, 4-8, 10-11, 13: World Bank, World Development Report 1980, op. cit., 110-111, 114-115, 144-145, 148-149; row 3: UN Compendium of Social Statistics 1977, (New York: United Nations, 1980), 50-54, row 9: World Bank, World Development Report 1979 (Washington, D.C.: World Bank, 1979), 126-127; World Development Report 1980 110-111; row 12, 14: UN Monthly Bulletin of Statistics (New York: United Nations) January 1980, 1981, xxiii-xxiv; row 15: FAO, Production Yearbook 1980 (Rome: FAO, 1981), 64-71.

THE ECONOMIC DEVELOPMENT OF THE NICs

The countries under study - Argentina, Brazil, Hong Kong, Korea, India, Malaysia, Mexico, Pakistan, Singapore, Taiwan, and Yugoslavia - were selected from among developing countries on the criterion of the share of manufactures in total exports 2/ and can be divided into four geographic groups. The first group contains the three Latin American countries: Argentina, Brazil, and Mexico. All three are large countries and, with the exception of Yugoslavia, have the lowest population density of all the NICs (See Table 2). In contrast, the South Asian countries of Pakistan and India are appreciably more densely populated (and also have high infant mortality rates) - but are still relatively sparcely populated when compared with the Far East. Further, the relative size of the agrarian population in these two South Asian countries is the largest of all the NICs.

The smallest countries in the sample - the Far Eastern countries of Singapore, Hong Kong, Taiwan, Korea, and Malaysia - are also the countries with the slowest rates of population increase. These countries are smaller in size and are more developed (especially Singapore) or are developing at a more rapid rate (Korea) than the other NICs under study.

The fourth "group" is Yugoslavia, the only European country - and the only labour-managed economy - to be considered.3/ In terms of both its area and its population density, Yugoslavia is towards the lower end of the range of values for the NICs.

The Far Eastern countries have the highest population densities - Hong Kong has 4,600 people per km^2 - and the scarcity of land has clearly influenced the development strategy of these countries, leading inexorably to industrialization. These countries must import food, raw materials, and energy, off-setting this with exports. This results in a situation such as that in Singapore, where in 1978 the value of both imports and exports per capita were over 135 per cent of the GNP per capita. 4/

2/ The choice of these eleven countries is based on the degree of their success relative to other developing countries in exports of manufactures. Pakistan and India are included in the NICs because of their high total exports of manufactures, even though organizations such as the World Bank (World Development Report 1980) still rank these countries as low income countries by virtue of their low GNP per capita.

3/ Yugoslavia's classification as a developing country follows the system adopted by the United Nations Statistical Office.

4/ World Bank, World Development Report 1980, p.125.

Countries such as India and Pakistan have, on the other hand, pursued a development strategy consistent with their relatively high endowment of land and lower level of industrialization. They also - historically at least - pursued more import substitution-oriented development strategies, and even in 1978 - when such policies had basically been abandoned - exports comprised only 5.5 and 8.6 per cent of their respective GNPs per capita.

Consistent with their higher degree of industrialization, Far Eastern 'Chinese economies' (such as Singapore and Hong Kong) have the highest GNP per capita. The difference between the highest and lowest GNP per capita is almost twenty fold - Singapore being $3,290 and India being $180. A parallel difference can be seen in the value-added in manufacturing per capita, Singapore having over twenty-five times the value-added manufacturing per capita of India.

Because of its central role in economic development, manufacturing value-added per capita correlates highly with GNP per capita for the NICs and the rankings of these two economic indicators are almost identical. No country deviates more than one place up or down, and the rankings of the last five countries are identical.

In exports per capita, there is again a parallel for a number of countries: Pakistan and India are at the bottom of the rankings on GNP, manufacturing value-added, and exports per capita. Over half of the population of India and Pakistan produce agricultural products and their GNPs per capita are less than one-quarter the amount of the next highest country, Malaysia. However, while just above them on the GNP and manufactures lists, Malaysia is significantly higher on the list when exports per capita are compared - a reflection of the differing development strategies and foreign trade regimes. 5/

The parallel rankings are also evident for Singapore and Hong Kong at the top of the exports per capita list. The fact that the latter group of countries pursued an import substitution, and the former an export-stimulation,

5/ For a discussion of trade regimes and development strategies for the NICs see J. Donges, "A Comparative Survey of Industrialization Policies in Fifteen Semi-Industrial Countries", Review of World Economics, Vol. 112 (1976), pp. 626-659.

development strategy is reflected in the fact that India and Pakistan produced less than $10 per capita manufactured exports, while Hong Kong was producing over $2400. But the evidence is not sufficiently strong to suggest that the latter strategy must unequivocally be judged superior to the former.

Another set of groupings (besides those based on geographic factors) can be established from the data in Table 2. Singapore, Hong Kong, Yugoslavia, and Argentina all have relatively high GNPs per capita as well as high levels of manufacturing production per capita. Of this group, only Yugoslavia has a relatively high percentage of its population working in agriculture, and indeed stands out among all the countries under investigation as being the only one that is both highly industrialized and also has a high percentage of the population working in agriculture.

The second group consists of countries with somewhat more agrarian populations. Their GNP and manufactures per capita are lower than those of the first group, but they are also distinctly higher than those of the still highly agrarian societies, Pakistan and India, which belong in the lowest group. This second group of countries - Brazil, Mexico, Malaysia, Korea, and Taiwan - are all much more closely related throughout this entire analysis. They have nearly the same rank order for GNP and industrial production per capita and, with the exceptions of Taiwan and Malaysia, they rank almost the same in exports and exports of manufactures per capita. Their agricultural labour force ranges from 37 to 50 per cent of the total working force and, with one exception, their GNP growth rates are also similar.

The exception to the pattern of similar growth rates is Korea, the data suggesting that Korea's very rapid GNP per capita growth rate is a result of their tremendous growth in industry, and particularly in manufacturing. In the 1970-78 period Korea, with 18.3 per cent, had the highest average annual growth rate in manufacturing in the world 6/. In 1978 - the most recent year for which we can approach a complete set of social and economic development indicators - Korea had a GNP growth rate of 41.5 per cent, almost double the rate of the next fastest growing country (Yugoslavia, 21.4 per cent).

6/ World Bank, World Development Report 1980, op.cit., p.113.

A promising sign in the 1977-78 growth rate figures is the improvement for the two least developed countries among this group of NICs, India and Pakistan. Though they had low growth rates for the 1970-78 period, their 1977-78 growth rates were the third and fourth highest. Both countries experienced reductions in agriculture as a percentage of their GNPs per capita and at the same time there were increases in their industrial production as a percentage of GNP.

THE LEVEL OF SOCIO-ECONOMIC DEVELOPMENT IN THE NICs IN 1978

Having seen the tremendous rate of economic development that has taken place in these NICs, one must now ask: Has there been a corresponding improvement in the socio-economic situation of these countries? For the purposes of this analysis, socio-economic development is measured through an examination of a number of different socio-economic indicators which represent different aspects of each goal area of socio-economic development: health, nutrition, education, housing, communication, and employment. 7/

The level of socio-economic development in the eleven NICs will be examined from two points of view. First, each dimension of socio-economic development will be examined for all the countries in order to investigate patterns of development across countries in given areas, with two or three indicators discussed for each goal area. Second, the entire process of socio-economic development in all its dimensions will be reviewed for each country.

The countries that seem to be consistently high for economic indicators - Hong Kong and Singapore - are once again high on the indicators that represent the result of the development of the health care sector of society - life expectancy and infant mortality; and India and Pakistan are once again at the bottom. From the perspective of economic development the two surprising countries are Malaysia and Argentina - Malaysia because it is normally low in rankings on other indicators that reflect the level of inputs into

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7/ For a discussion on methodological aspects of the question of using socio-economic indicators to monitor social development and on the choice of the "dimensions" (or "goal areas") of socio-economic development see UNIDO/IS.262.

socio-economic development, but ranks sixth in life expectancy and fourth in infant mortality; and Argentina because it normally ranks high on socio-economic indicators, but drops to a relatively low seventh on the list for infant mortality. (See Table 3.)

Examining physicians, nurses, and hospital beds per thousand, Argentina - which was third on life expectancy and seventh in infant mortality - is the highest on the ranking of inputs into the health care process (first for physicians and second highest for hospital beds). Yugoslavia, on the other hand, was either first or second for all three indicators and equally high in daily per capita caloric, protein, and animal protein supply - but ranks fifth on both life expectancy and infant mortality. Both cases illustrate the complex nature of the production function for health care (and are practical examples of why one must focus on several dimensions of socio-economic development simultaneously).

The group of countries is highly homogeneous in terms of enrollment rates in primary school education. With three exceptions, all the countries have enrollment percentages of over ninety per cent. Indeed, the figures range all the way up to 122 per cent for Mexico, suggesting that a large number of the students could well be repeating the year. 8/ This great emphasis on primary education demonstrates the NICs' realization that basic literacy is necessary for socio-economic, as well as economic, development.

But this emphasis does not carry over into the secondary school enrollment ratio: most of the countries suffer a considerable fall for this ratio, the Mexican case being the most dramatic. Mexico is one of the latest countries to join the NICs, industrialization having been brought about primarily through their oil production, and clearly primary education has been emphasized. But this emphasis has not yet been felt in the area of secondary education and so Mexico falls from the highest in the primary enrollment ratio to eighth in secondary. The contact of Northern Yugoslavia - which was once either Italian or Austrian - with Western Europe can be considered to have contributed to high enrollment ratios at both the primary and secondary levels.

8/ There are, however, methodological problems with the primary school enrollment indicator: See McGranahan, Richard and Pizarro, "Development Statistics and Correlations: A Comment on Hicks and Streeten", World Development, Vol.9 (London: Pergamon Press, Ltd., 1981), pp.389-397.

Table 3. Ranking of eleven NICs for eighteen socio-economic indicators, 1978.

