WORLD POPULATION TRENDS AND POLICIES

1979 Monitoring Report

VOLUME I
Population Trends

UNITED NATIONS

DEMOGRAPHIC PUBLICATIONS OF THE UNITED NATIONS

SELECTED LIST, January 1979

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WORLD POPULATION TRENDS AND POLICIES

1979 Monitoring Report

VOLUME I

Population Trends

NOTE

The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations concerning legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

The term "country" as used in the text of this publication also refers, as appropriate, to territories or areas.

In some tables, the designations "developed" and "developing" economies are intended for statistical convenience and do not necessarily express a judgement about the stage reached by a particular country or area in the development process.

Symbols of United Nations documents are composed of capital letters combined with figures. Mention of such a symbol indicates a reference to a United Nations document.

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PREFACE

The World Population Plan of Action, adopted by the United Nations World Population Conference at Bucharest in 1974, recommended that monitoring of population trends and policies "should be undertaken continuously as a specialized activity of the United Nations and reviewed biennially by the appropriate bodies of the United Nations system, beginning in 1977".[1] The present report is the second in the series of reports on this activity; the report on the first round was prepared in 1977.[2]

The outline of the present report was based on the discussion at the nineteenth session of the Population Commission.[3] In addition to a general survey of the world population situation, special topics dealing with the interrelationships between population and development were included, emphasizing such important areas as demographic aspects of income distribution; association between levels and trends in fertility and in socio-economic variables; demographic aspects of the integration of women in development; implications of rural-urban migration for development; population, food and nutrition; population and education.

Prior to the report on the first round of monitoring, the Population Division of the Department of International Economic and Social Affairs of the United Nations Secretariat had carried out numerous assessments of population trends. Mention should be made, for instance,, of *The World Population Situation in 1970,*[4] *Population Bulletin of the United Nations, No. 7—1963, with special reference to conditions and trends of fertility in the world,*[5] *Levels and Trends of*

Fertility throughout the World, 1950-2000,[6] *The Situation and Recent Trends of Mortality in the World,*[7] *Growth of the World's Urban and Rural Population, 1920-2000;*[8] and three consecutive reports[9] on *World Population Prospects as Assessed in 1963, 1968* and *1973.*

The present report on monitoring of population trends was prepared by the Population Division on the basis of inputs by the Division itself, the International Labour Organisation, the Food and Agriculture Organization of the United Nations, the United Nations Educational, Scientific and Cultural Organization, the World Health Organization and the World Bank. The regional commissions also contributed information which was helpful in preparing the various chapters. The report on monitoring of population policies was prepared by the Division, on the basis of information derived from the Fourth Inquiry among Governments on Population and Development, as well as from other official sources.

The Population Commission at its twentieth session, held in February 1979, reviewed a draft of this report and reiterated the view it expressed at its nineteenth session that monitoring of population trends and policies was an essential service to countries as well as to the international community. The Commission recommended that the report should be published and made available to Governments and to all institutions interested in population studies.

Acknowledgement is due to the United Nations Fund for Population Activities whose grant made this publication possible.

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[1] *Report of the United Nations World Population Conference, 1974* (United Nations publication, Sales No. E.75.XIII.3), part one, chap. I, para. 107.

[2] United Nations publications, Sales Nos. 78.XIII.3 and 4.

[3] See *Official Records of the Economic and Social Council, Sixty-second Session, Supplement No. 4* (E/5913), particularly para. 73.

[4] United Nations publication, Sales No. E.71.XIII.4.

[5] United Nations publication, Sales No. 64.XIII.2.

[6] United Nations publication, Sales No. 77.XIII.2.

[7] United Nations publication, Sales No. 62.XIII.2.

[8] United Nations publication, Sales No. E.69.XIII.3.

[9] United Nations publications, Sales Nos. 66.XIII.2, E.72.XIII.4 and E.76.XIII.4.

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Explanatory notes

The following symbols have been used in the tables throughout the report:

Three dots (. . .) indicate that data are not available or are not separately reported.

A dash (—) indicates that the amount is nil or negligible.

A blank in a table indicates that the item is not applicable.

A minus sign (−) indicates a deficit or decrease, except as indicated.

A full stop (.) is used to indicate decimals.

.A slash (/) indicates a crop year or financial year, e.g., 1970/71.

Use of a hyphen (-) between dates representing years, e.g., 1971-1973, signifies the full period involved, including the beginning and end years.

Details and percentages in tables do not necessarily add to totals, because of rounding.

Reference to "tons" indicates metric tons, and to "dollars" ($) United States dollars, unless otherwise stated.
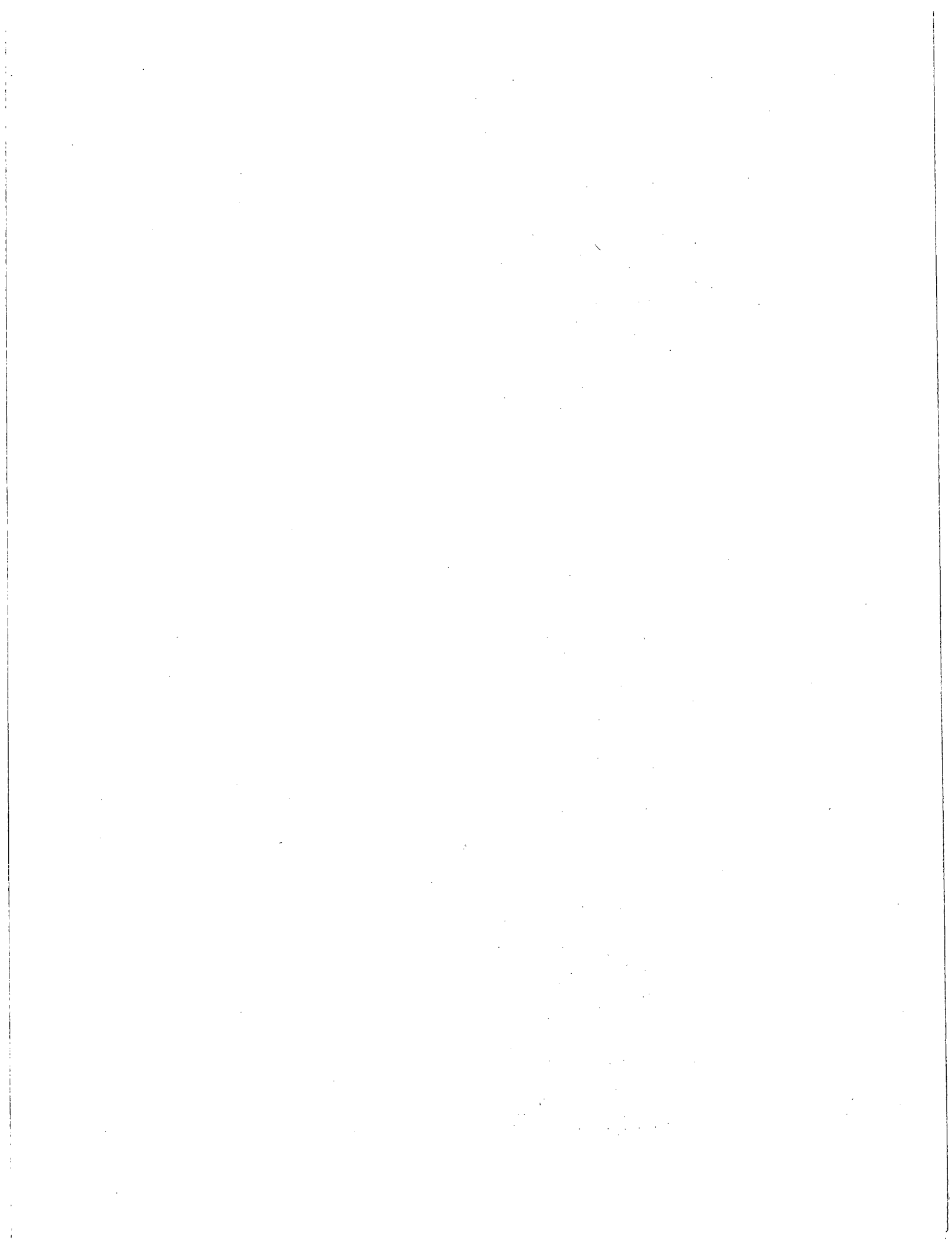
INTRODUCTION: OVERVIEW OF RECENT POPULATION TRENDS AND POLICIES

The third quarter of the twentieth century was perhaps the most dramatic in the history of world population, with an unprecedented acceleration of population growth, which during that 25-year span raised the total world population from almost 2.5 billion to nearly 4 billion and the average rate of growth to about 2 per cent, with much higher rates prevailing in many of the less developed countries.[1] When the last quarter of this century began, there were several questions—mostly new and unforeseen—about world population: whether a break-through had really occurred which would change the high-fertility patterns of the developing countries; the degree of seriousness of the changes in family life-styles in the developed countries, which had already brought rates of childbearing near or below replacement levels; whether the pace of mortality decline in the developing countries had actually slowed and what that change implied.

The dramatic acceleration that began about the middle of this century has been arrested but not substantially reversed in the less developed countries. However, it is believed, as shown by the United Nations projections, that the global rate of growth, currently estimated to be about 1.8 per cent per annum, will undergo a decline, slow at the beginning, accelerating later in the 1980s and reaching perhaps 1.6 per cent at the turn of the century. The anticipated decline would be caused mainly by declining fertility in the developing countries, which would lower their growth rate from the current level of approximately 2.2 to possibly 1.8 per cent in the year 2000; and partially also by a smaller decline in growth rate predicted for the developed countries, from 0.67 to 0.51 per cent. Ninety per cent of the expected growth in the world population would take place in the developing countries, a fact that entails potential implications for development in those countries which cannot be ignored.

These figures were derived from the results of the 1978 revision of the demographic estimates and projections prepared by the United Nations Secretariat. The results indicate that the total population of the world in 2000 is currently expected to be 6,199 million, or only about 55 million below the estimate provided by the projections prepared in 1973. This slight downward adjustment is the net result of two main changes: a limited downward adjustment of projected fertility which takes into consideration recent declines in some countries, both developed and developing; and an upward adjustment of the 1975 total population, from 3,968 million to 4,033 million, arising mainly from an upward revision of the estimated population of China in that year, from 839 million to 895 million. In other words, taking into consideration these two adjustments and the survivors from those who were added to the 1975 base population, it can be said that the downward revision of the fertility assumptions has resulted in a reduction of some 157 million in the estimated world population in the year 2000.

The global growth rate of 1.8 per cent represents a downward revision of the corresponding rate for 1975-1980 provided by the 1973 projections, namely, 1.95 per cent. The slower growth has been observed in almost all parts of the world, excluding Africa, where the growth rate has been revised slightly upwards. Elsewhere, fertility levels have been adjusted downward; the crude birth rate for 1975-1980 has been reduced from 17.4 to 15.6 in the developed regions and from 36.4 to 33.6 in the less developed regions.

Yet, a host of other problems are linked with world population, for example, the continuing flow of migration from rural to urban areas and the ensuing problems of rapid urbanization in most of the developing world. Most of the developed countries are experiencing unprecedented fertility declines which have led to concern by Governments about replacement, labour supply and age structure. International migration, usually from south to north, has caused social, economic and political problems in both sending and receiving countries. The aging of the populations of the developed world is continuing, with corresponding pressure for social readjustment. Most of Africa still suffers from high morbidity and mortality, particularly among infants and young children.

The highly significant decline in fertility currently under way in the developing countries gained momentum around 1965, with 19 countries of half a million population or more reported as having declines in their birth rates in excess of 20 per cent between 1965 and 1975, and an additional nine countries sustaining estimated declines of between 10 and 20 per cent during the same period. The combined populations of these countries represent about two thirds of the population of all developing countries in 1975. The countries of Asia experienced a decline of 17 per cent from 1965

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[1] For convenience, the largest regional groupings used below for dealing with trends are the categories of "less developed" and "more developed" as established by the Population Division of the Department of International Economic and Social Affairs of the United Nations Secretariat, on the basis of demographic criteria. The former category includes all countries and other territories of Africa, Asia (excluding Japan), Latin America and Oceania (excluding Australia and New Zealand). The latter category includes all of Europe, the Union of Soviet Socialist Republics, Northern America and the countries just cited as being outside the "less developed" classification. Within these two broadest groupings, there are eight "major areas" subdivided into 24 geographical regions, which are used at numerous points in the text and tables.

In Latin America, the countries of Temperate South America, which were formerly in the "more developed" category, are currently in the "less developed" category.

In certain chapters of this publication, some data are based on the inclusion of Cyprus, Israel and Turkey in the region of Southern Europe because such classifications were used when those data were prepared; those countries are currently included in the region of Western South Asia.

to 1975; those of Latin America had declines of about 12 per cent, while the countries of Africa as a group had virtually unchanged fertility.

Another spectacular trend has been observed in the developed countries, where fertility rates have declined to levels very close to replacement and in some of those countries below that level. Of the 30 largest developed countries, only five failed to show a decline in gross reproduction rates between the mid-1960s and mid-1970s, while 17 experienced declines of 20-40 per cent and 20 had declines of at least 10 per cent. Only three countries showed a significant rise in magnitude during this period, and even there the rises were not continuous. Half of these 30 countries already had net reproduction rates below replacement in 1973-1974. Another six were less than 10 per cent above that level and only nine were more than 10 per cent above that level. In terms of population rather than countries, the proportion living in countries with fertility below replacement is much more pronounced than indicated because several of the largest developed countries, including the Federal Republic of Germany, Japan, and England and Wales in the United Kingdom of Great Britain and Northern Ireland, belong in this category.

The spectacular declines in mortality experienced by many developing countries during the third quarter of the century have made demographic history by surpassing, within that short period, declines made by the developed countries over much longer periods of progress, despite modest levels and rates of economic development. The experience of the 1950s has led to serious doubts about the existence of any simple relationship between mortality and level of living, and doubts continue to exist whether the recent mortality trends can be sustained. Hard evidence is difficult to find because of deficiencies in data from most developing countries, but there are indications from some of those countries that the pace of mortality decline may well have slowed.

It is still difficult to determine from available information levels and trends of mortality in sub-Saharan Africa. It is evident, however, that this area has the highest mortality level in the world, with life expectancy at birth well below 50 years, and that recent progress has not been impressive. There is considerable divergence among mortality levels in the rest of the developing countries. Although several countries in Latin America and Asia already have life expectancies above 60 years, several others were still below the 50-year mark in the mid-1970s. Life expectancy levels in the developed countries, on the other hand, are showing considerable convergence, to levels between 70 and 78 years among females and between 64 and 72 among males. Further gains in these countries could only be achieved through advances against old-age diseases. A notable outcome of recent mortality trends is the increasing gap between male and female life expectancies.

Current and prospective declines in fertility in developing countries are bound to show their effect on the age structure. Although the interval since 1970 is too short for sizable changes in age distribution to take place, there is evidence that the proportion below age 15 has fallen in several developing regions. A notable example is China, where a sharp decline is expected to reduce the percentage below age 10 from 35 in 1975 to 25 at the end of the century. However, in most of sub-Saharan Africa, the absence of fertility decline—or even a possible increase—accompanied by mortality decline has probably led to an increase in the proportion of children. Elsewhere, the general declining trend in this age group is naturally expected to be sustained, and the medium projections imply a decline from 40.5 per cent in 1975 to 34.3 in 2000. Virtually all of this decline will be absorbed by the working ages 15-64, and the old-age percentage is expected to grow by less than one point, from 3.8 to 4.6, in the same period. Thus, while there is no imminent problem of aging for the developing countries as a whole, the fraction of the aged population in the developed countries, which was as high as 10.4 per cent, is expected to continue increasing and to reach about 13.8 by the end of the century. The percentage of children in developed countries, on the other hand, is expected to continue its declining trend, from 27 in 1970 to 25 in 1975 to 22 in 2000.

International migration continues to draw serious attention not only because of its nature as a demographic variable that has significant impact in some regions but because of the economic, social and humanitarian aspects involved. The current general pattern is a movement from poorer to richer countries, both between and within the developing and developed areas. The common pattern is that of movement of workers seeking employment and of their families. Over all, there has been a decline in such movement both within Europe and between Europe and the rest of the world. The migration of labour to Northern and Western Europe, which had been flowing from Southern Europe, Turkey and Northern Africa, was nearly terminated around 1974. However, the countries of these two regions still had about 14 million aliens, or 7 per cent, in their total population around 1975. Four other developed countries, namely, Australia, Canada, New Zealand and the United States of America, continue their policy of receiving immigration for the purpose of long-term resettlement. This policy has resulted in about 20 per cent of the population in Australia being foreign-born, about 15 per cent in Canada and New Zealand, and 5 per cent in the United States.

A distinct pattern of migration in the developing countries is the flow of workers into the oil-rich countries of the Middle East from the rest of this region, as well as from Pakistan and other countries. In the Middle East, it has been so substantial that in several of the Arab countries of the Gulf, two thirds or more of the labour force are migrants. In the Libyan Arab Jamahiriya and Saudi Arabia, they constitute over one third of all workers. The economic boost to the sending countries, in terms of remittances, has recently been estimated at well over $1 billion per annum. For several of the sending countries, the money sent home is equivalent to as much as 7-20 per cent of the cost of their imports.

Although urbanization is generally looked upon as a healthy phenomenon associated with economic growth, the social and economic problems arising from an imbalance between urban population and the available basic public services and economic opportunities rank very high among

world demographic problems, as clearly exemplified by the responses of Governments to inquiries from the United Nations Secretariat. The demographic dimensions of this situation can be realized from the estimates and projections of the urban population of the developing countries, which was 16 or 17 per cent of the total population in 1950, is currently about 30 per cent and is projected to be about 43 per cent by the turn of the century. The projections clearly indicate that these countries have to prepare for an urban increase of about 1.3 billion between 1975 and 2000. Because the developed countries as a whole are also slowly continuing their urbanization and are expected to be about 80 per cent urbanized by the year 2000, it is now estimated that the world population may become more urban than rural a few years before the end of the century.

There is evidence that among these countries rural-to-urban migration is faster with rapid economic growth. It is observed, for instance, that this migration is highly and significantly correlated with the level of *per capita* gross national product and with that of the growth rate of labour productivity in agriculture. This is not to say that the problems of poverty, illiteracy and poor health of the rural population in the developing countries, which constitutes 85 per cent of the world rural population and perhaps currently will constitute 90 per cent in the year 2000, are going to be solved on purely demographic grounds. Despite the unprecedented urbanization, it is estimated that rural populations will further increase by over 700 million, or more than one third, during the last quarter of the twentieth century.

Trends in population and development in the 15 years between 1960 and 1975 reveal a mixed pattern of substantial progress in some respects and stagnation and deterioration in others. Thus, for the developing countries as a whole, economic growth has been substantial and in a historical perspective even high. Gross domestic product at constant prices in these countries (excluding China) sustained an average annual rate of increase of the order of 5.5 per cent and gross domestic product *per capita* rose from somewhat less than $170 in 1960 to $260 in 1975. However, despite this rapid growth, the gap in average *per capita* product between developed and developing countries has not been reduced. In absolute terms, the difference in product *per capita* between developing and developed market economies increased and the ratio increased slightly to about 1.13. Moreover, within the group of developing countries, income differentials widened.

Similar patterns of relatively favourable changes in combination with other negative aspects are also found in demographic trends when they are compared with economic growth trends. A crucial aspect in this regard is the issue of fertility behaviour. There are indications that recent fertility declines in developing countries have been concentrated mainly in those countries in the higher range of relative economic development. Only in the group of countries with a *per capita* gross domestic product in 1970 of $400 or more are current crude birth rates in the lower thirties per 1,000. In the next lower group (with *per capita* product between $200 and $400), the birth rates are still on the order of 40 per 1,000. In the lowest income group (*per capita* product under $200 in 1970), the birth rate is still well above 40 per

1,000. With still high mortality, these countries, in addition to having a lower economic growth, have the highest long-term population growth potential. Moreover, despite the increasing signs of declining fertility, other data based on a somewhat different grouping of countries strongly suggest a continued dichotomy in fertility levels, with gross product *per capita* of about $750 in 1970 separating high-fertility countries from low-fertility countries.

A more detailed analysis of the association between fertility and a number of different social and economic indicators in developing countries points to the conclusion that changes in fertility appear to have occurred independently of changes in the selected socio-economic variables. By the same token, only a weak relationship would appear to exist between fertility changes and levels of socio-economic variables. However, confirmation was found of a comparatively stronger relation between levels of fertility and levels of the majority of social and economic indicators. To the extent that these observations permit a generalization, they suggest that the achievement of a given level of socio-economic development, rather than the pace of development, remains the most important factor in bringing about fertility transition.

Trends that involve both progress and set-backs are also evident where sectoral trends, such as food and education, are concerned. Recovery in food production and slow improvements in calorie supplies *per capita* in developing countries in recent years have not improved the food situation nor reduced the gap between requirements and supply. In fact, declines in food production *per capita* in recent years were widespread, with a further deterioration especially in Africa, where food production *per capita* has been declining for a considerable period. In general, the number of developing countries in which growth rates of food production remained below those of population increased from 56 in the 1960s to 69 in the first half of the 1970s. In education, substantial progress was made in school enrolment, with, for instance, an increase in enrolment of children aged 6-11 years from 46 to 62 per cent between 1960 and 1975, but the number of those out of school in developing countries rose by 10 per cent in the same period. Rapid progress in school enrolment was, moreover, associated with a steep increase in developing countries in the educational dependency ratio, which was 281 per 1,000 working persons in 1965, similar to the figure of 295 pupils per 1,000 working persons in developed countries, and which increased by 1975 to 338 per 1,000, as the ratio for developed countries fell to 258 per 1,000.

POPULATION TRENDS

Regional growth trends

A close examination of population trends shows that, at the regional level, the new trends reflect demographic changes that have occurred mainly in some developed regions and in East Asia, the Caribbean and several other countries of Latin America. In East Asia, the population growth rate has been declining rather rapidly, from 1.94 per

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cent in 1960-1965 to 1.60 in 1970-1975 and 1.32 in 1975-1980. In contrast, most of the other less developed regions have not yet shown a significant declining trend.

Among the more developed regions, further deceleration of population growth continued through the 1970s in Northern and Western Europe, Northern America, Australia and New Zealand. Japan and Southern Europe also have been in this category since 1975. The Union of Soviet Socialist Republics has had a virtually non-changing growth rate in the 1970s. The major cause of the change was a decline in the birth rate but a decline in international migration appears to be a significant factor in some regions. On the other hand, some rise in the growth rate was noticed in Eastern Europe recently, presumably reflecting changing trends of net migration and fertility, respectively.

In East Asia, the country most responsible for the declining growth rate is clearly China, the population of which constitutes about 84 per cent of the total of East Asia and a quarter of the world population. Recent scattered information indicates that the growth rate of China in the 1950s and 1960s was higher than generally believed and leads to an estimate of the current population reaching 950 million. There are also indications that the rate of population increase in China may now be decreasing very rapidly. The revised provisional estimates of growth rate for China prepared by the United Nations Secretariat currently stand at 2.0 per cent for 1960-1965, declining to 1.6 per cent for 1970-1975 and to 1.3 per cent for 1975-1980.

Apart from this striking slow-down of population growth in China, in other less developed regions of the world growth is showing less conspicuous changes. In Africa, the rates have increased slightly during the 1970s. In some other regions, a decline in birth rate, if any, has apparently been offset by a declining death rate. Estimated levels of growth rate in the major less developed areas for 1975-1980 are 2.9 per cent for Africa, 2.7 for Latin America and 2.5 for South Asia.

The combined population of the less developed regions was estimated to be 2,940 million in 1975 and was expected to increase to 3,280 million by 1980. The average annual growth rate of population in the quinquennial period 1975-1980, 2.21 per cent, shows a tangible decline from the value of 2.35 during 1960-1965. As to future prospects of population growth in these regions, recent trends would lead to a projected population of 4,930 million at the end of the twentieth century, which is about the same as the result obtained in 1973. As noted, however, the new projection uses a larger base population for 1975; if there had been no change in the base population, the new projected population for 2000 would have been smaller than the old by more than 100 million. The rate in 1995-2000 is now expected to be 1.84, instead of 1.93.

The total population of the more developed regions—Europe, Northern America, Australia and New Zealand, Japan and the USSR—was estimated to be 1,093 million in 1975 and is expected to increase to 1,272 million by 2000. It should be mentioned that the average annual growth rate of population in 1975-1980, namely, 0.67 per cent, is lower than the expected growth rate of 0.82 per cent estimated for the same period in 1973 and is also lower than the growth rate of the preceding period 1970-1975, namely, 0.81 per cent. The projected growth rate in the last quinquennium of this century is now revised downward from 0.60 to 0.51.

Fertility

Revised assessments of fertility levels indicate that the world current birth rate is about 29 per 1,000, compared with 31 during the period 1970-1975. It is now well established that fertility control, or childbearing by choice, has been practised increasingly in a growing number of developing countries. Indeed, the largest developing country, China, currently has a birth rate estimated at about 22; and the second, third and fourth largest countries—India, Indonesia and Brazil—have estimated rates in the range of 35-37.

In spite of the decline observed in many developing countries, fertility remains high in most developing regions. Gross reproduction rates of 3.4 or more prevail in Western South Asia. In Western Africa, Eastern Africa and Middle South Asia, this rate is commonly above 3; and, with some exceptions, birth rates of 47 or more are common in the first two of these regions. Rates of 50 are estimated for one half of the countries of Western South Asia, and measures not far from this level have been derived for a number of countries in Central America.

In many of the developed countries, fertility levels are lower than ever before recorded, to the extent that in nearly half of these countries the birth rate was below 15 in 1977; and in virtually all of them it was below 20. Fertility is lowest in Northern and Western Europe, where, except for Ireland, the 1977 birth rates were all in the range from 9.5 to 14; and in three countries, Austria, the Federal Republic of Germany and the United Kingdom, deaths have exceeded births in recent years.

Fertility levels are also conspicuously low in some other countries in Europe—Italy (13.2 in 1977) and the German Democratic Republic (13.3 in 1977), although the latter country has experienced a fertility increase since 1975. A rise was observed during 1970-1975 in three countries of Eastern Europe, seemingly caused in part by government policy. This trend stabilized in 1976 in two of these countries. A few European countries outside Eastern Europe have also reported slight recent increases in their birth rates, which cannot yet be considered significant.

The drop in marital fertility in developed countries is attributed to a fall in unwanted fertility and to a decline in the number of births wanted. The pattern of change has been such that there has been a slight increase in the frequency of childless and one-child families and a greater ability to fulfil family size targets in the two-to-three child range. Another important development in reproductive behaviour in several countries has been a lowering of the age of termination of reproduction to about 35 years, and a more recent change has been a rise in the age of onset of reproduction.

There has also been a steady increase in use of fertility control and in use of the most effective methods. By 1975, the proportion of white couples in the United States who had been sterilized for contraceptive purposes was almost

equal to that using the pill (31 per cent *versus* 34 per cent), and sterilization is now the single most popular method among couples married 10 years or more. Many western countries have adopted laws liberalizing abortion within the past 10 years, and grounds and facilities for abortion were extensive in Eastern European countries much earlier. However, access to abortion in several of the latter countries has been restricted in recent years, causing short-term increases in fertility.

In these post-transitional societies where reproduction is highly controlled, the traditional explanations of factors behind fertility decline are no longer adequate with respect to current fertility trends. Such aspects as industrialization, urbanization and education are so advanced that the effect of those processes on fertility change can only be limited. It appears that the prospect of near stationarity by the turn of the century is a real possibility. Couples' decisions concerning family size may be influenced by economic conditions. Government policies could also have an effect, but note should be taken that pro-natalist measures undertaken by Governments have had a history of limited success. It is clear that the most important factors rest with the individuals themselves.

Knowledge about fertility and the factors affecting it is still poorest in Africa—except for a few small islands and a few countries in Northern Africa. There are also indications that some countries of sub-Saharan Africa may have experienced a fertility increase, due possibly to the initial impact of improved health and well-being.

High to moderately high fertility is characteristic of Northern Africa, where for four of the six countries in the region the birth rates are in the upper forties. Tunisia has experienced considerable decline; the gross reproduction rate fell from 3.3 to 2.8 between 1965 and 1975. This decline is not surprising in view of social reforms, including legislation for a higher age at marriage and an effective family planning programme. Egypt also showed considerable decline in its reported birth rate, from 43 in 1963 to 34 in 1972, after which year there has been a reversal of the trend. Elsewhere in Africa, somewhat lower levels of fertility than those prevalent for all of the sub-Saharan regions have been estimated for some of the countries of Middle Africa, although all of the available measures date back to the late 1950s and early 1960s. This lower level is attributed by researchers to health conditions and cultural factors, including marriage patterns, breast-feeding practice and diet.

In contrast with the high levels which prevail in Western and Middle South Asia, fertility declines of considerable magnitude have been achieved in some countries in East Asia and South Asia. Foremost is China, where the existence of a large decline is realized by all writers, though they differ on its magnitude. Four small countries in East and South Asia had birth rates below 30 around 1975, and eight more had moderate levels between 30 and 40. In many of these countries modernization movements as well as family planning programmes are under way. Though the greater contribution to the decline in these countries is generally brought about by lower marital fertility rates, there is evidence that age at marriage had a significant role in some countries. There has been considerable interest lately in the downward trend of fertility in Indonesia, due to its size and its considerable family planning efforts. Views as to the extent of decline vary. Some studies indicate that the decline may be on the order of 12 per cent.

Among the regions of Latin America, considerable fertility decline has taken place in Temperate South America and the Caribbean, but it is in the latter region that considerable decline has been under way in recent years. With a few exceptions, rates between 20 and 30 are now common in the Caribbean. Impressive declines have also taken place in Colombia and Venezuela. Available data suggest a decline—from 40 in 1965-1970 to 34 in 1975. This decline has been attributed to a decreased proportion of women in different forms of cohabitation, a rise in abortion rates and an increase in effective use of contraceptives. The decline in Venezuela, from 40 in 1965-1970 to a current level of about 36, is compatible with the social and economic progress it is experiencing. In Central America, there has been considerable decline in Costa Rica and Panama, both of which have reached levels below 30. The trend in Mexico is clearly important, in view of the size of its population and the change in population policy, but this trend has yet to be fully assessed although there are indications of significant recent decline. A question also exists with regard to Brazil, for which reliable birth data are lacking. Some recent data suggest a small decline in this country, with the birth rate equal to about 37 in 1975.

It is thus clear that although most of the countries of Latin America are still within the range of moderately high fertility, and some are in the high range, there has been a clear and sustained fertility decline. Although it may well be justified to say that improvements in such conditions as education and infant and child mortality have facilitated the transition, other factors could have played a role. For example, the currents of emigration may have influenced the sex ratio at relevant ages. Also, the impact of family planning in some of these countries cannot be ignored.

Some light is thrown upon conditions of fertility in developing countries by the results obtained recently for eight countries covered by the World Fertility Survey, although these countries clearly do not represent the developing world as a whole. The countries discussed in this report are Colombia, the Dominican Republic, Fiji, Malaysia, Nepal, Pakistan, the Republic of Korea and Thailand. The influence of age at first marriage is clearly demonstrated by the observation that among women married 10 years or more, those who married below age 20 had a substantially higher average number of children ever born than did those who married later. This negative association was true for women married 10-19 years as well as for those married 20 years or more. For instance, in Malaysia, among women married 10-19 years, those who married at ages below 20 had an average parity of 4.9 children compared with 3.4 for those who married at ages 25 and above. The only exception is Nepal, for which the data do not reveal an age pattern. The survey data also show in this connexion that in three countries—the Dominican Republic, Nepal and Thailand—there has been little or no change in age at marriage, since women who are currently 45-49 years of age married at the same average age (within six months) as women who are cur-

rently 25-29. In Fiji, Malaysia and the Republic of Korea, an increase of from one to four years in mean age at first marriage was observed.

Data from these surveys also show a strong negative association between family size and education of wife. In fact, of the three socio-economic background variables considered, the other two being urban/rural residence and husband's occupation, the largest differences in fertility in all countries are associated with educational status. The negative relation persisted across marriage cohorts. Among women married 20 years or more, the average parity of women with no education ranged between six and eight, whereas for women who had at least primary education the average was between four and six. In each of the eight countries, the relationship was most pronounced for the group of women married 20 years or more and weakest when marriage duration was less than 10 years. This finding may be explained in terms of early childbearing among all educational groups, after which fertility is controlled, at least more effectively, by the better educated who appear to use fertility control to limit births rather than to space them.

The lower level of fertility in urban areas, generally ascribed to social and economic change in these areas, is also found in the parity data of six among the eight countries. Likewise, women whose husbands worked in agricultural occupations consistently had higher fertility than those with a spouse engaged in non-agricultural activities. However, in Pakistan, where fertility has not declined, there were practically no differences according to urban/rural residence or between the two occupational groups. As with education, the strength of relationship between fertility and urban/rural residence, or husband's occupational group, is particularly weak among marriage durations below 10 years—an observation implying again the lack of use of contraception for spacing purposes.