A. Life expectancy at birth (years).		B. Infant mortality rate (aged 0-1) per 1000 live births.		C. Adult literacy rate (%) (MRE [3]).	
1. Taiwan	72	1. Hong Kong	12	1. Argentina	94
2. Hong Kong	72	2. Singapore	12[2]	2. Korea	93
3. Argentina	71	3. Taiwan	25[2]	3. Hong Kong	90
4. Singapore	70	4. Malaysia	31[2]	4. Yugoslavia	85
5. Yugoslavia	69	5. Yugoslavia	34	5. Taiwan	82
6. Malaysia	67	6. Korea	37	6. Brazil	76
7. Mexico	65	7. Argentina	59[1]	6. Mexico	76
8. Korea	63	8. Mexico	60	8. Singapore	75
9. Brazil	62	9. Brazil	92[2]	9. Malaysia	60
10. Pakistan	52	10. Pakistan	121[1]	10. India	36
11. India	51	11. India	125[2]	11. Pakistan	21

D. Physicians per 1000 (1977)[3].		E. Nurses per 1000 (1977).		F. Hospital beds per 1000 (1975).	
1. Argentina	1.89[2]	1. Singapore	2.94	1. Yugoslavia	6.0
2. Yugoslavia	1.32	2. Yugoslavia	2.44	2. Argentina	5.7
3. Singapore	.79	3. Korea	1.96	3. Hong Kong	4.1
4. Hong Kong	.78	4. Hong Kong	1.03	4. Brazil	3.8
5. Taiwan	.64[2]	5. Malaysia	.93	5. Malaysia	3.7
6. Brazil	.59	6. Mexico	.71	6. Singapore	3.6
7. Mexico	.55	7. Taiwan	.57[2]	7. Taiwan	2.2[11]
8. Korea	.51	8. Brazil	.36[2]	8. Mexico	1.2
9. India	.28[2]	9. India	.18[2]	9. Korea	.7
10. Pakistan	.26[2]	10. Pakistan	.10[2]	10. India	.6
11. Malaysia	.23[2]	NA - Argentina		11. Pakistan	.5

G. Daily per capita caloric supply.		H. Daily per capita protein supply (grams).		I. Daily per capita animal protein supply (grams).	
1. Yugoslavia	3496	1. Argentina	113.7	1. Argentina	76.3
2. Argentina	3383	2. Yugoslavia	100.2	2. Hong Kong	50.4
3. Singapore	3040	3. Hong Kong	86.2	3. Singapore	38.6
4. Taiwan	2822[11]	4. Singapore	80.1	4. Yugoslavia	36.5
5. Korea	2816	5. Taiwan	77.0[11]	5. Malaysia	23.7
6. Mexico	2799	6. Korea	74.2	6. Mexico	22.9
7. Hong Kong	2794	7. Mexico	71.5	7. Brazil	22.7
8. Malaysia	2632	8. Brazil	60.1	8. Korea	14.7
9. Brazil	2503	9. Pakistan	59.3	9. Pakistan	14.1
10. Pakistan	2237	10. Malaysia	59.1	10. India	4.7
11. India	2037	11. India	49.8	NA - Taiwan	

J. Primary school enrollment ratio. [16/]

1.	Mexico	122
2.	Korea	111
3.	Hong Kong	110
3.	Argentina	110
5.	Singapore	109
6.	Yugoslavia	99
7.	Malaysia	94
8.	Brazil	89 [4/]
9.	Taiwan	87 [11/]
10.	India	78 [4/]
11.	Pakistan	56

K. Secondary School enrollment ratio. [16/]

1.	Yugoslavia	82
2.	Korea	70
3.	Taiwan	65 [11/]
4.	Hong Kong	60
5.	Singapore	57
6.	Argentina	56
7.	Malaysia	51
8.	Mexico	42
9.	Brazil	32 [4/]
10.	India	27 [4/]
11.	Pakistan	16

L. Combined primary and secondary enrollment ratio. [16/]

1.	Korea	90
2.	Argentina	89 [4/]
3.	Yugoslavia	87
4.	Mexico	86
5.	Singapore	80
5.	Hong Kong	80
7.	Taiwan	77 [11/]
8.	Brazil	75 [4/]
9.	Malaysia	72
10.	India	52 [4/]
11.	Pakistan	35

M. Percentage of population with access to safe water (1975).

1.	Singapore	100
2.	Brazil	77
3.	Argentina	66
4.	Korea	62
4.	Mexico	62
4.	Malaysia	62
7.	India	33
8.	Pakistan	29

NA - Hong Kong, Taiwan, Yugoslavia

N. Percentage of dwellings with access to electricity (MRE [3/]).

1.	Taiwan	94.0 [5/]
2.	Yugoslavia	87.9 [14/]
3.	Singapore	87.0 [5/]
4.	Argentina	79.0 [7/]
5.	Brazil	63.0
6.	Mexico	59.0 [13/]
7.	Korea	49.9 [13/]
8.	Malaysia	43.0 [13/]
9.	Pakistan	17.9 [6/9/]

NA - Hong Kong, India

O. Percentage of dwellings with piped water (MRE [3/]).

1.	Hong Kong	94.3
2.	Singapore	79.7
3.	Argentina	47.3
4.	Mexico	38.7
5.	Korea	35.2
6.	Malaysia	34.6 [8/]
7.	Yugoslavia	34.0
8.	Brazil	33.0
9.	Pakistan	8.4

NA - India, Taiwan

P. Newspaper circulation per 1000 (1975).

1.	Hong Kong	368 [17/]
2.	Singapore	229
3.	Korea	173 [17/]
4.	Argentina	154 [17/]
5.	Yugoslavia	106
6.	Malaysia	87 [17/]
7.	Brazil	44
8.	India	18
9.	Pakistan	15

NA - Mexico, Taiwan

Q. Radio receivers per 1000 (MRE [3/]).

1.	Argentina	838
2.	Hong Kong	527
3.	Mexico	301
4.	Yugoslavia	210
5.	Singapore	158
5.	Brazil	158
7.	Korea	144
8.	Malaysia	118
9.	Taiwan	97
10.	India	24
11.	Pakistan	16

R. Inverse of the level of unemployment.		S. Percentage of women in total labour force (MRE[2]).	
1. Taiwan	60[11]	1. Yugoslavia	36.3
2. Argentina	44	2. Hong Kong	34.2
3. Brazil	42	3. Korea	32.8
4. Hong Kong	35	4. India	32.2
5. Korea	26	4. Singapore	32.2
6. Mexico	25	6. Malaysia	31.4
7. Pakistan	20[10]	7. Argentina	25.6
8. India	13	8. Taiwan	25.0[12]
8. Malaysia	13	9. Brazil	21.6
10. Singapore	10	10. Mexico	18.5
11. Yugoslavia	8	11. Pakistan	9.9

Notes:

1. ILO Data Bank (1981).
2. Not necessarily for year indicated. See technical notes from World Bank, World Development Report 1980, op. cit.
3. Most recent estimates range between 1975-1977.
4. 1977 figure is most recent available.
5. 1966 figure is most recent available.
6. 1973 figure is most recent available.
7. Percentage of population.
8. Peninsular Malaysia.
9. Data from "Global Socio-economic Development in 1978" (forthcoming).
10. Data not available, 5% assumed.
11. Taiwan Statistical Data Bank 1981, Council for Economic Planning and Development (Taipei: Republic of China, June 1981), p.5.
12. Statistical Yearbook of the Republic of China 1981, Directorate General of Budget Accounting and Statistics, (Taipei: The Republic of China, 1980), p.200.
13. 1970 Figure is most recent available.
14. 1971 Figure is most recent available.
15. World Bank, World Development Report 1980, op. cit., p.155.
16. There are many methodological problems in counting enrollment ratios, such as length of study and frequency of data collection. For a further discussion see McGranahan, Richard, and Pizarro, op. cit.
17. UNCTAD, Handbook of International Trade and Development Statistics 1979 (New York Publications, 1979), pp. 578-593.

Sources:

A-E, M: World Development Report 1980, op. cit., 150-153, 156-157; F, O: UNCTAD, Handbook of International Trade and Development Statistics, op. cit., Table 6.10; G-I: FAO computer printout (preliminary to the FAO Production Yearbook 1981); J-L, P-Q: UNESCO Statistical Yearbook 1981 (Paris: UNESCO, 1981), III 28-III 83, VIII 150-VIII 155, XI 14-XI 21; N, S: World Bank, World Tables, 2nd ed (Baltimore: Juhns Hopkins Univ. Press, 1980), 460-468; R: ILO, Yearbook of Labour Statistics 1980, (Geneva: ILO, 1980), 16-31.

In terms of the quality of the housing and sanitation stock, India and Pakistan are again least developed: e.g., in percentage of dwellings with piped water, Pakistan reports only 8.4 per cent having piped water compared to Hong Kong with 94.3 per cent. The only significant lack of parallel ranking on the three housing indicators - percentage of dwellings with safe water, piped water, and electricity - is Yugoslavia, which is much higher on electricity (second) than on piped water (seventh). Comparisons within this target area are, however, difficult to carry out because data are not collected regularly. For instance, of the nine countries who reported any statistic for percentage of dwellings with access to electricity, the years of collection ranged from 1960 to 1977, with no more than two countries reporting in the same year. 9/

In the socio-economic indicators for communication there are no unexpected differences, though it is interesting to note that, despite the relatively large production of radios (for export) in Korea, the country ranks relatively low on ownership of radios per thousand. The rankings in the area of radios per thousand are also interesting because of the large number of countries grouped in the range of 97 to 210 radios per 1000 inhabitants, though Argentina and Hong Kong are well above the other countries (with 838 and 527, respectively) and India and Pakistan are very low (24 and 16, respectively).

Taiwan is probably the most difficult country of the NICs to analyze because there is a lack of data. 10/ If Taiwan seemed to be consistently on the top or on the bottom of the rankings, it might be simpler to assume consistency and fill in the gaps. But there are large fluctuations in Taiwan's rankings, from the highest in life expectancy, unemployment, and percentage of dwellings with electricity to a low of ninth in radios per thousand and primary school enrollment ratio with a range of third to seventh in other indicators. (See Table 3.)

9/ For further discussion of problems in housing statistics see Ibid. and Sheenan and Hopkins, Basic Needs Performance: an analysis of some international data (Geneva: ILO, 1979).

10/ This problem arises because much of the data collected is done by the UN or one of its agencies from member countries.

Other volative countries in the list include Malaysia, Brazil, and Korea. Malaysia is tenth in daily per capita protein supply, but ranges between fourth and ninth on other indicators. The problem area for Malaysia is nutrition - one of the two areas that seem to be concentrated on by the NICs. The Malaysians consume just over half of the total protein that is consumed by Argentinians, and less than one-third of the animal protein. It is worth noting, however, that they rank relatively high in both nurses and hospital beds per 1000 (fifth in both, although they are the lowest in doctors per 1000) and in access to safe water. However, even a combination of relatively good health and sanitation still leaves Brazil ranking ninth in infant mortality and life expectancy. Areas of strength for Korea seem to be education, housing, and employment, where, with one exception, they always rank fifth or above on each indicator. The high employment rate and the high percentage of women in the labor force contributed to the large economic growth rates attained by Korea in the 1970's.

Mexico is consistent in its rankings: only four times are they below seventh in the rankings (eighth in infant mortality, secondary school enrollment ratio, and hospital beds per 1000, tenth in women as a percentage of the labor force) and they peak at first in primary school children as a percentage of the group. The rest of the time they rank between third and seventh. Mexico could, then, perhaps be used as the norm for this second group when comparisons with other countries within and outside of this group are carried out, as compared to a country like Brazil which has concentrated heavily on certain target areas (employment and housing) in anticipation of raising levels of the other areas in the future.

This examination of the nineteen social indicators for these countries, then, suggests that there exist roughly the same three groups of countries seen in the economic indicators. The top group once again consists, with few exceptions, of Singapore, Hong Kong, Argentina, and Yugoslavia; and India and Pakistan again remain at the bottom. The characteristics of the middle group of countries, however, are interesting. There exist within this group countries, such as Korea, Brazil, or Malaysia which are quite volatile; countries like Mexico that are consistent in their rankings; and countries that are left in doubt because adequate data are not available (Taiwan).

The impact of the concentration of a country in a certain dimension, like Korea on education, is unclear and requires further detailed time-series investigation. Whether it is better for a country to pursue a balanced pattern of socio-economic development - like Mexico - or to specialize in certain areas with the intention of developing the lacking areas later - like Brazil - is one of the questions for future investigation thrown up by this investigation.

RANK CORRELATION ANALYSIS FOR 1978

The relative rankings of different countries allows one to draw general conclusions regarding socio-economic development, but reducing the number of variables being examined should make the process of comparing different countries simpler without substantially decreasing its accuracy. The set of socio-economic indicators is then reduced to one variable from each of five dimensions of socio-economic development: daily per capita protein supply (nutrition), physicians per 1000 (health), combined school enrollment as a percentage of age group (education), percentage of dwellings with piped water (housing), and radios per 1000 (communication). With this more limited group of indicators, rank correlation analysis is used to compare socio-economic indicators of development among themselves as well as to study the comparative rankings of countries on their socio-economic versus their economic position.

The set of economic variables that will be juxtaposed are: GNP per capita, manufacturing value-added per capita, and exports of manufactures per capita. GNP is obviously important, but manufacturing value-added and exports of manufactures are commonly taken as the distinguishing characteristics of the NICs and so are used to compare NICs with one another.

As can be seen in Table 4, only the comparison of rankings in manufactures per capita and GNP per capita is significant at the 1 per cent level. Of the three variables, the poorest relation involved the exports of manufactures per capita - suggesting that high levels of GNP per capita and of manufacturing production per capita have been attained even in the NICs not systematically pursuing manufactured exports-led development strategies.

The rankings of the different socio-economic indicators are compared in the hope of shedding some light upon the nature of the socio-economic development of these countries (see table 48). The major results appear to be

Table 4. Results of Spearman rank correlation analysis

Table A. Results of rank correlation between economic indicators, 1978.

	GNP per capita	Manufacturing value-added per capita
Manufacturing value-added per capita	..981*	
Exports of Manufactures per capita	.706**	.691**

Table B. Results of rank correlation between socio-economic indicators, 1978

	Daily per capita protein supply	Physicians per 1000 2/	Combined school enrollment as percentage of age group	Percentage of dwellings with piped water 1/
Physicians per 1000 2/	.927*			
Combined school enrollment as percentage of age grou	.745*	.641**		
Percentage of dwellings with piped water	-	-	-	
Radios per 1000 2/	.741*	.741*	.718**	.658**

Table C. Results of rank correlation between economic and socio-economic indicators, 1978.

	Daily per capita protein supply	Physicians per 1000 2/	Combined school enrollment as percentage of age group	Percentage of dwellings with piped water	Radios per 1000 2/
GNP per capita	.836*	.978*	.550**	.667	.745*
Manufacturing value-added per capita	.914*	.900*	.555**	-	.695**
Exports of manufactures per capita	.600**	-	.550**	.667**	-

Notes: * Significant of 1% level
** Significant at 5% level
- Not significant at 5% level

1/ Data do not include India and Taiwan.
2/ Most recent estimates 1975-1977.

Sources: As Tables 1 and 2.

increases in radios per 1000 (representing 'communication') tend to accompany improvements in the other indicators; and ii) the figures for the percentage of dwellings with piped water (representing 'housing') do not tend to change concomitantly with the movements in the other social indicators. However, there is no information for India and Taiwan pertaining to dwellings with piped water which must qualify this second observation. If, for example, India (normally the lowest in these indicators) were included at or near the bottom of the list, the correlations would improve dramatically for this housing indicator.

In the cross-section analysis between the socio-economic group of variables and the economic group it appears that GNP per capita and manufacturing value-added per capita move closely in line with changes in daily per capita protein supply ('nutrition'), physicians per 1000 ('health') and, to a lesser extent, radios per 1000 ('communication').

The low degree of significance for the relationship with secondary school enrollment ratio, in turn, is created by the presence of Singapore and Korea. These two countries have major shifts in their school enrollments - Singapore being quite low in overall rankings for combined school enrollment ratio (fifth), but high in GNP per capita (first) - and Korea being the reverse, going from first in school enrollment to eighth in GNP per capita. The Korean results may be explained in two ways. One is the fact that the tremendous growth rates that Korea has achieved over the last decade can be attributed in part to the great emphasis that has been placed on education. Korea may not have as yet reached a level of GNP as high as countries who have equal rates of education, but its growth rate may bring it there quickly. The second reason is much more abstract and cultural. The Koreans have historically placed a large emphasis on education and it has become part of their culture to aspire to levels of education; but the importance of this emphasis cannot be measured through purely quantitative measures.

INTER-TEMPORAL DEVELOPMENT IN THE NICs

To gain a proper perspective on the development process of the NICs and a fuller understanding of the current state of their development it is necessary to review their past performance. This analysis will focus on life expectancy, infant mortality and literacy rate, as these "output" indicators

represent the result of previous policies of providing social welfare inputs (measured by input indicators). The analysis will cover the 1960-78 period, and focus on contrasting the state of development in 1960 with that in 1978 (see Appendix B).

Examining the NICs on an intertemporal basis, it can be seen (on Figure 1) that roughly the same three groups that existed in 1975 were also evident in 1960. In literacy, most of the first group remained clearly above average during the entire period with some, like Argentina, reaching what might be called a threshold level where further improvements become appreciably more difficult to achieve. Singapore was an exception to this pattern, having started out in 1960 below average, only to improve tremendously from 1960-1970 and then continue its improvement from 1970-75. Of all countries, Taiwan certainly showed the greatest increases, moving from 54 per cent of the population in 1960 being literate to over 80 per cent in 1975 - this tremendous increase placing Taiwan with the fifth highest literacy rate in the group in 1975. The other country within the second group to show great improvements in literacy was Korea which, as discussed earlier, seems to have placed great emphasis on education over this entire period.

Mexico, another member of the second group, began the period above average, but increased at a decreasing rate, and in 1975 was much closer to the "average NIC" in terms of literacy. Mexico's position as the country closest to average for the group is most evident in life expectancy, where it is never more than 1 year away from the group average. But the relationship between Mexico and the average does not carry over well to the infant mortality rate - Mexico started out slightly below average in 1960, rose relative to the other NICs in 1970, and then continued to improve at the same annual rate as the average, though still remaining above the average level.

The countries of Argentina and Korea both serve as contrasts to Mexico in improvement relative to the group. Argentina began the period with the highest levels of literacy and life expectancy and fourth highest in infant mortality. Its slow improvements in the first two categories could be viewed (as mentioned above) as approaching threshold levels which are difficult to improve upon. But if that were the case, then improvements in areas of weakness might be anticipated. Since only a small improvement was seen in