Fertility preferences of individuals are important for understanding current and future performance. Such information is also useful to those concerned with fertility reduction because preventing unwanted pregnancies is a main target in family planning and high desired family size indicates more resistance to reduction. In all eight countries, the proportion of women who wanted no more children was surprisingly high, ranging from 30 per cent in Nepal to 72 per cent in the Republic of Korea. The percentage increased with the number of living children. Among women with four living children, the majority in all countries reported they did not want more; the range was from 52 per cent in Malaysia to 92 per cent in the Republic of Korea. These results should be viewed with caution, however, since replies to the question whether more children are wanted are liable to errors, particularly with regard to conditions of the interview and time preference.

In every country, desired family size increased with number of living children. Women with no living children or with one child generally desired a total of three or four children, whereas women with five or more children desired from four to six children. In part, this finding might reflect a decline in family size preferences, and to some extent it might reflect attempts on the part of women with large families to rationalize unwanted births. In Nepal and Paki-

stan, which have shown little fertility decline, women who are beginning their reproductive careers desire almost as many children as women who have already had five or more. It is also striking to note that the mean number of desired children was always larger than the number of living children, except in five of the eight countries when the number of living children was five or more. It was only in the Republic of Korea that desire fell below actual performance from the fourth child onward.

Family planning practice in developing countries, other than the use of traditional methods with limited effectiveness, is a new phenomenon, the extent of which is a main factor in fertility decline. As can be expected, numbers of ever-users of contraceptives are very limited in Nepal and Pakistan. Survey results show that among all ever-married women aged 15-49, those who ever used a contraceptive, efficient or inefficient, amounted to 4 per cent in Nepal and 10 per cent in Pakistan. "Current" users show even smaller percentages in Nepal and Pakistan, amounting to 2 and 5 per cent, respectively. The percentages range from almost zero at ages 15-19 to 4 for Nepal and 10 for Pakistan at ages 35-39. At the other end, Colombia and Fiji have relatively high over-all percentages of current use, 37 and 39, respectively. Significantly, among these eight countries, the highest proportions of current users among women aged 15-19 were in Colombia and Fiji, where one out of five ever-married women was a current user. In the 20-24 age group, about 30 per cent were current users in Colombia, Fiji, Malaysia and Thailand compared with 1 or 2 per cent in Nepal and Pakistan, which appears to indicate that as the practice of birth regulation spreads, it may be used increasingly at younger ages for postponing births. It can also be safely said on the basis of these results that in some of these countries there is more use of contraceptives, even in the early reproductive period, than would have been thought a few years ago.

Education appears to be the factor generally associated with the most significant differences in family planning practice, with low levels of contraceptive use associated with low levels of education. This is the relationship shown for the eight countries. The conventional hypothesis is also confirmed in the case of urban/rural residence. Such differences between the two types of locality presumably reflect differences in accessibility of contraceptive information, services and supplies and in the extent of contraceptive practice.

The relationship between desire to have no more children and contraceptive practice is not as strong as might be expected in most of these countries. In addition to possible errors, there may be family pressures on the woman to have more children or her motivation may simply not be strong enough. Then, of course, there is the important category of those who genuinely do not want any more children but lack information and/or contraceptive services. Thus, in seven of the eight countries, more than 40 per cent of the women exposed to the risk of conception who stated the desire for no more children were not currently using any contraceptive method, efficient or inefficient, and the percentage goes even higher when only efficient methods are considered. In Pakistan, more than three quarters of the women at risk and

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wanting to end childbearing were not using any method; and in Nepal, this ratio was more than 90 per cent. The only exception was Fiji, where about three quarters of such women were using some contraceptive and two thirds were using an efficient method.

Mortality

A widespread, though not universal, feature of recent mortality trends appears to be a recent slow-down in progress, which, in some places, is manifested by a cessation in mortality decline. The explanation for this development differs for various parts of the world. For countries where mortality was already very low, the recent trend can be attributed to the technical difficulties in achieving additional improvements. The recent trend in areas where mortality remains well below the optimum level can be explained only in terms of the economic, social and technological difficulties faced by the countries involved.

All of the more developed countries have made significant improvements in life expectancy during the past quarter of a century. Equally important, the dispersion of life expectancies about the mean has diminished during recent years, but the gap between male and female life expectancies does not appear to have changed considerably. The most recent data available show that female life expectancies for more developed countries varied from 70 to 78 years at birth during the early 1970s. At the same time, male life expectancies varied from 64 to 72 years and averaged six years less than corresponding figures for females.

It is still not possible to determine levels of mortality—much less trends—in sub-Saharan Africa with any degree of confidence. However, the evidence points to life expectancies in all countries (except the small, unrepresentative islands) of well below 50 years at birth. As a whole, it appears that mortality levels in sub-Saharan Africa remain the highest in the world and that the countries of the area have made the least progress during recent years in lowering mortality. Moreover, although one finds evidence of slight improvement, there is concern that mortality conditions may have deteriorated in some localities during the past decade. Mortality levels can be determined with a greater degree of confidence for most of Northern Africa. In all but two of the countries, life expectancy currently falls in the medium range of from 50 to 60 years at birth.

The data for Asia also indicate that mortality declines have slowed during recent years. The Asian situation in the early 1970s may be summarized in the following manner: Although six relatively small countries and territories can be placed in the low-mortality category (life expectancy above 60 years), in 11 countries, mostly large and including Bangladesh, India, Indonesia and Pakistan, the mortality level falls in the high category (life expectancy below 50). Another 10 countries, including China, appear to belong in the medium range (life expectancy of 50-60 years).

Among the less developed countries, mortality conditions are best documented in Latin America. By the mid-1970s, only two countries, Bolivia and Haiti, remained in the high-mortality category. Seven countries, most of which are in Central America, fell in the medium range, with a life expectancy of from 50 to 60 years at birth. Brazil and Colombia appear to be about on the line between the medium- and low-mortality zones. All the remaining areas, most notably those in the Caribbean and the three countries of Temperate South America, could be classified as low-mortality areas. Within the low-mortality group, most life expectancies fell within the range of those for more developed countries. However, there has been a marked slow-down in mortality declines during recent years in Latin America.

Data for Cuba are especially interesting in this respect: Cuba currently appears to have the highest life expectancy in Latin America, namely, over 70 years, which makes it the third ranking country in the hemisphere. This achievement is especially impressive because it was brought about primarily through the extension of basic medical and public health services and the improvement of the basic nutritional status. In contrast, Argentina, which may have had the highest life expectancy in Latin America around 1960, currently ranks rather low among the low-mortality countries, and it appears that Argentine life expectancy has declined. In the other countries of Temperate South America, mortality also appears to have ceased declining. The reasons for these recent developments are not known.

Among the more developed countries in the early 1970s, mortality was lower at all ages, on average, in the countries of Northern and Western Europe and in Northern America and Japan, than it was in Southern and Eastern Europe and in the Soviet Union. The greatest variations in age-specific death rates occurred in the first year of life and in age group 1-4 years. The range of infant mortality rates in the early 1970s was, for males, from 9.1 to 42.9 deaths per 1,000 live births, and for females, from 7.5 to 37.6.

Available information for sub-Saharan Africa provides no basis for thinking that there were any significant improvements in infant mortality in the early 1970s. At the national level, rates for virtually all the countries in that region must still be in the range of 200 deaths per 1,000 live births. Rates for Northern Africa all exceed 100. In both Asia and Latin America, the infant mortality rates cover a greater range. In Latin America, the range is from about 30 to fewer than 150, if Bolivia and Haiti are excluded, but up to 160 or 170 if they are included. However, the majority of infant mortality rates in Latin America are well below 100. The range for Asian countries runs from as low as 14 or 15 in Hong Kong and Singapore to possibly 200 or more in Afghanistan and a few other high-mortality areas. In the large populous countries of South Asia, infant mortality rates appear to remain well above 120 deaths per 1,000 live births.

A feature of infant mortality rates that is common to all developing areas where it can be measured properly is an apparent divergence among national levels. In general, rates appear to have dropped more rapidly in the existing low-mortality areas than in high-mortality countries. This assertion applies equally well to childhood mortality rates.

In the developed countries, male mortality rates exceed female rates at all ages. In the early 1970s, the excess male mortality was least among the ages under 5 years and the

oldest ages of 80 years and more. Male mortality rates were proportionately greatest in relation to female rates in the ages from 15 to 29 years. At these ages, male rates were commonly at least twice those of females; and where they were the highest, accidents were the leading cause of death. However, the leading causes of death, regardless of the actual death rates, were the same for males and females. During infancy, the leading causes of death are currently the endogenous causes of the pre-natal and neonatal periods, followed by pneumonia and influenza. From age 1 to the twenties, accidents are usually the leading cause of death, followed by malignant neoplasms. From the twenties through the remainder of the life span, cardio-vascular diseases and malignant neoplasms are the two leading causes of death.

As in the developed countries, male mortality rates in Latin America have been generally higher than female rates at any given age. In contrast, it appears that in certain age groups female mortality exceeds male mortality in parts of both Asia and Northern Africa. In the latter region, female mortality has been consistently found to be higher than male mortality for age group 1-4, for reasons that have not yet been fully explained. Only four Asian countries, all in the medium- and high-mortality ranges, provide sufficiently reliable data to demonstrate conclusively that female mortality exceeds male mortality. The four countries are India, Iraq, Pakistan and Sabah (an area of Malaysia). The reasons for this phenomenon remain obscure but appear to be rooted in cultural attitudes, discrimination against females and the particular hazards of bearing children in such circumstances. In the four countries just mentioned, female mortality is higher than male mortality at most or all ages. However, other than these situations, the common feature of recent data for Asia and Northern Africa show the same excess of male over female mortality to be found in the more developed countries and in Latin America.

Perhaps the most interesting recent development in trends of deaths by cause in the more developed countries has been the decline among the cardio-vascular diseases in the groups aged 35 years or over. It appears as if the reduction in deaths from these diseases is strongly related to campaigns to alert people to the causes of the diseases and of preventive measures they can take.

Despite data limitations, it is clear that the infectious and parasitic diseases—which have been largely eliminated as significant causes of death in the more developed regions—still account for a very large proportion of all deaths in developing countries, especially among the very young. If to these deaths are added those either caused by or associated with nutritional deficiencies, the proportion rises to a sizable majority of all deaths. The number of deaths from the above-mentioned causes can be reduced dramatically at relatively modest costs, and most of them must be characterized as preventable.

International migration

International migration continues to show significant shifts in pattern and direction. Broadly speaking, the current flows may be characterized as predominantly a movement from less developed towards more developed countries, both between and within the developed and developing regions of the world. Secondly, the numerically more important pattern has become one of movement across international boundaries of workers and members of their families, ostensibly (and in the eyes of the sending and receiving Governments) for a temporary stay. Thus, international migration has come to reflect in particular the prevailing international economic order.

Some substantial shifts in patterns of international migration have occurred in the flow of workers into the oil-rich countries of Northern Africa and Middle and Western South Asia. It is estimated that the total number of such workers is currently well in excess of 2 million. Migrants come mostly from countries within those regions, and there are growing numbers from India, Pakistan and elsewhere. In many of the receiving countries, migrant workers comprise a very substantial proportion of the total labour force, between two thirds and one third. It has recently been estimated that the remittances by these workers amount to well over $1 billion per annum, and for many sending countries the amounts received are equivalent to a significant proportion of the cost of all imports—typically running from 7 to 20 per cent.

Another region in which international labour migration has a numerically significant role is Western Africa. Patterns of movement are rather complex but the predominant flow is from countries of the interior towards the coast. During recent years, the migration to the Ivory Coast has been particularly important; over 20 per cent of the current population originated outside the country, over half of the immigrants being from the Upper Volta.

In Latin America, Ecuador and Venezuela have begun to experience significant increases in immigration, some proportion of which is undocumented. There are also notable flows into Argentina.

As of about 1975, the countries of Northern and Western Europe were estimated to have about 14 million aliens in their populations—some 7 per cent of the total. In some individual countries, the percentages were notably higher. The estimated number of immigrants who were temporary workers from outside Northern and Western Europe was about 6.5 million, coming mainly from Southern Europe, Finland, Ireland, Turkey and Northern Africa. However, the inflow of new worker migrants was brought to a nearly complete standstill around 1974 as a result of the economic slow-down and has not been revived. The number of foreign workers has declined since its peak—by about 10 per cent from 1974 to 1976.

It is estimated that there are a significant number of undocumented migrants in the leading countries of labour immigration in Europe. A common conjecture is that there is one undocumented temporary worker for every 10 who are documented; but the number is, of course, impossible to verify.

Over all, as far as Europe is concerned, there has been a decline in the numbers moving internationally. However, there continues to be a flow of emigrants both within Europe and from Europe overseas. For example, Italy and the United Kingdom currently have a net oversea emigration of approximately 25,000-30,000 per annum.

The other developed countries having large-scale international migration—Australia, Canada, New Zealand and the United States of America—have had comparatively little experience with temporary labour migration. New Zealand has had some guest workers from the islands of the Pacific; and the United States has a substantial inflow of undocumented migrants, mainly from Mexico, Colombia and other countries of Central America and the Caribbean, which bears a functional resemblance to temporary labour migration. However, the predominant pattern has continued to be of immigration for the purpose of long-term resettlement.

International migration has had a marked impact on the populations of each of those four countries. In Australia, about 20 per cent of the population are foreign-born; in Canada and New Zealand, approximately 15 per cent, and in the United States of America, about 5 per cent. The United States is estimated to have a net immigration of about 350,000 per annum; Canada, somewhat less than 100,000; Australia, 60,000; and New Zealand, just over 15,000. Undocumented migration has been a matter of policy concern in all of the countries. In the United States, undocumented migrants are thought to comprise some 2-3 per cent of the total population.

Traditionally, these countries drew most of their immigrants from Europe. Beginning somewhere in the 1960s, there was a shift of origin and each began to receive increasing proportions of its immigrants from countries of Africa, Asia and Latin America. All currently receive substantially less than 50 per cent of their immigrants from Europe—between some 40 per cent in Australia and 18 per cent in the United States.

Many developed countries have to some extent been beneficiaries of the inflow of highly trained migrants—the "brain drain". However, prevailing economic conditions and internal policy considerations may currently have the effect of reducing that inflow. In the United States, for example, newly enacted regulations will make it substantially more difficult for foreign medical graduates to enter the country and to practise. In Canada, there has been a reduction in the total number of persons admitted on the basis of their occupational skills.

Urbanization and population distribution

Reflecting high rates of natural increase, the world urban and rural populations alike are growing rapidly. The urban population grew by an estimated 206 million between 1970 and 1975. Of this growth, 31 per cent occurred in more developed regions and 69 per cent in less developed regions. The more rapid urban accretion in less developed regions has raised their urban population slightly above that of the more developed countries in which the urban population constituted 49.2 per cent of the world total in 1975. By the year 2000, this figure is projected to decline to 34.1 per cent as urban growth continues at a more rapid rate in developing countries. In fact, the projected gain of 1,320 million in the urban population of developing countries by 2000 is nearly double the total urban population of more developed countries in 1975 (768 million). In Africa, the

annual urban growth rate of 4.94 per cent is the highest of any major area.

Currently, 85 per cent of the world rural population live in less developed countries, and the figure is projected to increase to 90 per cent by 2000. The projected rural increment of 714 million between 1975 and 2000 in developing countries represents a growth factor of 35 per cent during this quarter of a century. On the other hand, rural populations of more developed countries are in the midst of a slow decline which is projected to continue until the end of the century.

More uncertainty is attached to this projection because of recent indications that urbanization has slowed or even reversed itself in several more developed countries, for example, Japan, Italy, Norway, Sweden and the United States. Many factors have been invoked to account for this "turnround". Continued improvements in transportation and communications may have reduced the economies of agglomerating into very dense aggregates (while the much poorer transport systems of less developed regions offer continued incentives to agglomerate into areas that facilitate face-to-face interaction); an increase in government transfer payments as a fraction of national product may have allowed larger fractions of the population to locate in smaller areas without economic sacrifice; economic recession may have inhibited the formation of new firms, which tend to locate disproportionately in large cities; high-income elasticities of demand for outdoor recreational opportunities may have led increasing fractions to locate outside a metropolis; and governmental deconcentration policies may have had an impact in certain places. Separating these and other influences will prove very difficult and can scarcely begin until the 1980 round of censuses provides more data on the types of cities involved in the turn-round and on its breadth and continuity.

In 1975, an estimated 39.3 per cent of the world population lived in urban areas (67.8 per cent in the more developed regions and 27.9 per cent in the less developed). The average annual gain in the urban percentage between 1975 and 2000 is projected at 0.61 percentage point in less developed regions and 0.50 percentage point in more developed regions. The projected gain for the world as a whole is only 0.48 percentage point. The world is urbanizing less rapidly than either the more developed or the less developed regions simply because regional differentials in rates of demographic growth are giving increasing weight to the less urbanized regions. If the projections prove to be accurate, the next century will begin just after the world population achieves an urban majority; in 2000, the world is projected to be 51.25 per cent urban. Nevertheless, in Eastern and Western Africa, China and South Asia, rural residents are still expected to outnumber urban residents by more than 50 per cent.

Recent estimates prepared by the Population Division of the United Nations Secretariat suggest that the bulk of urban growth in less developed countries results from the natural increase of the urban population. Of the 29 developing countries for which data are sufficient to support an analysis of components of change, an average of 60 per cent of urban growth between the last two censuses was ascribed to this source. The remaining 40 per cent is attributable to net

migration from rural areas and to reclassification of places from rural to urban. The fraction of growth attributable to migration/reclassification appears relatively stable over time, with, perhaps, a slight tendency to decline. In more developed countries, on the other hand, the figures are nearly reversed: an average of 59 per cent of intercensal growth in 20 countries was attributable to migration/reclassification, of which the reclassification component is undoubtedly quite important.

Among developing countries, net rural-urban migration appears to be a more important contributor to urban growth in those countries which are more advanced economically and where economic growth has been relatively rapid. Rural net out-migration is highly and positively correlated with the level of gross national product *per capita*. It is also highly and significantly correlated with the growth rate of labour productivity in agriculture in a country. Viewed in a comparative context, rural-urban migration apparently plays a less erratic and disruptive role in economic and social development than sometimes appears to be the case at a national level.

Urban growth is not evenly distributed among places of different size. Examination of the most recent intercensal growth rates for the 1,338 cities that were larger than 100,000 at the initial census shows that, in more developed countries, city growth rates are negatively related to city size. The most rapidly growing cities are those in the range of 100,000-250,000 population (averaging an annual growth rate of 2.23 per cent), while cities with over 4 million population grow at an average rate of 1.56 per cent. Among less developed countries the pattern is U-shaped, with the fastest growth (3.90-3.95 per cent per annum) occurring in both the smallest and in the largest size categories, and a minimum of 3.08 per cent reached for cities in the range from 1 million to 2 million population.

Far more important than city size as an influence on city growth rates is the population growth rate of the country in which the city is located. The simple correlation between the city growth rate and the national growth rate for these 1,338 cities is 0.50. Within every size class of city, those located in more rapidly growing populations are themselves growing at a faster average rate. In view of the multiple and complex influences on the growth of a particular city, it is perhaps surprising to find any one influence standing out so vividly.

Age structure

A population's age structure is a product of its past history of fertility, mortality and migration. Mortality reductions tend to inflate the fraction of the population who are in the ages of childhood and in the very high ages. Fertility reductions, on the other hand, invariably make a population older and decrease the proportion in the childhood years. In many developing regions, recent fertility declines have more than offset the effects of mortality declines, with the result that the proportion of the population that is below age 15 has fallen. The proportion in this age interval fell between 1970 and 1975 in less developed regions as a whole

and particularly in Latin America and East Asia. However, in Eastern, Western and Southern Africa, the fraction in childhood ages is estimated to have risen during that period, reflecting the effects of mortality declines and in some cases of fertility increases. An increase is also suggested to have occurred in Western South Asia. Although the changes in either direction during a short period are necessarily small and are only suggestive of long-term trends, they are especially noteworthy because they reverse a long-standing history of stability or slight increase in the youthful fraction. For example, between 1950 and 1970, the proportion of the population in less developed regions aged 0-14 increased by 2.2 percentage points.

This recent reversal of long-standing demographic trends is expected to continue and even to accelerate during the remainder of the century. Between 1975 and 2000, the medium-variant projection implies a decline of 6.4 percentage points in the proportion of the population under age 15 in less developed regions. This decline represents 15 per cent of the total population which would have been in this age range in 2000 had the 1975 age distribution been maintained. Between 1985 and 2000, all major less developed regions, including those in Africa, are expected to be sharing in the declining youthful fraction. Virtually all of the youthful loss will be absorbed by the working ages 15-64. The fraction over age 65 is expected to grow by less than 1 percentage point in the last quarter of the century. The result is that the burden of dependency in developing countries is expected to decline continuously for the remainder of the century. In 1975, a person of labour force age ''supported'' an average of 0.80 person outside of labour force age; by 2000, the figure is expected to have declined to 0.64, or by 20 per cent.

Among the more developed countries, the aging of populations has been even more rapid and pronounced. Between 1970 and 1975, the percentage of population in the 0-14 age interval declined from 27.1 to 25.3. This decline of 1.8 percentage points was absorbed in equal parts by the working ages and by ages 65 and over. Although all developed regions experienced a rise in the fraction of aged, the increase was more rapid in Europe than elsewhere. By 1975, the percentage in the retirement years exceeded 13 in Western and Northern Europe, whereas it was still less than 9 in the USSR, in Australia and New Zealand and in Japan. By 2000, the percentage over age 65 is expected to be 12.8 in more developed regions as a whole, compared with 10.4 per cent in 1975.

The age distribution in developed regions is approaching with considerable speed the age distribution of a stationary population with a life expectancy at birth of 70 years. A typical population with this life expectancy at birth and zero growth has about 21 per cent of the population under age 15, 64 per cent aged 15-64 and 15 per cent above age 65. By 2000, the percentages of the population in more developed regions in these intervals are projected to be 22.2, 65.1 and 12.8. In Western Europe, stationarity will be even closer at hand, with corresponding percentages of 18.2, 66.9 and 14.9. The achievement of stationary age distributions, with their attendant problems of reduced intragenerational mobility and increased fraction of retirement-aged

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persons, is for all practical purposes less than a generation away in developed regions.

Demographic aspects of intercountry income distribution

The inequalities in the distribution of world income and population were, as might be anticipated, very striking. In 1975, the poorest 20 per cent of the population of the world, which lived in 12 countries, received only 2 per cent of the income generated in all countries, while a share of 69 per cent accrued to the richest 20 per cent of the people, who lived in 34 countries. By comparing 1960 with 1975 data, the population in the second richest quintile was the only group to experience an increase in share, from 18 per cent in 1960 to 21 per cent in 1975.

The developing economies, with about 71 per cent of the world population, obtained only 18 per cent of world income in 1975. The developed market economies, with 20 per cent of the total population, accounted for 66 per cent of world income and the centrally planned economies of Eastern Europe and the USSR, with 9 per cent of the total world population, had 16 per cent of the income. The average *per capita* income of the developed market economies was about 13 times that of the developing economies; and in the centrally planned economies, the average was about seven times that of the developing countries.

The distribution of income within each of these three broad groups varied substantially. The degree of concentration was high among the centrally planned economies and within this group the *per capita* income in the highest income country was only 1.7 times that of the lowest. For the developed market economies as a whole, there was considerably less concentration, and the *per capita* income of the highest income countries was over six times as large as that of the lowest income. For the developing countries, the differences in *per capita* income were considerably larger. Within this group, the highest quintile received 49 per cent of the group's income; in comparison, the lowest two quintiles accounted for only 7 and 9 per cent, respectively, of the total. The ratio between the *per capita* income of the richest and poorest countries was about 34:1. The findings with respect to the international distribution of income are not significantly different if the effects of the demographic composition (specifically the sex and age structure) are taken into account.

Comparison of selected demographic indicators in 116 countries (population growth, fertility, mortality, adult population ratio and urban population proportion) for different income groups shows for most of these variables a clear dividing line at the income level of $750 *per capita* at 1970 prices: above this level values of demographic variables are, on the whole, typical for countries that have completed the demographic transition; below it the values are more representative of countries at the transitional as well as the pre-transitional stages. Average values of those demographic variables for countries in the income groups immediately below and over $750 are illustrative in this respect (individual readings were weighted by population size):

	Income level	
	$350-749	$750-1 999
Rate of population growth (percentage)	2.80	0.90
Rate of natural increase	2.87	0.95
Total fertility rate (per 1,000)	5 426	2 476
Life expectancy at birth (years)	60.4	70.8
Percentage of persons aged 15-64	53.6	64.3

Furthermore, average values of these variables for groups below or over this income level vary comparatively little, the exception being China. Excluding the latter countries, the range of variation of the indicators is:

	Income level	
	Below $750	$750 and over
Rate of population growth (percentage)	2.50-2.90	0.9
Rate of natural increase	2.61-2.93	0.69-0.95
Number of children per 1,000 women	5 426-5 919	1 994-2 476
Life expectancy at birth (years)	49.9-60.4	70.8-73.1
Adult population ratio (percentage)	52.2-53.9	64.3-64.5

In China, the levels of growth and fertility are well below the average level of other groups with *per capita* income below $750, although the indicators are still substantially different from those typical of high-income countries.

As concerns the proportion of urban population, although it increased in relative terms for successive income groups, mainly at the early and later stages of economic development, no sharp dividing line existed at the $750 income level. Besides, this pattern of change in the proportion of urban population was not significantly associated with any pronounced change in fertility. In fact, the largest decline in fertility (between income groups $350-749 and $750-1,999) was accompanied by only a relatively modest increase in the urban population proportion.

In general, the dividing line of $750 appears to be most significant from a demographic point of view, while the cross-sectional observations would appear to support, to some extent, the theory of demographic transition. On the one hand, for the lower income group with *per capita* income below $750, the results show, excluding China, that the rate of natural increase rose from 2.6 to 2.9 as *per capita* income increased from less than $175 to $175-349 and then to $350-749. The corresponding mortality of these groups decreased substantially: life expectancies at birth rose from 49.9 years to 57.7 and then to 60.4 years. Likewise, fertility decreased in the successive groups, but only slightly, from 5,919 children in the first group to 5,426 in the third. On the other hand, the demographic indicators for the higher income groups, those in the income group $750 and over, are illustrative of the final stages of transition. Mortality, although already low, shows a further moderate decline between the income groups $750-1,999 and $2,000 and over (with life expectancies at birth increasing from 70.8 to 73.1 years) as does fertility (from 2,476 to 2,196 children per 1,000 women). Although the data thus tend to be in conformity with the theory of demographic transition, they only represent the initial and final stages of transition and they do not shed much additional light on the critical phase of accelerated fertility decline.

Although in general the groups and most countries within each of them conform to the patterns described above, a number of countries deviate, revealing levels of demographic variables different from the typical levels observed and suggesting that levels of *per capita* income cannot alone explain differences in demographic behaviour among countries. The most important case in this respect is China, which has low levels of fertility and mortality compared with other countries in the same income brackets. Other cases also exist. Cyprus, Mauritius and Sri Lanka, among others, had comparatively low fertility rates, suggesting that they were already at a more advanced stage of fertility transition than other countries in the same income groups. In contrast, other countries, such as Gabon, Iran, Kuwait, the Libyan Arab Jamahiriya, Saudi Arabia and Venezuela, all of them petroleum-exporting countries, as well as Israel, had comparatively high fertility rates in relation to other countries in their own income groups. These observations emphasize the importance of other development factors with regard to demographic transition.

Despite a more rapid growth of income in the developing countries as a whole, as compared with the developed market economies (but not with respect to the group of centrally planned economies), income growth *per capita* in the developing countries remained below that in the other two groups, owing to higher population growth. During the period 1960-1975, growth of national income in the developing economies was 5.3 per cent per annum, 1.1 percentage points higher than in the developed market economies, but 1.3 percentage points lower than in the centrally planned economies. Population increased at a rate of 2.3 per cent per annum in the developing countries, which was more than twice the rate in the developed market and centrally planned economies. Consequently, the rate of growth of income *per capita* in the developing countries was 2.9 per cent, compared with 3.1 per cent in the developed market economies and 5.5 per cent in the centrally planned economies of Eastern Europe and the Soviet Union. Differentials in *per capita* income levels in absolute terms increased further as annual absolute increments corresponding to those rates were $5, $72 and $52, respectively, on average. It should be noted also that if countries are further divided by their level of *per capita* income in 1975, the differential increase in *per capita* income between 1960 and 1975 becomes even more pronounced.

The comparative deterioration of the relative income in the poorer countries compared with richer countries was associated, to some extent, with changes in demographic patterns, particularly a tendency towards higher population growth in the economically less developed countries and a slowing-down of population growth in the richer countries. For countries with *per capita* income under $750 in 1975 (excluding China), the rate of natural population growth in 1975 was higher than in 1960, with the increment ranging between 0.02 and 0.18 for the different income groups. In contrast, for countries with *per capita* income of $750 or more in 1975, population growth in 1975 was lower than in 1960, with changes in a range between –0.18 and –0.57 for the different income groups.

Association between levels and trends of fertility and of socio-economic variables in developing countries

Some further insight on the associations between socio-economic and demographic variables, specifically fertility, is provided by a comparison carried out of the evolution of fertility and of socio-economic development in developing countries in the period 1960-1975. For this comparison, 12 variables associated with socio-economic development, grouped into five broad categories, were selected. These variables are:

(*a*) *Mortality indicators:* life expectancy at birth; infant mortality rates;

(*b*) *Education indicators:* proportion literate among the population aged 15 years and over; school enrolment ratio, first plus second levels for both sexes;

(*c*) *Status of women indicators:* ratio of the proportion of females literate to the proportion of males literate aged 15 years and over; ratio of the female school enrolment ratio to the male school enrolment ratio; proportion ever married of women aged 15-19 years; proportion of women in the non-agricultural, economically active population;

(*d*) *Income indicators:* gross domestic product *per capita;* share of the poorer 40 per cent of the population in gross domestic product;

(*e*) *Urban rural indicators:* proportion of the total population in urban areas; proportion of economically active males in non-agricultural activities.

Information on fertility for the period 1960-1975 was found for 87 developing countries, but 38 among those countries had only one fertility observation during the period, and the detailed analysis was made only for the 49 remaining countries, i.e., those for which it was possible to compute a fertility trend by taking the average annual change in the gross reproduction rate between the two extreme dates for which observations existed. Of these 49 countries, 14 are in Africa, 20 in Latin America and 15 in Asia.

It should be mentioned that an inherent bias exists in an analysis based on actual observations of indicators because such observations are more likely to exist in countries at a more advanced stage of development. The differences in the indicators were substantial between countries that, for the period under consideration, had two or more estimates of fertility and those for which only one estimate existed. Only income distribution and male non-agricultural labour do not show a marked difference. Similar results are obtained when the criterion is the existence of data on changes and levels of the socio-economic variables.

Within the countries for which data were available, the analysis suggested that for the period covered little relationship appears to exist between changes in fertility, on the one hand, and changes in socio-economic factors, on the other. The same premise holds for the relationship between changes in fertility and levels of socio-economic variables, but the evidence regarding the existence of a relationship is much stronger as far as levels of fertility and levels of socio-economic variables are concerned. The results would thus seem to indicate that if there is any relationship between

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fertility and socio-economic variables, on a cross-country basis, it is between the levels of these variables that the relationship exists and not between their trends. These results should, however, be used with caution because of the questionable accuracy of the data on changes and also because in many cases the changes, particularly fertility changes, were very small.

For the period 1960-1975, the data analysed thus suggest that changes in fertility may have occurred in most cases independently of socio-economic change. Fertility changes in 1960-1975 show a moderately strong negative relationship with only two variables, the proportion of women in the non-agricultural labour force and the proportion literate among the population aged 15 years and over. Weaker or virtually no relationships appeared to exist between changes in the gross reproduction rate and changes in other socio-economic variables selected.

As in the case of changes, the results suggest only a weak relationship between changes in fertility and levels of socio-economic variables, even though, on the whole, correlation coefficients in the latter case are a little higher. A moderately strong relationship was found between fertility change and levels of two socio-economic variables, infant mortality and life expectancy. Weaker associations were found for gross domestic product *per capita* and the proportion literate among the population aged 15 years and over. Values of all other correlation coefficients are lower.

The strongest relationship shown by the data exists between levels of fertility and levels of socio-economic variables: for eight socio-economic variables, the absolute values of the correlation coefficient between their levels and the gross reproduction rate are over 0.5. The variables, in order of magnitude of the apparent associations, are level of infant mortality, life expectancy, proportion of economically active males in non-agricultural activities, proportion literate among the population aged 15 years and over, gross domestic product *per capita*, proportion urban of the total population, share of the poorer 40 per cent in gross domestic product and proportion ever married of women aged 15-19 years. The other correlation coefficients are below 0.5 but over 0.4 in absolute value, except in the case of the proportion of women in the non-agricultural economically active population, which has a very low correlation coefficient.