Figure 1. Intertemporal Development in the NICs

A. Literacy Rates

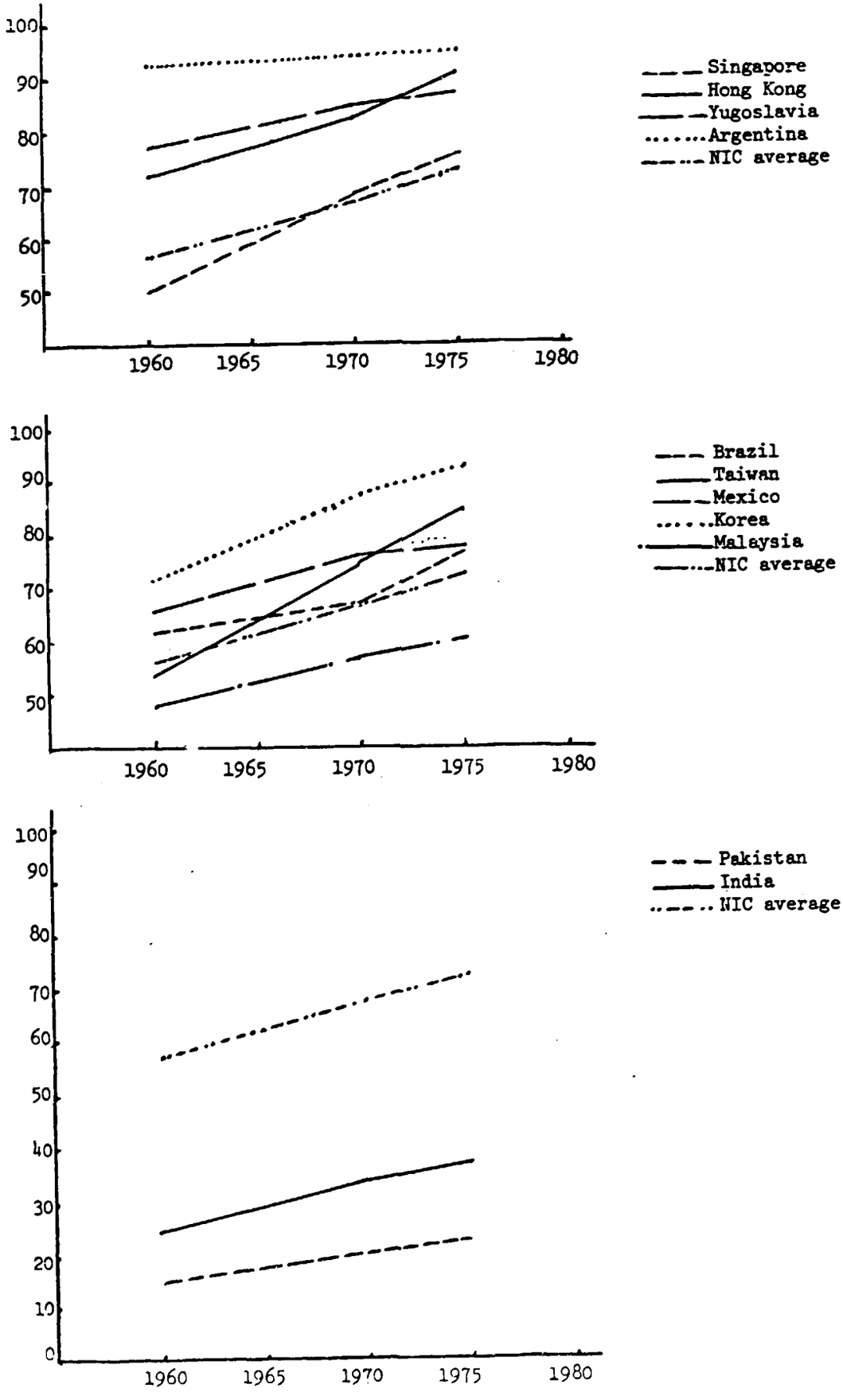


Figure 1. Intertemporal Development in the NICs

B. Life Expectancy

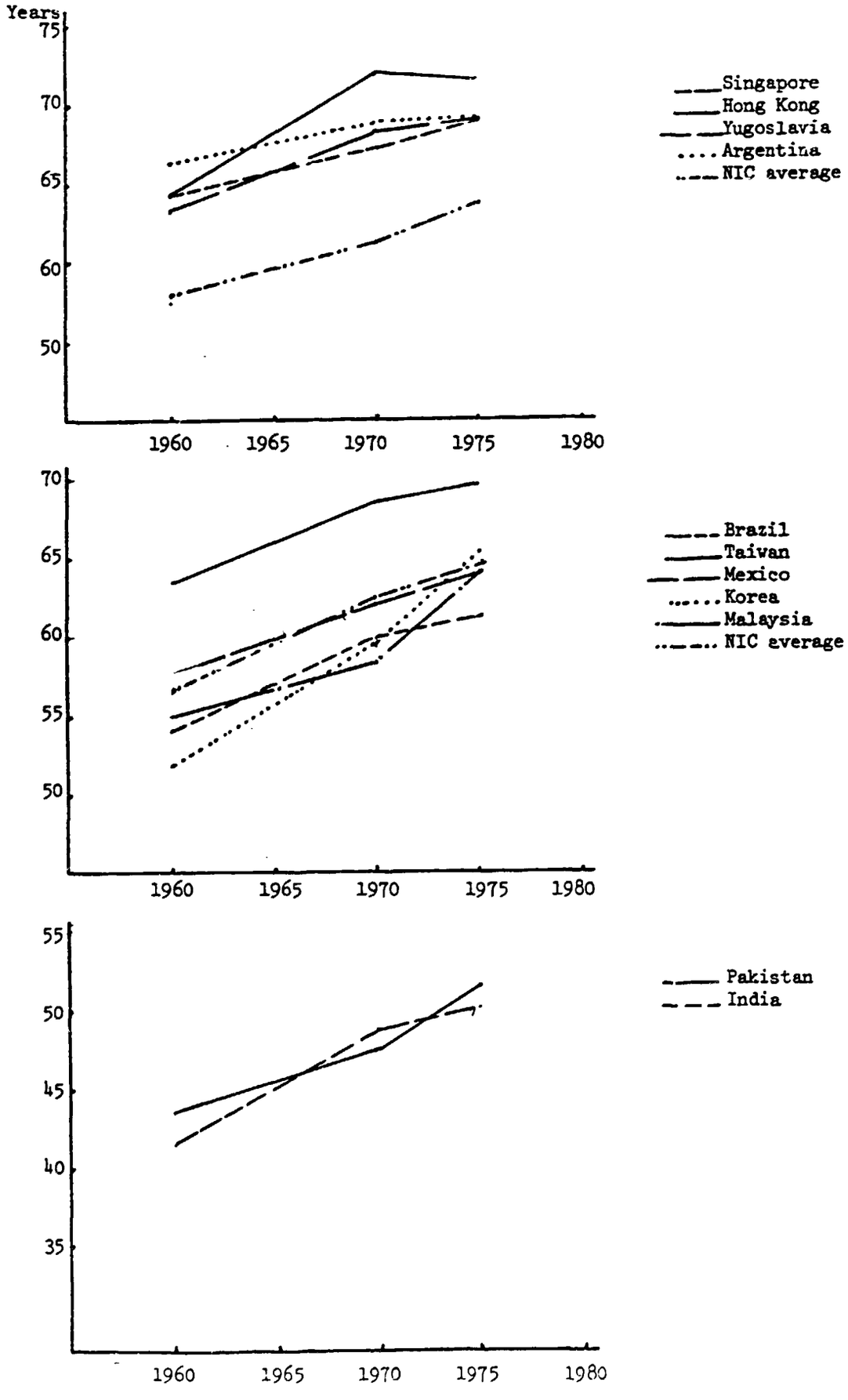
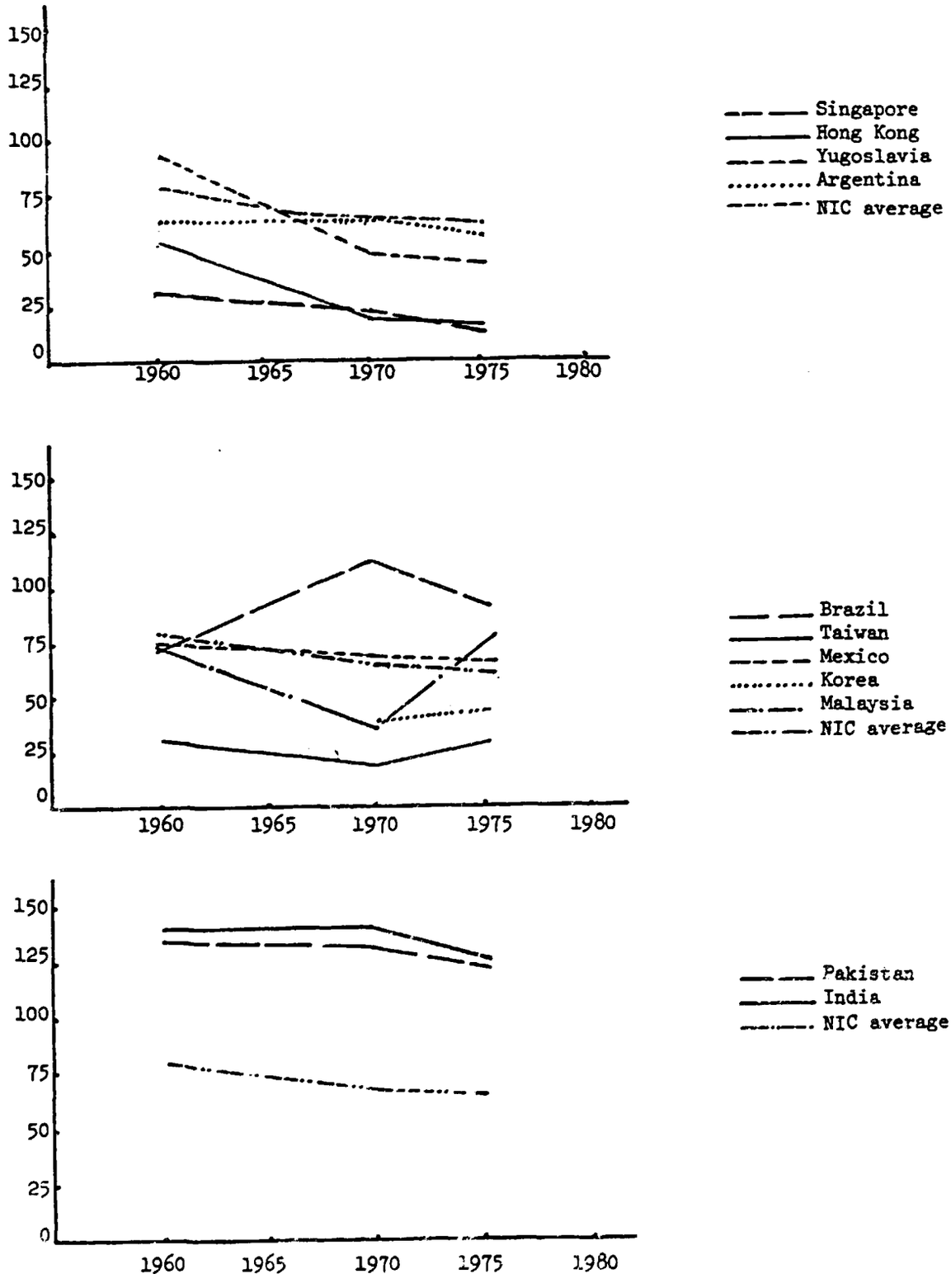


Figure 1. Intertemporal Development in the NICs

C. Infant Mortality



Notes and Sources: As Table 3.

Argentina's infant mortality rate, it might be concluded that other problems were the cause. 11/ Argentina's relatively small increases can be seen clearly on Figure 2, where absolute values are subtracted from the (arbitrary) figure of 150, meaning that - as in the case of life expectancy and literacy - higher values of the (adjusted) indicator corresponds to a higher level of welfare.

This figure emphasizes the improvements attained by Korea during the 1960-78 period: the improvement in life expectancy was one of the greatest of any of the NICs, and the literacy rate increased by more than 20 per cent in the 18 year period. But Korea, along with Taiwan, Malaysia, and Brazil, did not show a continuous improvement in its infant mortality rate.

Hong-Kong was one of two countries to improve greatly in infant mortality over the 1960-78 period. She began the period with almost double the lowest infant mortality rate (Taiwan) but at the end of 18 years, Hong Kong had not only surpassed Taiwan but had equalled the new best rate (Singapore). Comparing the development of Hong Kong with that of Singapore, in 1960 the two countries had the same life expectancy (64.5), while at the end of the period Hong Kong's people were living an average of 2 years longer - an appreciable difference considering the difficulties in increasing life expectancy at this level.

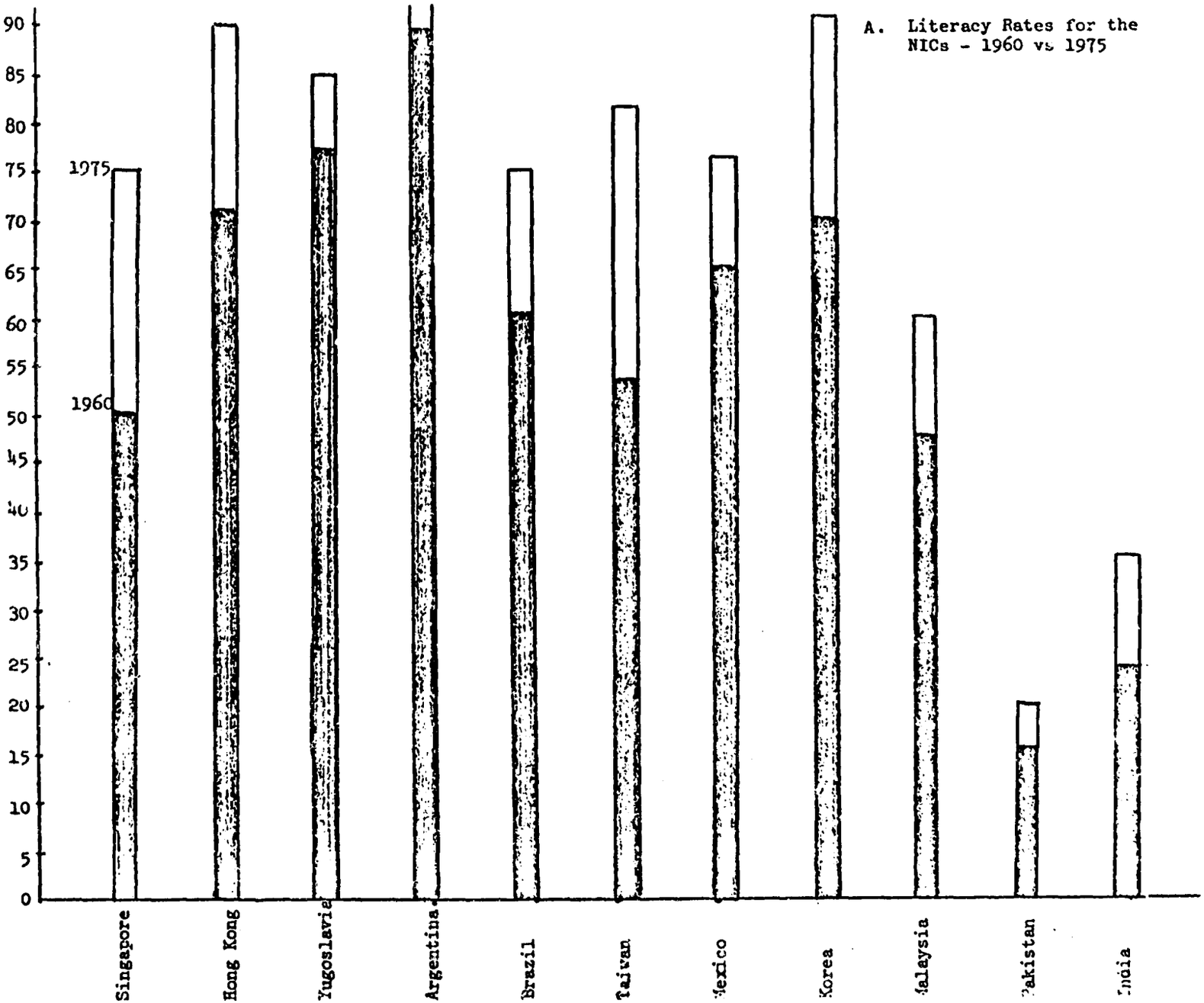
Yugoslavia recorded an improvement in infant mortality which equalled that of Hong Kong. In 1960 Yugoslavia's infant mortality was much higher than that of the average NIC (ranking eighth), but in the 1960-70 period she showed tremendous improvement. This improvement continued into 1978, when Yugoslavia ranked fifth in infant mortality for the NICs, having lowered her infant mortality rate to less than half its original level.