It is thus clear that the relationship between levels and changes of fertility and the different groups of socio-economic indicators mentioned above does not show a systematic pattern. The change in the proportion of women in the non-agricultural economically active population (as an indicator of status of women) had the highest correlation coefficient with change in the gross reproduction rate, but neither its level—nor that of any other of the indicators of status of women—revealed any relationship with changes or levels of that rate. On the other hand, changes in the two mortality indicators (life expectancy and infant mortality) were virtually unrelated to changes in the gross reproduction rate, but their levels showed a strong or moderately strong relationship with both changes and levels of fertility. Of the education indicators, changes in the proportion literate among the population aged 15 years and over were

moderately strong related with changes in fertility and levels of the same with levels of fertility, but the relation between levels of proportion literate and change in fertility was weak. Of the economic indicators, changes and levels in the gross domestic product *per capita* were weakly related to changes in fertility, but a moderately strong relationship existed with regard to levels of the gross domestic product *per capita* and the gross reproduction rate. Lastly, of the urban/rural indicators, only the level of proportion of economically active males in non-agricultural activities was moderately strong related with the fertility level, but neither levels nor changes in this socio-economic variable were related to fertility change.

In the long run, of course, it is not possible to maintain a relationship between levels of fertility and development unless changes in these variables are also related to one another. The main point to be drawn from the present data and their analysis is that short-run changes in these variables are currently loosely related and allow considerable scope for other factors to influence fertility.

Female participation in economic activity

Considering that in the process of women's integration into development the role of women's employment is crucial, it is significant that growth of female participation in the labour force has been one of the most important factors in labour force trends in the past decade and a half or so. According to estimates prepared by the International Labour Organisation (ILO), between 1950 and 1975 the female labour force increased at an average annual rate of 2.1 per cent, compared with a corresponding rate of male labour force increase of 1.4 per cent. As a result, the proportion of females in the total labour force increased from 31.3 to 34.9 per cent and the female crude activity rate from 27.5 to 29.0 per cent between 1950 and 1975.

The more rapid growth of female labour force was found in both more developed and less developed regions. According to the same data cited above, the average annual rates of labour force growth were 1.4 and 2.5 per cent, respectively, for more developed and less developed regions, compared with 0.9 and 1.6 per cent, respectively, among the male labour force. The share of the females in the total labour force increased between 1950 and 1975 from 36.7 to 39.7 per cent in the more developed regions and from 28.2 and 32.7 per cent in the less developed regions.

These trends in female participation, in turn, have been associated with changing patterns in participation rates, affecting, in particular, participation rates in the intermediate age groups (25-54 years). Whereas, according to the ILO estimates, for 1950 and 1975 participation rates for females in the younger and more advanced age groups did not change much (except for a decline in participation rates for girls and young women at ages below 25 in the more developed regions), substantial increases were found in both more developed and less developed regions in the extent of participation of the central ages. In the more developed regions, participation rates for women in this age group rose

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from 20.6 per cent in 1950 to 25.9 per cent in 1975, whereas in the less developed regions, the increase over this period was from 14.5 to 18.0 per cent.

Significant shifts also took place in the industrial structure of the female labour force. Between 1950 and 1970, in both more developed and less developed regions, according to the ILO estimates, the proportion of the female labour force in secondary sectors (industry) and tertiary sectors (services) increased. However, while in the more developed regions the proportion in the tertiary sectors rose most steeply (from 34.4 per cent in 1950 to 52.3 per cent in 1970), in the less developed regions the most pronounced increase occurred in the secondary sectors (where the proportion increased from a low 5.6 to 12.4 per cent). In contrast with trends in the secondary and tertiary sectors, the proportion of active women engaged in agriculture declined in both groups of countries (with a pronounced fall from 44.9 to 20.3 per cent in the more developed regions and from 85.8 to 73.8 per cent in the less developed regions). Note should be taken, however, that levels and patterns of female participation varied considerably between countries and groups of countries. Considerable differences exist in sex and age patterns as well as in patterns of participation by marital status.

Population, food and nutrition

The situation in the critical area of food production is unsatisfactory in that the rate of growth of food production in the developing world during the 1970s has slowed to a point where it is barely higher than the growth rate of population. The annual growth rate of food production *per capita* in the developing countries, which was 0.7 per cent in the 1960s, declined to 0.3 per cent during the period 1970-1976. In Africa, where there was very little growth *per capita* in the 1960s (only 0.1 per cent per annum), the rate of food production in the 1970s has fallen back to less than half its value in the decade of the 1960s, thus causing an actual change in production *per capita* at an annual rate amounting to –1.4 per cent between 1970 and 1976. The developed countries, on the other hand, maintained in the 1970s the same rate of the 1960s, namely, 1.4 per cent.

In the developing countries, there was a significant recovery in food production beginning in 1973—and particularly in 1975 and 1976—after the set-backs caused by bad weather in 1971 and 1972. However, data for 1977 prepared by the Food and Agriculture Organization of the United Nations (FAO) indicate that the situation has not improved and in fact there was a 1 per cent decline in food production *per capita* from 1976. A decline of 2-3 per cent was observed in all developing regions, except the Far East[2] (developing market economies in South and East Asia), where the positive trend was mainly the result of gains in India. The situation appears especially critical in Africa, where the index of food production *per capita* is more than 10 per cent lower than in 1961-1965 and has reached its

lowest point since the Sahelian drought in 1973. Disaggregating the data by countries indicates the serious problems experienced by a number of countries. During the 1960s, 56 of 128 developing countries experienced population growth rates higher than those of food production. During the 1970s, the number of such countries not only rose to 69 but they currently include such large countries as Egypt, India, Mexico and Pakistan. The trends in production of cereals, the most important of food groups, were generally similar to the above-mentioned trends.

Food balance-sheets prepared by FAO for 162 countries make it possible to compare food supply and requirements in terms of calories in various regions. Although data for 1975/76 are not yet available, it is evident that at the world level there has been a slow but steady improvement in calorie supply, from 2,410 kilocalories daily in 1961-1963 to 2,550 in 1972-1974, and in meeting the calorie requirement (from 101 per cent in the former period to 107 in the latter). This trend is observed in the developing countries as a whole, although requirements have not yet been met since in 1972-1974 the supply was only 96 per cent of requirement. In fact, the excess at the world level arises from a 32 per cent excess of supply over requirement in the developed countries. The difference in supply of protein between developed and developing countries as a whole was even larger than that for calories, and the *per capita* supply in the latter was only 58 per cent of that in developed countries, with that proportion remaining almost unchanged between 1961 and 1974.

The foregoing discussion shows that, in terms of world average, available food supplies can be adequate for satisfying needs. There is a vast disparity, however, among regions and countries in food supply *per capita;* and there are many developing countries, notably in Africa, where supply is far below nutritional requirements. Within countries, the insufficiency of food affects several sectors as a result of considerable unevenness of distribution among different socio-economic groups. Available data invariably show that the poorer generally have access to smaller amounts of food. In fact, the insufficient effective demand resulting from low income can explain in part the low food production in some countries. It should also be mentioned in this regard that the low productivity of agricultural workers in many developing countries, although primarily due to technique and input, is influenced by the low caloric intake of the workers, creating, therefore, a vicious circle of low income/low demand/low production.

From a nutritional standpoint, infants, children and pregnant or lactating women are particularly vulnerable to dangers of inadequate food supply. Indeed, poor nutrition of women of gestational age is reflected in the low weight of the child at birth and subsequently in the high degree of infant mortality. It is estimated that about one sixth of the live births in the world are below the World Health Organization (WHO) standard which distinguishes normal from low birth weight, namely, 2,500 grams; and that roughly 95 per cent of all low birth-weight babies are born in developing countries. Regional averages are particularly significant in this respect: although live births below this limit amount to 4 per cent of all live births in Northern Europe and 7 per

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[2] Regional groupings used by the Food and Agriculture Organization of the United Nations do not differ greatly from the major-area groupings established by the Population Division of the United Nations Secretariat (see foot-note 1).

cent in Western Europe and Northern America, the percentage is as high as 30 in South Asia.

Malnutrition is seldom seen during the first six months of life for a breast-fed infant. The decline of breast-feeding, both in proportion of mothers who breast-feed and in the duration of breast-feeding, has a serious impact on child malnutrition. Beyond the first six months, however, inadequate food supplementation of breast milk, coupled with exposure to infection, is responsible for impaired growth in a good proportion of children in developing regions. Protein-energy malnutrition occurs particularly at weaning age in the second year. Though data are not available for many countries, recent studies indicate that the percentage of children under 5 years of age suffering from this malnutrition is as high as 30 or 40, or more, in some countries of Africa, Middle America and the Caribbean; and, perhaps, even above 50 in some South Asian countries. The end result of severe malnutrition for many children is death. If data for Latin America can be generalized, nutritional deficiency is a factor in, perhaps, more than 60 per cent of all deaths from infectious diseases.

The FAO estimates of the number of persons undernourished in the developing countries, derived on the basis of data relating to the distribution of food supplies and a critical (subsistence) limit of food intake set at 1.2 times the basic metabolic rate, indicate that in 1972-1979, there were about 450 million persons with food intake below this critical limit in the developing countries, excluding the centrally planned economies of Asia. This figure amounts to 25 per cent of the total population in these regions. Among the vulnerable young children, however, it was estimated that up to 50 per cent may be undernourished.

Population and education

An important illustration of the impact of demographic trends on education, and a fact for which the effect on the educational status of population in developing countries is to be reckoned, is that despite a considerable increase in primary and secondary school enrolment, the numbers of those who are not in school have not yet begun to decline and, in fact, are still showing a slight increase. Data prepared by the United Nations Educational, Scientific and Cultural Organization (UNESCO) show that among children aged 6-11 years, although enrolment increased impressively from 46 to 62 per cent between 1960 and 1975, the numbers of those out of school rose from 110 million to 121 million, resulting in an addition of 11 million to the number of illiterates. This situation reflects clearly the effect of population growth in Africa and South Asia: in Africa, enrolment at these ages increased from 33 to 51 per cent and the number out of school from 29.1 million to 31.6 million; and in South Asia, while enrolment increased from 48 to 61 per cent, the number of children aged 6-11 years who are out of school increased from 65.7 million to 77.2 million. In Latin America, on the other hand, progress in enrolment has outpaced population growth, and the number out of school declined from 14 million to 11 million between 1960 and 1975. (China and two other East Asian countries are not included in these figures.)

Among those aged 12-17 years, enrolment in Africa, South Asia and Latin America increased, again impressively, from 22 to 35 per cent; yet, the numbers of those out of school rose from 131 million to 173 million. Failure of enrolment to keep pace with population increase in this age group was observed in each of these three areas. Note should be taken that during the same period the developed countries were able to further increase their enrolment ratios and reduce the numbers of out of school, in both age groups.

The future impact of population growth on enrolment is also very sobering. Even if no consideration is given to the aspirations of countries for raising enrolment, the developing countries of Africa, South Asia and Latin America would have to add before the end of this century three places to every four that now exist in their primary schools (children aged 6-11 years) in order simply to maintain the 1975 enrolment ratios. The required increase is estimated to be 63 per cent in South Asia, 75 in Latin America and as high as 107 in Africa. Needless to say, when efforts are concentrated on trying to ascertain minimum education for as large an enrolment as possible, little is left for improving the quality of education. It should be mentioned in this regard that when a fertility decline took place in some countries, educational expenditure was not curtailed but was diverted from expansion to improvement of the system.

Population structure not only determines the relative proportions of the population requiring education and training and is a factor in determining some of the needed skills but determines the educational dependency ratio, expressed as pupils per working person, which is a determinant of the potential of a country for supporting education. In the developing countries, due essentially to their young age structure, this ratio in 1965 was almost equal to that of the developed countries (281 and 295, respectively, per 1,000 working persons). Between 1965 and 1975, while the "burden" decreased for the latter countries (to 258), it increased considerably for the former (to 338). The continuation of current trends would lead to a widening of the gap by 1985, according to projections prepared by UNESCO.

The impact of education on population variables is far from being clearly understood. The difficulty lies in the interrelatedness of a whole complex of social and economic factors influencing demographic behaviour. Thus, although the association between women's education and fertility is generally (but not universally) negative, the observed pattern of association shows considerable variation among different communities where fertility is high. These patterns are more consistent, however, in countries with a fertility decline under way. In these countries, the negative relationship pattern is observed, although there are differences regarding the level of education at which the decline is significant. The same complexity exists in the case of the relationship between education and age at marriage. There is fairly substantial evidence of a negative relationship, but the relationship is far from being simple. It is true that education tends to lead to postponement of marriage, but cultural factors can also be very influential in this regard since in many communities where early marriage is encouraged, higher education is discouraged.

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Migration and education in developing countries have clearer relationship in that, in general, rural-to-urban migrants have a higher level of education than the average in the place of origin; and, as various studies in Africa, Asia and Latin America have shown, the propensity to migrate tends to be positively related with level of education and, indeed, lack of educational facilities is one of the motivating factors for out-migration. On the other hand, immigrants usually have less education than the population in the area of destination, although there are situations where the migrants have higher proportions at both ends of the educational scale. This is not to deny the importance of other factors correlated with education, such as occupation, income and unemployment.

POPULATION POLICIES

The great majority of Governments, whether of developed countries or developing countries, consider that controlling the components of their population trends is of vital importance to the future success of their development plans. Governments realize, however, that they have population problems which are not limited to population growth. Thus, of all demographic variables, spatial distribution is identified by almost all Governments as an important problem, and two thirds of the developing countries find that their mortality levels constitute an impediment to their development. They also realize that fertility problems are not limited to the global aspects and effect on population growth; the individual aspects, those relating to the individual's rights, are also very important. National recognition of the importance of population and of its close relationship with economic and social development has been accompanied by a growing awareness of the possible international consequences of national population policies.

It is important to take note also that of all demographic variables (growth, fertility, mortality, spatial distribution and international migration), spatial distribution is the variable most frequently mentioned as the source of serious development problems. Only six developing countries and 13 developed countries failed to identify it as such. The remaining 139 countries all refer to problems arising from the current geographical distribution of the population. This statement should not be interpreted to mean that this variable is the most serious of all demographic variables since its impact clearly has varying degrees of seriousness. The next variable most frequently identified by the developing countries is mortality—two thirds of the Governments of these countries referred to it but no Government of a developed country mentioned this variable as a cause of development problems. Another important observation is that, in their perception of demographic variables as obstacles to development, Governments do not usually identify just one variable; three quarters of all Governments mention between two and four variables, and Governments of 14 developing countries mentioned all five variables as being obstacles.

The following brief analysis of governmental views and policies concerning the various demographic variables is based on information derived from official sources: replies to the Fourth United Nations Inquiry among Governments, which dealt with population policies and with the review and appraisal of the World Population Plan of Action; official statements or documents; national development plans etc. The analysis covers the 158 countries which are Members of the United Nations or Members of the specialized agencies of the United Nations.

Growth rates

The trend in the rate of population growth is a main concern of most Governments in both the developing and the developed countries. The importance of governmental action in this area is now more and more widely recognized. It is significant that all Governments consider their rate of growth to be an advantage, major or minor, in the achievement of their development objectives. More than half of the 42 developed countries (including about 70 per cent of their total population) considered the advantage to be major, but only about one third of the 116 developing countries (having only 7 per cent of their total population) shared this view.

The differences between the developed and the developing countries are striking with regard to the disadvantages. While fewer than one fifth of the developed countries (comprising only 9 per cent of their population) considered the disadvantages to be major, half of the developing countries (including more than 80 per cent of their total population) had a negative view. The differences between the developed and the developing countries in this regard can be summarized by saying that 85 per cent of the population of the former countries, compared with only 17 per cent of the population of the latter, lived in countries that considered that the advantages outweighed the disadvantages. The great majority in the developing countries, over 82 per cent of their total population, had Governments' opinions outweighing the disadvantages. The corresponding proportion among the population of the developed countries was only 9 per cent.

The reasons Governments gave for their over-all views of the net advantages compared with the disadvantages, and vice versa, also varied considerably between the two groups of countries. While the developed countries, which have little population growth and in some cases zero or even negative growth, tended to emphasize the disadvantages deriving from the shortage of manpower, the developing countries frequently referred to such disadvantages as unemployment, difficulty in providing efficient public services, exhaustion of natural resources and great difficulty in ensuring adequate rates of savings and investment. Nevertheless, the majority of both the developed and the developing countries agreed on the need for a degree of demographic vitality in order to maintain their national identity.

With regard to desirability of a change in the rate of growth, none of the developed countries wanted a lower rate, while 45 developing countries (including 80 per cent of their population) were of this opinion. On the other hand, 13 out of 42 developed countries (having a little less than 40 per cent of the population) would like a higher rate, com-

pared with only one fifth of the developing countries (with only 3 per cent of their total population). Countries satisfied with their current rates included 29 developed countries (comprising over 60 per cent of the population) and 48 developing (with only 18 per cent of the population). The region served by the Economic and Social Commission for Asia and the Pacific (ESCAP) is that where most concern about rapid population growth was expressed: 90 per cent of the population of this region lived in countries in which the Governments expressed a desire for a lower rate, compared with 33 per cent in each of Latin America and Africa, and nil in Western South Asia.

Of the 158 countries, 136 considered the rate of increase a source of problems of varying degrees of seriousness. Governmental action in this regard can focus either on the demographic variables themselves or on changing the economic and social conditions and thereby indirectly producing a demographic change. The demographic variable on which action is most frequently taken in this connexion is spatial distribution, which was mentioned by three quarters of the countries, almost 100 of which are developing. The second is international migration, mentioned by 81 countries, 62 of them developing countries; and the third is fertility, mentioned by 75 countries, of which 58 are developing countries. The importance Governments give to action on development, which is expected to have demographic impact, is clearly demonstrated by the very high frequency with which Governments reported action in this respect: 128 countries, of which 104 are developing. It is also interesting to note the emphasis placed by Governments on demographic action compared with non-demographic action. Only 19 countries, of which 13 are developing, have policies in which non-demographic action predominates although they still employ limited demographic action; and another 18 countries, of which 12 are developing, have policies in which action on demographic factors predominates. The majority—99 countries, including 81 developing countries—have policies that place equal emphasis on both types of action.

It should be mentioned that action on demographic variables directed towards solving problems arising from the rate of growth is usually directed to more than one variable simultaneously. Thus, in the developing countries, while no action was reported on that rate of natural increase alone, 70 of these countries have intervened on this variable combined with the geographical distribution. The corresponding figures for the developed countries are 2 and 16, respectively.

Between 1976 and 1978, a number of changes took place in the views of Governments concerning the rate of growth. Several developed countries changed their view from "higher rate desirable" to "rate satisfactory"; this was true of Finland, Greece and Ireland. On the other hand, such countries as France, the Federal Republic of Germany and Switzerland displayed growing concern over their rates, which they considered too low. Although some countries, for example, Canada and the Netherlands, viewed their rates as satisfactory and continued to avoid intervening on them, they adopted a "wait-and-see" attitude, keeping open the possibility of taking action in the future. Among

the developing countries, several interesting changes occurred. Several of the countries that formerly considered a "lower rate desirable" now view it as satisfactory as a result of the success of their policies or of a spontaneous trend considered favourable. This is true of Colombia, Ecuador, Panama and Malaysia. In Africa, although Madagascar, Senegal and Sierra Leone now consider their rate satisfactory, they still believe that the rates observed cause certain problems. On the other hand, Guinea, which had considered its rate satisfactory, stated in 1978 that a higher rate was desirable and adopted measures to that end. The only developing country that has reversed its view is Bolivia, which considered in 1978 that a higher rate was desirable but previously had expressed the desirability of a lower rate. This change was brought about by the results of the most recent census which gave a population size far below the forecasts.

Mortality

Several Governments consider that mortality policy has explicitly demographic implications in addition to its implications for health and well-being. These Governments belong to countries for which growth rates are considered too low, and they are located in both the developed and the developing regions. It should be mentioned that no Government considered the current level of mortality to be totally satisfactory. However, some stated that in the circumstances and under the constraints affecting mortality, the level achieved was acceptable.

As might be expected, all but two of the 56 countries having a life expectancy at birth below 50 years and 24 of the 32 with a life expectancy of from 50 to 60 years said that this level was unacceptable. At the other end, though a life expectancy at birth of 70 years or more is quite high by international standards, seven of the 37 Governments whose countries belonged to that category still found this level unacceptable. Africa is the major area where unacceptability of the level of mortality is dominant—47 of 50 countries.

It currently appears very doubtful that the mortality targets set in the World Population Plan of Action for the year 1985 will be met. Actually, according to the targets set by Governments, in 1985 there will still be 34 countries, having 6 per cent of the world population, with life expectancies below the minimum level of 50 years given in paragraph 23 of the Plan of Action. Another 39 countries, having 36 per cent of the world population, find that their resources will not enable them to reach by 1985 the level of 62 years referred to in the Plan of Action as desirable for the world in that year.

The slow-down of progress in reduction of mortality has caused concern, both national and international, during the past few years. A closer look at the strategies was taken at the International Conference on Primary Health Care, held at Alma-Ata, USSR, from 6 to 12 September 1978, and its recommendations emphasize the need for health education; choice of the measures best suited to the needs of the society not only at the technical level but at the social and cultural levels; and giving the highest priority to the neediest and the

underprivileged, such as children, women and the rural population; and the inclusion of birth control services in maternal and child care. The inclusion of these multidisciplinary aspects reflects a clear attempt at giving new impetus to the decline of mortality. There is also evidence of more emphasis being given by developed countries to health education programmes focusing on certain diseases. It now appears that the reduction in deaths from cardio-vascular diseases is strongly related to campaigns to alert the public to the causes and to the preventive measures they can take. Campaigns designed to point out the dangers of smoking and improper dietary and exercise habits appear to have been particularly effective.

Fertility

Governments consider their action on fertility from two standpoints: its effect on the rate of growth; and its importance to the individual in terms of well-being, human rights and health. The policies adopted vary according to the standpoint. The view Governments adopt towards fertility as a major component of the rate of growth is clearly linked closely to their view concerning the level of this rate and the desirability of a change. However, the correlation is not complete because some countries prefer to take action on mortality or on migration rather than on fertility. In summary, 22 countries (including 10 developed) consider their fertility rate "too low"; 83 (including 31 developed) consider it "satisfactory"; and 53 (including one developed) consider it too high.

It should be stated in this respect that it is only in the regions of the Economic Commission for Europe (ECE) and the Economic Commission for Western Asia (ECWA) that satisfaction with the fertility level is the dominant view (28 of 39 countries in the former region and 9 of 12 in the latter). In Africa, although half of the 50 Governments are satisfied with the current level, six consider the rate too low and 19 consider it too high. The majority in Latin America and in the ESCAP region (14 of 27 countries in the former region and 17 of 30 in the latter) are unsatisfied with the rate and find it "too high". However, 10 countries in the former region and 11 in the latter are satisfied with the fertility rate.

The fact that 83 Governments find the current fertility rate satisfactory is the main reason that 82 Governments (including 22 in developed countries) have no policies of intervention to alter the fertility level in their countries. It should be mentioned, however, that some Governments refrain from intervening to change an unsatisfactory rate for reasons of timeliness or effectiveness. The remainder are broken down in the following manner by objectives: 17 countries (9 developed) have policies to increase fertility; 21 countries (11 developed) to maintain it; and 38, all developing, to reduce it. The picture is different when the population size is taken into consideration since in this case one finds that more than half of the world population live in countries with policies directed towards reducing fertility and 30 per cent in countries where the Governments do not want to intervene. Only 3 per cent of the world population live in countries where the Governments have policies directed towards increasing fertility and 10 per cent in countries with policies designed to maintain the current level.

Because of the multiplicity and complexity of factors influencing fertility, Governments usually find realistic target-setting a much more difficult task with respect to fertility than mortality, although such targets have great significance, both nationally and internationally. For this reason, of the 38 developing countries that have adopted policies to reduce the birth rate, only about 20 have set targets in terms of quantities and dates. In the developed countries, targets are frequently adopted where fertility is considered too low, as in many countries of Eastern Europe and in Finland and France. Some other countries, Japan and the Netherlands, for instance, expressed their targets in such less specific terms as "a stationary population situation".

Access to modern contraceptives is no longer a politically controversial issue in the great majority of countries: there are only 14 countries, of which six are developed, in which the Governments have a policy of restricting such access. Clearly, all Governments that have adopted policies intended to lower fertility have no restricting policies. Furthermore, even among Governments desiring to increase fertility or to maintain its current level, the great majority do not restrict access to contraceptives; this standpoint, as mentioned above, derives from a realization on the part of Governments of the importance to the individuals of controlling fertility when the need arises. Among the developing countries, direct governmental support to accessibility of contraceptives is provided in 72 of the 116 countries; and in 13 countries, support is indirect.

A number of very significant changes in views and policies took place between 1976 and 1978. Several countries, including Colombia, Ecuador and Panama in Latin America and Malaysia in Asia, changed their assessment of the fertility rate from "too high" to "satisfactory". Bolivia, as mentioned earlier, changed its view from "rate too high" to "rate too low"; and Guinea and Iraq adopted this latter opinion, whereas previously they had considered the rate "satisfactory". Jordan said for the first time that its fertility rate was too high. Among the developed countries, Finland, which was satisfied with the effect of its policy, adopted a "satisfactory" view, as Czechoslovakia and Hungary had done previously for the same reason.

Changes in views brought about changes in policies. Thus, some countries, such as Guinea and Iraq, decided to institute programmes in order to raise the level of fertility. Colombia, on the other hand, abandoned the programme it had instituted several years ago because it was satisfied with the results achieved. India, which had attracted attention with its extremely vigorous campaign to lower the birth rate and the more or less compulsory sterilization measures implemented during that period, abandoned all coercive methods. Emphasis was placed on voluntary measures and, while the quantitative objective of lowering fertility was retained, the target was revised downward: it was set at 30 births per 1,000 by 1983 whereas previously it had been 25 per 1,000 by 1985. The birth rate currently is 35 per 1,000. In China, the Government had said at the beginning of 1978 that it wanted to achieve a population growth rate of less than 1 per cent by 1981.

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In the developed countries, even those Governments which were satisfied with their growth rate—for example, Finland—mentioned the need to maintain some incentives as a precautionary measure. Other Governments, such as Canada and the Netherlands, said that they would take action if the fertility rate continued to decline. Lastly, acting from the standpoint of support for the individual well-being aspects rather than that of concern for the demographic aspects, Spain rescinded its restrictive measures with respect to the distribution of modern methods of contraception; and Brazil and Nigeria increased their support to organizations that provide assistance for the distribution of contraceptive methods, although they did not institute policies directed towards reducing the fertility of the population.

Spatial distribution and internal migration

In 1978, as in 1976, the one area in which the largest number of Governments did not accept the situation was that of the spatial distribution of the population and internal migration. The results of the 1978 study show that only 19 countries, mostly developed, found the spatial distribution acceptable. The rest considered the situation either "unacceptable to a large extent" (73 countries, the vast majority of which, 68 countries, are developing) or "unacceptable to a certain extent" (66 countries, of which 42 are developing). The reasons behind this highly unsatisfactory situation in the developing countries are found in the enormous migration from rural to urban areas in search of employment and the imbalance between the size and structure of the urban population and the services available. Thus, 76 of the developing countries wanted to slow this migration and 14 to reverse it. The corresponding figures for the developed countries are 23 and 6, respectively.

A spatial distribution policy, like other population policies, can have an impact on other demographic variables. This is true, in particular, of many of the developing countries, which, having a high rate of growth, thought that by redistributing the population they could improve the utilization of natural resources and thereby reduce the negative effects of the growth. Changes in the socio-economic conditions of the migrants or of the areas of emigration can also have an impact on fertility and mortality.

With regard to policies directed towards changing the urban and rural structure of the population, it is significant that some 50 developing countries want to change both the urban and rural structures and another 30 would like to change the rural structure alone. Among developed countries, action is generally focused on urban areas, and more

than half of these countries have policies designed to change the urban structure. Among policies recently adopted, it is interesting to note that Viet Nam announced its adoption of a policy directed towards redistributing its population and relieving the urban swell; Malaysia stepped up its policy establishing and developing new urban centres and Papua New Guinea formulated a policy to develop urban centres in order to combat the excessive growth of the capital. Nigeria also announced a new policy of decentralization simultaneously with the establishment of a new federal capital in the interior of the country. Such countries as Spain and Turkey appeared to emphasize rural development, which had been somewhat neglected previously in favour of urban development. Others, including Canada, Finland, New Zealand and Switzerland, developed a series of measures to encourage better balanced regional development. In the countries of Eastern Europe, an effort was made to the same end; for example, the German Democratic Republic adopted more vigorous measures to encourage university graduates and skilled workers to settle in those regions which the Government wanted to develop as a priority.

International migration

The demographic importance of international migration is restricted in the sense that it has significant levels only in a limited number of countries: one quarter of all countries found immigration to be demographically important; and one third expressed this opinion concerning emigration. However, for the countries involved, international migration can be an issue of great economic, social and demographic importance. It should also be mentioned that, apart from the demographic importance, immigration of skilled manpower has become an issue for which governmental concern is much more widespread than the above proportions would indicate.

The concern among some developed countries about the large numbers of immigrant labourers and their families who were moving in until recently is reflected in the data on official policies with respect to immigration. The data show that of the 15 countries that have such policies, 11 have policies directed towards reducing future flows. It is also perhaps somewhat surprising that emigration is still found demographically significant in 11 developed countries, eight of which find the level unsatisfactory because it is too high and have policies designed to reduce future emigration. Among developing countries, more concern has been expressed about the high level of emigration than about its low level. In fact, of the 44 countries that found emigration significant, 17 were dissatisfied because the level was too high while only four were dissatisfied because it was too low.
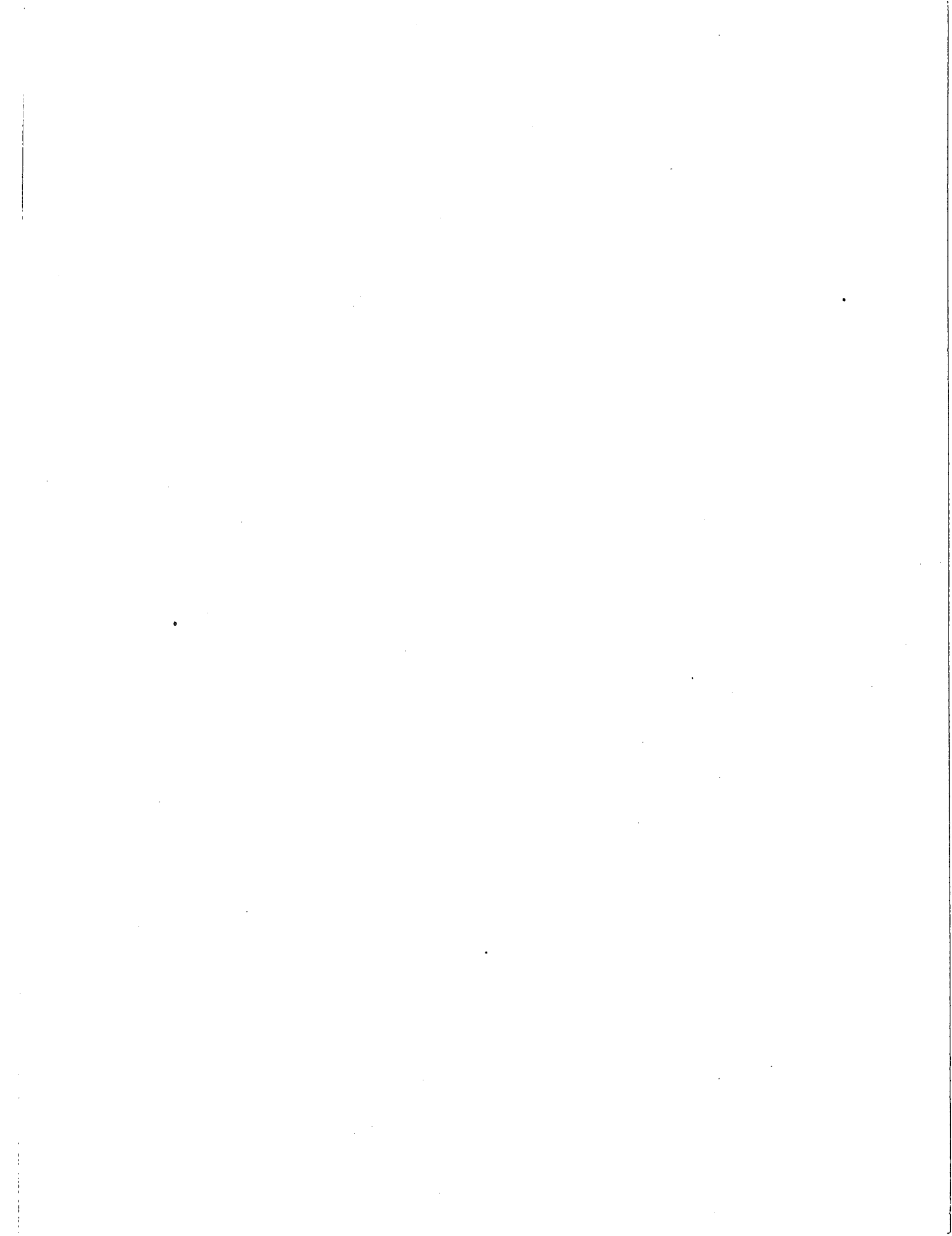
Part One

RECENT DEMOGRAPHIC TRENDS

Chapter I

WORLD AND REGIONAL POPULATION GROWTH*

The United Nations world population estimates and projections have recently been revised, taking into consideration all demographic information that has become available since the previous assessment in 1973. According to the provisional results of the revision, the total population of the world in 1975, the bench-mark year, is estimated at 4,033 million, with an annual growth rate of 1.8 per cent. According to these estimates, the world population as of the beginning of 1979 was about 4,300 million. In comparison with the estimates previously given in 1973, the revised figures for 1975 represent an increase of 65 million in the total population and a reduction of the average growth rate for 1975-1980 of 0.14 per cent.