Yugoslavia also improved her life expectancy, but still showed a much smaller improvement than Taiwan. Both countries had life expectancies of 63 in 1960, but while Yugoslavia improved to a level of 69 by 1978, Taiwan had increased to 72 years, one year less than the US life expectancy and greater than many developed countries.

11/ For discussion of Argentina's economic development, see World Bank, "Growth and Equity in Semi-Industrialized Countries", World Bank Staff Working Paper, No 351, pp.61-72.

Figure 2.

A. Literacy Rates for the NICs - 1960 vs 1975



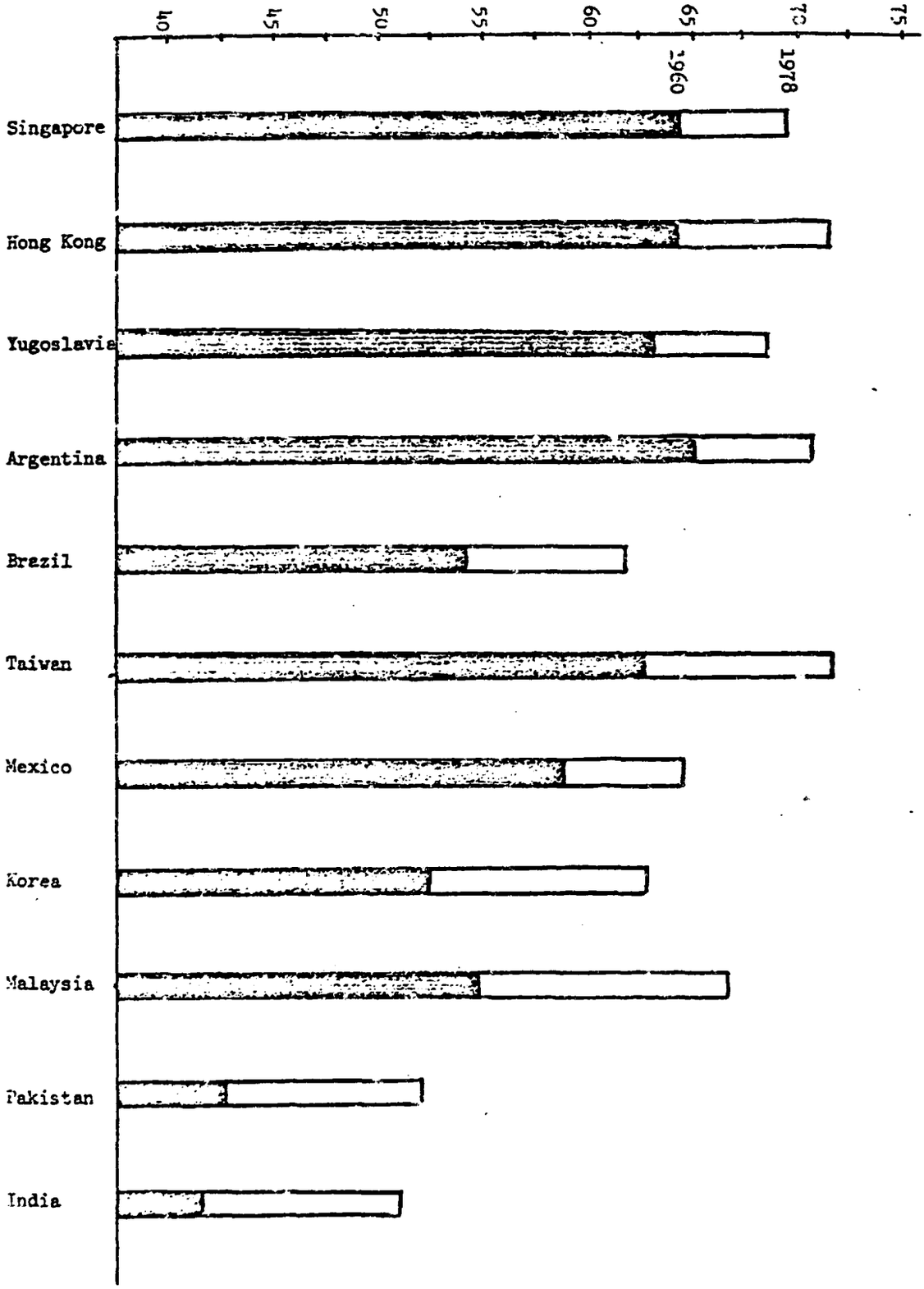
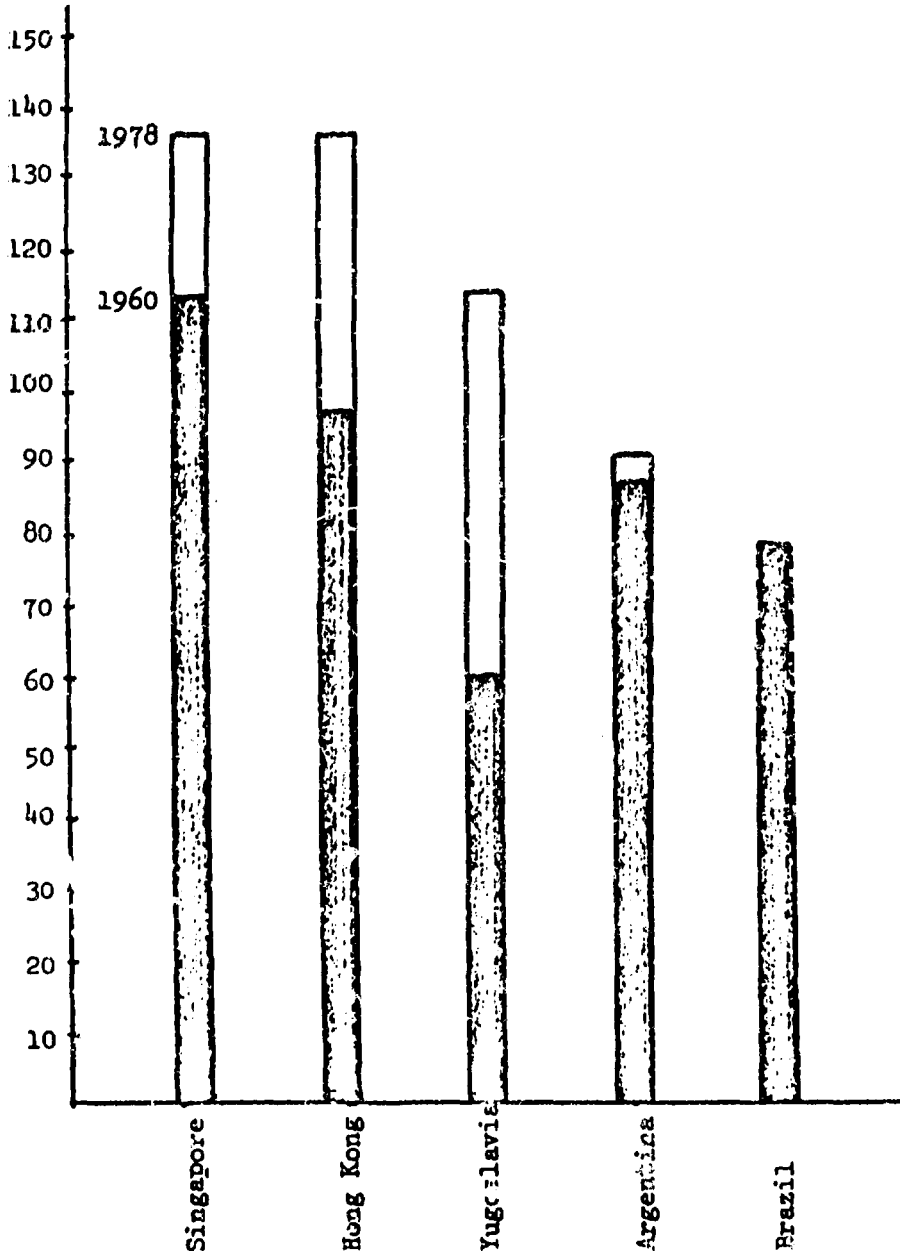


Figure 2. B. Life Expectancy for the NICs - 1960-1976

Figure 2. C. Adjusted Infant Mortality for the NICs -



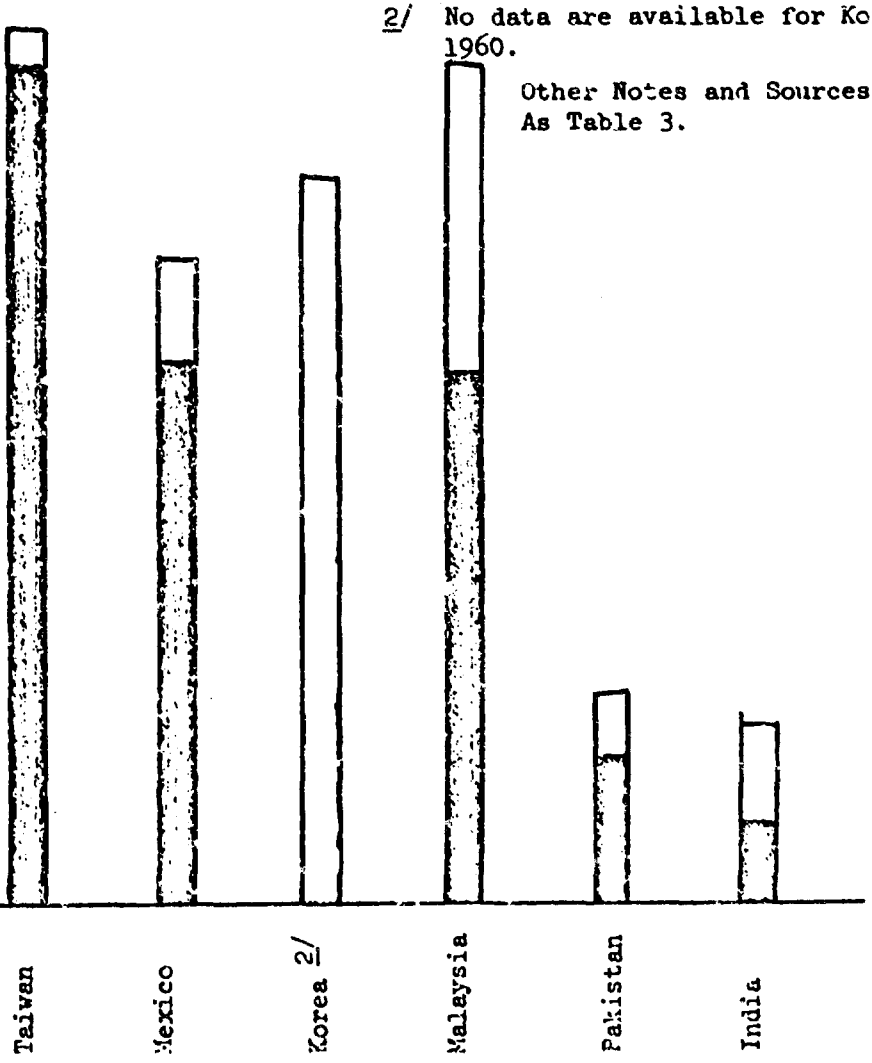
1960-1978 1/

Notes:

1/ Adjusted being 150 minus the actual infant mortality rate.