As is well known, any world population estimate is liable to a considerable degree of uncertainty due to the limitations of available demographic data. Apart from the few countries that have never taken a national population census, many countries can only supply demographic data that are either outdated or unreliable. For example, China, the most populous country in the world, has not taken a population census since 1953, leaving much room for speculation as to the magnitude of population increase since then. In Nigeria, the largest country in Africa, the results of the new population census of 1973, which were inconsistent with previous census counts, were rejected by the Government. Similar problems are to be found in many other countries, giving rise to questions of various magnitudes in the assessment of world population.

In spite of all these limitations, more statistical data have been gathered and accumulated for study in the past several years so that a considerable reassessment of both the size and the rate of growth of the world population has become necessary. Although there is no indication that China has taken a nation-wide population census in the recent past, several reports refer to recent provincial populations; and if summed up, they indicate that the current total population of China has grown much larger than had previously been assumed. In the new assessment, the population of China in 1975 is estimated at 895 million, instead of the old estimate of 838 million for the same year. Given the 1953 census figure of 590 million, this means that population increase in China in the 1950s and 1960s should have been much faster than previously believed, probably in excess of 2 per cent per annum at times. This reassessment of the demographic situation of China alone contributed considerably to the new estimates of past and future world population growth, as is

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*Prepared by the Population Division of the Department of International Economic and Social Affairs of the United Nations Secretariat.

discussed below. Other factors that led to an increased estimate of the current world population total are the results of population censuses which have recently become available from many countries in Africa and Asia.

Interestingly, recent information has led to downward changes in comparison with the previous estimates in growth rates for both the more developed and the less developed regions. Among the less developed regions, growth rates for 1970-1975 and after have been lowered for Latin America, East Asia and South Asia; the notable exception is Africa. Among the more developed regions, downward adjustments in growth rates have been made for Europe, Northern America, Japan, and Australia and New Zealand, especially in the current quinquennium.

The immediate cause for these reductions in the estimated growth rates appears to be, with a few exceptions, the recent decline of the birth rate rather than changes in the death rate. In East and South Asia, as well as in Latin America, birth rates appear to be declining more rapidly than previously assumed. The same is true in Europe, Japan, and Australia and New Zealand, where birth rates have dropped sharply in the latter 1970s; and the rise in the birth rate of Northern America anticipated in the 1973 projection has not materialized. On the other hand, the revision of growth rates for the USSR (downwards) and Africa (upwards) was at least partially due to the reassessment of death rates. Available statistics from the USSR indicate a slow improvement in mortality indices, such as life expectancy at birth, in the 1970s.

The reassessment of the growth trends of the world population mentioned above presents new global demographic perspectives which are quite remarkable in two respects. The first is that the current growth rate of the world population may be in a declining phase rather than in a rising phase as previously thought. According to the new assessment, the highest annual growth rate is to be found in the early 1960s, when it reached almost 2 per cent. However, the growth rate appears to have been declining since the 1960s, dropping to 1.81 per cent in the period 1975-1980 (see table 1). As discussed below, the projected future population will continue to show a declining growth rate, reaching 1.56 per cent during the period 1995-2000.

The second point of distinction of the new assessment is the new dichotomy of the world geographical regions into two groups of high and low growth rates (see table 2). In the past, there were apparently three groups of such regions characterized by their growth trends: a group with low growth rates of 1 per cent per annum or less, including

Europe, Northern America and the USSR; a group with high growth rates exceeding 2.5 per cent, including Africa, Latin America and South Asia; and a group of regions with medium growth rates between 1.5 and 2.0 per cent, including East Asia and Oceania. At the time of the 1973 assessment, these three groups appeared to be moving in parallel, showing little sign of a convergence. However, the most recent demographic changes have obviously affected the third group of regions so much that this group appears to be getting much closer to the low-growth group. With respect to the first group with high growth rates, the recent decline of birth rates in Latin America and South Asia, as mentioned above, surely pushed down their high growth rates to some extent, but they still maintain growth rates of about 2.5 per cent and do not indicate a rapid change in the near future.

TABLE 1. WORLD POPULATION AND ITS RATE OF GROWTH, 1950-2000, AS ASSESSED IN 1973 AND IN 1978

| | As assessed in 1978 [a] | | As assessed in 1973 | |
Year	Population (millions)	Rate [b] (percentage)	Population (millions)	Rate [b] (percentage)
1950	2 513	—	2 501	—
1955	2 745	1.77	2 722	1.69
1960	3 027	1.95	2 986	1.85
1965	3 344	1.99	3 288	1.93
1970	3 678	1.90	3 610	1.87
1975	4 033	1.84	3 968	1.89
1980	4 415	1.81	4 374	1.95
1985	4 830	1.80	4 817	1.93
1990	5 275	1.76	5 280	1.84
1995	5 733	1.66	5 763	1.75
2000	6 199	1.56	6 254	1.64

Source: Populations from 1980 to 2000 are results of projections by the Population Division of the Department of International Economic and Social Affairs of the United Nations Secretariat.

[a] Provisional.

[b] Average annual rate for the preceding five years.

The reassessed recent demographic trends in many parts of the world have significant implications for future prospects. The recent decline of birth rates, probably excluding Africa and the Arab countries, would certainly imply, if continued into the future, a slower growth of the world population. In

fact, according to new population projections made by the United Nations Secretariat, the 1975 world population of 4,033 million is estimated to increase to 6,199 million by the year 2000. The increase during a quarter of a century would therefore be 2,166 million, or 54 per cent of the current world total. This increase is somewhat lower than that predicted in 1973, namely, 58 per cent. However, because of the increased estimate of the current world population, the projected total in 2000 will be only slightly smaller in the new projections. If the old projections had the same base population as the new projections, the world population in 2000 should have been 6,360 million. This hypothetical calculation indicates that the recent birth rate decline has reduced the projected population in 2000 by 148 million, or 2.3 per cent.

According to the new projections, the percentage of the world population in the less developed regions, if the current classification of regions is fixed, will increase from 72.9 in 1975 to 79.5 in 2000, while the percentage in the more developed regions will decrease from 27.1 to 20.5. Of the total increase of 2,166 million in the world population during the last quarter of this century, 1,986 million or 91.7 per cent will occur in the less developed regions.

A. LESS DEVELOPED REGIONS

One of the most prominent features of the recent demographic trends among the less developed regions is the increasing diversity in the rate of population increase. For the purpose of geographical classification of countries, the Population Division has used two levels of geographical groupings: eight major areas and 24 regions. Of the latter regions, eight are labelled "more developed" and 16 "less developed", in accordance with selected socio-economic and demographic indicators. In this report, the less developed regions include all five regions in Africa, all four regions in Latin America, two regions in East Asia, all three regions in South Asia and two regions in Oceania.

The combined population of the less developed regions is estimated as 2,940 million in 1975, increasing at an annual

TABLE 2. WORLD POPULATION AND ITS RATE OF GROWTH, BY MAJOR AREA, AS ASSESSED IN 1973 AND IN 1978

| | As assessed in 1978 [a] | | | As assessed in 1973 | | |
| | | Rate of change (percentage) | | | Rate of change (percentage) | |
Major area	Population (millions)	1970-1975	1975-1980	Population (millions)	1970-1975	1975-1980
World total	4 033	1.84	1.81	3 968	1.89	1.95
More developed regions	1 093	0.81	0.67	1 093	0.84	0.82
Less developed regions	2 940	2.24	2.21	2 835	2.02	2.64
Africa	406	2.71	2.91	401	2.64	2.77
Latin America	323	2.64	2.66	324	2.71	2.74
Northern America	236	0.87	0.83	237	0.90	0.99
East Asia	1 063	1.62	1.32	1 006	1.65	1.56
South Asia	1 255	2.45	2.49	1 206	2.53	2.65
Europe	474	0.61	0.39	517	0.76	0.74
Oceania	21	1.81	1.47	21	1.96	1.94
USSR	254	0.84	0.94	255	0.99	1.00

[a] Provisional.

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rate of 2.21 per cent in the period 1975-1980. However, differences in the estimated current growth rates among the less developed regions are quite large. On the high side, there are two regions where annual growth rates exceed 3 per cent: Middle America, 3.26 per cent; and Western Africa, 3.06 per cent (table 3). On the low side, there are four regions in which growth rates are below the average of the less developed regions. They are China (1.33 per cent), Temperate South America (1.34 per cent), Caribbean (1.8 per cent) and Other East Asia (2.03 per cent). Other regions, including four African regions (excluding Western Africa), Tropical South America, Eastern South Asia, Middle South Asia and Melanesia have growth rates in a range between 2.4 and 3.0 per cent.

If the growth rates in the current quinquennial period, 1975-1980, are compared with those for 1970-1975, a trend of divergence, rather than convergence, of the growth rates can be noticed. With a few exceptions, those regions in which populations had been growing more rapidly than the average before 1970, are now growing even faster; those which had been growing slowly are now growing more slowly. For example, in Middle America, the annual growth rate has increased from 3.19 per cent in 1970-1975 to 3.26 per cent in 1975-1980; in Western Africa, the increase is from 3.00 per cent to 3.06 per cent. On the other hand, in China, the growth rate has dropped from 1.62 per cent to 1.33 per cent; and in the Caribbean, from 2.06 per cent to 1.81 per cent.

Exceptions to these diverging trends can be found in three regions: Temperate and Tropical South America and Eastern South Asia, where the current growth rates are unchanged, if not slightly higher than the previous rates.

The recent divergence in the growth rates of population has apparently been caused by the different trends of fertility decline among the less developed regions (see table 4). Since mortality has been, and will continue to be, improving in a long run, a very small or zero decline of fertility from its high level means, in all likelihood, an increasing growth rate of population. On the other hand, a natural growth rate can be decreased when a rapid fertility decline has taken place. And such a rapid fertility decline has apparently occurred in East Asia and in the Caribbean, where fertility levels had originally been below the other less developed regions. In a sense, the four regions—China, Other East Asia, Caribbean and Temperate South America—appear to be diverging from the rest of the less developed regions in terms of growth trends and approaching the level of certain more developed regions, such as Southern Europe.

However, one should not overlook important changes that have taken place among the high-growth regions. If the revised growth rates for 1975-1980 are compared with the old estimates of 1973 for the same period, the new estimates will be found to be lower than the old in many of these regions. Such downward adjustments, which reflect more rapid fertility decline than anticipated five years ago, have been made for Tropical South America, Eastern South Asia, Middle South Asia and Micronesia-Polynesia.

As indicated above, the levels and trends of growth rate are largely determined by fertility. The two regions with an annual growth rate of 3 per cent or more in 1975-1980 also feature high gross reproduction rates above 3.0, namely, 3.33 for Western Africa and 3.22 for Eastern Africa. On the slow growth side, four regions with less than average

TABLE 3. POPULATION GROWTH IN LESS DEVELOPED REGIONS, 1970-1975 AND 1975-1980, AS ASSESSED IN 1973 AND IN 1978

	As assessed in 1978 [a]			As assessed in 1973		
	Population in 1975 (millions)	Rate of change (percentage)		Population in 1975 (millions)	Rate of change (percentage)	
Major area and region		1970-1975	1975-1980		1970-1975	1975-1980
Africa						
Eastern Africa	115.3	2.77	2.94	114.5	2.74	2.84
Middle Africa	46.7	2.38	2.55	45.3	2.27	2.44
Northern Africa	94.1	2.50	2.90	98.2	2.74	2.82
Southern Africa	28.8	2.61	2.75	27.9	2.70	2.89
Western Africa	121.0	3.00	3.06	115.5	2.58	2.75
Latin America						
Caribbean	28.0	2.06	1.81	27.1	1.93	2.03
Middle America	78.9	3.19	3.26	78.7	3.21	3.27
Temperate South America	38.4	1.34	1.34	38.7	1.43	1.40
Tropical South America	177.4	2.78	2.80	179.6	2.90	2.88
East Asia						
China	895.3	1.62	1.33	838.8	1.66	1.58
Other East Asia [b]	56.6	2.20	2.03	56.5	2.15	2.06
South Asia						
Eastern South Asia	324.7	2.54	2.49	323.8	2.70	2.70
Middle South Asia	845.2	2.38	2.46	837.8	2.44	2.60
Western South Asia	85.3	2.81	2.82	85.3	2.81	2.82
Oceania						
Melanesia	3.1	2.45	2.60	3.1	2.41	2.57
Micronesia-Polynesia	1.3	2.12	2.02	1.3	2.55	2.55

[a] Provisional.
[b] Excluding Japan.

TABLE 4. ESTIMATED RECENT CRUDE BIRTH AND DEATH RATES, LESS DEVELOPED REGIONS

Major area and region	Crude birth rate [a]			Crude death rate [a]		
	1965-1970	1970-1975	1975-1980	1965-1970	1970-1975	1975-1980
Less developed regions	37.7	35.5	33.6	14.8	13.2	12.0
Africa	46.9	46.1	46.0	20.4	18.8	17.1
Eastern Africa	47.9	47.8	47.6	21.3	19.9	18.3
Middle Africa	45.9	45.3	45.1	23.4	21.6	19.6
Northern Africa	44.7	42.5	42.6	17.5	15.6	13.9
Southern Africa	39.1	38.5	38.6	13.0	12.3	11.0
Western Africa	49.9	49.3	49.0	22.5	20.6	18.8
Latin America	38.0	36.3	35.4	10.3	9.3	8.4
Caribbean	36.4	32.2	28.4	10.4	9.4	8.6
Middle America	43.2	42.1	41.4	10.6	9.3	8.1
Temperate South America	24.0	22.9	22.4	9.0	8.7	8.8
Tropical South America	39.4	37.4	36.5	10.5	9.5	8.4
East Asia[b]	29.6	26.2	22.2	11.1	9.4	8.8
China	29.5	26.0	22.1	11.2	9.4	8.8
Other East Asia	32.9	30.1	27.8	10.1	8.7	8.0
South Asia	42.6	40.5	38.9	17.6	15.7	14.0
Eastern South Asia	43.5	40.7	38.2	17.3	15.2	13.3
Middle South Asia	42.3	40.4	39.1	17.9	16.3	14.5
Western South Asia	42.6	40.9	39.7	15.7	13.8	12.4
Oceania[c]	41.1	40.3	39.0	16.1	14.6	13.1
Melanesia	42.9	42.2	41.2	18.6	16.9	15.2
Micronesia-Polynesia	37.4	35.0	33.6	8.7	7.8	7.0

[a] Provisional.
[b] Excluding Japan.
[c] Excluding Australia and New Zealand.

growth rate have also less than average gross reproduction rate—1.44 for Temperate South America, 1.52 for China, 1.84 for Other East Asia and 1.96 for Caribbean—whereas the average for the less developed regions is 2.31.

The new United Nations projections show a continuous decline of growth rate of the total population in the less developed regions for the coming 25 years. The projected growth rate for 1995-2000 is currently estimated at 1.84 per cent. These revised growth rates lead to a projected population of 4,926 million at the end of the twentieth century. Although this figure is about the same as in the previous projections prepared in 1973, it is yet significant because of the larger base population for 1975 used in the new projections. The increase in the base year population was 65 million and was mostly due to the reassessed current population for Bangladesh, China, India and some countries of Africa. In fact, if there were no change in the base population, the new projected population for the less developed regions in the year 2000 would have been smaller than the old projection by more than 100 million, reflecting a faster decline of the growth rate in those regions than previously assessed.

B. MORE DEVELOPED REGIONS

As mentioned above, the term "more developed regions" refers in this report to eight geographical regions: all four regions of Europe; Northern America; Japan; Australia and New Zealand; and the USSR. Their total population is estimated to have been 1,093 million in 1975. The percentage of the world population living in these regions is 27.1 and its growth rate for the period 1975-1980 is currently estimated as 0.67 per cent per annum (see table 2), which is

about one third of the average for the less developed regions. This low growth rate is also significant in light of the demographic history of those regions in the past 25 years. The rate of population increase in the more developed regions as a whole, which was more than 1.3 per cent per annum in the 1950s, began to decrease in the 1960s and declined to 0.91 per cent in 1965-1970. It appeared earlier as though the rate of increase had reached a nadir of 0.9 per cent in the first half of the 1970s; but rather unexpectedly, it further declined to about 0.7 per cent in the latter half of the present decade. Unless the observed continuous decline of the fertility rate, except for the countries of Eastern Europe and the USSR, combined with the declining immigration trends should drastically change, the gradual decline of the growth rate is likely to continue. According to the new United Nations projections, the rate is to drop to 0.51 per cent by the end of this century. The validity of this highly uncertain assumption remains to be seen.

If population trends are observed by region, the lowest rate can be found in Northern and Western Europe (see table 5). Both these regions had their highest growth rates in 1960-1965 and showed a sharp decline thereafter. In fact, several countries in these regions appear to be currently losing population in absolute terms. They are Austria, the Federal Republic of Germany, Switzerland and the United Kingdom, in which the negative growth rates are the product of both negative natural increase (excluding Switzerland) and negative net migration in the period 1975-1980. On the other hand, the population growth in Eastern Europe, which slowed gradually from a 1 per cent level to a 0.6 per cent level during the 1950s and the 1960s, showed a slow recovery in the 1970s. Currently, the annual growth rate in this region is estimated at close to 0.7 per cent.

Northern America and the USSR have had similar population trends in the past in which the high growth rate of about 1.8 per cent in the 1950s was followed by a rapid decline in the 1960s to approximately 1 per cent. In the 1970s, Northern America and the USSR, respectively, have a growth rate of about 0.83 and 0.94 per cent per annum.

The population trends in Japan have been notable in the sense that in spite of the absence of significant migration, a large rise of growth rate to 1.33 per cent in 1970-1975 was followed by a sharp drop to 0.85 per cent in the next quinquennium. On the other hand, Australia and New Zealand are characterized by a continuous decline of the growth rate. Their recent sharp decline, especially in 1975-1980, is due to a decrease both in the rate of natural increase and in net migration.

In the recent population trends among the more developed regions, fertility and migration have played an important role. However, it is worth mentioning here that one of the mortality indices, life expectancy, for the more developed regions appears to have begun a further increase in recent years after a decade of apparent stagnation (see table 6). Although the immediate effect of this improvement is concealed behind the small rise of crude death rate due to the aging of the populations, human longevity appears to be increasing in many developed countries. However, comparable increases of life expectancy in the USSR and in some of the countries of Eastern Europe have not yet been observed, due in part to the scarcity of recent statistics.

TABLE 5. POPULATION GROWTH IN MORE DEVELOPED REGIONS, 1970-1975 AND 1975-1980, AS ASSESSED IN 1973 AND IN 1978

Major area and region	Population in 1975 [a] (millions)	Average annual rate of growth (percentage)				
		As assessed in 1978 [a]			As assessed in 1973	
		1965-1970	1970-1975	1975-1980	1970-1975	1975-1980
More developed regions	1 093.2	0.91	0.81	0.67	0.84	0.82
Northern America	236.4	1.11	0.87	0.83	0.90	0.99
East Asia						
Japan	111.5	1.07	1.33	0.85	1.26	1.12
Europe						
Eastern Europe	106.2	0.64	0.55	0.71	0.64	0.63
Northern Europe	81.6	0.44	0.31	0.08	0.41	0.43
Southern Europe	134.1	0.77	0.92	0.72	0.72	0.71
Western Europe	152.3	0.69	0.56	0.03	0.58	0.46
Oceania						
Australia-New Zealand	16.7	1.85	1.67	1.21	1.83	1.78
USSR	254.4	1.09	0.84	0.94	0.99	1.00

[a] Provisional.

TABLE 6. ESTIMATED RECENT CRUDE BIRTH AND DEATH RATES, MORE DEVELOPED REGIONS

Major area and region	Crude birth rate [a]			Crude death rate [a]		
	1965-1970	1970-1975	1975-1980	1965-1970	1970-1975	1975-1980
More developed regions	17.8	16.7	15.6	9.1	9.2	9.4
Northern America	18.3	15.8	15.3	9.3	9.2	9.0
East Asia						
Japan	17.8	19.2	15.0	6.9	6.6	6.5
Europe	17.6	15.8	14.5	10.3	10.4	10.6
Eastern Europe	16.8	16.6	17.5	9.7	10.3	10.4
Northern Europe	17.3	14.7	12.6	11.2	11.3	11.5
Southern Europe	19.4	17.9	16.2	9.3	9.2	9.0
Western Europe	16.8	13.9	11.8	11.2	11.1	11.6
Oceania						
Australia-New Zealand	20.3	21.2	16.8	8.9	8.1	7.9
USSR	17.6	17.8	18.3	7.6	7.9	8.9

[a] Provisional.

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Chapter II

FERTILITY AND REPRODUCTION*

For the world as a whole, the rate at which births occur is decreasing. In 1976, it was estimated that in each year during the period 1970-1975, there were 31 children born alive for every 1,000 persons living at mid-year. Currently, in part because of lower fertility in the developed regions and in many developing countries and in part because measures for some of the larger, economically less advanced countries have been improved, it is calculated that the world annual crude birth rate is approximately 29 per 1,000 population.

Estimates based on the best available data show a world range in crude birth rates of from 9.5 (Federal Republic of Germany) to 53 (Niger) and in gross reproduction rates from 0.7 (Federal Republic of Germany) to 3.8 (Kenya). From the regional viewpoint, the measures are lowest for Western Europe and highest in Africa, excluding the middle region, and in Western South Asia.

There are counter-trends in both the developing and the more developed regions. In each, the most prevalent movement, except possibly for parts of Africa, is downward. In parts of Africa, however, owing possibly to the initial impact of improved health and well-being, the number of live births per 1,000 population in a number of the countries has increased in recent years. While declining fertility continues to predominate in the developed regions, at the same time, some developed countries have experienced a recent slight rise in birth rates, because the age structure became more favourable and/or because births formerly postponed were made up.

What is most evident is that elective childbearing is no longer the prerogative of couples in modern centres of the economically most advanced countries. The fertility decline has been pervasive within and among the developed countries. And over the past decade and a half, childbearing by choice, if this can be deduced from the current fertility levels and trends, appears to have been practised increasingly within a growing number of the less developed countries. Indeed, only one of the six largest developing countries is currently estimated to have a crude birth rate in excess of 40 per 1,000 live births; and estimates for the four largest—China, India, Indonesia and Brazil—are from moderate to low, being 26, 35, 37 and 36 per 1,000, respectively.

Results of surveys taken in eight developing countries as a part of the World Fertility Survey[1] confirm that contraceptive use is interrelated with a wide range of demographic and socio-cultural variables. The data reveal that, due possibly to insufficient motivation, cultural circumstances, lack of access to information and supplies or other reasons, larger proportions of women who stated that they did not want additional children none the less did not use birth-regulating methods. When only women who are "exposed" to pregnancy risks are considered, this applies to a much smaller extent.

The effect of education and rural/urban residence upon contraceptive use tends to be mediated by the general socio-cultural background of the people, so that, to a certain extent, characteristics of users and non-users can explain contraceptive behaviour only within the context of a given socio-cultural environment. Within this context, use is more prevalent among the urban and the educated. Where it is from moderate to widespread, the frequency of use by age of women resembles a normal curve, slightly skewed left or right in some cases. Where use is infrequent, there is little variation by age. Women in these countries rarely practise contraception prior to achieving first parity. As the practice spreads in the society, younger women adopt contraception increasingly for spacing births. But when it is first introduced, older women use it mainly to limit family size.

This report also includes an analysis of the relations between rural/urban residence, wife's education, husband's education and wife's age at marriage upon fertility preferences in eight of the developing countries that are participating in the World Fertility Survey.

Significantly, age at first marriage and wife's level of education were associated with the largest fertility differences in all of the countries included in the analysis. The relationship between levels of fertility and the other two background variables, urban/rural residence and husband's occupation, were in the expected direction. Women with no education, residing in rural areas and whose husbands were engaged in agricultural occupations had the highest fertility. Lower fertility was associated with greater education, urban residence and non-agricultural occupational status. However, in all countries, the association between these background variables and fertility weakened when duration of marriage was held constant. For example, regardless of place of residence or husband's occupation, women whose first marriage occurred less than 10 years ago had almost equal numbers of children. Large fertility differences associated with the socio-economic variables emerged only among women married 10-19 years and were largest among women married 20 years or more. One implication of this finding is that women who may plan the ultimate size of

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[1] These countries are Colombia, the Dominican Republic, Fiji, Malaysia, Nepal, Pakistan, the Republic of Korea and Thailand.

their families are still not using contraception for spacing purposes to any great extent, but primarily for limiting purposes. It is probable that, in general, most women in these countries still do not plan the ultimate size of their family and that social and economic factors are instrumental in determining the timing of the next birth rather than total family size.

The review of factors associated with fertility trends in selected developed countries where fertility had decreased to unprecedentedly low levels reveals that the current decline is explained in part by a slight reversal of the downward trend in age at marriage and a major drop in the rate at which married women are bearing children. In the past decade, the control of fertility has been increasing throughout the economically more advanced regions. The fall in marital fertility may be attributable equally to a drop in unwanted fertility and to a decline in the number of wanted births. There has been a slight increase in the frequency of childlessness and of one-child families and a greater ability of couples to fulfil family size targets in the two- and three-child range. In some countries, the beginning of childbearing has been delayed. The spread of legalized abortion and of sterilization as means of fertility regulation have also been significant factors.

The remainder of this chapter is divided into three parts. First, there is a discussion of the current levels of crude birth rates and gross reproduction rates in the major world regions and in countries of 250,000 and more inhabitants. For most of the developing countries, the data represent the best available estimate for the most recent year. For the developing countries for which the data are of adequate quality and for all of the more developed countries, the report deals with post-1960 trends in the two measures and alludes to some factors underlying them. The second part contains an analysis of demographic, social and related background variables affecting fertility and family size preferences in selected developing and developed countries. The final section deals with factors affecting contraceptive use in the same selected developing countries. The sources of data on levels and trends of fertility are provided in the respective tables. For the analysis of differential fertility, fertility preferences and levels of contraceptive use, in selected developing countries, the statistics were obtained from the World Fertility Survey, First Country Reports.[2]

A.   CURRENT LEVELS AND RECENT TRENDS OF FERTILITY

World Summary

In spite of the decreases in birth rates and gross reproduction rates for many countries over the past decade or so, fertility remains high in the vast majority of the developing countries. For the regions as a whole, it is nearly twice as high as in the group of economically more advanced countries. Gross reproduction rates of 3.4 and above prevail in Western South Asia, the region for which the estimates are, on the whole, highest; and measures above 3.0 are common for countries of Western Africa, Eastern Africa and Middle South Asia. In the same regions, crude birth rates also tend to be very high, with some notable exceptions. Thus, in all but four countries in Eastern Africa and three in the western region of the continent, the most recent estimates place the number of births per annum at 47 or more per 1,000 population. Rates of 50 per 1,000 are estimated for one half of the countries of Western South Asia, and measures approximating this level have been derived for a number of countries in other parts of Africa, Central America and Middle South Asia.

Owing to sharp decreases in some countries since the period from mid-1960s to the late 1960s, fertility is not uniformly high in the developing regions. Birth rates of 30 per 1,000 and lower have been estimated for 16 per cent of all countries listed in table 7, and gross reproduction rates of 2.0 or less described the fertility of 13 per cent of the developing countries having data for calculating this measure. At the first assessment of world fertility levels in 1963, no developing country was estimated to have a crude birth rate below 30 per 1,000 population. It was this level of the crude birth rate and a gross reproduction rate of 2.0 that distinguished the developed from the developing countries more systematically than did any of a dozen other social and economic characteristics.[3] Thus, there no longer exists a bimodal distribution of developed and developing countries by level of the crude birth rate and the gross reproduction rate. Indeed, 1977 birth rates were lower in a few developing countries than in a number of the more developed countries. This is not the case with the gross reproduction rate, however. In 1975, only Ireland among the economically more advanced countries had a gross reproduction rate higher than that for a developing country.

Very few of the developing countries possess the data required for assessing fertility trends; and because the relatively small populations in these countries, no regional or international generalization about the trends can be based upon what is observed in those few countries. In many of the developing countries, the best estimates suggest that crude birth rates have declined constantly since the 1960-1965 quinquennium (table 7). In some, however, a deceleration of the trend occurred during 1970-1975. In most, the pace of the decline appears not to have been uniform, gathering and losing momentum the reasons for which explanations are not possible with data currently at hand. As table 10 shows, the downward trend has been reversed, at least temporarily, in a few countries, possibly in response to improved health and nutrition and decreases in breast-feed-

[2] The World Fertility Survey is an international research programme whose purpose is to assess the current state of human fertility throughout the world. To date, sample surveys have been carried out or are being planned or conducted in 35 developing countries and 20 developed countries. Additional countries are expected to participate. When this study was begun, eight First Country Reports were available (for complete citations, see foot-note 26). At this writing, 10 First Country Reports have been published, and sections B and C of this chapter are based entirely upon data from these reports. The programme is administered by the International Statistical Institute in collaboration with the International Union for the Scientific Study of Population.

[3] *Population Bulletin of the United Nations, No. 7—1963, with special reference to conditions and trends of fertility in the world* (United Nations publication, Sales No. 64.XIII.2), p. 2.

ing, and to a drop in male mortality that would result in increased proportions married below age 50.[4]

Crude birth rates and reproduction rates are uniformly low in the more developed countries, although inclusion of Albania, Fiji and Israel among those countries distorts the picture somewhat. In 1977, none but Israel and no doubt Albania, for which data are not available, had a birth rate as high as 26 per 1,000 population; and in nearly one half, the measure was below 15 (table 8). The gross reproduction rates for many of the more developed countries are currently below the levels ever previously recorded. In 1975, the most recent year for which a comprehensive picture can be made, the gross reproduction rate for 14 out of 34 developed countries was below 1.0.

Since 1970, the trend of fewer live births annually per 1,000 population, evident since the late 1950s or early 1960s, has been nearly universal among developed countries, the exceptions being mainly within the region of Eastern Europe. In many of them, birth rates are now currently below the previous nadir reached during the 1930s and early 1940s.[5] In some, the decline has been a continuation of a late secular trend; in most, it represents a reversal following an interruption of the long-term decline. It is thus of some interest that crude birth rates substantially above the average for 1970-1974 were recorded in 1975 and later years for nine of the developed countries (table 8). However, it is too early to determine whether these higher rates signal a new trend or are merely temporary fluctuations.

[4] *Levels and Trends of Fertility Throughout the World, 1950-1970* (United Nations publication, Sales No. E.77.XIII.2), p. 136.

[5] *Recent Trends in Fertility in Industrialized Countries* (United Nations publication, Sales No. 1957.XII.2), appendix table A.

TABLE 7. ESTIMATES OF FERTILITY MEASURES, COUNTRIES OF AFRICA, LATIN AMERICA AND ASIA, SPECIFIC YEARS

Major area, region and country	Period	Method of estimation	Crude birth rate (per 1,000 population)	Gross reproduction rate
Africa				
Eastern Africa				
Burundi[a]	1970-1971	B	42	2.92
Comoros	1966	C(4)	47	3.0
Ethiopia	1970	C(4)	52	3.6
Kenya[b]	1972-1973	B	48.7	3.8
Madagascar	1966	C(3)	49	3.3
Malawi	1966	C(4)	48	3.0
Mauritius	1976	A	25.7	1.54
Mozambique	1960	C(4)	43	2.7
Réunion[c]	1975	A	28.0	...
Rwanda	1957	C(4)	50	3.5
Somalia	1965	C(4)	47	3.2
Southern Rhodesia	1969	C(4)	48	3.3
Uganda	1969	C(4)	46	3.0
United Republic of Tanzania[d]	1973	B	47	3.2
Zambia[e]	1969	C(4)	50	3.5
Middle Africa				
Angola	1960	C(4)	49	3.2
Central African Republic[f]	1959-1960	C(3)	45	2.5
Chad	1963-1964	C(3)	48	2.6
Congo	1960-1961	C(3)	44	2.8
Equatorial Guinea	1965	C(4)	35	2.4
Gabon	1960-1961	C(3)	31	2.0
United Republic of Cameroon[g]	1960	C(3)	40	2.5
Zaire	1955-1957	C(4)	45	2.8
Northern Africa				
Algeria	1975	A	47.8	...
Egypt[h]	1977	A	37.7	...
Libyan Arab Republic	1964	C(4)	47	3.2

[a] Burundi, Ministère du plan, Département des statistiques, *Enquête démographique 1970-71*, vol. II, *Demographic-methodologic-annexes—1974*, pp. 107 and 110.

[b] Kenya, Central Bureau of Statistics, Ministry of Finance and Planning, *Demographic Baseline Survey Report, 1973* (DSU/Kenya) (Chapel Hill, North Carolina, 1976), pp. 31 and 41, tables 111.2 and 111.7.

[c] Henri Leridon, "La situation démographique des départements français d'outre-mer", *Population* (Paris), vol. 31, No. 6 (November-December 1976), p. 1251.

[d] United Republic of Tanzania, *1973 National Demographic Survey of Tanzania*, vol. VI, *An Analysis of the 1973 Demographic Survey of Tanzania* (1977), pp. 91-92, table 5.15.

[e] Patrick O. Ohadike and Habtemariam Tesfaghiorghis, *The Population of Zambia*, CICRED Monograph Series, World Population Year 1974 (Lusaka, 1974), p. 43.

[f] Survey data excluding the populations of Bangui, Zone East and nomad population (Bororos, Babugas).

[g] For Northern Cameroon.

[h] Jacques Veron, "Niveaux nationaux de la natalité et politiques de limitations des naissances", *Population* (Paris), vol. 31, No. 6 (November-December 1976), p. 1242.

Major area, region and country	Period	Method of estimation	Crude birth rate (per 1,000 population)	Gross reproduction rate
Morocco	1973	B	47.7	3.61
Sudan	1955-1956	C(4)	49	3.4
Tunisia	1975	A	36.2	2.8
Southern Africa[j]				
Botswana	1971	C(4)	44	3.56
Lesotho	1966	C(4)	38	2.4
Namibia	1960	C(4)	45	3.0
Swaziland	1966	C(4)	50	3.2
Western Africa				
Benin	1961	C(3)	50	3.3
Gambia	1963	C(4)	40	2.6
Ghana[k]	1967-1969	C(3)	48	3.52
Guinea	1954-1955	C(3)	48	3.0
Guinea-Bissau	1965	C(4)	40	2.6
Ivory Coast	1957-1958	C(3)	52	3.0
Liberia[l]	1970	B	51	3.2
Mali	1960-1961	C(3)	50	3.3
Mauritania	1964-1965	C(4)	45	2.9
Niger	1959-1960	C(3)	53	3.5
Nigeria	1963	C(4)	50	3.3
Senegal	1960-1961	C(4)	49	3.1
Sierra Leone	1963	C(4)	45	2.9
Togo	1961	C(3)	50	3.1
Upper Volta[m]	1969	C(3)	49	3.2.
Latin America				
Caribbean				
Cuba[n]	1970-1975	C	25.8	1.69
Dominican Republic[n]	1970-1975	C	43.6	3.18
Guadeloupe[o]	1975	A	24.8	...
Haiti[n]	1970-1975	C	42.7	2.96
Jamaica[p]	1976	A	29	2.13
Martinique[o]	1975	A	20.4	...
Puerto Rico	1975	A	22.6	...
Trinidad and Tobago	1975	A	23.7	1.53
Middle America				
Costa Rica[q]	1974	A	29	1.89
El Salvador	1976	A	40.2	...
Guatemala[r]	1973	A	41.5	2.80
Honduras[s]	1974	B	48	3.42
Mexico[n]	1975	A	41.8	...
Nicaragua	1965-1970[t]	C[u]	49	3.5[v]
Panama	1975	A	32.3	2.13

[i] Morocco, Direction de la statistique, Centre de recherches et d'études démographiques, *La fécondité marocaine*, Report No. 6 (Rabat, 1974), p. 11, table 8.

[j] Not including South Africa because no data are available for the major ethnic group.

[k] United States of America, Department of Commerce, Bureau of the Census, *Country Demographic Profiles: Ghana*, ISP-DP-5 (Washington, D.C., 1977), table 7.

[l] Liberia, Department of Planning and Economic Affairs, *Demographic Annual of the Population Growth Survey 1970: Patterns of Natality*, Series N-1 (Monrovia, 1971), table (a).

[m] D. Ian Pool and S. P. Coulibaly, eds., *Demographic Transition and Cultural Continuity in the Sahel* (Ithaca, New York, 1977), p. 11 and table 1.2 on p. 33.

[n] Data provided by United Nations Latin American Demographic Centre (CELADE).

[o] Henri Leridon, "La situation démographique des départements français d'outre-mer", *loc. cit.*

[p] United States of America, Department of Commerce, Bureau of the Census, *Country Demographic Profiles: Jamaica*, ISP-DP-9 (Washington, D.C., 1977), pp. 6, 9 and 18, tables 3, 7 and A.2.

[q] United States of America, Department of Commerce, Bureau of the Census, *Country Demographic Profiles: Costa Rica*, ISP-DP-4 (Washington, D.C., 1977), tables 3 and 7.

[r] United States of America, Department of Commerce, Bureau of the Census, *Country Demographic Profiles: Guatemala*, ISP-DP-6 (Washington, D.C., 1977), tables 3 and 7.

[s] United States of America, Department of Commerce, Bureau of the Census, *Country Demographic Profiles: Honduras*, ISP-DP-10 (Washington, D.C., 1977), pp. 5 and 8, tables 3 and 7.

[t] Centro Latinoamericano de Demografía, "América Latina: índice de crecimiento de la población en el período 1950-2000 por países", *Boletín Demográfica*, vol. VII, No. 13 (January 1974), table 3.

[u] Provisional projections by the United Nations Latin American Demographic Centre (CELADE), using 1950 as the base year and taking into account all available information that would reflect possible change in fertility.

[v] For 1970. Data provided by United Nations Latin American Demographic Centre (CELADE).

Major area, region and country	Period	Method of estimation	Crude birth rate (per 1,000 population)	Gross reproduction rate
Temperate South America				
Argentina	1970	A	22.9	1.48
Chile[w]	1975	A	24	1.47
Uruguay	1975	A	21.1	1.51
Tropical South America				
Bolivia[n]	1970-1975	C	46.02	3.28
Brazil[n]	1975	C	36.6	. . .
Colombia[x]	1976	B	31.1	2.07
Ecuador	1974	C	35.8	2.59
Guyana[y]	1968	A	38.2	. . .
Paraguay[t]	1965-1970	C	44	. . .
Peru[n]	1970-1975	C	40.97	2.93
Suriname[z]	1970	A	36.5	2.69
Venezuela	1973	A	35.9	2.42
East Asia				
China	1970-1975	D	26	. . .
Japan	1976	A	16.3	0.9
Other East Asia				
Democratic People's Republic of Korea	1972	C(6)	44.0	. . .
Hong Kong	1976	A	17.2	. . .
Mongolia	1972	C(6)	40.0	. . .
Republic of Korea[aa]	1975	A	26.0	1.8
South Asia				
Eastern South Asia				
Burma	1972	C(6)	40.0	. . .
Democratic Kampuchea[bb]	1957-1962	C(5)	45.9	3.5
East Timor	1970	A	43.0	. . .
Indonesia[cc, dd]	1966-1970	C(2)	44.0	2.7
Lao People's Democratic Republic	1972	C(6)	42.0	. . .
Malaysia	1972	C(6)	38.0	. . .
Peninsular Malaysia	1974	A	32.0	2.2
Sabah and Sarawak	. . .	D	. . .	. . .
Philippines[ee]	1968-1972	D	40	2.9
Singapore	1976	A	18.8	1.0
Thailand[ff]	1974-1975	B	37.0	2.5
Viet Nam[gg]	1973	D	42.0	3.3

[w] United States of America, Department of Commerce, Bureau of the Census, *Country Demographic Profile: Chile*, ISP-DP-13 (Washington, D.C., 1978), pp. 5 and 8, tables 3 and 7.

[x] Colombia, Corporación Centro Regionale de Población, *Encuesta nacional de fecundidad Colombia 1976, resultados generales* (Bogotá, 1977).

[y] Excluding Amerindian population.

[z] Excluding Indian and Negro population living in tribes.

[aa] United States of America, Department of Commerce, Bureau of the Census, *Country Demographic Profiles: Republic of Korea*, ISP-DP-17 (Washington, D.C., 1978), p. 6, table 3. For 1974, the crude birth rate of 25.9 and gross reproduction rate of 1.8 have been calculated on the basis of data given in Republic of Korea, Korea Institute for Family Planning, National Bureau of Statistics of the Economic Planning Board, *The Korean National Fertility Survey, 1974—First Report* (Seoul, 1977), tables II. 1B and 39.

[bb] George S. Siampos, "The population of Cambodia, 1945-1980", *The Milbank Memorial Fund Quarterly*, vol. XLVIII, No. 3 (July 1970), p. 336.

[cc] Including West Irian.

[dd] Suwardjono Surjaningrat and others, "Indonesia-East Asia review, 1973", *Studies in Family Planning*, vol. 5, No. 5 (May 1974), pp. 144-149. See also Geoffrey McNicoll and Si Gde Made Mamas, *The Demographic Situation in Indonesia*, Papers of the East-West Population Institute, No. 28 (Honolulu, East-West Center, 1973), pp. 18-9 and 45.

[ee] Mercedes B. Concepción, ed., *Population of the Philippines*, CICRED Monograph Series, World Population Year 1974 (Manila, University of the Philippines, Population Institute, 1977), table 3 and pp. 11 and 13.

[ff] Fred Arnold, Robert D. Retherford and Anuri Wanglee, *The Demographic Situation in Thailand*, Papers of the East-West Population Institute, No. 45 (Honolulu, East-West Center, 1977), table 9.

[gg] Data for former Republic of South Viet-Nam. See Troung-Minh-Cac and Ngo Yeh-Tuan-Phong, "Viet-Nam (South)-East Asia Review, 1973", *Studies in Family Planning*, vol. 5, No. 5 (May 1974), p. 172.

TABLE 7. ESTIMATES OF FERTILITY MEASURES, COUNTRIES OF AFRICA,
LATIN AMERICA AND ASIA, SPECIFIC YEARS *(continued)*

Major area, region and country	Period	Method of estimation	Crude birth rate (per 1,000 population)	Gross reproduction rate
Middle South Asia				
Afghanistan[hh]	1972-1973	C(6)	50.0-53.0	3.76
Bangladesh[ii]	1974	B	48.3	3.4
Bhutan	1972	C(6)	47.0	...
India[jj]	1975	B	35.2	...
Iran[kk]	1975-1976	C(4)	42.7	3.25
Nepal[ll]	1971	C(4)	41	3.1
Pakistan[mm]	1975-1976	B	40.5	...
Sri Lanka	1974	A	28.0	1.8
estern South Asia				
Bahrain[nn]	1971	C(4)	41.2	3.5
Democratic Yemen	1972	C(6)	50.0	...
Iraq[oo]	1965	C(4)	49.5	3.5
Jordan[pp]	1972	B	45.0	3.4
Kuwait[nn]	1969-1971	C(4)	47.0	3.4
Lebanon[qq]	1970	B	34.4	2.7
Oman	1972	C(6)	50.0	...
Saudi Arabia	1972	C(6)	50.0	...
Syrian Arab Republic[rr]	1970	C(4)	47.8	3.7
Yemen[ss]	...	D	45.0-50.0	...

[hh] James F. Spitler and Nancy B. Frank, *Afghanistan: A Demographic Uncertainty*, paper prepared by the International Statistical Program Center of the United States Bureau of the Census, for presentation to the Population Association of America, St. Louis, Missouri, 21-23 April 1977, p. 9.

[ii] United Kingdom, Ministry of Overseas Development, Population Bureau; and Bangladesh, Ministry of Planning, Census Commission, Statistics Division, *Report on the 1974 Bangladesh Retrospective Survey of Fertility and Mortality* (London and Dacca, 1977), p. 76.

[jj] India, Ministry of Home Affairs, Office of the Registrar General, *Sample Registration Bulletin*, vol. XI, No. 1 (January 1978), p. 2.

[kk] Habibollah Zandjani, "Evolution de la population Iranienne à travers les recensements", in "Notes et documents", *Population* (Paris), vol. 32, No. 6 (November-December 1977), p. 1281.

[ll] Nepal, Central Bureau of Statistics, National Planning Commission Secretariat, *The Analysis of the Population Statistics of Nepal* (Kathmandu, Jose Ganesh Press Pot. Ltd., 1977), p. 112 and p. 118, table 4.10.

[mm] Pakistan, Population Council of Pakistan, *Pakistan Fertility Survey, First Report*, World Fertility Survey (Lahore, 1976), p. 75.

[nn] Youssef Courbage and Philippe Fargues, "La population des pays arabes d'Orient", *Population* (Paris), vol. 30, No. 6 (November-December 1975), p. 1123, table VII.

[oo] K. C. Zachariah and Wided Hamoredi, "Use of census data for estimating demographic measures of Iraq", in Cairo Demographic Centre, *Demographic Measures and Population Growth in Arab Countries*, Research Monograph Series, No. 1 (Cairo, 1970), p. 46. See also Y. Courbage and P. Fargues, "La population des pays arabes d'Orient", *loc. cit.*

[pp] Jordan, Department of Statistics, *Draft Final Report of National Seminar on Population Policy as Related to Development Strategy, 2-7 December 1972* (Amman, 1972), p. 1.

[qq] Youssef Courbage and Philippe Fargues, *La situation démographique au Liban*, vol. I, *Mortalité, fécondité et projection: méthodes et résultats* (Beirut, Université Libanaise, 1973), p. 36, table II. See also Y. Courbage and P. Fargues, "La population des pays arabes d'Orient", *loc. cit.*

[rr] Syrian Arab Republic, Office of the Prime Minister, Central Bureau of Statistics, *Statistical Abstract, 1977*, p. 92.

[ss] No specific date was given for the estimated fertility rates in the source. See W. B. Fisher, "Southern Arabia: a human reservoir", in J. I. Clarke and W. B. Fisher, eds., *Population of the Middle East and North Africa, A Geographical Approach* (New York, Holmes and Meier, 1972), p. 281.

NOTE: Methods of estimation were as follows:

A - "Complete" birth registration statistics;

B - Birth data from sample survey;

C - Other estimates, including estimates whose basis cannot be clearly determined from available information;

(1) "Reverse survival" method;

(2) On number of children reported as having been born to each woman during her lifetime;

(3) On reported births occurring during the 12-month period before a survey or census and the number of children ever born, both by age of mother;

(4) On the analysis of the age composition of the population, supplemented by indications of the rate of natural increase or of an approximate level of mortality;

(5) On number of reported births by age of mother in the year preceding the census, adjusted by graphic technique;

(6) Basis either unknown or cannot be clearly determined for available information;

D - Either no data available or birth registration statistics so deficient as to be useless for identifying trend.

TABLE 8. CRUDE BIRTH RATES, MORE DEVELOPED COUNTRIES AND SELECTED LESS
DEVELOPED COUNTRIES WITH RELATIVELY GOOD STATISTICS, 1960-1977

(Live births per 1,000 population)

Major area, region and country	Crude birth rates					
	1960-1964	1965-1969	1970-1974	1975	1976	1977
Africa						
Eastern Africa						
Mauritius[a]	39.2	32.0	25.4	25.1	25.7	25.8
Réunion	44.0	38.9	29.8[b]	28.0[c]	. . .	. . .
Northern Africa						
Egypt .:...............	42.6	39.3	34.9	37.7	. . .	37.7
Tunisia	45.1[d]	41.3[d]	36.4[d]	36.2	. . .	. . .
Latin America						
Caribbean						
Cuba	33.2[e]	31.9[e]	27.8[b, e]	. . .	. . .	. . .
Guadeloupe[f]	. . .	33.2	28.8	24.8	. . .	. . .
Jamaica[g]	. . .	. . .	32.0	29.0	29.0	. . .
Martinique[f]	. . .	31.0	24.8	20.4	. . .	. . .
Puerto Rico	31.3	27.4	24.2	22.4	. . .	23.0
Trinidad and Tobago	37.0	28.6	24.9	23.7	25.3	. . .
Middle America						
Costa Rica	45.9	38.4	30.8	29.3	29.7	. . .
El Salvador	48.6	44.3	41.2	39.9	40.2	41.7
Guatemala[h]	45.8	42.6	42.1	. . .	. . .	. . .
Panama[i]	39.4	38.6	35.2	32.3	32.2	28.8
Temperate South America						
Argentina	22.9	22.1	23.0[b]	. . .	. . .	. . .
Chile	35.9	30.3	25.7	25.0	23.9	. . .
Uruguay	24.3	21.3	19.4	21.1	21.2	. . .
Tropical South America						
Guyana[j]	41.8	38.6[k]	. . .	. . .	. . .	. . .
Suriname[l]	47.1	39.6	. . .	. . .	. . .	. . .
Venezuela[m]	44.3	41.8	37.2	37.2	36.4	36.6
Northern America						
Canada[n]	25.2	18.7	16.2	15.7	15.6	15.5
United States of America	22.4	18.2	16.2	14.8	14.8	15.3
East Asia						
Japan	17.4	17.9	19.1	17.2	16.3	15.4
Other East Asia						
Hong Kong	34.5	24.9	19.6	18.1	17.7	17.5
South Asia[o]						
Eastern South Asia						
Malaysia[p]	41.3	37.1	33.0	31.3	. . .	30.9
Singapore	34.2	25.7	21.8	17.8	18.8	16.2

[a] Excluding dependencies.

[b] For 1970-1973.

[c] Henri Leridon, "La situation démographique des départements français d'outre-mer", *Population* (Paris), vol. 31, No. 6 (November-December 1976), p. 1251.

[d] Average corrected crude birth for 1960-1964 taken from Alain Marcoux, "La croissance de la population de la Tunisie, passé récent et perspectives", *Population* (Paris), vol. 26, special issue (March 1971), p. 197. Rates for 1965-1969, 1969-1974 calculated on the basis of data given in Tunisia, Institut national de la statistique, *Projections de la population de la Tunisie, 1976-2001* (Tunis, 1977), pp. 10 and 12.

[e] Average crude birth rates calculated on the basis of annual rates given in Cuba, Ministerio de Salud Pública, *Cuba: organización de los servicios y nivel de salud* (Havana, 1974).

[f] Average crude birth rates calculated on the basis of annual rates given in Henri Leridon, "La situation démographique des départements français d'outre-mer", p. 1250.

[g] Average crude birth rates calculated on the basis of annual rates given in United States of America, Department of Commerce, Bureau of the Census, *Country Demographic Profiles: Jamaica*, ISP-DP-4 (Washington, D.C., 1977), table 3.

[h] Average crude birth rates calculated on the basis of data given in United States of America, Department of Commerce, Bureau of the Census, *Country Demographic Profiles: Guatemala*, ISP-DP-6 (Washington, D.C., 1977), p. 3, table 1.

[i] Excluding the Canal Zone. Prior to 1966, excluding tribal Indian population numbering 62 187 in 1960.

[j] Excluding Amerindian population.

[k] For 1965-1968.

[l] Average rate calculated on the basis of data taken from H. E. Lamur, *The Demographic Evolution of Surinam, 1920-1970*, trans. by Dirk van den Elst (The Hague, Martinum Nijhoff, 1973).

[m] Excluding Indian jungle population.

[n] Births including Canadian residents temporarily in the United States but excluding United States residents temporarily in Canada.

[o] Data for Cyprus and Israel, two countries currently included in the region of Western South Asia, are given in data for Southern Europe.

[p] Data cover only Peninsular Malaysia, formerly referred to as West Malaysia.

TABLE 8. CRUDE BIRTH RATES, MORE DEVELOPED COUNTRIES AND SELECTED LESS
DEVELOPED COUNTRIES WITH RELATIVELY GOOD STATISTICS, 1960-1977 *(continued)*
(Live births per 1,000 population)

Major area, region and country	Crude birth rates					
	1960-1964	1965-1969	1970-1974	1975	1976	1977
Middle South Asia						
Sri Lanka	35.0	31.9	29.8[q]	...	...	...
Europe						
Eastern Europe						
Bulgaria	16.9	15.8	16.2	16.6	16.5	16.1
Czechoslovakia	16.3	15.5	17.7	19.6	19.2	18.7
German Democratic						
Republic	17.3	15.1	12.1	10.8	11.6	13.3
Hungary	13.5	14.3	15.3	18.4	17.5	16.7
Poland	20.1	16.7	17.5	18.9	19.5	19.1
Romania	16.7	21.3	19.6	19.7	19.5	...
Northern Europe						
Denmark[r]	17.0	16.6	14.6	14.2	12.9	12.2
Finland	18.2	16.3	13.1	13.9	14.2	13.9
Ireland	21.8	21.4	22.4	21.5	21.6	21.4
Norway	17.3	17.6	16.0	14.1	13.3	12.5
Sweden	14.5	15.0	13.7	12.6	12.0	11.6
United Kingdom	18.2	17.6	14.9	12.5	12.1	11.8
Southern Europe[s]						
Albania	40.1	35.1	32.9[t]	...	...	...
Cyprus[u]	25.3[v]	21.3	18.3	15.5	17.9	...
Greece	18.1	18.1	16.0	15.7	16.0	15.4
Israel[w]	25.5	25.5	27.4	27.7	28.0	26.1
Italy	18.7	18.2	16.3	14.8	14.0	13.2
Malta	22.5	16.6	17.1	18.3	18.0	18.0
Portugal[x]	24.0	22.2	20.0	19.0	19.2	...
Spain[y]	21.5	20.5	19.6	19.1	18.2	18.0
Yugoslavia	22.1	19.8	18.1	18.2	18.1	17.7
Western Europe						
Austria[z]	18.5	17.3	13.9	12.5	11.6	11.3
Belgium[aa]	17.1	15.5	13.9	12.2	12.3	12.4
France	18.0	17.1	16.5	14.1	13.6	14.0
Germany, Federal						
Republic of	18.0	16.6	11.5	9.7	9.8	9.5
Luxembourg	16.0	14.7	12.0	11.2	11.0	11.4
Netherlands	20.9	19.2	16.0	13.0	12.9	12.5
Switzerland	18.5	17.7	14.4	12.2	11.7	11.5
Oceania						
Australia-New Zealand						
Australia	21.8	19.8	19.7	16.9	16.4	16.1
New Zealand	25.9	22.6	21.3	18.4	17.8	...
Micronesia-Polynesia						
Fiji	39.2	33.2	29.2	29.0	28.6	21.5
USSR	23.6	17.8	17.7	18.1	18.4	18.2

[q] For 1970-1972.

[r] Excluding Faeroe Islands and Greenland.

[s] Including Cyprus and Israel, which are currently included in the region of Western South Asia.

[t] For 1970-1971.

[u] Crude birth rates for 1961-1976 were calculated on the basis of the *de jure* population and the corresponding births adjusted for under-registration given in Cyprus, Ministry of Finance, Statistics and Research Department, *Demographic Report 1976* (Nicosia), table 18.

[v] For 1961-1964.

[w] Beginning in 1970, including East Jerusalem.

[x] Crude birth rates for 1960-1974 calculated on the basis of the unofficially revised total *de jure* population.

[y] Excluding Ceuta and Melilla.

[z] Rates for 1961-1971 calculated on the basis of the unofficially revised total mid-year population estimates.

[aa] Crude birth rates for 1960-1971 calculated on the basis of unofficially revised total mid-year population estimates taken into account the census results of 31 XII 1961 and 31 XII 1970.

Africa

Africa is the region about which knowledge of fertility and the factors affecting it is poorest. Relatively reliable data are available only for Egypt, Mauritius, Réunion, and Tunisia, and they are not in any sense typical of countries in this region. The estimates of the crude birth rate for countries of Africa that are provided in table 7 were derived from a variety of sources and by varying methods, and they relate to a year or period within a broad time span. The figures for

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37 of the 48 countries are for a year or period prior to 1970. Thus, the measures are not comparable with respect to time or quality.[6]

The range in level of the crude birth rates estimated for countries of Africa is from almost 26 per 1,000 population in Mauritius (1976) to 52 in Ethiopia (1970) and 53 in the Niger (1959-1960). Conditions in Ethiopia and the Niger are such that the levels of birth rates probably have not changed. Both the upper and the lower extremes of the spread in levels of the gross reproduction rate are found in Eastern Africa, from 1.54 in Mauritius (1976) to 3.8 in Kenya (1972-1973). As stated above, the crude birth rates tend to be highest, on the whole, in Western Africa, where a level of 50 per 1,000 is estimated for one third of the countries and only four have rates below 48. The gross reproduction rates confirm the high fertility of this region, the range being from 2.6 to 3.5, with all but four of the 15 countries having a rate of 3.0 or higher.

The level of fertility is high also in Eastern Africa, where both the upper and lower extremes of the range in crude birth rates and gross reproduction rates for the continent are found. The breadth of this range is due to the uncommonly low measures for Mauritius (1976), which, as stated above, has a crude birth rate of 25.7 and a gross reproduction rate of 1.54, and to the new estimates for Kenya (1972-1973)[7] which place its gross reproduction rate at 3.8, above the level of Ethiopia (1970), previously thought to be the highest in Africa.

The gross reproduction rates for most countries of Middle Africa are somewhat below the average for the region south of the Sahara, varying from 2.0 (Gabon) to 2.8 (Congo and Zaire) and 3.2 (Angola). Crude birth rates for some of them are also comparatively low, with six of the eight countries having measures of 45 per 1,000 or lower. Where such levels prevail, it may be, as some researchers maintain, that elements of the culture, including mating habits, breast-feeding practices and diet, as well as the conditions of health, tend to depress fertility. Others hold that fertility in some of these countries is lower because the transition to low fertility has already commenced.[8] As is true throughout Africa, the data are faulty and reliable answers to the question concerning existence of pockets of lower fertility in Middle and Western Africa must await relevant statistics of good quality.

From moderate to high fertility has long been characteristic of the northernmost countries of Africa, and the range in

estimated crude birth rates from 36.2 for Tunisia (1975) to 49 for the Sudan (1955-1956) tend to confirm this. Gross reproduction rates, which are available for four of the six countries, suggest that, except in Tunisia, fertility may not have dropped very much in recent years. Indeed, both Algeria and Egypt appear to have experienced a rise in fertility. In Algeria, the gross reproduction rate rose from 3.3 to 3.5 during the period 1965-1969; and in Egypt, the crude birth rate has moved upwards since 1973. These changes may be attributable either to improved data or to the probably temporary influence of certain modernization factors, such as improved health and nutrition. But in Tunisia, the other country of Northern Africa for which the trend can be examined, there is very firm evidence of a downward spiral in the gross reproduction rate during the preceding decade. From 1965 to 1975, the Tunisian gross reproduction rate fell from 3.3 to 2.8, which is scarcely surprising in view of the social reforms, including legislation that forced a higher age at marriage, and the measured impact of the national family planning programme, all of which were instituted around 1967.

From moderately high to higher crude birth rates have been estimated for countries of Southern Africa, the range being from 38 to 50 live births annually per 1,000 population. However, the basis of the measure is weak; and in three of the countries, it refers to dates in the 1960s. Thus, it is uncertain to what extent they accurately represent current levels of the birth rate.

Asia

Satisfactory bases for calculating the crude birth rate and gross reproduction rate exist for only four countries of Asia. Rates for the remainder of the countries represent the best available estimates. They are not comparable either as to quality or as to the time to which they refer.

Levels of the crude birth rate and gross reproduction rate vary widely among the developing countries of Asia, a major area in which are found some of the highest and lowest indications of national fertility levels among developing countries today. The four countries with crude birth rates of 30 per 1,000 or under around 1975 or later have small populations and are situated in East and South Asia. The measures for them vary from 17.2 (Hong Kong) to 28.0 (Sri Lanka) and the gross reproduction rates from 1.0 to 1.8 (table 7). They have also had national family planning programmes for a considerable time.[9] There is another group of countries for which birth rates are estimated to be of moderate levels. For these eight countries, which are scattered throughout all regions of Asia, the measures are from 30 to 40 births per 1,000 population. In some of them— Malaysia, the Philippines and Thailand, for example— modernization factors and programmes to encourage regulation of fertility may have facilitated a decline.

The region within Asia of highest fertility appears to be Western South Asia, where crude birth rates for most coun-

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[6] The comparability of crude birth rates for different countries is also affected by the variations in age structure of the female population, proportions of women married and other related factors.

[7] This change is attributable, in so far as is known, to an improved measure for Kenya, although a rise in fertility sometimes occurs during early stages of modernization. Previously, the best estimates of the crude birth rate and gross reproduction rate (49 and 3.3) for Kenya, related to 1969, and were derived by analysis of the age composition of the population supplemented by an indication of the rate of natural increase or of the approximate level of mortality. The measures given in table 7 were obtained from results of a Demographic Baseline Survey conducted in 1973.

[8] William Brass, "The demography of French-speaking territories covered by special sample inquiries: Upper Volta, Dahomey, Guinea, North Cameroon, and other areas", in William Brass and others, *The Demography of Tropical Africa* (Princeton, New Jersey, Princeton University Press, 1968), pp. 346-347.

[9] *Measures, Policies and Programmes Affecting Fertility, with Particular Reference to National Family Planning Programmes* (United Nations publication, Sales No. E.72.XIII.2), chap. II.

tries amount to 47 or higher per 1,000 population and, except for Lebanon, the gross reproduction rate—where it is available—ranges from 3.4 to 3.7. The measures are high also in several countries of Middle South Asia. In all of these countries, social and cultural institutions and factors clearly favour high fertility. In most, the pertinent elements of change do not appear to have occurred on a scale sufficient to precipitate an appreciable decline. That fertility is not higher may reflect the persistence of traditional behavioural norms, such as breast-feeding and, in some countries, adolescent marriage, which would tend to depress fertility.

It is appropriate to emphasize the marked decreases that have occurred in the fertility of several Asian countries since 1960 (table 8). From that year until 1975, the gross reproduction rate declined by 64 per cent in Singapore, 48 per cent in Hong Kong, 40 per cent in the Republic of Korea, 31 per cent in Malaysia and 24 per cent in Sri Lanka. Inasmuch as this measure is not influenced by changes in age structure, the decreases may have resulted from a decrease in marital fertility due to the practice of birth regulation by married women. However, there is evidence that, during a portion of this period at least, the decrease in Singapore resulted more from a rising age at marriage than from a decrease in marital fertility; in Hong Kong, the Republic of Korea, and Sri Lanka, marital fertility played the greater role.[10]

The crude birth rate for China has been subjected to much analysis and speculation. Data are not available to the Population Division for calculating a measure in which firm confidence can be placed. A review of all information from the best available sources leads to an estimate of 26.1 per 1,000 population. Other estimates place the measure between 14 and 36.6.[11] The estimate of 26.1 acknowledges important decreases in the crude birth rate in China; indeed, the social and economic changes that have occurred there suggest a decline, and it is generally recognized that the national family planning programme has been widely successful.

There is much interest also in the downward trend of fertility that is considered recently to have begun in Indonesia, one of the largest countries in Asia, in which there have been heavy investments in the national family planning programme. Precise knowledge about this trend is impaired by lack of a reasonably reliable bench-mark measure for a year prior to the time when this decline is believed to have begun and by the fact that the bases for this conclusion are data from Bali and Java only. Estimates given in table 7 place the pre-1970 level of the crude birth rate at 44.0 per 1,000 population and the gross reproduction rate at 2.7. Views as to the amount of decline vary. One analysis[12] of data for Java indicated a drop in the crude birth rate of from 41.0 per 1,000 prior to 1970 to 36.6 during the period 1971-1975,

and this decrease of 12 per cent is estimated to characterize what is occurring in the country as a whole. Another study[13] concluded, following an analysis of data obtained in the 1976 fertility survey, that the total fertility rate had decreased by about 15 per cent in Java and Bali from the late 1960s to 1976. It was reckoned that, even if there were no changes in the remainder of Indonesia, the decrease in Java and Bali, which contain two thirds of the national population, would effect a decline of about 10 per cent for the country as a whole.

Latin America

Basic data of the quality required to derive adequate crude birth rates and gross reproduction rates are available for a comparatively larger number of countries in Latin America than is the case in Africa and Asia: 17 of the 28 countries possess more or less reliable birth registration statistics. The range in level of the fertility indicators for countries of Latin America is relatively wide, reflecting the differences among them in levels of development and in social and cultural conditions. This is not to suggest that the country with the lowest fertility has made the most advancements with respect to development. None the less, it will be seen from table 7 that the number of live births annually per 1,000 population is lower in countries of Temperate South America and certain of those in the Caribbean, regions where, with a few exceptions, economic and social progress has been more impressive. In Martinique, the crude birth rate in 1975 of 20.4 per 1,000 population is less than one half the maximum for the region, 49 and 48, respectively, for Nicaragua (1965-1970) and Honduras (1974). Available gross reproduction rates vary in level from 1.47 for Chile (1975) to 3.5 for Nicaragua (1965-1970).