2/ No data are available for Korea in 1960.

Other Notes and Sources:
As Table 3.



The three lowest countries - Malaysia, Pakistan, and India - have had somewhat divergent paths of growth. Throughout the period Pakistan and India showed some improvements but they were not as great as the NIC's average. Their greatest improvements were in life expectancy where they slowly approached the average from below; and in literacy they also showed small improvements. But in infant mortality they had periods of progress and of failure: after showing little or no change in 1960-70, they both had dramatic increases in 1970-75, but then fell back slightly again in 1975-78. Malaysia had this same pattern of improvement followed by a setback, and then by another improvement. Their infant mortality went from 75 in 1960 to 40.8 in 1970, back to 75 in 1975, and then once again improved in 1978 to 31. The difficulties and seeming inconsistencies of infant mortality may be seen in a comparison with the other two result indicators and their dependency to economic indicators during the 1960-78 period explain the contradictory results.

A comparison of indicators of socio-economic development with economic variables for the same year is shown on Table 5, and it illustrates the changes in relationships between economic and socio-economic variables which took place from 1960-78 in the NICs. The literacy rate and life expectancy show the decreasing relationship over time between the economic and socio-economic variables: with only one exception, there are consistent declines in the relationships between life expectancy and literacy rates on the one hand and GNP, MVA, and exports of manufactures (all per capita) on the other. These results further illustrate the point that after a certain level of economic achievement, further progress of soico-economic development becomes more multi-faceted, and so the socio-economic dependency on economic variables decreases. The data for infant mortality on the other hand lead to results which fluctuate during the period, yielding no clear pattern.

Through this intertemporal comparison the decreasing relationship between economic and socio-economic development in the NICs becomes increasingly evident. These countries all had high growth rates in economic and socio-economic indicators throughout the 1960-78 period, but there were great fluctuations in the nature of this growth - from the fast growth of Korea to the average rate of Mexico, to the almost zero growth of Argentina to the sometimes negative growth of Brazil. But if the NICs continue to improve at their present rate, they will soon equal the level of socio-economic development of most developed countries.

Table 5. Spearman rank correlations between economic and socio-economic indicators, 1960-78.

	1960			1970			1975			1978		
	GNP	MVA	E of Man	GNP	MVA	E of Man	GNP	MVA	E of Man	GNP	MVA	E of Man
Literacy Rates	.7545*	.8545*	NA	.6182**	.7091**	--	--	--	--	NA	NA	NA
Life Expectancy	.8000*	.7954*	NA	.7909*	.8636*	.7273**	.7545*	.7818*	.8818*	.7045**	.7409*	.6500**
Infant Mortality	.5636**	--	NA	--	--	.9364*	.7727*	.7545*	.9455*	.6909**	.7045**	.8955*

Notes: * Significant at 1% level
** Significant at 5% level
- Not significant at 5% level
GNP = GNP per capita
MVA = manufacturing value-added per capita
E of man = exports of manufactures per capita

Sources: 1960-75 - As Appendix C.
1978 - As Table 2.

AN INDEX OF SOCIO-ECONOMIC DEVELOPMENT IN THE NICs

In the rank correlation analysis the study of socio-economic development was simplified to the study of a group of some twenty-five relationships. However, such a large amount of information is still too cumbersome, because no one of the numbers gives a broad overview of the level of socio-economic development. In order to compare the relative socio-economic development of specific countries against that of other countries or to measure the level of development of a region or a specific country over time, it is necessary to establish the important dimensions of socio-economic development and combine them in a composite index. This section will calculate and discuss the index that has most frequently been proposed for this purpose, the PQLI index.

The Physical Quality of Life Index (PQLI) considers only three aspects of socio-economic development - life expectancy at age one, infant mortality, and literacy - and all are result (output) indicators monitoring the long-term result of the process of socio-economic development. Though the first two variables seem to be representing the same dimension, the authors of the index argue that they represent distinct factors which imply that changes in life expectancy after age one are not related to changes in the infant mortality rate.12/ Literacy rate is also included because it represents a wide range of factors that could affect the future development of the country and the extent to which the poor can achieve economic success. 13/

The PQLI index these variables between 0 and 100. The life expectancy levels for the world range between 38 and 77 and so these values are used as the 0 and 100 values on the index. Similarly, the range of infant mortality is established as being between 229 and 7 per 1000 and these values taken at

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12/ The question of multicollinearity between life expectancy and infant mortality is discussed in David A. Larson and Walton T. Wilford, "The Physical Quality of Life Index: A Useful Social Indicator?". World Development 7, No. 19, pp.581-584.

13/ The possibility of multicolinearity between the literacy rate and infant mortality was not discussed by the authors of the PQLI, but recent work has strongly suggested its presence. See G. Dallaportas, "Interntional Data: Their Use in Showing Relationships between Socioeconomic and Demographic Variables". World Health Statistics Quarterly 34/2 (1981), 110-216.

the endpoints of a 0 to 100 scale. Literacy rate is already indexed between 0 and 100, so the index is calculated as follows:

$$\text{PQLI Index} = \frac{\text{Index of life exp. at age one} + \text{Literacy rate of population over 15} + \text{Index of infant mortality per 1000 live births}}{3}$$

The PQLI Index is therefore quite a simple index to compute, involving only addition, and relatively easy to compile data for as these three figures are published regularly for many countries. 14/

To see how effectively this index measures socio-economic development, one can rank the countries according to the PQLI index and then compute a rank correlation between the ranking of the index and the ranking on each of the eight socio-economic and economic indicators used above. Ranking the countries by the PQLI composite index, as shown on Table 6, reveals basically the same broad groupings as normally occur in the rankings on any indicator discussed earlier.

As can be seen from Table 7, the PQLI has generated high correlation with economic and socio-economic indicators. The only areas where the PQLI did not show significance levels of 1 per cent was with exports of manufactures per capita, combined school enrollment, and radios per 1000, showing 5 per cent levels for these three instances. The figure for radios per 1000 may be exceptional because Taiwan, which ranked highly on both indices, drops to ninth in radios per 1000 and so the r_s value is thrown off. If Taiwan were excluded from this indicator analysis, the significance level would rise to 1 per cent.

The question then becomes: given that the index has high correlations with the indicators, can it then be said to accurately measure socio-economic development? The PQLI rankings in Table 6 show that Argentina has reached a higher level of socio-economic development than Pakistan; but also that it has

14/ Although collected regularly for some industrialized countries, there are problems with the collection of literacy data. See David Brodsky, "Indicators of Development and Data Availability: The case of the PQLI". World Development Vol 9, No. 7, pp. 659-699.

Table 6. Country rankings by PQLI composite index of socio-economic development.

Hong Kong	91.6
Taiwan	87.0
Argentina	85.1
Singapore	84.9
Yugoslavia	84.1
Korea	81.2
Malaysia	74.4
Mexico	73.8
Brazil	66.4
India	38.7
Pakistan	35.2

Table 7. Rank correlation analysis of PQLI index against eight indicators, 1978.

	PQLI
Economic variables:	
GNP per capita	.736*
Manufacturing value-added per capita	.763*
Exports of manufactures per capita	.755*
Socio-economic Variables:	
Daily per capita protein intake 3/	.809*
Physicians per 1000 2/	.709**
Secondary school enrollment as percentage of age group 2/	.577**
Percentage of dwellings with piped water 1/	.833*
Radios per 1000 2/	.595**

Notes:

* Significant at 1% level.

** Significant at 5% level.

1/ Data were not available for India and Taiwan.

2/ Most recent estimates: 1975-1977.

reached a level above that of Singapore. The former result is clear cut; but with a difference of only 0.2, the probability of a statistical error in the latter ranking is great enough that this result is insignificant. Thus, because of the ceiling value of 100, the index is less useful at higher levels of relative development than at lower ones.

Another problem of the PQLI Index is the strong correlation between life expectancy and infant mortality. It has been suggested that these two variables measure the same thing because the rank correlation between them is significant at the 1 per cent level (r_s value .827). Why, then, should these two variables be given separate importance in these indices? In the PQLI, life expectancy and infant mortality comprise two-thirds of the index, and the correlation between these two indicators may distort the value of a country's index.

An additional problem with an index like the PQLI becomes apparent when it is used to analyze more developed countries, because two of the elements - life expectancy and literacy rates - approach threshold values of the low 70s and 99 per cent, respectively. This means that the prime determinant of the differentiation among developing countries on the PQLI is the rate of infant mortality, and that the PQLI progressively becomes a health care index rather than an index of socio-economic development broadly conceived.

A further point worth noting is the exclusive use of output (or result) variables - literacy rate, life expectancy, and infant mortality - in the PQLI. If the index is designed to measure only the past development of a country, resulting from previous government programmes, then output variables are the appropriate indicators and should be the components of an index of socio-economic development. However, when the emphasis is on the future, attention will turn to the program areas where the government can and should act to raise the future development level. Then the appropriate focus would then be on input indicators and, if it were deemed relevant, on an index composed of input indicators. By using two indices simultaneously, one measuring the results of past development and one measuring the inputs for future development, a country's dynamic path of development could be best brought into focus.15/

15/ But using both input and output indicators together in one index, would not show the position of the country in terms of either past development or future policy, the two aims of a composite index.

Because of its high correlations with socio-economic indicators, the PQLI is clearly a good index, but it also needs revision. A problem noted earlier is the bunching of countries caused by the indexing system of the PQLI, which might be numerically separated in the rankings. Thus, by indexing the variables over a range larger than 0 to 100, one would eliminate the problem of bunching, but the problem of distortion through indexing would then become relevant. If one indexes numbers between 30 and 50 on a scale between 0 and 1000, for example, the very small difference between a country rating at 39 and a country at 41 will be increased to 100 - even though the difference between the two may not have originally been statistically significant.

Thus, while such a synthetic index is much more manageable than the numerous rank correlations or the rankings by indicator discussed earlier, and while the PQLI index discussed here may well be the best synthetic index currently being used in research in this area, there is a clear need to make improvements in the area of accounting methodology and statistics for socio-economic development.

THE INTERTEMPORAL INTERRELATIONSHIP BETWEEN ECONOMIC AND SOCIO-ECONOMIC DEVELOPMENT

Having considered the nature of the socio-economic development that has taken place in the newly industrializing countries, we now turn to the question of the direction of causality between the social and economic variables. This is at the heart of the problem of development: is it sufficient to encourage industrialization within a developing country in the belief that this will lead to inevitable social improvements? What is the effect - perhaps just as strong? - of social variables upon economic and industrial development? For example, it is quite likely that a well educated populace would be more able to take advantage of its natural resources than one less well educated, which would lead us to expect school enrollment ratios to have an effect upon economic activity, at the same time that industrialization created the necessary preconditions to allow further development of the educational sector.