Around 1960, birth rates and gross reproduction rates tended to be higher, on the whole, in Middle America and in Tropical South America than elsewhere in Latin America (tables 8 and 9). The latter region had uniformly high birth rates; but impressive declines since 1960, most conspicuously in Colombia and Venezuela, have altered that picture.

Indeed, although the data for a majority of these countries are of too poor quality to serve as a basis for trend analysis, there is impressive evidence of decreases in Colombia and to a lesser extent also in Suriname and Venezuela (tables 8, 9 and 10). The estimated birth rate for Colombia in 1967-1968 was 41 per 1,000, and in 1973, 33.1.[14] The 1976 national fertility survey revealed a birth rate of 31.1, a possible drop of 24 per cent in nine years.[15] In Colombia, the gross reproduction rate may also have dropped from 2.9 in 1967-1968 to around 2.0 in 1976.[16]

[10] Levels and Trends of Fertility Throughout the World, 1950-1970, p. 178.

[11] Ibid., p. 188; and W. Parker Mauldin, "Patterns of fertility decline in developing countries, 1950-1975", Studies in Family Planning, vol. 9, No. 4 (April 1978), p. 77.

[12] "Levels of birth and death rates in Indonesia, 1971-75", manuscript prepared by C. Chandrasekaran, Population Specialist, World Bank, Jakarta, 1977.

[13] Terrence H. Hull, Valerie J. Hull and Masri Singarimbun, "Indonesia's family planning story: success and challenge", Population Bulletin (Washington, D.C.), vol. 32, No. 6 (November 1977), 52 pp.

[14] Levels and Trends of Fertility Throughout the World, 1950-1970, p. 77.

[15] Colombia, Encuesta nacional de fecundidad Colombia 1976, Resultados generales (Bogotá, 1977), p. 45.

[16] As indicated above, the extent of comparability among these measures is not known, and due caution about interpreting a trend from them is decidedly in order.

TABLE 9. GROSS REPRODUCTION RATES, MORE DEVELOPED COUNTRIES AND SELECTED
'LESS DEVELOPED COUNTRIES WITH RELATIVELY GOOD STATISTICS, 1960-1976

Major area, region and country	1960	1965	1970	1975	1976
Africa					
Eastern Africa					
Mauritius[a]	2.9	2.7	1.9	1.6	1.5
Réunion	...	3.4[b]	2.3[b]	...	1.6[c]
Northern Africa					
Algeria[d]	...	3.3	3.5[e]	...	...
Tunisia[f]	3.3	3.3	3.1	2.8	...
Latin America					
Caribbean					
Cuba	...	2.2	1.9[g]	...	...
Guadeloupe	2.8	2.7	2.7[h]	...	...
Jamaica[i]	2.8	...	2.6	2.2	2.1
Martinique	2.8	2.9	2.3[j]	...	...
Puerto Rico	2.3	2.0	1.5	...	...
Trinidad and Tobago	2.7	2.2	1.7	1.5	...
Middle America					
Costa Rica	3.5[k]	3.2[k]	2.1[k]	1.9[l]	...
El Salvador	3.5[k]	3.4[k]	2.9[k]	2.9[m]	...
Guatemala	3.2[n]	3.1[n]	2.8[n]	2.8[o]	...
Panama	2.8[k]	2.7[k]	2.6[k]	2.1	...
Temperate South America					
Argentina	1.5	1.4	1.5	...	...
Chile[p]	2.5	...	1.7	1.5	...
Uruguay[q]	...	1.4[m]	...	1.5	...
Tropical South America					
Suriname	...	3.1[r]	2.6[r]	...	...
Venezuela[s]	3.3[t, u]	...	2.6[m, t]	2.4[o]	...

[a] Excluding dependencies.

[b] Rates taken from France, Institut national de la statistique et des études économiques, *Annuaire statistique de la Réunion 1969-1972* (Paris, 1973), pp. 34 and 36, tables 2 and 3.

[c] Alain Jourdain, *Baisse de fécondité et planification familiale a l'ile de la Réunion: thèse pour le doctorat de troisième cycle* (Université de Rennes Uer des sciences économiques, 1978), annex 1, p. 229.

[d] Gourari Négadi, "La fécondité en Algérie, niveaux-tendances-facteurs", doctoral dissertation, Ecole pratique des hautes études, VIème section: Sciences économiques et sociales, Paris, 1975, p. 64, table II-4.

[e] For 1969.

[f] For 1965, see Alain Marcoux, "La croissance de la population de la Tunisie, passé récent et perspectives", *Population* (Paris), vol. 26, special issue (March 1971), p. 113, table V. Rate for 1970 calculated in accordance with Marcoux's population estimates, with the assumption that official birth registration was 95 per cent complete. For 1975, see Tunisia, Office national du planning familial et de la population, *Evolution récente de la nuptialité et de la fécondité en Tunisie* (Tunis, 1977), p. 25, table VI.

[g] For 1969-1971. Rates calculated on the basis of births obtained by averaging the number of births for 1969-1971. The resulting rates were thus distributed according to the 1968 reported live births by age of mother.

[h] For 1967.

[i] United States of America, Department of Commerce, Bureau of the Census, *Country Demographic Profiles: Jamaica*, ISP-DP-9 (Washington, D.C., 1977), pp. 6, 9 and 18, tables 3, 7 and A-2.

[j] France, Institut national de la statistique et des études économiques, *Annuaire statistique de la Martinique 1969-1972* (Paris, 1973), p. 30.

[k] Rates calculated on the basis of female population aged 15-49 given in *Boletín Demográfico* (Centro Latinoamericano de Demografía), vol. XII, No. 13 (January 1974), table 2, with adjustment to agree with more up-to-date official estimates of total mid-year population.

[l] For 1974. United States of America, Department of Commerce, Bureau of the Census, *Country Demographic Profile: Costa Rica*, ISP-DP-4 (Washington, D.C., 1977), table 7.

[m] For 1971.

[n] Rates calculated on the basis of female population aged 15-49 taken from Centro Latinoamericano de Demografía, *Guatemala: evaluación del censo de 1973 y proyección de la población por sexo y edad 1950-2000*, Series A, No. 1021 (San José, Costa Rica, 1976), p. 43, table 26; and prorated to mid-year total population given in United States of America, Department of Commerce, Bureau of the Census, *Country Demographic Profiles: Guatemala*, ISP-DP-6 (Washington, D.C., 1977), table 1.

[o] For 1973.

[p] United States of America, Department of Commerce, Bureau of the Census, *Country Demographic Profiles: Chile*, ISP-DP-13 (Washington, D.C., 1978), pp. 5 and 8, tables 3 and 7.

[q] For 1963. Agustín García L., *Uruguay: proyección de la población por sexo y grupos de edades, 1963-2003*, CELADE Series A, No. 101 (Santiago, Chile, 1970).

[r] H. E. Lamur, *The Demographic Evolution of Surinam*, trans. by Dirk H. Van der Elst (The Hague, Martinus Nijhoff, 1973), p. 56. Rates based on births to mothers aged 15-44.

[s] Excluding Indian jungle population.

[t] For 1961.

[u] Universidad del Zulia, Facultad de Ciencias Económicas y Sociales, Centro de Investigaciones Económicas, *La población de Venezuela*, CICRED Monograph Series, World Population Year 1974 (Maracaibo, Venezuela, 1974), p. 17, table 4.

TABLE 9. GROSS REPRODUCTION RATES, MORE DEVELOPED COUNTRIES AND SELECTED
LESS DEVELOPED COUNTRIES WITH RELATIVELY GOOD STATISTICS, 1960-1976 *(continued)*

Major area, region and country	1960	1965	1970	1975	1976
Northern America					
Canada[v, w]	1.9	1.6	1.1	0.9	. . .
United States of America	1.8	1.4	1.2	0.9	. . .
East Asia					
Japan	1.0	1.1	1.0	1.0	0.9
Other East Asia					
Hong Kong	2.5[x]	2.4[x]	1.7	1.3	. . .
Republic of Korea	3.0[y]	2.4[y]	1.9[y]	1.8	. . .
South Asia[z]					
Eastern South Asia					
Malaysia[aa]	2.9	2.8	2.5	2.2[bb]	. . .
Singapore	2.8	2.3	1.5	1.0	1.0
Middle South Asia					
Sri Lanka	2.6	2.4	2.2[e]	1.8[bb]	. . .
Europe					
Eastern Europe					
Bulgaria	1.1	1.0	1.1	1.1	. . .
Czechoslovakia	1.2	1.2	1.0	1.2	. . .
German Democratic Republic	1.2	1.2	1.1	0.8	0.8
Hungary	1.0	0.9	1.0	1.2	1.1
Poland	1.5	1.2	1.1	1.1	1.1
Romania	1.1	0.9	1.4	1.3	1.2
Northern Europe					
Denmark[cc]	1.2	1.3	1.0	0.9	0.8
Finland	1.3	1.2	0.9	0.8	. . .
Ireland	1.9	2.0	1.9	1.7	. . .
Norway	1.4	1.4	1.2	1.0	0.9
Sweden	1.1	1.2	0.9	0.9	0.8
United Kingdom					
England and Wales	1.3	1.4	1.2	0.9	0.8
Scotland	1.4	1.4	1.2	0.9	0.9
Southern Europe[dd]					
Albania	3.2	2.6	2.4	. . .	. . .
Cyprus	. . .	. . .	1.2[ee]	1.0	1.1
Greece	1.1	1.1	1.2	1.1	1.1
Israel	1.9	1.9	1.9[ff]	1.8[ff]	1.8[ff]
Italy	1.2	1.3	1.1	1.1	. . .
Malta	1.7	1.2	1.0	1.0	. . .
Portugal	1.5	1.5	1.4	1.3	. . .
Spain	1.4	1.4	1.4	1.4[bb]	. . .
Yugoslavia	1.4	1.3	1.1	1.1	. . .
Western Europe					
Austria	1.3	1.3	1.1	0.9	0.8
Belgium	1.2	1.3	1.1	0.8	. . .
France	1.3	1.4	1.2	1.0[bb]	. . .
Germany, Federal Republic of	1.2	1.2	1.0	0.7	0.7
Luxembourg	1.1	1.2	1.0	0.8[bb]	. . .
Netherlands	1.5	1.5	1.3	0.8	0.8
Switzerland	1.2	1.2	1.0	0.8	0.8

[v] Births of Newfoundland prorated to the distribution by age for Canada excluding Newfoundland.

[w] Births including Canadian residents temporarily in the United States but excluding United States residents temporarily in Canada.

[x] Data for 1961 and 1965 have been taken from Ronald Freedman and others, "Hong Kong's fertility decline, 1961-1968", *Population Index*, vol. 36, No. 1 (January-March 1970), pp, 4 and 10.

[y] For 1960, 1966 and 1970, Lee-Jay Cho, "The own children approach to fertility estimation: an elaboration", in International Union for the Scientific Study of Population, *International Population Conference, Liège, 1973* (Liège, 1974), vol. 2, p. 275. For 1975, see United States, Department of Commerce, Bureau of the Census, *Country Demographic Profiles: Republic of Korea*, ISP-DP-17 (Washington, D.C., 1978), p. 6, table 3.

[z] Data for Cyprus and Israel, countries currently included in the region of Western South Asia, are given in the data for Southern Europe.

[aa] Data cover only Peninsular Malaysia, formerly referred to as West Malaysia.

[bb] For 1974.

[cc] Excluding Faeroe Islands and Greenland.

[dd] Including Cyprus and Israel, which are currently included in the region of Western South Asia.

[ee] For 1973.

[ff] Beginning in 1970, including East Jerusalem.

Major area, region and country	1960	1965	1970	1975	1976
Oceania					
Australia-New Zealand					
Australia	1.7	1.4	1.4	1.1	. . .
New Zealand	2.1	1.7	1.5	1.2	. . .
Micronesia-Polynesia					
Fiji	2.7	2.4	1.9	1.7	1.7
USSR[gg]	1.4	1.2	1.2	1.2	. . .

[gg] For 1960-1961, 1966-1967, 1969-1970, 1975-1976, gross reproduction rates calculated on the basis of data taken from Union of Soviet Socialist Republics, Central Statistical Office, *National Economy of the USSR, 1967* (Moscow, 1968), p. 38; *ibid., 1970* (Moscow, 1971), p. 49; and *ibid., 1976* (Moscow, 1977), p. 72.

According to results of one study,[17] the recent fertility decline in Colombia is attributable in part to a decreased proportion of women in sexual unions, a rise in the relative numbers of pregnancies that terminate in abortion and to an increase in effective use of contraceptives. The change in Venezuela is compatible with the economic and social progress that it is experiencing. Birth rates have dropped among women of all ages, but particularly among those under 30 years of age, an indication that a change in family size norms may be evolving.

In Middle America, the range in crude birth rates among five countries with available data changed between the periods 1960-1964 and 1970-1974; whereas in 1960-1964 the levels had varied from 39.4 in Panama to 48.6 in El Salvador, in 1970-1974 the extremes were 30.8 (Costa Rica) and 42.1 (Guatemala).

In the years from 1960 to 1976, some important birth rate declines occurred, in Costa Rica (36.8 per cent), El Salvador (18.8) and Panama (17.6).[18] The changes were most marked during the late 1960s (Costa Rica and El Salvador) and early 1970s (Mexico and Panama). It is worthwhile to mention that, in recent years, the birth rates of El Salvador and Guatemala have moved slightly upwards. Whether this rise is merely a fluctuation due to changes in the proportions marrying annually, or whether it is due to the early effects of modernization, to changes in population composition or other demographic factors or even to a rise in marital fertility, remains to be seen. Trends of the birth rate in these countries up to 1975 are generally confirmed by the gross reproduction rates shown in table 9, except that the measure appears to have stabilized, at least temporarily, in both El Salvador and Guatemala.

Crude birth rates have fallen below 30 per 1,000 in all of the Caribbean countries, except the Dominican Republic and Haiti, for which the 1970-1975 levels have been estimated at 43.6 and 42.7 per 1,000. Moreover, the gross reproduction rates affirm that, apart from these two countries, the Caribbean is no longer an area of high fertility. From 1960 to 1975, the birth rate fell by 40 per cent in Trinidad and

Tobago, 28 per cent in Puerto Rico and 31 per cent in Martinique.[19] One analyst[20] reports a 38 per cent drop in the birth rate in Barbados between 1955-1956 and 1970.

Although it probably may be safely stated that, in several countries of Latin America, many development factors, such as improvements in education and in levels of mortality, particularly of infants and young children, may have facilitated the transition from higher to lower fertility, other important factors could have played a role. For example, the currents of emigration from some countries of the West Indies may have influenced the crude birth rate, although the behaviour of the gross reproduction rate shows that changes in age composition were not a factor. However, alteration of the sex ratio at relevant ages might have been an influential factor. Clearly more information is needed if there is to be an understanding of these changes.

No picture of demographic phenomena in Latin America could be meaningful without due cognizance of conditions in Brazil, for which reliable birth data are lacking. One study of recent fertility declines in developing countries estimated a probable decrease of from 42 to 38 per 1,000, or 10 per cent, in the Brazilian crude birth rate during the decade 1965-1975.[21] The latter figure is somewhat higher than the estimate of 36.6 shown in table 7.

Developed countries

Within the developed regions, birth rates are relatively more uniform. Excluding Albania and Israel, which are well outside the range, the measure varies in 1977 from 9.5 in Federal Republic of Germany to 21.4 in Ireland. Among these countries, fertility is lowest in Western and Northern Europe (excluding Ireland) and in Italy and the German Democratic Republic. In these countries, the number of live births recorded in 1977 per 1,000 of the mid-year population varied within the comparatively short range between 9.5 in the Federal Republic of Germany and 13.9 in Finland. Measures for Southern Europe (excluding Italy, as

[17] Elena Prada and Jerald Baily, "Fertility trends in Colombia: something important has happened", abstracted in *Population Index*, vol. 43, No. 3 (July 1977), p. 406.

[18] In addition to tables 8 and 10, see *Levels and Trends of Fertility Throughout the World, 1950-1970*, p. 76.

[19] *Ibid.*

[20] Huw R. Jones, "Fertility decline in Barbados: some spatial considerations", *Studies in Family Planning*, vol. 8, No. 6 (June 1977), pp. 157-162.

[21] W. Parker Mauldin and Bernard Berelson, "Conditions of fertility decline in developing countries", *Studies in Family Planning*, vol. 9, No. 5 (May 1978), pp. 96-97.

TABLE 10. PERCENTAGE CHANGE IN CRUDE BIRTH RATES, MORE DEVELOPED COUNTRIES AND SELECTED LESS DEVELOPED COUNTRIES WITH RELATIVELY GOOD STATISTICS, 1960-1976

Major area, region and country	Percentage change in crude birth rates				
	1960-1965	1965-1970	1970-1975	1975-1976	1976-1977
Africa					
Eastern Africa					
Mauritius[a]	− 8.9	− 24.9	− 6.5	2.3	0.5
Réunion	− 2.5	− 29.7	− 7.0[b]	...	...
Northern Africa					
Egypt	− 3.3	− 16.1	8.2	0.0[c]	...
Tunisia	− 5.7	− 11.4	− 5.2	...	...
Latin America					
Caribbean					
Cuba	18.0	− 19.2	− 11.5[b]	...	...
Guadaloupe	...	− 18.7	− 13.6	...	...
Jamaica	− 4.8	− 17.5	− 12.1	—	...
Martinique	...	− 21.2	− 25.8	...	...
Puerto Rico	− 4.3	− 19.5	− 9.8	3.0[c]	...
Trinidad and Tobago	− 17.0	− 25.6	− 2.8	6.5	...
Middle America					
Costa Rica	− 9.9	− 20.8	− 12.3	1.4	...
El Salvador	− 5.1	− 14.7	− 0.4	0.8	3.8
Guatemala	− 6.9	− 7.9	1.3	4.3	...
Panama[d]	− 1.9	− 3.2	− 13.2	− 0.3	− 10.3
Temperate South America					
Argentina	− 5.3	5.5	− 0.9[b]	...	...
Chile	− 6.1	− 25.0	− 2.0	− 4.3	...
Uruguay	− 7.1	− 14.3	11.2	0.0	...
Tropical South America					
Guyana[e]	− 6.1	− 3.7[f]	...	...	...
Suriname	...	− 13.7	...	...	...
Venezuela[g]	− 5.3	− 12.3	− 2.6	− 2.1	0.7
Northern America					
Canada[h]	− 20.4	− 18.0	− 10.0	− 1.2	− 0.6
United States of America	− 17.9	− 5.8	− 19.4	—	3.8
East Asia					
Japan	7.8	0.4	− 8.5	− 5.2	− 5.5
Other East Asia					
Hong Kong	− 18.2	− 32.4	− 9.2	− 2.6	− 1.2
South Asia[i]					
Eastern South Asia					
Malaysia[j]	− 8.5	− 10.8	− 7.5	− 1.3[c]	...
Singapore	− 21.3	− 25.0	− 19.8	5.8	− 11.5
Middle South Asia					
Sri Lanka	− 9.5	− 11.2	− 4.7[k]	...	...
Europe					
Eastern Europe					
Bulgaria	− 13.9	6.6	1.5	− 0.4	− 2.6
Czechoslovakia	2.8	− 2.6	22.6	− 1.6	− 2.6
German Democratic Republic	− 2.8	− 15.9	− 22.3	7.8	14.3
Hungary	− 10.7	12.1	25.5	− 5.1	− 4.7
Poland	− 22.8	− 4.0	12.8	3.1	− 2.0
Romania	44.1	− 6.6	− 1.1	− 1.1	...

[a] Excluding dependencies.
[b] For 1970 and 1973.
[c] For 1975 and 1977.
[d] Excluding the Canal Zone. Prior to 1966, excluding Indian population numbering 62,187 in 1960.
[e] Excluding Amerindian population.
[f] For 1965 and 1968.
[g] Excluding Indian jungle population.
[h] Including Canadian residents temporarily in the United States, but excluding United States residents temporarily in Canada.
[i] Data for Cyprus and Israel, countries currently included in the region of Western South Asia, are given in the data for Southern Europe.
[j] For Peninsular Malaysia, formerly referred to as West Malaysia.
[k] For 1970 and 1974.

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Major area, region and country	Percentage change in crude birth rates				
	1960-1965	1965-1970	1970-1975	1975-1976	1976-1977
Northern Europe					
Denmark[l]	8.6	− 20.3	− 0.8	− 9.7	− 5.5
Finland	− 8.0	− 17.9	− 0.5	1.4	− 2.0
Ireland	3.1	− 1.6	4.5	0.3	− 0.5
Norway	3.0	− 6.5	− 15.5	− 5.6	− 5.6
Sweden	16.2	− 13.8	− 7.6	− 5.4	− 2.8
United Kingdom	5.8	− 11.2	− 23.8	− 3.1	− 2.8
Southern Europe[m]					
Albania	− 18.8	− 7.6	2.2[n]	...	...
Cyprus	− 10.8[o]	− 17.2	− 12.0	16.0	...
Greece	− 6.2	− 6.9	− 4.6	1.7	− 3.5
Israel[p]	− 3.1	...	1.8	1.0	6.7
Italy	5.1	− 11.8	− 11.8	− 5.8	− 5.8
Malta	− 32.4	− 7.5	12.3	− 1.8	0.1
Portugal	− 4.3	− 16.0	− 2.0	0.9	...
Spain[q]	− 3.1	− 6.9	− 0.3	− 4.6	− 1.0
Yugoslavia	− 10.7	− 15.1	1.9	− 0.3	− 2.4
Western Europe					
Austria	0.4	− 15.8	− 17.5	− 6.6	− 2.8
Belgium	− 2.7	− 10.7	− 17.3	0.5	0.7
France	− 1.1	− 5.7	− 16.0	− 3.5	3.4
Germany, Federal Republic of	1.2	− 24.5	− 27.3	0.9	− 3.2
Luxembourg	− 0.0	− 18.6	− 14.2	− 1.9	9.0
Netherlands	− 4.2	− 8.1	− 28.9	− 1.3	− 2.8
Switzerland	6.9	− 15.9	− 22.6	− 4.6	− 1.6
Oceania					
Australia-New Zealand					
Australia	− 12.7	5.2	− 17.8	− 3.3	− 1.6
New Zealand	− 13.6	− 3.3	− 16.7	− 3.5	− 3.5
Micronesia-Polynesia					
Fiji	− 9.7	− 17.1	− 3.0	− 1.3	− 24.9
USSR	− 26.0	− 6.8	4.2	1.4	− 0.9

[l] Excluding Faeroe Islands and Greenland.
[m] Including Cyprus and Israel, which are currently included in the region of Western South Asia.
[n] For 1970 and 1971.
[o] For 1961 and 1965.
[p] Beginning 1970, including East Jerusalem.
[q] Excluding Ceuta and Melilla.

Notes: 0.0 = magnitude not zero, but less than 0.05.
   — = magnitude zero.

well as Albania, for which data are lacking) varied from 15.4 in Greece to 26.1 for Israel. In Oceania, Japan, Northern America and the USSR, the range in crude birth rates was narrow, from 15.3 (United States) to 18.2 (USSR). Similarities in levels also mark the crude birth rate in countries of Eastern Europe, where the range in 1977 was from 13.3 (German Democratic Republic) to 19.1 (Poland).

In a number of these countries, birth rates were still increasing during the first half of the 1960s; in a majority, declines were very evident. However, all but Australia, Bulgaria, and Hungary witnessed significant decreases during the second half of the decade. The years 1970-1975 saw a tapering off of the trend in some countries, whereas in others the peak of the decline was reached. Post-1975 increases have been recorded in at least half a dozen countries outside of Eastern Europe. Whether these upturns denote a reversal of the downward trend is problematical. It may be

argued that the change is temporary and merely represents planned childbearing by women who had postponed births either by marrying late, by lengthening the interval between marriage and first birth or both. The changing mating patterns make it difficult to determine whether relatively more or fewer women are exposed to childbearing risks and, consequently, whether the level of marital fertility is actually changing. Several developed countries recorded no alterations in the gross reproduction rates for 1975 and 1976 compared with the level in 1970, which suggests that total fertility may be stabilizing. In Czechoslovakia, the German Democratic Republic and Hungary, the measure rose during the period 1970-1975; but in the latter two countries, for which data are available, it remained steady in 1976. The post-1970 rise in fertility among these countries is believed to have been caused by the institution of social and population policies designed to bring about higher fertility. How-

ever, as a longitudinal survey in Hungary[22] revealed, some of the policies serve as an inducement to family building at the outset, but the incentives soon become a part of the family's level of living and then become less of a stimulant to childbearing.

As table 9 shows, fertility in a number of the more developed countries has declined below the level required for replacement; in 1976, the gross reproduction rate of 11 countries was less than 1.0. Significantly, for 1975 or 1976, deaths exceeded births in Austria, the Federal Republic of Germany, the German Democratic Republic and the United Kingdom.[23]

It has been suggested that if current trends persist, the prospect of a stationary if not a declining population will become a real possibility in many developed countries by the turn of the century.[24] In this connexion, the notion has been put forward that certain developed countries are in the process of going "beyond" the demographic transition.[25] In a demographic phase such as this, fertility levels might rise and fall in response to short-term economic fluctuations, to legislative changes effecting access to abortion or to other governmental measures designed to influence reproductive behaviour.

B. FACTORS AFFECTING FERTILITY IN SELECTED DEVELOPING AND DEVELOPED COUNTRIES

The levels, patterns and trends of fertility are influenced by a wide variety of factors, many of which are intricately interrelated. Reliable information on these factors has rarely been available for any of the developing countries. Consequently, little is known of ways in which reproductive behaviour in these countries is affected by social, cultural, demographic and other, related conditions or by the fabric of their interrelationships. The first reports on eight surveys[26] conducted as a part of the World Fertility Survey have now

been released; and data from them are analysed in this section with the view to throwing some light upon conditions of fertility change in developing countries, with due regard for the fact that they do not represent the developing regions as a whole. The countries for which data are included in the present analysis are Colombia, the Dominican Republic, Fiji, Malaysia, Nepal, Pakistan, the Republic of Korea and Thailand.

The demographic and socio-economic factors analysed in relation to fertility in these eight countries are: age at first marriage; duration of marriage; urban/rural residence; wife's level of education; and husband's occupation. Fertility is measured by number of children ever born. There is also a discussion of factors that influence fertility preferences. The section concludes with an analysis of some important variables that have influenced the post-1960 fertility trends in selected developed countries.

Characteristics of respondents

The advantage in conducting substantively identical national fertility surveys is that issues of comparability are, in theory, at a minimum. Nevertheless, not all problems of comparability were resolved in the World Fertility Survey, and the degree of incomparability varies with the measure considered. The demographic control variables—age at first marriage and duration of marriage—may be more easily compared from one country to another than is the case with wife's level of education or husband's occupational status. Different definitions of primary or secondary education or interpretations of occupational codings affect how women are classified. However, there are even problems relating to duration of marriage. This factor is particularly important in a comparative analysis of fertility because the date of first marriage is frequently used as the starting-point of exposure to childbearing. One problem is that the date of first marriage may not coincide with the beginning of cohabitation. Depending upon the society, the actual date of legal or formal marriage may precede or follow the beginning of cohabitation. In addition, marital stability varies significantly cross-nationally. For example, at the time of survey more than four times as many of first marriages had been dissolved in the Dominican Republic (44 per cent) as in Pakistan (10 per cent). The causes of marital dissolution vary, as do the customs regarding remarriage. In the countries of Latin America, marriages are dissolved most frequently by separation or divorce, and remarriage is fairly common. In Asia, the majority of marital disruptions are due to widowhood. Thus, although duration of marriage has been defined in each survey as "years since first marriage" the proportions of ever-married women who have been in continuous exposure to childbearing, i.e., in unbroken marriages, differ cross-nationally because of cultural differences in the actual definition of marriage and/or in marital stability.

The characteristics of the women according to the variables employed are presented in table 11. It should be mentioned that the relative size of these groups may not be exactly the same as the distributions for the country as a whole.

[22] Hungarian Central Statistical Office, *The 1966-1972 Years' Family Planning, Fertility and Birth Control Attitude of Couples Married in 1966* (Budapest, 1975), pp. 16-28.

[23] *Demographic Yearbook, 1976* (United Nations publication, Sales No. E.77.XIII.1), tables 9 and 17.

[24] Jean Bourgeois-Pichat, "The economic and social implications of demographic trends in Europe up to and beyond 2000", *Population Bulletin of the United Nations, No. 8—1976* (United Nations publication, Sales No. E.76.XIII.3), pp. 34-88.

[25] A. A. Campbell, "Beyond the demographic transition", *Demography*, vol. 11, No. 4 (November 1974), pp. 549-562.

[26] The World Fertility Survey reports discussed in this chapter are: *Encuesta nacionale de fecundidad de Colombia 1976, resultados generales* (Bogotá, Instituto Internacional de Estadisticas, 1977); Dominican Republic, Consejo Nacional de Población y Familia, *Encuesta nacional de fecundidad—informe general* (Santo Domingo, 1976); *Fiji Fertility Survey 1974, Principal Report* (Suva, Bureau of Statistics, 1976); *Malaysian Fertility and Family Survey—1974, First Country Report* (Kuala Lumpur, National Family Planning Board, 1977); *Nepal Fertility Survey 1976, First Report* (Kathmandu, His Majesty's Government, Health Ministry, Nepal Family Planning and Maternal Child Health Project, 1977); *Pakistan Fertility Survey, First Report* (Lahore, Population Planning Council of Pakistan, 1976); *The Korean National Fertility Survey 1974, First Country Report* (Seoul, Korean Institute for Family Planning, 1977); *The Survey of Fertility in Thailand: Country Report No. 1*, vols. I and II (Bangkok, Chulalongkorn University, Institute of Population Studies; and National Statistical Office, Population Survey Division, 1977).

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The data for age at first marriage are presented in table 11. Mean age at first marriage for the entire sample of women does not exceed 20 in any country. Marriage is earliest in Nepal, where the mean age is 15.0; and latest in Colombia (19.1) and the Republic of Korea (19.4). A rough insight into changes in age at first marriage can be gained by examining the average age at first marriage by current age (table 11). Because the sample is ever-married women, it is subject to downward bias due to truncation particularly if age at marriage is rising. Younger women who are included in the calculation are currently married, but younger women who are delaying marriage are excluded from the calculation. Nevertheless, some trends can be discerned from table 11. In three countries, the Dominican Republic, Nepal, and Thailand, there has been little or no change in marriage patterns. Women who are currently 45-49 years of age married at roughly the same age (within six months) as women who are currently 25-29. In three countries, Fiji, Malaysia and the Republic of Korea, there has been an increase of from one to four years in mean age at first marriage. The largest change in age at marriage seems to have occurred in the Republic of Korea, where the oldest women (45-49) married near age 17 and the youngest women (25-29) did not marry until age 21, on average. A decline in age at marriage may be taking place in Colombia. However, the unique pattern of legal and consensual unions in Latin America make it difficult to discern trends with a high degree of certainty.

As would be expected in light of the young age composition of the populations in these countries, the greatest proportion of women in all countries have been married less than 10 years (table 11). Proportions in marriages of this duration range from 37.2 per cent in Malaysia to 43.6 per cent in Colombia. Given the above-mentioned reasoning, it is of interest that marriages with a duration of 20 years or more are almost as numerous as those of 10-19 years. Almost one third of the women in Nepal and Pakistan reported their first marriage to have occurred more than 20 years prior to the survey. The main reason for this is the high proportion of older women who married at very young ages.

The countries included in the analysis are by no means similarly situated along a continuum of economic development or modernization. There is a wide range in the level of such indicators as life expectancy, infant mortality, gross domestic product *per capita* and proportion literate. Of the countries included, Nepal and Pakistan are perhaps the least advanced. Both have the highest birth and death rates with no apparent downward trend in fertility. Nepal is predominantly rural; only 4 per cent of the population live in urban areas and only 5 per cent of the labour force are engaged in non-agricultural activities. According to the 1971 census, 25 per cent of the male population aged 6 years and over and 5 per cent of the female population are literate.[27] At the other extreme, Colombia, Malaysia and the

Republic of Korea are considerably more advanced in respect of social and economic development. However, the differences in levels of social and economic advancement notwithstanding, fertility has begun to decline in six of the eight countries.

As might be expected, the majority of respondents reside in rural areas (table 11). The proportion urban ranges from less than 5 per cent in Nepal to 64.3 per cent in Colombia. As is well known, urbanization and economic development do not necessarily move at the same pace. Malaysia and the Republic of Korea have achieved similar levels of economic development by some indicators, but the latter country is considerably more urbanized than the former. Consequently, the impact of urban residence on fertility may differ among the countries.

The general level of education attainment in the eight countries is fairly low (table 11). In all of them, the majority of women either had no education or had completed only the primary level. Except for Fiji and the Republic of Korea, less than 20 per cent of the women in any country had completed a level of education above primary. Because of the generally low educational status, it was decided to distinguish only three broad levels of educational attainment: no education; primary; and more than primary. This classification also minimized problems related to the different number of years of schooling associated with secondary and higher education in the various countries. Women who are classified in the "primary" category have had roughly six years of formal education. Although few women have received much more than primary education, there is considerable range in the proportions who have had no or only primary-level education: 7 per cent of the respondents in the Dominican Republic have had no education compared with 96 per cent in Nepal, between 4 and 83 per cent of the women have completed primary education.

The surveys also contained information on the occupational status of the husband. In table 11, this variable is presented as the industry of his employment at the time of the interview. It is important to mention that even within countries it is extremely difficult to obtain a reliable classification of occupation, particularly if the information about a husband is obtained from the wife. In the present analysis, occupational status was collapsed into two broad categories, agricultural and non-agricultural. A large proportion of the respondent's husbands were engaged in agriculture-related occupations. In the six countries for which the data are available, more than one third of the husbands were so employed.

In a macro-level comparative analysis such as this discussion, it is important to bear in mind the compositional differences of the various countries according to the particular characteristic considered. For example, a comparison of fertility preferences of women who have had no education in the various countries is based on very different proportions of the total sample (7 per cent in the Dominican Republic and 96 per cent in Nepal). At this level of analysis, these kinds of compositional differences require that explanatory conclusions be made cautiously.

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[27] Because of the overwhelmingly rural and agricultural character of the country, distributions by urban/rural residence or husband's occupation are not provided in the First Country Report for Nepal.

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TABLE 11. DISTRIBUTION OF RESPONDENTS BY MEAN AGE AT FIRST MARRIAGE, DURATION OF MARRIAGE, URBAN OR RURAL RESIDENCE, LEVEL OF EDUCATION AND OCCUPATION OF HUSBAND

	Colombia		Dominican Republic[a]		Fiji		Malaysia		Nepal		Pakistan		Republic of Korea		Thailand[a]	
	Number	Mean	Number	Mean	Number	Mean	Number	Mean	Number	Mean	Number	Percentage	Number	Percentage	Number	Percentage
Current age[b]												*Mean age at first marriage*				
Total	3 302	19.1	1 442	17.3	3 551	17.6	4 666	17.6	3 837	15.0	4 949	16.8	4 369	19.4	2 687	18.7
Under 20	215	15.8	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	628	15.6	. . .	. . .	. . .	. . .
20-24	589	17.6	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	843	16.6	. . .	. . .	. . .	. . .
25-29	654	18.9	406	17.1	1 003	18.3	1 080	18.8	1 123	14.9	911	17.4	1 021	21.1	693	18.7
30-34	531	19.6	292	17.4	887	17.5	957	18.1	838	14.8	821	17.3	902	20.5	535	18.7
35-39	508	19.7	326	17.2	682	17.3	970	17.3	702	15.3	623	16.8	948	19.5	529	18.7
40-44	434	20.4	213	17.1	979	17.1[c]	775	17.1	684	15.1	623	16.3	836	18.1	509	18.4
45-49	371	20.9	205	17.8	. . .	. . .	884	16.7	490	15.3	500	16.6	662	16.9	421	18.8
Number of years since first marriage												*Duration of marriage*				
Total	3 302	100.0	2 256	100.0	4 928	100.0	6 313	100.0	5 940	100.0	4 948	100.0	5 420	100.0	3 776	100.0
Less than 10	1 440	43.6	966	42.8	2 029	41.2	2 350	37.2	2 251	37.8	1 876	37.9	2 219	40.9	1 533	40.6
10-19	1 068	32.3	710	31.5	1 588	32.2	1 831	29.0	1 928	32.5	1 525	30.8	1 620	29.9	1 189	31.5
20+	794	24.1	580	25.7	1 311	26.6	2 132	33.8	1 761	29.7	1 547	31.3	1 581	29.2	1 054	27.9
Urban/rural residence												*Place of residence*				
Total	3 302[d]	99.9	2 256	100.0	4 928[e]	99.6	6 313	100.0	. . .	. . .	4 948	100.0	5 420[d]	100.0	3 776	100.0
Urban	2 123	64.3	1 144	50.7	1 764	35.8	1 022	16.2	. . .	. . .	1 319	26.7	2 834	52.3	551	14.6
Rural	1 176	35.6	1 112	49.3	3 146	63.8	5 291	83.8	. . .	. . .	3 629	73.3	2 586	47.7	3 225	85.4
Level of education of wife												*Education*				
Total	3 302[f]	99.8	2 256	100.0	4 928	100.0	6 313[g]	96.3	5 940[h]	99.7	4 948	100.0	5 420[i]	100.0	3 776	100.0
No education	693	21.0	161	7.1	950	19.3	2 241	35.5	5 668	95.4	4 420	89.3	1 135	20.9	680	18.0
Primary	1 948	59.0	1 876	83.2	1 817	36.9	3 077	48.7	236	4.0	196	4.0	2 713	50.1	2 816	74.6
More than primary	653	19.8	219	9.7	2 161	43.8	767	12.1	18	0.3	332	6.7	1 562	28.8	280	7.4
Occupational category												*Occupation of husband*				
Total	3 302[j]	99.8	2 255[k]	99.4	4 928[l]	99.9	6 314[m]	99.9	. . .	. . .	4 948	100.0	5 420[n]	96.9	3 769[o]	99.6
Agricultural	1 236	37.4	883	39.2	1 646	33.4	2 364	37.4	. . .	. . .	2 129	43.0	1 846	34.1	2 361	62.6
Non-agricultural	2 060	62.4	1 358	60.2	3 277	66.5	3 948	62.5	. . .	. . .	2 819	57.0	3 406	62.8	1 395	37.0

Sources: Data taken from the following World Fertility Survey reports: Encuesta nacional de fecundidad de Colombia 1976, resultados generales (Bogotá, Instituto Internacional de Estadisticas, 1977), pp. 85, 132 and 133, tables 1.1.4A, 2.2.5B and 2.2.5C; Dominican Republic, Consejo Nacional de Población y Familia, Encuesta nacional de fecundidad—informe general (Santo Domingo, 1976); pp. 157, 196, 225 and 230, tables 1.1.3A, 1.6.3E, 2.2.4A and 2.2.5B; Fiji Fertility Survey 1974, Principal Report (Suva, Bureau of Statistics, 1976), pp. 176, 243, 279 and 285; tables D3, E11, E17 and E19; Malaysian Fertility and Family Survey—1974, First Country Report (Kuala Lumpur, National Family Planning Board, 1977); pp. A5, A109, A115 and A120, tables 1.1.3A, 2.2.4A, 2.2.4E and 2.2.5B; Nepal Fertility Survey 1976, First Report (Kathmandu, His Majesty's Government, Health Ministry, Nepal Family Planning and Maternal Child Health Project, 1977), pp. 90 and 113, tables 1.1.3 and 2.2.4A; Pakistan Fertility Survey, First Report (Lahore, Population Planning Council of Pakistan, 1976), pp. A-II-3, A-II-24 and A-II-25, tables 111, 2.2.4 and 2.2.5; The Korean National Fertility Survey 1974, First Country Report (Seoul, Korean Institute for Family Planning, 1977), pp. T218, T272 and T275, tables 1.1.3A, 2.2.7A and 2.2.7C; The Survey of Fertility in Thailand: Country Report No. 1, vol. II (Bangkok, Chulalongkorn University, Institute of Population Studies; and National Statistical Office, Population Survey Division), pp. 9, 87 and 95, tables 1.1.4A, 2.2.6A and 2.2.6E.

[a] For currently married women only.
[b] Data for women under 25 years not given in the reports, except for Colombia and Pakistan.
[c] Referring to 40 years and older.
[d] Including three women who did not state type of place of residence.
[e] Including 10 women who did not state type of place of residence.
[f] Including eight women who did not state level of education.
[g] Excluding 228 women who had non-formal education.
[h] Including 18 women who did not state level of education.
[i] Including 10 women who did not state level of education.
[j] Including six women whose husbands were not working.
[k] Including 14 women whose husbands were not working.
[l] Including five women who did not state husband's occupation.
[m] Including two women whose husbands were not working.
[n] Including 13 women whose husbands were not working.
[o] Including 93 women whose husbands were not working and 75 women who did not state husband's occupation.

TABLE 12. MEAN NUMBER OF CHILDREN EVER BORN, BY DURATION OF MARRIAGE AND SELECTED BACKGROUND CHARACTERISTICS

	Colombia		Dominican Republic		Fiji		Malaysia		Nepal		Pakistan		Republic of Korea		Thailand	
	Number	Mean	Number	Mean	Number	Mean	Number	Mean	Number	Mean	Number	Mean	Number	Mean	Number	Mean
Duration of marriage and age at first marriage																
All durations of marriage																
Total	3 302	4.3	2 256	4.1	4 928	3.8	6 314	4.2	5 940	3.3	4 949	4.3	5 420	3.6	3 775	3.9
Under 20	2 020	4.7	1 733	4.4	3 445	4.2	4 175	4.9	5 247	3.3	4 214	4.5	2 460	4.7	2 299	4.3
20-24	925	3.9	429	3.4	1 239	3.1	1 672	3.2	558	2.9	613	3.3	2 518	2.8	1 203	3.6
25+	357	3.1	94	3.0	244	2.5	467	2.3	135	2.6	122	2.0	442	2.0	273	2.5
Married less than 10 years																
Total	1 440	1.9	966	1.7	2 028	1.8	2 350	1.9	2 251	1.1	1 877	1.5	2 219	1.8	1 532	1.7
Under 20	801	2.0	724	1.8	1 194	1.7	1 117	2.1	1 907	1.0	1 467	1.5	440	1.9	837	1.8
20-24	448	1.8	197	1.4	669	1.6	923	1.8	268	1.3	328	1.6	1 425	1.9	527	1.6
25+	191	2.0	45	2.1	165	1.9	310	1.6	76	1.5	82	1.1	354	1.7	168	1.5
Married 10-19 years																
Total	1 068	5.0	710	4.9	1 588	4.4	1 832	4.7	1 928	3.7	1 525	4.8	1 620	4.1	1 192	4.4
Under 20	656	5.1	528	5.0	1 164	4.5	1 212	4.9	1 704	3.7	1 301	4.8	631	4.4	714	4.5
20-24	276	5.0	143	4.9	360	4.2	484	4.3	172	3.9	191	4.8	908	4.0	383	4.3
25+	136	4.2	39	3.6	64	3.6	136	3.4	52	3.7	34	3.4	81	3.2	95	3.8
Married 20 years or more																
Total	794	7.5	580	7.1	1 311	6.4	2 132	6.4	1 761	5.6	1 547	7.1	1 581	5.5	1 051	6.7
Under 20	563	7.9	481	7.5	1 087	6.5	1 846	6.5	1 636	5.7	1 446	7.2	1 389	5.7	748	6.9
20-24	201	6.9	89	5.5	209	5.6	265	5.8	118	5.0	94	6.3	185	4.4	293	6.2
25+	30	5.1	10	4.5	15	4.7	21	4.9	7	5.3	6	5.8	7	4.0	10	5.0
Duration of marriage and level of education																
All durations of marriage																
Total	3 302[a]	4.3	2 256	4.1	4 928	3.8	6 313[b]	4.2	5 940[c]	3.3	4 948	4.3	5 420[d]	3.6	3 776	3.9
No education	693	5.7	161	5.5	950	5.2	2 241	5.4	5 668	3.3	4 420	4.4	1 135	5.3	680	5.1
Primary	1 948	4.3	1 876	4.2	1 817	4.4	3 077	3.9	236	2.2	196	3.4	2 713	3.6	2 816	3.8
More than primary	653	2.7	219	2.2	2 161	2.8	767	2.1	18	1.9	332	2.9	1 562	2.3	280	2.1
Married less than 10 years																
Total	1 440[e]	2.0	966	1.7	2 029	1.8	2 350[f]	1.9	2 251[g]	1.1	1 875	1.5	2 219	1.8	1 533	1.7
No education	202	2.5	49	2.2	192	1.9	305	2.2	2 074	1.1	1 586	1.5	82	2.5	122	1.8
Primary	844	2.1	782	1.8	531	2.0	1 413	2.0	154	1.2	169	1.4	1 103	2.0	1 221	1.8
More than primary	389	1.4	135	1.2	1 306	1.6	554	1.4	12	1.1	120	1.6	1 034	1.7	190	1.3
Married 10-19 years																
Total	1 068[h]	5.0	710	4.9	1 588	4.4	1 831[i]	4.7	1 928[j]	3.7	1 526	4.8	1 620[k]	4.1	1 189	4.4
No education	223	5.8	34	5.7	283	4.6	607	4.8	1 858	3.7	1 383	4.8	347	4.6	237	4.6
Primary	678	5.0	617	5.0	713	4.6	1 012	4.8	62	3.8	96	4.8	906	4.2	896	4.4
More than primary	165	3.8	59	3.6	592	4.0	148	3.4	4	3.5	47	4.1	366	3.3	56	3.4
Married 20 years or more																
Total	794[k]	7.5	580	7.1	1 311	6.3	2 132[l]	6.4	1 761[m]	5.6	1 547	7.1	1 581[n]	5.6	1 054	6.7
No education	268	8.0	78	7.5	475	6.8	1 329	6.4	1 736	5.6	1 452	7.1	706	6.0	321	6.6
Primary	426	7.6	477	7.2	573	6.3	652	6.6	20	5.2	66	6.5	704	5.3	699	6.8
More than primary	99	5.8	25	4.0	263	5.5	65	4.9	2	4.0	29	6.3	162	4.3	34	4.3
Duration of marriage and type of place of residence																
All durations of marriage																
Total	3 302[o]	4.3	2 256	4.1	4 928[p]	3.8	6 313	4.2	...	...	4 948	4.3	5 420	3.6	3 776	3.9
Urban	2 123	3.9	1 144	3.5	1 764	3.5	1 022	3.7	...	...	1 319	4.4	2 834	3.0	551	3.3
Rural	1 176	5.0	1 112	4.8	3 146	4.0	5 291	4.3	...	...	3 629	4.2	2 586	4.2	3 225	4.0
Married less than 10 years																
Total	1 440[q]	2.0	966	1.7	2 029[r]	1.7	2 350	1.9	...	...	1 875	1.5	2 219	1.8	1 533	1.7
Urban	938	1.8	509	1.6	753	1.8	431	1.7	...	...	509	1.6	1 390	1.8	259	1.6

Rural	501	2.3	457	1.9	1 264	1.7	1 919	1.9	...	...	1 366	1.5	829	1.9	1 274	1.7
Married 10-19 years																
Total	1 068[q]	5.0	710	4.9	1 586[s]	4.4	1 831	4.7	...	...	1 526	4.8	1 620	4.1	1 189	4.4
Urban	692	4.5	380	4.4	531	4.0	279	3.9	...	...	407	5.1	779	3.6	158	3.9
Rural	375	6.0	330	5.6	1 050	4.6	1 552	4.8	...	...	1 119	4.7	840	4.4	1 031	4.5
Married 20 years or more																
Total	794[q]	7.5	580	7.1	1 313[q]	6.4	2 132	6.4	...	...	1 547	7.1	1 581	5.6	1 054	6.7
Urban	493	7.0	255	6.0	480	5.7	312	6.3	...	...	403	7.1	661	4.8	134	5.7
Rural	300	8.4	325	8.0	832	6.7	1 820	6.5	...	...	1 144	7.1	911	6.1	920	6.8
Duration of marriage and occupational status of husband																
All durations of marriage																
Total	3 302[t]	4.3	...	...	4 928[u]	3.8	6 314[v]	4.2	...	...	4 948	4.3	5 420[w]	3.6	3 769[x]	3.9
Non-agricultural	2 060	3.8	...	...	3 277	3.5	3 948	4.0	...	...	2 819	4.2	3 406	3.1	1 395	3.3
Agricultural	1 236	5.1	...	...	1 646	4.4	2 364	4.6	...	...	2 129	4.4	1 846	4.6	2 361	4.3
Married less than 10 years																
Total	1 440[y]	2.0	...	...	2 029[z]	1.7	2 350[v]	1.9	...	...	1 876	1.5	2 219[aa]	1.8	1 532[bb]	1.7
Non-agricultural	943	1.8	...	...	1 438	1.7	1 645	1.9	...	...	1 119	1.5	1 669	1.8	657	1.6
Agricultural	493	2.3	...	...	590	1.9	703	1.9	...	...	757	1.6	472	2.0	868	1.8
Married 10-19 years																
Total	1 068[cc]	5.0	...	...	1 586[dd]	4.4	1 832	4.7	...	...	1 526	4.8	1 620[ee]	4.1	1 193[y]	4.4
Non-agricultural	668	4.5	...	...	1 058	4.2	1 156	4.6	...	...	868	4.8	976	3.8	414	3.9
Agricultural	399	5.8	...	...	525	4.7	676	4.8	...	...	658	4.7	601	4.6	775	4.6
Married 20 years or more																
Total	794[ff]	7.5	...	...	1 313[z]	6.4	2 132	6.4	...	...	1 547	7.1	1 581[gg]	5.6	1 044[v]	6.7
Non-agricultural	445	6.8	...	...	781	6.0	1 147	6.4	...	...	835	7.0	761	4.9	324	5.9
Agricultural	344	8.4	...	...	531	6.8	985	6.5	...	...	712	7.1	773	6.2	718	7.0

Sources: Data taken from the following World Fertility Survey reports: *Encuesta nacional de fecundidad de Colombia 1976, resultados generales*, pp. 120, 131 and 132, tables 2.2.3A, 2.2.5B and 2.2.5C; Dominican Republic, *Encuesta nacional de fecundidad—informe general*, pp. 223, 225 and 230, tables 2.2.3A, 2.2.4A and 2.2.5B; *Fiji Fertility Survey—1974, Principal Report*, pp. 237, 243, 279 and 285, tables E7, E11, E17 and E19; *Malaysian Fertility and Family Survey 1974, First Country Report*, pp. 107, A109, A115 and A120, tables 2.2.3A, 2.2.4A, 2.2.4E and 2.2.5B; *Nepal Fertility Survey 1976, First Report*, pp. 112 and 113, tables 2.2.3A and 2.2.4A; *Pakistan Fertility Survey, First Report*, pp. A-II-22, A-II-24 and A-II-25, tables 2.2.3A, 2.2.4 and 2.2.5; *The Korean National Fertility Survey 1974, First Country Report*, pp. T251, T272 and T275, tables 2.2.3A, 2.2.7A and 2.2.7C; *The Survey of Fertility in Thailand: Country Report No. 1*, vol. II, pp. 78, 87 and 95, tables 2.2.3A, 2.2.6A and 2.2.6E. For complete citations of these reports, see table 11.

[a] Including eight women who did not state level of education.
[b] Including 228 women who had religious or non-formal education.
[c] Including 18 women who did not state level of education.
[d] Including 10 women who did not state level of education.
[e] Including five women who did not state level of education.
[f] Including 78 women who had religious or non-formal education.
[g] Including 11 women who did not state level of education.
[h] Including two women who did not state level of education.
[i] Including 64 women who had religious or non-formal education.
[j] Including four women who did not state level of education.
[k] Including one woman who did not state level of education.
[l] Including 86 women who had religious or non-formal education.
[m] Including three women who did not state level of education.

[n] Including nine women who did not state level of education.
[o] Including three women who did not state type of place of residence.
[p] Including 18 women who did not state type of place of residence.
[q] Including one woman who did not state type of place of residence.
[r] Including 12 women who did not state type of place of residence.
[s] Including five women who did not state type of place of residence.
[t] Including six women whose husbands were not working.
[u] Including five women who did not state husband's occupation.
[v] Including two women whose husbands were not working.
[w] Including 65 women who did not state husband's occupation and 93 women whose husbands were not working.
[x] Including 13 women whose husbands were not working.
[y] Including four women whose husbands were not working.
[z] Including one woman who did not state husband's occupation.
[aa] Including 26 women who did not state husband's occupation and 52 women whose husbands were not working.
[bb] Including seven women whose husbands were not working.
[cc] Including one woman whose husband was not working.
[dd] Including three women who did not state husband's occupation.
[ee] Including 20 women who did not state husband's occupation and 22 women whose husbands were not working.
[ff] Including five women whose husbands were not working.
[gg] Including 19 women who did not state husband's occupation and 19 women whose husbands were not working.

Cumulative and socio-economic differentials in fertility

When the information is from cross-sectional fertility surveys, the number of births a respondent had had at the time of the survey is a function, *inter alia*, of current age, age at first marriage and duration of marriage. A differential analysis of fertility stresses the heterogeneity of society. It assumes that groups within society that are distinguished according to some social significant attributes will also display different demographic characteristics. Further, as the societies become increasingly modernized and, hence, more homogeneous, differences in fertility among national groups will become less pronounced. The social composition of a country as a whole will change as a direct result of differential fertility, other things being equal, especially where the differences between the groups are large; and the trend of these changes will be altered as the margin in levels of fertility among the various groups narrows. In recent decades, studies of differential fertility have been of interest to policy-makers desirous of aiding individuals and couples in achieving the number of children wanted at the desired intervals and of realizing government targets for population growth rates.

In the present analysis, the World Fertility Survey data relating to the number of births respondents had had at the time of the survey are used to indicate the international range in levels of achieved fertility and to investigate relationships between fertility and three socio-economic variables: wife's level of education; urban/rural residence; and husband's occupational status. The purpose is not to make exact comparisons among the countries in the fertility levels of certain groups, but to determine the general direction of the relationship between these selected variables and fertility.

Intercountry differences in the mean number of children ever born by age at first marriage and duration of marriage are presented in table 12. Apart from Nepal, the range in achieved levels of fertility is fairly narrow, from 3.6 births per woman in the Republic of Korea to 4.3 in Colombia and Pakistan. The level of fertility observed for Nepal is unusually low, the average number of births for all respondents being 3.3. Since publication of the main report, the average for women aged 45-49, which is roughly equivalent to completed fertility, has been adjusted upwards from 5.7 to 6.5 on the basis of a comparison of the cumulative fertility rates for the year prior to the survey and reported number of children ever born for different age groups (P/F ratio method).[28] This new estimate suggests an omission of about 12 per cent of births to ever-married women aged 45-49. However, even after adjustment, this estimate of completed fertility is quite low, given that contraceptive use is extremely rare. Another factor that probably contributes to the apparent low level of fertility is a high incidence of adolescent sterility or subfecundity associated with the practice of child marriage, which is quite common in Nepal.[29] Thus,

although family planning is not practised to any great degree, fertility does not approach the maximum because of intervening cultural and biological factors. In this particular case, rising age at marriage would probably have the initial effect of increasing fertility for the country as a whole.

Age at first marriage

Age at first marriage is one of the most important determinants of ultimate family size. In most societies where family planning is not widespread, women who marry early will complete their childbearing with more births than women who marry later.[30] In addition to a shorter period of exposure to conception, it is suggested that women who delay marriage become exposed, through education or employment, to influences that provide alternatives to childbearing, with an effect that their fertility desires are reduced.

The influence of age at first marriage on fertility is clearly seen in the first section of table 12, which shows children ever born for combined duration of marriage by age of the woman at first marriage. In every country, women who married below age 20 had substantially more births than did those who married later. The range of difference between those married under age 20 and those marrying at 25 years or later varies from 1.4 births in the Dominican Republic to 2.7 births in the Republic of Korea. These data also show that this negative association between age at marriage and fertility remains constant between marriage duration cohorts. In every country (excluding certain marriage durations for Nepal and marriages of less than 10 years in the Republic of Korea) regardless of duration of marriage, the higher the age at marriage, the lower the average number of live births.

The range in completed fertility is indicated by the differences in average number of births to women who were first married at least 20 years prior to the survey. Among them, the range in average number of children ever born is twice as wide as in the average for all durations of marriage. Among these marriages of completed fertility, 5.5 births were recorded in the Republic of Korea, as compared with more than seven in three countries, Pakistan (7.1), the Dominican Republic (7.1) and Colombia (7.5). Close to 6.5 births were recorded in Fiji, Malaysia and Thailand.

Level of education

Classically, the relationship between women's educational status and levels of fertility has been inverse—the higher the education, the lower the fertility. Data from the World Fertility Survey also show a strong negative association between family size and education of wife. Of the three socio-economic background variables considered, the largest differences in fertility in all countries are associated with the educational status of the respondent. For all durations of marriage, the average number of births to women with no education is in a range of from five to six births,

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[28] World Fertility Survey, *The Nepal Fertility Survey, 1976: A Summary of Findings*, No. 5 (London, 1978), p. 5.

[29] *Ibid.*, p. 6.

[30] As mentioned above, the reverse may occur in societies where child marriage is customary and fecundity impairments become widespread.

whereas for women with more than primary education, the average is between two and three. For some countries, the difference in the two extreme categories of educational attainment is three children or more. This is true in Colombia, the Dominican Republic, Malaysia, the Republic of Korea and Thailand.

It is clear from table 12 that the negative relation between level of education and fertility persists across marriage cohorts, although the strength of the association is not the same in all groups. In each of the eight countries, the relationship is weakest for women who were married less than 10 years and becomes most pronounced for the group of women married at least 20 years. This is true because childbearing is common among all groups early in marriage but is terminated earlier by the better educated, who apparently use some relatively efficient means to limit births but who are less effective at or less desirous of spacing them.

In the highest and lowest educational categories, the difference in average number of births to women married less than 10 years ranges from 0.3 in Fiji to 1.0 in the Dominican Republic. From table 12, it also becomes apparent that important differences in marriage duration composition contribute to the over-all difference in fertility of the three educational groupings. One significant reason that the average number of births to all women who have had more than primary education is so low is because over 50 per cent of them were married less than 10 years. This finding is true in every country: the education of women in developing countries is a new phenomenon.

Rural/urban residence

It is generally believed that, in societies undergoing demographic, social and economic changes, characteristics associated with urban living and life-styles initiate and promote the desire for smaller families and a reduction of fertility. Excluding Pakistan, women residing in urban areas had lower fertility than did those living in rural areas (table 12). In Pakistan, urban fertility may be higher than rural fertility because of better health and nutritional conditions and/or more complete reporting of births among urban women.[31] The excess of rural over urban fertility for all women ranges from 0.5 in Fiji to 1.3 in the Dominican Republic. The countries that have the highest proportion of respondents residing in urban areas, Colombia (64.3 per cent), the Republic of Korea (52.3 per cent) and the Dominican Republic (50.7 per cent), also have the largest urban/rural differential, 1.1, 1.2 and 1.3, respectively. One possible explanation of this finding is that the effect of urban life upon fertility may be more pronounced as urbanization spreads. As with education, the strength of the urban/rural differential is diminished when duration of marriage is held constant. This effect is especially true for the women married less than 10 years. These women, regardless of place of

residence, have had roughly the same numbers of children. Again, it would appear that these women do not regulate births to any great extent until they have the number of children wanted. In most countries, the urban/rural fertility differential increases for each successive marriage duration group. However, in Pakistan, regardless of duration of marriage, there is very little difference between levels of urban and rural fertility.

In all countries, fertility differences associated with urban/rural residence are smaller than those found for educational status, as is demonstrated in table 13, which gives data on the fertility of respondents according to level of education and urban/rural residence (sample average = 100). As would be expected, women with more than primary education residing in urban areas have the lowest fertility, between one half and two thirds the average of the total sample. However, in several countries, particularly in Colombia, Fiji and Thailand, women with the same educational status have almost equal levels of fertility, regardless of urban or rural residence. In all countries, however, substantial differences in fertility by level of education are found within both urban and rural areas. Thus, educational status appears to have a greater influence on fertility than does type of place of residence.

Table 13. Index of children ever born to ever-married women, by level of education and type of place of residence
(Total = 100)

Country and type of residence	Total	Level of education		
		No education	Primary	More than primary
Colombia				
Total	100	132	100	63
Urban	91	132	95	63
Rural	116	132	109	72
Dominican Republic				
Total	100	134	102	54
Urban	85	134	90	49
Rural	117	134	115	78
Fiji				
Total	100	137	116	74
Urban	92	132	113	68
Rural	105	137	116	76
Malaysia[a]				
Total	100	129	93	50
Urban	88	126	90	50
Rural	102	129	93	48
Nepal				
Total	...	...	...	...
Urban	...	...	...	...
Rural	...	...	...	...
Pakistan				
Total	100	102	79	67
Urban	102	109	91	67
Rural	98	100	65	60
Republic of Korea				
Total	100	147	100	64
Urban	83	122	92	64
Rural	117	158	108	64
Thailand				
Total	100	131	97	54
Urban	85	136	90	51
Rural	102	128	100	59

[a] Excluding 228 women who had religious or non-formal education.

[31] World Fertility Survey, *The Pakistan Fertility Survey 1975: A Summary of Findings*, No. 3 (London, 1977).

Occupation of husband

Respondents whose husbands work in agriculture-related occupations consistently had higher fertility than those with a spouse engaged in non-agricultural activities (table 12). A difference of more than one child between the agricultural and non-agricultural occupations is reported for Colombia, the Republic of Korea and Thailand. In Pakistan, where fertility remains high, there is practically no difference in children ever born between agricultural and non-agricultural workers. The agricultural non-agricultural occupational classification is naturally interrelated with urban/rural residence. The two countries that have the highest proportion of respondents residing in urban areas, Colombia and the Republic of Korea, also have the largest fertility differences associated with husband's occupational status. (It will be recalled that the most pronounced urban/rural fertility differentials were also observed for these two countries.) However, this finding was not uniform: in Thailand, which is still predominantly rural, respondents whose husbands were not engaged in agriculture had, on average, one child fewer (3.3) than their counterparts whose husbands were employed in agriculture (4.3). Again, as with wife's education and urban/rural residence, when duration of marriage is held constant the strength of the relationship between fertility and husband's occupational status is weaker. This finding is especially true for the women whose first marriage occurred less than 10 years earlier. In five countries (Fiji, Malaysia, Pakistan, the Republic of Korea and Thailand), the average number of children born for both categories of workers is practically identical. Only in Colombia is there a large difference associated with husband's occupational status. In some countries, the differential increases with marriage duration (Colombia, Fiji, the Republic of Korea and Thailand), while in others, the absence of an association persists over all durations of marriage (Malaysia, Pakistan).

Of the factors associated with fertility differences that are discussed above, age at first marriage and wife's level of education are associated with the largest fertility differences in all countries. The relationship between fertility and the three background variables are generally in the expected direction. The highest fertility is reported for women with no education, who reside in rural areas and whose husbands are engaged in agricultural occupations. Lower fertility is found for women who have at least primary education, urban residence and non-agricultural occupational status. However, an important conclusion that emerges in all countries is that the association between these background variables and fertility becomes much weaker when duration of marriage is held constant. Regardless of place of residence or husband's occupation, for example, women whose first marriage was of less than 10 years duration had had almost equal numbers of children. Large fertility differences associated with the socio-economic variables emerge only among women married 10-19 years and are largest among women married 20 years or more. One implication of this finding is that women who may ultimately regulate fertility probably do not use contraception for spacing purposes, but to limit births when desired family size has been achieved. Thus, age at first marriage is an important determinant of completed family size, because relatively few women apply contraceptives. The urban, better educated of non-agricultural occupational status tend to do so to a greater extent than other women, but even they apparently do not plan the ultimate size of their family at the beginning of their reproductive careers. Instead, biological, social and economic factors are permitted to determine the timing of the next birth rather than total family size, at least until no more children are wanted.

Fertility preferences and desired family size

Since the early 1960s, there has been considerable research interest in fertility preferences in relation to knowledge and use of contraception among women in developing countries, because of the usefulness of such information to those concerned with altering rates of population growth by reducing fertility. It is believed by many of those who advocate family planning that, based on findings of fertility surveys, family size desires in developing countries are low. In their view, motivational problems are minimal and population growth could be reduced by preventing the pregnancies that respondents claim are unwanted. Others maintain that family size desires are still high in most developing countries. Although this group also favours providing contraceptive services, it is argued that family size desires are resistant to change and can be reduced only through basic change in social and economic institutions that support the large family as ideal.[32]

Fertility preferences are measured by two sets of questions in the World Fertility Survey. One concerns the desire for more children; the other concerns the total number of children desired. Particular attention has been focused on the group of women who reported they did not want more children. This is an important group of women because they are presumably potential candidates for family planning. It has been reported that results from the World Fertility Survey support the view that there is a large unmet need for family planning services based on the evidence that a large proportion of respondents reported that they had more children than they wanted and that a high proportion wanted to cease childbearing.[33] There are at least two issues to be considered concerning the question whether women want more children. Has the size of the group that reported they wanted no more children been accurately measured; and if, in these countries, a woman states that she does not want more children, that statement is sufficient evidence that she is a candidate for family planning service? In other words, how meaningful is the question on desire for more children? Previous investigations into this area have shown that inconsistencies in results from the same data set cast doubt on

[32] *Measures, Policies and Programmes Affecting Fertility, with Particular Reference to National Family Planning Programmes*, pp. 1-16.