The complex inter-relationships that must exist between social and economic variables both within and between countries could perhaps be developed in a model framework; however, no attempt on these lines is made in

this paper. Rather, an impression of the direction of these causalities is sought by using a series of lagged rank correlations. If, for example, one can observe a closer relationship between future GNP per capita and present social development than with past GNP per capita and present social development, this would suggest that the social indicator had a stronger effect upon future economic activity, rather than vice versa. This procedure must be viewed with caution, however, since we may only pick up general pictures of relationships, and not the sophicticated feedback linkages.

As well as being a rather simple method of determining the direction of causality, there is a major problem involved with the use of simple rank correlation in that it does not register what could be significant changes in the relative position of countries unless they actually change rank. A simple example should clarify this point. Consider three countries, A, B, C, with initial literacy rates of 90, 50, and 48 per cent, respectively; then consider a change to 91, 85, and 40 per cent respectively. Although the ranking remains as before, there is clearly a change in relative performance in this indicator, one that would not be reflected by the simple rank correlation process. Further work must employ more complex methods of analysis to allow for this; but the straigt forward method of ranking is used here.

The analysis involves considering the ranking of the NICs for 10 different social indicators for the year 1975 and comparing each one with the ranking in GNP per capita for 1970 to 1980 (i.e., five years before and five years after). The results are given on Table 8.

The interpretation for education is not totally clear, but there is a tendency for the relationship between the rankings to be lower in 1975 than for both before and after. This suggests that the relationship between education and GNP per capita is very much a two-way affair, a result which is not very surprising.

The results for the nutrition indicators (as measured by daily caloric supply per capita and daily protein supply per capita) are again not conclusive, but point towards a predominantly one-way relaionship, with the levels of GNP per capita affecting future levels at nutrition more than vice versa.

Table 6. Spearman rank correlation coefficients using GNP per capita from 1970 to 1980 and SEIs for 1975

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
Hospital beds per 1000	0.773*	0.709	0.664	0.745*	0.736*	0.727	0.773*	0.782	0.745*	0.745*	0.718
Life expectancy	0.736*	0.705	0.718	0.727	0.736*	0.745*	0.736*	0.782*	0.791*	0.791*	0.841*
Infant mortality	0.668	0.641	0.723	0.714	0.714	0.75*	0.75*	0.786*	0.814*	0.814*	0.859*
Daily per capita calorie supply	0.719	0.673	0.609	0.691	0.709	0.645	0.618	0.627	0.636	0.636	0.709
Daily per capita protein supply	0.855*	0.806*	0.745*	0.794*	0.818*	0.794*	0.770*	0.770*	0.818*	0.818*	0.782*
Primary school enrollment rate	0.777*	0.814*	0.85*	0.795*	0.786*	0.714	0.741*	0.741*	0.768*	0.768*	0.80*
Secondary school enrollment rate	0.632	0.586	0.501	0.627	0.614	0.586	0.586	0.586	0.614	0.614	0.586
Combined primary and secondary enrollment	0.755*	0.727	0.664	0.727	0.718	0.673	0.655	0.655	0.70	0.70	0.673
Adult literacy	-.577	0.559	0.477	0.523	0.514	0.495	0.468	0.477	0.541	0.541	0.491
Telephones per 1000 population	0.932*	0.923*	0.95*	0.941*	0.941*	0.959*	0.932*	0.932*	0.95*	0.95*	0.95*

Note: * - significant at 1% level.

Communication might be expected to play an important role in the rapid economic development of NICs, but this analysis suggests that the effect is not very strong. The only indicator used (telephones per 1000 of population) showed a peak for the relationship with GNP per capita in 1975. A tentative conclusion would be that the effect runs both ways.

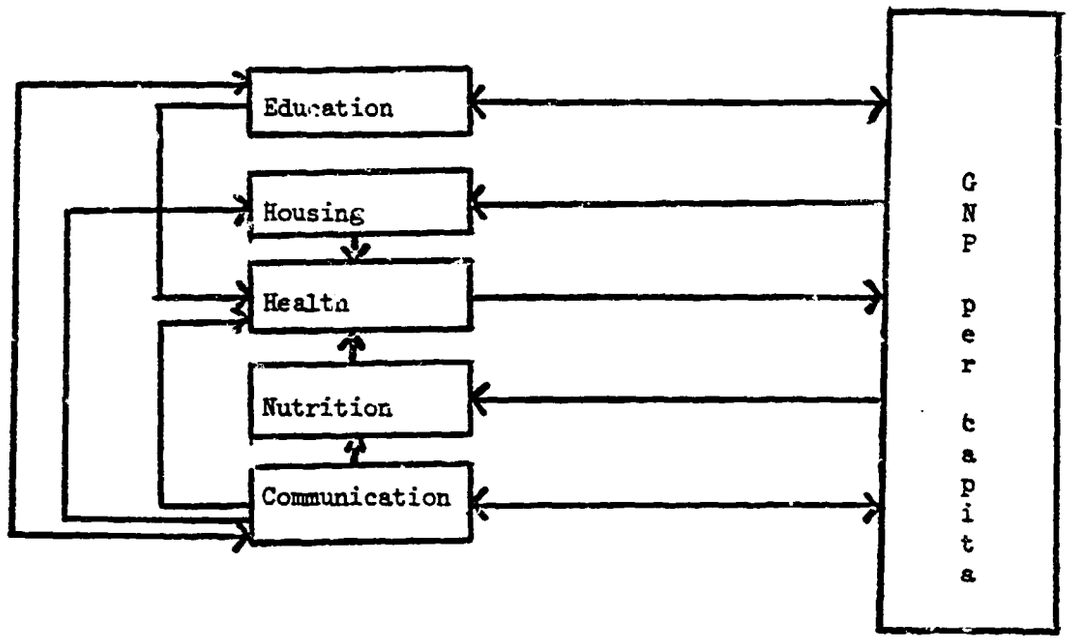
The most interesting result, however, come from the three indicators used as a measure of health: infant mortality rates, life expectancy at birth, and hospital beds per 1000 of population. All three indicators suggest that the health of the population has important effects upon the future levels of GNP per capita, rather than the other way around. It is interesting that this conflicts with the result for the nutrition indicators, where we saw the tendency for changes in economic activity to generate nutritional developments. However, part of the explanation for this may be found by considering the different indicators as either inputs of outputs. The figures for infant mortality (or output), for example, have incorporated into them some lag structure for the way that nutritional improvements work their way through to improved health. The results could then be seen not as conradictory, but rather mutually reinforcing: higher levels of industrialization generate higher levels of provision of inputs (e.g., food supply) into the process of soico-economic development, these inputs in turn stimulating socio-economic welfare (e.g., infant mortality reduction). Which is directly conducive to higher levels of economic development.

By way of summary, figure 3 gives a preliminary and highly schematic idea of the interrelationships beween social and economic variables based upon the foregoing results.

CONCLUSIONS

This study examined socio-economic development in the NICs, a group of countries which are different in many respects except for their NIC status: some are small, densely-populated countries, others large and sparsely populated; some have achieved high growth rates in GNP, others appreciably lower rates; some have urban populations, others agrarian; some are mineral giants (in all areas except fuels), others have an almost Japanese sensitivity to extraneous mineral supplies; etc. But they exemplify the effects of industrialization on developing countries and therefore provide a case study

Figure 3.


Education
Housing
Health
Nutrition
Communication
GNP per capita

for the resulting impact of industrialization on the socio-economic development of developing countries.

Initially the countries were discussed in terms of their general level of economic achievement. These comparisons revealed three groupings within the NICs: Singapore, Hong Kong, Yugoslavia and Argentina with the highest levels, India and Pakistan with the lowest levels, and Korea, Taiwan, Mexico, Brazil and Malaysia as a less well-defined middle group.

These same three groups were also evident when their rankings on socio-economic achievement were discussed, the second group acquiring particular interest because of different development strategies that became evident in these new rankings. Some countries had concentrated on certain areas, planning on improving the deficient ones later, while other countries were trying to pursue a balanced pattern of development and improve all socio-economic dimensions simultaneously.

Reducing the number of socio-economic indicators to five (one from each goal dimension), rank correlation analysis was employed to try and measure the significance of the relationships between socio-economic and economic indicators and among the socio-economic indicators. Among the economic indicators GNP was (not surprisingly) found to have the highest correlation with the other indicators, while among the socio-economic indicators the highest correlation values were found with the daily per capita protein supply.

The rank correlation analysis was also employed in evaluating the PQLI index which uses different aspects of development to measure in a single number, the level of development that has been achieved by a country. As there was a slight distortion caused by going from the original rankings to rank correlation there was a further distortion in the simpler, more general composite index. The index makes certain judgements about what should determine socio-economic development. These decisions of what to include and what to omit in an index create problems that appear insurmountable with some indices, and even the PQLI has problems with distortions of the data in transforming the data to an index form.

Throughout this analysis the problems of studying socio-economic analysis have been highlighted. The problems of definition, data collection, and

distortion will all have to be faced before establishing a more universally acceptable index of socio-economic development.

A model case of stability in relative rankings and socio-economic development at a 'normal NIC rate' was Mexico: life expectancy increased over the 1960-78 period from 57.9 to 65 years, infant mortality decreased from 74.2 to 60 per 1000, and literacy increased from 65.4 to 76 per cent. All of these were substantive improvements when viewed against not only other deveveloping countries but also the world as a whole; but were somewhat 'normal' for the NICs as a group.

Brazil seemed to improve the least relative to the other NICs during the 1960-78 period. Its life expectancy ranking remained somewhat constant over the period (only falling one place), but Brazil's infant mortality actually increased by over 35 per 1000 in 1960-70, only to improve slightly by 1978. Although Brazil showed a continuous improvement in its literacy rate, the increase was only 6 per cent in 1960-70, while the average increase for the NICs was over 9 per cent, and so it fell from sixth to eighth in the rankings; but it improved greatly in the 1970's and regained its original ranking.

In the static analysis of 1978, Pakistan and India were used as a contrast to the rapid growth and success of the highest group. Their intertemporal analysis yielded the same results - they occupy, without exception, the two bottom rankings for all three indicators throughout the 1960-78 period. Pakistan over the 1960-78 period did show progress in all three indicators, but the progress was not as great as in other NICs.

India showed somewhat better progress in literacy rate, increasing the percentage of the literate population from 24 to 36 per cent during the 1960-75 period, and an increase was also seen in life expectancy of nearly 10 years. But infant motality did not show the same promise, decreasing only from 139 to 125 in the 1960-78 period. Although there exists no single definition of a newly industrializing country, it would appear that the inclusion of India and Pakistan appreciably increases the heterogeneity of the category.

Taking an overview of the whole 1960-78 period, it can be seen that the groupings of 1978 were apparent in 1960. The highest group kept improving

throughout this period but at a decreasing rate, largely due to the fact that they were approaching the threshold levels of the industrialized countries. In infant mortality, Hong Kong and Singapore are approaching the best in the world (Sweden - 8 per 1000) and both have surpassed the United States and several Western European countries. The first group is approaching the levels of life expectancy which have been achieved by the Western industrialized countries; and although they do not have full literacy, that could well be achieved in the 1980's.

The second group of countries seems to be about eight years behind the first group, being in 1978 at about the 1970 levels for the best group. Their growth has proceeded more quickly over the last few years in absolute terms but one would expect them to remain at a lower relative level because of the slowdown in growth that occurs once an internationally high (i.e., West European - North American) level is approached. As a group, their most impressive advances have been made in the area of literacy, where they have all increased their literacy rates by over 10 per cent, with some - like Korea - having appreciably larger increases. But because of its range the second group is crucial in the "link" of the NICs between the industrialized and less de . ed regions of the world.

Finally, an attempt was made to establish the direction of causality between the social and economic variables. While confirming the complexity of the two way relationship betweem many pairs of indicators, it appeared that there was an important direct effect of the improvement in the level of several aspects of socio-economic development upon a country's future economic development, a consideration that should be borne in mind when attempts are being made to stimulate the industrialization process in a country. The symbiotic nature of this interrelationship is one that should therefore be borne in mind when government economic policies for coping with the present international economic crisis are formulated in the NICs (and in developing countries in general). Thus, extensive cuts in public expenditure to help save foreign exchange could well have negative impacts aspects of socio-economic welfare such as health care, which the above results suggest would, in turn, have a negative feedback on the country's future economic development.

Appendix A. Economic and Socio-Economic Development in the Newly Industrializing Countries, 1978.

Economic Indicators	No. of Observations	Units	Singapore	Hong Kong	Yugoslavia	Argentina	Brazil	Taiwan	Mexico	Korea	Malaysia	Pakistan	India
GNP per capita	11	US$.	3290	3040	2380	1910	1570	1400	1290	1160	1090	230	180
Industrial production per capita	11	US$	1151.5	942.4[1/]	1071	859.5[1/]	580.9	672	477.3	406.0	348.8	55.2	46.8
Manufactured exports per capita [13/]	11	US$	2001	2402[2/]	182[1/]	64	37	174[5/]	20[3/4/]	304	176[3/]	14	6[3/]
Socio-economic Indicators													
Result Indicators													
demographic													
life expectancy	11	years	70	72	69	71	62	72	65	63	67	52	51
infant mortality	11	per th. births	1	12	34	59[6/]	92[7/]	25[7/]	60	37	31[2/]	121[6/]	125[7/]
literacy													
literacy rate [11/]	11	%	75	90	85	94	76	82	76	93	60	21	36

Appendix A. (cont.)

Economic and Socio-Economic Development in the Newly Industrializing Countries, 1978.

Socio-Economic Indicators	No. of Observations	Units	Singapore	Hong Kong	Yugoslavia	Argentina	Brazil	Taiwan	Mexico	Korea	Malaysia	Pakistan	India
Input Indicators													
health care													
physicians (1977)	11	per th.	.79	.78	1.32	1.89[1]	.59	.64[1]	.55	.51	.23[1]	.26[1]	.28[1]
nurses (1977)	10	per th.	2.94	1.03	2.44	NA	.36[8]	.57[1]	.71	1.96	.93[1]	.10[1]	.18[1]
hospital beds (1975)	11	per th.	3.6	4.1	6.0	5.7	3.8	2.2[9]	1.2	.7	3.7	.5	.6
nutrition													
daily per capita caloric supply	11	cal.	3040	2794	3496	3383	2503	2822[9]	2799	2816	2632	2237	2037
daily per capita protein supply	11	grams	80.1	86.2	100.2	113.7	60.1	77.0[1]	71.5	74.2	59.1	59.3	49.6
daily per capita animal protein supply	10	grams	38.6	50.4	36.5	76.3	22.7	NA	22.9	14.7	23.7	14.1	4.7
education [10]													
primary school enrollment ratio	11	%	109	110	99	110	89[1]	87[9]	122	111	94	56	78[1]
secondary school enrollment ratio	11	%	57	60	82	56	32[1]	65[9]	42	70	51	16	27[1]
primary plus secondary school enrollment ratio	11	%	80	80	87	89[1]	75[1]	77[9]	86	90	72	35	52[1]
housing													
dwellings with safe water (1975)	8	%	100	NA	NA	66	77	NA	62	62	62	29	33
dwellings with piped water [11]	9	%	79.9	94.3	34.0	47.3	33.0	NA	38.7[15]	35.2[15]	34.6[12]	8.4	NA
dwellings with electricity [11]	9	%	87[13]	NA	88[14]	79[12]	63	94[13]	59[15]	50[15]	43[12]	17.9[16]	NA
communication													
newspaper circulation (1978)	9	per th.	229	368[17]	106	154[17]	44	NA	NA	173[17]	87[17]	15	18
radios [11]	11	per th.	158	527	210	838	158	97	301	144	118	16	24
employment													
women in labour force	11	%	32.2	34.2	36.3	25.6	21.6	25.0[5]	18.5	32.8	31.4	9.9	32.2
inverse of the level of unemployment	11	units	10	35	8	44	42	60[9]	25	26	13	20[18]	15

Appendix B. Time series data for the NICs for three result indicators 1960, 1970, 1975.

	Life Expectancy			Infant Mortality			Literacy Rates		
	1960	1970	1975	1960	1970	1975	1960	1970	1975
Singapore	64.5	67.6	68	34.8	20.5	14	50	68.9	75[2/]
Hong Kong	64.5	71.4	71	57	19.6	17	71	80.7	90
Yugoslavia	63	67.7	68[2/]	87.7	55.5	40	77	83.7	85
Argentina	65.5	67.9	68	62.4	63.3	59	91.4[2/]	92.6	93
Brazil	54.2	59.7[1/]	61	71	110[1/]	82	61	67	76
Taiwan	63[1/]	68[1/]	59	31[1/]	18[1/]	26	54	73[1/]	82
Mexico	57.8	61.4	63	74.2	68.5	66	65.4[2/]	74.2	76
Korea	52.6[1/]	59.2	65	NA	41	47	70.6[2/]	87.5	91
Malaysia	55	58.1	63	75	40.8	75	48	55[1/]	60
Pakistan	43	47.4[1/]	51	130	128.4	121	16	20[1/]	21
India	41.7[1/]	48.3	50	139[1/]	140.2	122	24	33	36

Notes: 1/ ILO
2/ UNRISD

Sources: 1960, 1970:Life expectancy, infant mortality, 1970: literacy rates: UNRISD, Research Data Bank of Development Indicators (various volumes) (Geneva: UNRISD, 1976).
1960:Literacy rates. 1975:Life expectancy, infant mortality, literacy rates: ILO, WEP 2-32/WP 24, Working Paper, March 1981.

Notes:

1. 1977
2. Share of manufactured goods exports in total consists mainly of the export of unworked precious and semi-precious stones.
3. Share of manufactured goods exports in total consists mainly of the export of non-ferrous base metals.
4. 1975 or most recent estimate.
5. Republic of China, Directorate General of Budget, Accounting and Statistics, Statistical Yearbook of the Republic of China 1981), (The Republic of China: 1981), pp.300, 417.
6. ILO Data Bank.
7. Not necessarily for year indicated. See technical notes from World Bank, World Development Report 1980, op. cit.
8. Data from "Global Socio-economic Development in 1978" (forthcoming).
9. Republic of China, Council For Economic Planning and Development, Taiwan Statistical Data Book 1981, (Taipei: Republic of China, June 1981), pp. 5, 11, 253.
10. There are many methodological problems in counting enrollment ratios, such as length of study and frequency of data collection. For further discussion see: McGranahan et al., op. cit.
11. Most recent estimates ranging between 1975-1977.
12. Peninsular Malaysia.
13. 1966
14. 1971.
15. 1970.
16. 1973.
17. UNCTAD, Handbook of International Trade and Development Statistics 1979, (New York: UN Publications, 1979), pp.578-593.
18. Data not available, 5% assumed.
19. Percentage of population.

Sources: As Tables 1 and 2 in the text.

Appendix C.

. Infant Mortality, Literacy, and Life expectancy range, median, mean, standard deviation for 1960, 1970, 1975 and 1978.

	Range		Median	Mean	Standard deviation (s)	Number of observations
	High	Low				
Infant Mortality						
1960	31	139	74.2	76.2	33.6	10
1970	18	140.2	55	64.2	41.8	11
1975	14	122	59	60.8	35.6	11
1978	12	125	37	55.3	38.8	11
Literacy Rates						
1960	91.4	16	61	57.1	21.2	11
1970	92.6	20	7[illegible]	66.9	21.6	11
1975	93	21	76	71.4	22.3	11
Life Expectancy						
1960	65.5	41.7	57.9	56.8	8.1	11
1970	71.4	47.4	61.4	61.5	7.7	11
1975	71	50	65	63.4	6.7	11
1978	72	51	67	64.9	7.1	11

Note: "High" indicates the best performance and "Low" the worst performance of the respective group.

Sources: 1960-75 - As Appendix B.
1978 - As Table 2.

Appendix D.

GNP per capita, current US$

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
Singapore	842	1039	1285	1726	2010	2279	2700	2880	3290	3830	4430
Hong Kong	768	833	1039	1382	1631	1740	2110	2590	3040	3760	4240
Yugoslavia	616.6	583.4	693.9	935.8	1124.8	1308.9	1680	1960	2380	2430	2620
Argentina	984	1191	1005	1420	1922	1388	1550	1730	1910	2230	2390
Brazil	472	499	575	723	896	1095	1140	1360	1570	1780	2050
Taiwan	360	410	482	642	852	888	1039	1182	1421	1720	2101
Mexico	608	684	747	847	1027	1191	1090	1120	1290	1640	2090
Korea	251	259	281	345	455	527	670	820	1160	1480	1520
Malaysia	305	306	404	568	715	714	860	930	1090	1370	1620
Pakistan	163	169	109	121	149	183	170	190	230	260	300
India	93	99	103	122	140	139	150	150	180	190	240

Sources: 1970-75: United Nations, Yearbook of National Account Statistics (New York: United Nations), 1972-80
1976-80: World Bank, World Development Report (Washington D.C.: World Bank), 1979-82.

Appendex E. Selected Socio-economic Indicators, 1975.

	No. of physicians per 100,000 inhabitants	No. of nurses per 100,000 inhabitants	No. of telephones per 100 inhabitants	Kilocalories per capita per day	Grams of protein per capita per day	Primary school enrollment rate	Secondary school enrollment rate
Singapore	71	259	12.9	2839	77	110	53
Hong Kong	67	65	23.5	2547	79	123	50
Yugoslavia	118	222	6	3509	99	97	55
Argentina	221	96	7.8	3442	109	108	55
Brazil	60	25	3.1	2480	60	90	18
Taiwan	67	30	-	2780[a]	70	-	-
Mexico	-	-	5	2788	70	112	35
Korea	50	67	4	2655	74	108	63
Malaysia	14	69	2.5	2544	54	93	45
Pakistan	25	9	0.3	2206	59	50	17
India	24	15	0.3	1791	45	77	28

Source: ILO, "Programme de Synthese de Politique Economique et Sociale", Working Paper (Geneva: ILO, 1981)
FAO, Production Data Bank, (Rome: FAO, 1981)

Note: a. 1974