[33] Lee-Jay Cho, "Fertility preferences in five Asian countries", *International Family Planning Perspectives and Digest*, vol. 4, No. 1 (Spring 1978), pp. 2-8.

the meaning of the responses of women to questions on desire for more children.[34]

The percentage of currently married fecund women who do not want more children, as reported in the First Country Reports, is given by number of living children in table 14. There is no doubt that the desire to cease childbearing as reported here is surprisingly high, ranging from 30 per cent in Nepal to 72 per cent in the Republic of Korea. Furthermore, a majority of the women with four living children in all countries report that they do not want any more. However, the range is substantial, from 52 per cent in Malaysia to 92 per cent in the Republic of Korea.

The background characteristics of these women (table 14) also indicate that high proportions of women with no education and rural backgrounds report wanting no more children. However, at this stage of analysis it is impossible to determine the extent to which these results are an artifact of the different demographic characteristics of the women who did and did not want more children. In the Dominican Republic, Fiji, Malaysia, Nepal, Pakistan and Thailand, more than 65 per cent of the women who have been married less than 10 years wanted more children. On the other hand, among women married more than 20 years, 64 and 63 per cent of those in Nepal and the Dominican Republic, respectively, stated that they did not want more children; in the remaining six countries, the proportions in this category ranged from 74 to about 98 per cent.

In the fertility regulation section of the World Fertility Survey core questionnaire, a filtering of the currently married women was employed so that certain groups of women were not asked the question on desire for more children. This procedure could upwardly bias the proportion not wanting more children. Women who had been sterilized, or whose husbands had been sterilized for medical or contraceptive reasons, were not asked the question but were assumed to have responded negatively to it. Also, women who subjectively felt they were infecund (for unspecified reasons) were not asked about their desire for more children. Thus, the questionnaire omits the group of women who might desire more children but for whom having an additional child would be difficult or impossible because of possible biological impairments.

An upward bias also results from the manner in which currently pregnant women were processed. Because currently pregnant women were treated as if they had already achieved the next parity, the desire to cease childbearing is exaggerated, especially for women with 0-3 children, where the largest proportion of currently pregnant women are located. The procedure of mixing currently pregnant women (parity X-1) with women who already have X number of living children (parity X) assumes there will be no spontaneous or induced abortions or stillbirths among those currently pregnant women. In addition, among currently pregnant women who experienced either fetal loss or an infant death, a certain proportion would want to replace that loss and continue childbearing.

Some doubt concerning the ability to measure the desire to cease childbearing from responses to the question "do you want any more children" derives from various sources. There is evidence indicating that the question on future childbearing intentions was not easily or universally understood. In a critical review of the Fiji survey, it was observed that the most frequent problems of comprehension occurred around the questions of desires, intentions and opinions concerning the last and future pregnancies. In particular, problems relating to time reference were most numerous. Questions that contained the phrase "before your last pregnancy" were too abstract for respondents to grasp. There was confusion between the past and the future, and respondents tended to think in terms of their current preference and found it difficult to relate their feelings in the past.[35]

Similar problems of time references were noticed with the question on desire for children in the future. Frequently, it was found that women who responded negatively to that question interpreted the question to mean in the near future; and with probing, it was revealed that many women did want more children.[36]

Furthermore, there is the issue of the relationship between a woman's desire to have no more children and her actually having a strong inclination or ability to act upon this desire. A major deficiency of the question concerning future childbearing desires is the failure to obtain any measure of the intensity of the opinion or attitude. It may be that the wife's desire for no additional children is not equal to that of her husband or some other significant family member; and if the woman occupies an inferior position within the family, there will be little connexion between desire and future behaviour.

The fact that responses to other sets of questions are inconsistent with the response to the question on future childbearing desires also casts doubt on its meaningfulness. The high proportions of women who report not wanting more children and the high proportions who report knowledge of some method of contraception do not coincide with the low proportions of current contraceptive use as reported in table 15. It is possible that the desire for no additional children is high and that the practice of family planning is low where, for example, the wife's desire is greater than her husband's. However, there remains a large gap between expressed desires and behaviour.

All currently married women were asked the question: "If you could choose exactly the number of children to have in your whole life, how many children would that be?" The data obtained are given in table 16, by number of living children, wife's level of education and urban/rural residence. In every country, desired family size increases with number of living children. Women with no or one living child desired between two and four children, whereas

[34] See John Knodel and Visid Prachuabmoh, "Desired family size in Thailand: are the responses meaningful?", *Demography*, vol. 10, No. 4 (November 1973), pp. 619-637; and John Stoeckel and Moqbul A. Choudhury, *Fertility, Infant Mortality and Family Planning in Rural Bangladesh* (Daccu, Oxford University Press, 1973).

[35] M.A. Sahib and others, *The Fiji Fertility Survey: A Critical Commentary*, Occasional Papers (London, World Fertility Survey, 1975), p. 45.

[36] See Helen Ware, *Language Problems in Demographic Field Work in Africa: The Case of the Cameroon Fertility Survey*, Scientific Reports (London, World Fertility Survey, 1977).

TABLE 14. PROPORTION OF CURRENTLY MARRIED WOMEN WHO DO NOT WANT MORE CHILDREN, BY NUMBER OF LIVING CHILDREN, LEVEL OF EDUCATION, TYPE OF PLACE OF RESIDENCE AND DURATION OF MARRIAGE

	Colombia[a]		Dominican Republic[a]		Fiji[a]		Malaysia[a]		Nepal[a]		Pakistan		Republic of Korea[a]		Thailand[a]	
	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Number of living children																
Total	2 667	61.0	1 456	44.7	4 160	49.5	4 921	42.7	4 888	29.6	4 618	49.0	4 385	71.6	2 606	56.9
Zero	139	9.0	129	3.1	327	2.1	254	0.4	938	1.3	586	2.0	168	12.5	168	5.4
One	404	19.0	258	10.5	641	6.7	705	3.5	988	5.2	686	7.0	646	13.0	535	18.9
Two	478	52.0	249	33.3	648	34.0	833	21.4	887	23.4	644	30.0	881	65.6	520	45.6
Three	420	65.0	211	54.0	660	48.5	816	31.1	799	39.4	646	48.0	942	85.8	398	64.1
Four	309	79.0	151	61.6	542	66.6	638	51.9	581	58.0	560	69.0	800	92.0	294	81.3
Five	257	78.0	458[b]	72.1	1 342[b]	82.6	1 675[b]	78.3	341	66.3	514	78.0	515	95.3	238	90.3
Six	195	35.0	...	...	...	...	...	...	195	80.5	432	90.0	262	96.2	178	91.0
Seven	161	93.0	...	...	...	...	...	...	100	88.0	550[c]	94.0	113	99.1	120	96.7
Eight	101	89.0	...	...	...	...	...	...	45	88.9	...	...	41	00.0	82	93.9
Nine or more	203	90.0	...	...	...	...	...	...	14	92.9	...	...	17	00.0	73	98.6
Level of education																
Total	2 661[d]	61.0	1 456	44.7	4 160	49.5	4 920[c]	42.7	4 888[f]	29.6	4 618	49.0	4 385[d]	71.6	2 610	56.9
No education	514	67.0	96	53.1	759	69.8	1 476	55.0	4 632	29.8	4 135	50.0	691	88.3	414	66.2
Primary	1 595	64.3	1 213	46.5	1 499	54.6	2 587	39.7	221	24.4	302	44.0	2 275	71.4	2 000	57.9
More than primary	552	48.9	147	24.5	1 902	37.3	681	28.8	17	47.1	181	46.0	1 413	63.6	196	28.1
Type of place of residence																
Total	2 667[g]	61.0	1 456	44.7	4 160	49.5	4 921	42.7	...	...	4 618	49.0	4 385	71.6	2 605	57.0
Urban	1 672	60.0	659	38.5	1 487	53.6	765	48.9	...	...	1 212	54.0	2 337	71.0	348	44.5
Rural	994	64.0	797	49.8	2 656	47.3	4 156	41.6	...	...	3 406	47.0	2 048	72.3	2 257	58.9
Duration of marriage																
Total	2 667	61.0	1 456	44.7	4 160	49.5	4 916	42.7	4 888	29.6	4 618	49.0	4 385	71.6	2 604	57.0
Less than 10 years	1 263	42.0	724	28.9	1 912	24.4	2 224	16.6	2 169	8.4	1 817	16.0	2 169	50.2	1 342	35.0
10-19 years	887	76.0	445	58.4	1 416	61.7	1 550	57.0	1 766	36.9	1 444	57.0	1 461	90.1	826	76.3
20 years or more	517	82.4	287	63.4	832	86.4	1 142	74.3	953	64.2	1 357	85.0	755	97.5	436	87.8

Sources: Data taken from the following World Fertility Survey reports: *Encuesta nacional de fecundidad de Colombia 1976, resultados generales*, pp. 145, 147 and 148, tables 3.1.1, 3.1.2, 3.1.3B and 3.1.3C; Dominican Republic, *Encuesta nacional de fecundidad—informe general*, pp. 252, 253, 256 and 259, tables 3.1.1, 3.1.2, 3.1.3A and 3.1.3C; *Fiji Fertility Survey 1974, Principal Report*, pp. 337, 339 and 342, tables G1, G2 and G3; *Malaysian Fertility and Family Survey—1974, First Country Report*, pp. A-128, A-183, A-186 and A-192, tables 3.1.1, 3.1.2, 3.1.3A and 3.1.3C; *Nepal Fertility Survey 1976, First Report*, pp. 136 and 137, tables 3.1.1, 3.1.2 and 3.3.3A; *Pakistan Fertility Survey, First Report*, pp. A-II-34 and A-II-35, tables 3.1.2 and 3.1.3; *The Korean National Fertility Survey 1974, First Country Report*, pp. 307, T-307, T-308 and T-310, tables 3.1.1, 3.1.2, 3.1.3A and 3.1.3B; *The Survey of Fertility in Thailand: Country Report No. 1*, vol. II, pp. 156, 157, 160 and 163, tables 3.1.1A, 3.1.1B, 3.1.2A and 3.1.2B. For complete citations of these reports, see table 11.

[a] Fecund women only.
[b] Five or more children.
[c] Seven or more children.
[d] Including six women who did not state level of education.
[e] Including 176 women who had religious or non-formal education.
[f] Including 18 women who did not state level of education.
[g] Including one women who did not state type of place of residence.

(Percentage)

	Colombia	Dominican Republic	Fiji	Malaysia	Nepal	Pakistan	Republic of Korea	Thailand
Currently married fecund women who do not want any more children	61.0	44.7	49.5	42.7	29.6	49.0	71.6	56.9
Ever-married women who know any method of contraception	95.8	97.3	99.8	90.0	21.3	75.0	97.0	96.1
Currently married women currently using any method of contraception	52.0	38.4	56.2	38.0	2.9	6.0	45.7	37.0

women with five or more children desired roughly from four to six children. In part, this finding might reflect a decline in family size preferences; and to some extent, it might reflect a bias that achieved fertility influences desired family size. Women with large families may rationalize unwanted fertility. Inquiry to estimate the impact of rationalization on stated desired family size has been limited. However, using data from Thailand, one report[37] suggests that if rationalization of the existing number of children is a factor influencing the choice of the desired number, then the probability of giving a particular number as the desired family size should be greater for women with that particular number of living children than for women with either more or fewer than that number. The authors calculate and compare these two sets of probabilities and conclude that the differences in probabilities by parity are not large. Only among women with four or more children is there some substantial difference. Yet even for these/women, the authors believe that rationalization cannot account for more than one fourth of their responses. They suggest that rationalization has an even weaker effect on the family size desires of women with higher parities: ". . . perhaps it is more difficult for women who exceed their 'true' preference by a large number of children to rationalize their entire current family size than for women who have only one or two more than they might otherwise not want".[38] As can be seen from table 16, excluding the Republic of Korea, women with 0-4 living children consistently reported an average desired family size that exceeded achieved family size.

Desired family size for all currently married women (table 16) ranges from a low of 3.2 in the Republic of Korea to 4.8 in the Dominican Republic. In Colombia, the Dominican Republic, Fiji, Malaysia, Nepal and Pakistan, currently married women desired an average of four or more children.

When desired family size by number of living children and background variables is presented graphically (see figure I), it becomes apparent that except in Pakistan, the Republic of Korea and Thailand, there are few categories of women for whom achieved fertility has surpassed fertility

desires. The diagonal indicates the state where actual family size equals desired family size: women above the diagonal have not reached desired parity; women below have surpassed that level. In the Republic of Korea, where the fertility decline has been most pronounced, desired family size is also lowest regardless of number of living children. Fertility has shown little decline in Nepal and Pakistan; and in these countries, desired family size is high and differences associated with number of living children are small. In other words, women who are beginning their reproductive careers in Nepal and Pakistan desire almost as many children as women who have already had five or more. A similar, but less pronounced pattern exists in Malaysia, where the crude birth rate has declined by 26 per cent since 1965.

One pattern that exists for all countries, regardless of the average desired family size, is that fertility preferences of childless women and those with one living child are almost identical. Except in Nepal and Pakistan, larger differences in fertility preferences begin to emerge for women who have two, three and four living children.

Even though a higher proportion of rural than urban women report not wanting more children, from table 16 it can be seen that the number of children desired by rural women still exceeds that of urban women. Also, in every country, except Thailand, there is an inverse relation between desired family size and level of education.

In addition to information from the direct question on the desire for more children, it is possible to measure the desire to cease childbearing indirectly by using the question on total number of children desired. The results of responses to this question, classified by number of living children, for the Republic of Korea are presented in table 17. From the First Country Reports, it was possible to present the following analysis for that country only. The women along the diagonal have had exactly the number of children they desire, the women below the diagonal have had more children than they desire and those above the diagonal have not yet reached their desired number. Presumably, the women along and below the diagonal are those who do not want more children; they are the women who have had "exactly the number of children desired" and "more than the number of children desired". When measured this way, the proportion of all women in the Republic of Korea who do not want more children is 61 per cent rather than the 72 per cent shown in table 14. The difference in the two measures

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[37] J. Knodel and V. Prachuabmoh, *loc. cit.*

[38] *Ibid.*, pp. 629-630.

TABLE 16. MEAN NUMBER OF CHILDREN DESIRED BY CURRENTLY MARRIED WOMEN, BY NUMBER OF LIVING CHILDREN (INCLUDING CURRENT PREGNANCY) AND SELECTED BACKGROUND CHARACTERISTICS

	Colombia		Dominican Republic		Fiji		Malaysia		Nepal		Pakistan		Republic of Korea		Thailand	
	Number	Mean	Number	Mean	Number	Mean	Number	Mean	Number	Mean	Number	Mean	Number	Mean	Number	Mean
Urban/rural residence and number of living children																
Urban:																
Total	1 782	3.9	841	4.4	1 425	3.9	942	3.8	. . .	. . .	1 201	3.9	2 621	2.9	472	3.4
Zero	122	2.7	81	3.8	118	2.5	57	3.2	. . .	. . .	147	3.5	124	2.3	39	2.7
One	293	2.7	148	3.5	244	2.6	157	3.2	. . .	. . .	165	3.7	435	2.4	97	2.7
Two	341	3.1	148	3.8	228	2.8	183	3.3	. . .	. . .	158	3.7	624	2.7	97	3.1
Three	296	3.6	147	4.3	244	3.4	179	3.9	. . .	. . .	149	3.8	626	3.0	77	3.3
Four	207	4.2	94	5.1	194	4.0	96	4.0	. . .	. . .	142	4.0	458	3.3	64	3.8
Five or more	523	5.4	223	5.3	397	5.9	270	4.4	. . .	. . .	440	4.2	354	3.5	98	4.8
Rural:																
Total	1 024	4.5	923	5.1	2 528	4.3	4 805	4.5	. . .	. . .	3 323	4.3	2 380	3.6	2 889	3.7
Zero	43	2.6	65	3.4	198	2.6	246	3.8	. . .	. . .	424	4.1	80	2.9	159	3.0
One	124	2.9	121	3.5	367	2.8	604	3.8	. . .	. . .	508	3.9	249	2.9	465	2.8
Two	150	3.4	128	3.8	373	3.1	725	4.0	. . .	. . .	474	4.1	309	3.0	513	3.2
Three	140	4.0	115	4.4	376	3.7	720	4.4	. . .	. . .	483	4.2	384	3.3	452	3.6
Four	118	4.5	104	4.9	313	4.3	628	4.7	. . .	. . .	402	4.4	468	3.7	368	4.1
Five or more	449	5.7	390	6.6	901	6.2	1 882	5.0	. . .	. . .	1 032	4.8	890	4.0	932	4.6
Level of education and number of living children																
No education:																
Total	560	4.9	126	5.4	739	4.8	1 941	4.7	5 218	4.0	4 029	4.3	965	3.8	579	4.1
Zero	20	2.4	7	6.4	31	2.6	75	4.1	948	3.5	501	4.0	20	3.1	27	2.8
One	40	3.3	15	3.7	62	2.6	125	4.0	964	3.6	572	4.0	29	3.3	51	3.0
Two	79	3.3	14	4.0	70	2.9	187	4.1	906	3.6	550	4.1	66	3.4	65	3.6
Three	71	4.4	19	3.7	85	3.4	250	4.4	837	3.9	561	4.2	123	3.2	89	3.8
Four	56	4.5	16	5.6	92	4.2	240	4.7	665	4.4	496	4.3	213	3.7	86	4.0
Five or more	294	6.0	55	6.6	391	6.2	1 064	5.1	898	5.1	1 349	4.7	514	4.1	261	4.6
Primary:																
Total	1 662	4.1	1 461	4.8	1 428	4.5	2 855	4.3	229	3.5	309	3.7	2 536	3.3	2 524	3.7
Zero	89	2.6	115	3.4	85	2.7	150	3.7	57	3.1	41	3.3	86	2.8	138	3.0
One	238	2.7	211	3.5	148	2.9	389	3.7	52	3.1	62	3.4	304	2.7	435	2.8
Two	270	3.2	221	3.8	173	3.0	466	3.9	42	3.2	51	3.6	434	2.9	476	3.1
Three	263	3.6	208	4.4	225	3.6	492	4.2	35	3.6	43	3.7	545	3.2	408	3.6
Four	220	4.2	168	4.9	193	4.2	410	4.6	20	4.3	32	3.8	542	3.4	317	4.1
Five or more	582	5.5	538	6.1	604	6.1	948	4.8	23	4.9	80	4.0	625	3.8	750	4.6

Primary and over:																
Total	579	3.4	177	4.0	1 802	3.6	739	3.6	18	2.8	186	3.2	1 491	2.7	259	3.1
Zero	56	2.7	24	3.9	202	2.5	69	3.1	...	...	29	3.4	98	2.3	34	2.9
One	139	2.7	43	3.5	404	2.7	224	3.3	...	...	39	3.2	351	2.4	78	2.7
Two	141	3.1	41	3.7	356	3.0	218	3.4	...	...	31	3.0	433	2.6	67	3.1
Three	100	3.6	35	3.9	311	3.5	118	3.9	...	...	28	3.0	342	3.0	32	2.9
Four	48	4.1	14	4.9	225	4.1	51	3.9	...	...[a]	16	3.5	169	3.2	28	3.4
Five or more	95	4.6	20	5.8	304	5.9	59	4.3	...	...[a]	43	3.5	98	3.3	20	4.7
Number of living children																
Total	2 807	4.1	1 764	4.8	3 969	4.2	5 747	4.4	5 483	4.0	4 524	4.2	5 001	3.2	3 361	3.7
Zero	165	2.6	146	3.6	318	2.6	303	3.7	1 009	3.5	571	3.9	204	2.6	198	3.0
One	418	2.8	269	3.5	614	2.7	761	3.7	1 027	3.6	673	3.9	684	2.6	562	2.8
Two	491	3.2	276	3.8	607	3.0	908	3.8	958	3.6	632	4.0	933	2.8	610	3.2
Three	436	3.8	262	4.3	621	3.6	899	4.2	876	3.9	632	4.1	1 010	3.1	529	3.6
Four	325	4.3	198	5.0	510	4.2	724	4.6	688	4.4	544	4.3	926	3.5	432	4.0
Five or more	972	5.5	613	6.2	1 299	6.1	2 152	4.9	925	5.1	1 472	4.6	1 244	3.9	1 030	4.6

Sources: Data taken from the following World Fertility Survey reports: *Encuesta nacional de fecundidad de Colombia 1976, resultados generales,* pp. 169 and 171, tables 3.4.6A$_2$ and 3.4.6A$_3$; Dominican Republic, *Encuesta nacional de fecundidad—informe general,* pp. 307 and 311, tables 3.4.6A and 3.4.6C; *Fiji Fertility Survey 1974, Principal Report,* p. 378, table G26; *Malaysian Fertility and Family Survey—1974, First Country Report,* pp. A250 and A256, tables 3.4.6A and 3.4.6C; *Nepal Fertility Survey 1976, First Report,* pp. 161 and 164, tables 3.4.4B and 3.4.6A; *Pakistan Fertility Survey, First Report,* pp. A-II-15 and A-II-49, table 3.4.6; *The Korean National Fertility Survey 1974, First Country Report,* pp. T-340 and T-342, tables 3.3.7A and 3.3.7B; *The Survey of Fertility in Thailand: Country Report No. 1,* vol. II, pp. 78, 87 and 95, tables 2.2.3A, 2.2.6A and 2.2.6E. For complete citations of these reports, see table 11.

[a] Figures not given because total in category is fewer than 20 observations.

Figure I. Mean number of children desired by currently married women, by number of living children and selected background variables

Colombia

Dominican Republic

Urban ————
Rural — — —

Urban/rural residence

No education — — —
Primary ————
Primary and over —·——·—·

Level of education

Agricultural — — —
Non-agricultural ————

Occupation of husband

56

Fiji

Malaysia
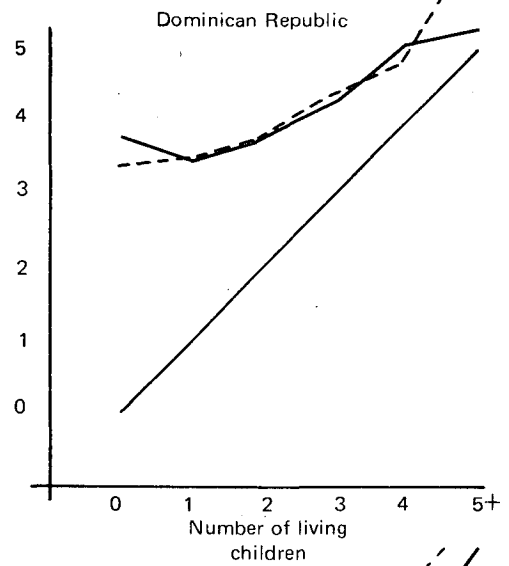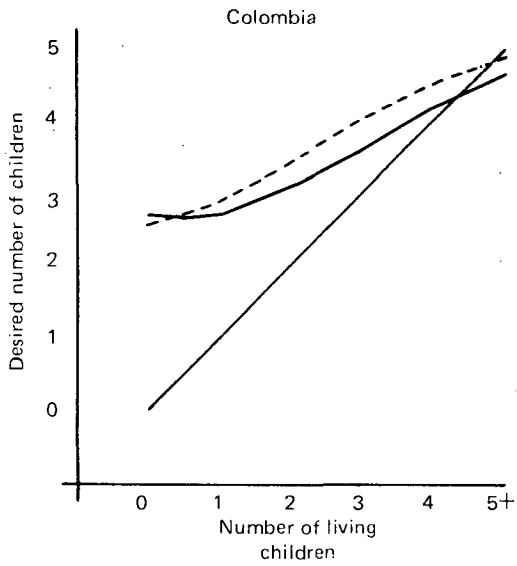
Urban/rural residence
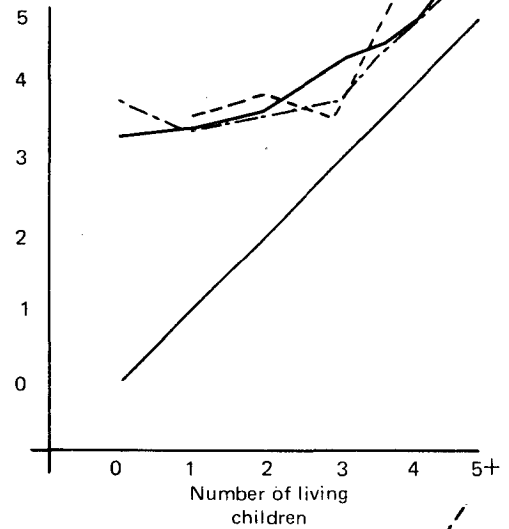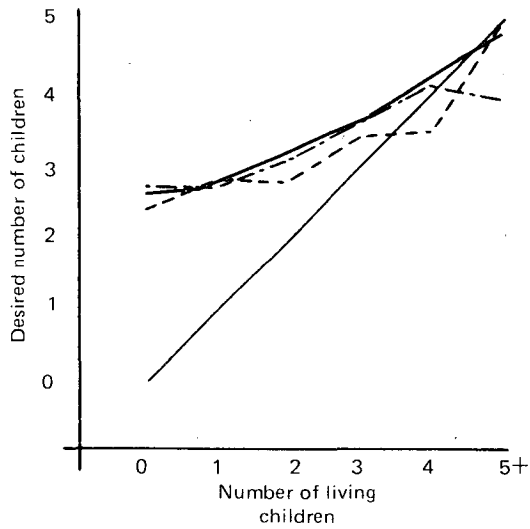
Level of education

Occupation of husband

Urban ———
Rural - - - -

No education - - - -
Primary ———
Primary and over —·—·—

Agricultural - - - -
Non-agricultural ———

57
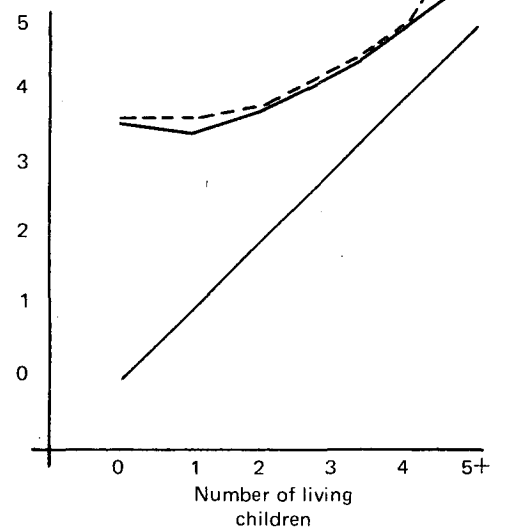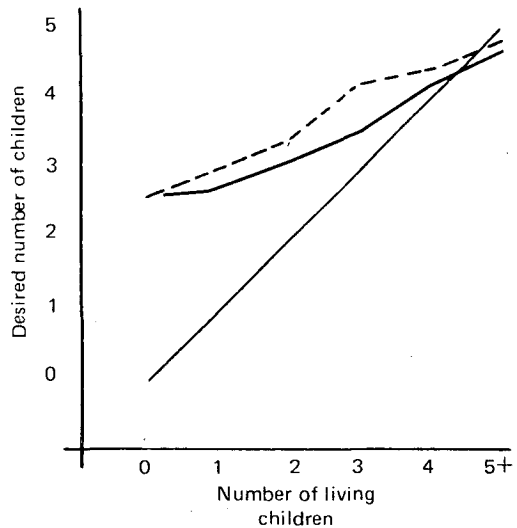
Figure I. Mean number of children desired by currently married women, by number of
living children and selected background variables _(continued)_

Pakistan

Republic of Korea

Urban/rural residence

Urban ———
Rural — — — —

Level of education

No education — — — —
Primary ————
Primary and over — — · — —

Occupation of husband

Agricultural — — — —
Non-agricultural ————

Thailand

Urban ———
Rural ─────

Urban/rural residence

No education ─────
Primary ───────
Primary and over ─·──·──

Level of education

Agricultural ────
Non-agricultural ───────

Occupation of husband
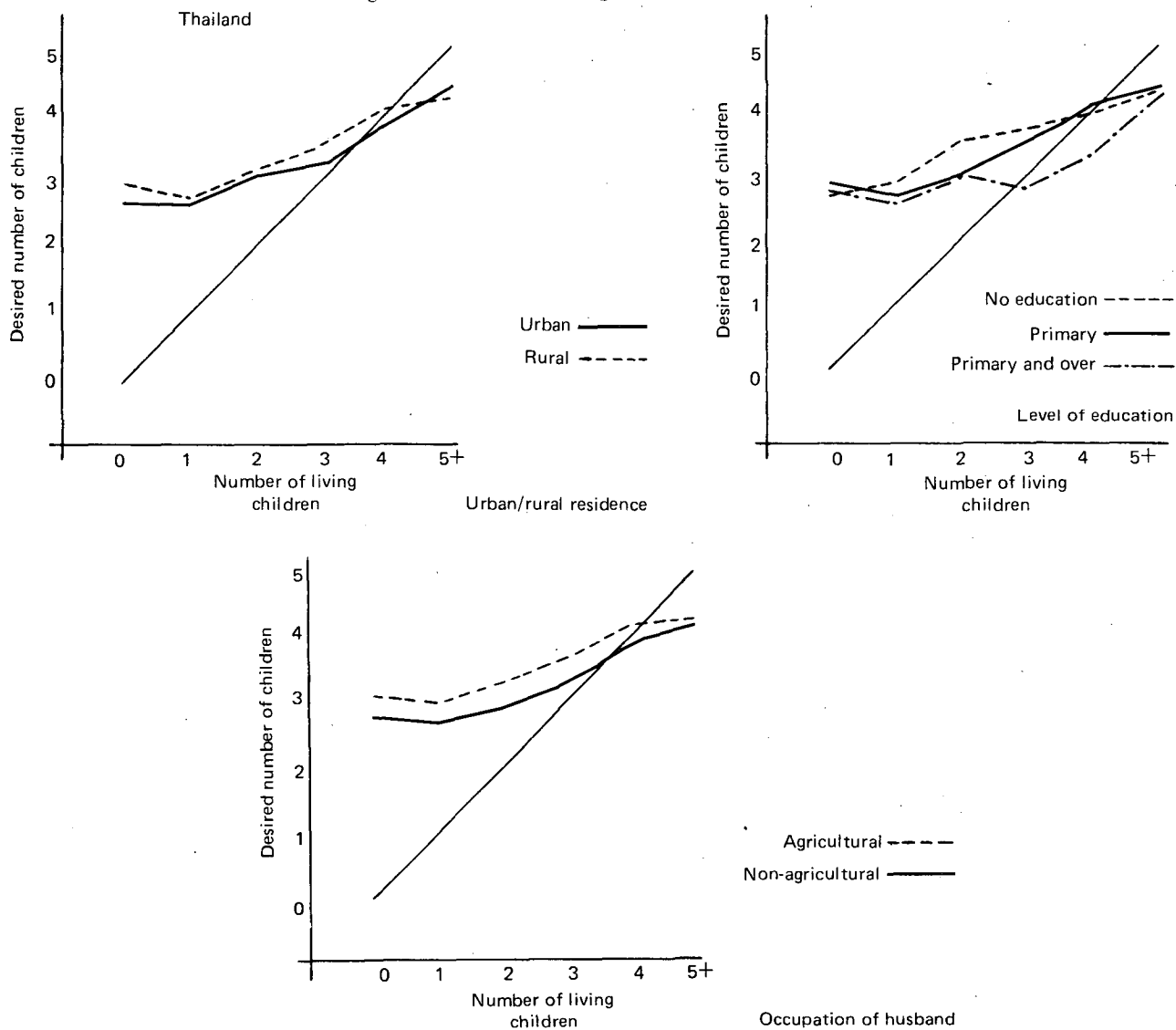
TABLE 17.   FREQUENCY DISTRIBUTION OF CURRENTLY MARRIED WOMEN ACCORDING TO TOTAL NUMBER OF CHILDREN
DESIRED, BY NUMBER OF LIVING CHILDREN, REPUBLIC OF KOREA

Number of living children	Total number of children desired									Proportion of women wanting no more children	Total
	Zero	One	Two	Three	Four	Five	Six	Seven	Eight or more		
Zero	2	26	149	137	28	11	0	0	0	0.6	353
One	2	22	308	291	47	27	2	0	0	3.4	699
Two	2	10	*318*	379	109	47	3	0	1	38.0	869
Three	4	8	195	*502*	178	75	7	2	1	72.8	972
Four	0	2	131	346	*325*	75	11	2	3	89.7	895
Five	2	4	67	238	130	*161*	12	2	4	97.1	620
Six	0	2	21	102	125	71	*23*	5	6	96.9	· 355
Seven	2	0	13	47	38	51	2	*2*	1	99.4	156
Eight or more	1	0	4	19	19	29	3	1	*6*	97.6	82

of the desire to cease childbearing is most pronounced for women with 0-3 living children. For women who have two living children, the proportion not wanting any more, as measured this way, is 38 per cent compared with 66 per cent (table 14). In contrast to the unusually high proportion of zero-parity women who want no more children (12.5 per cent), as calculated from table 17, less than 1 per cent of these women have had exactly the number of children they desired and 99.4 per cent have had fewer.

In developing countries, women who do not want more children constitute an important group. Presumably, they are candidates for family planning services. Precisely because it is such a significant group, it becomes important to identify this group accurately. From the foregoing discussion it is clear that further investigation into the meaning of fertility preferences from survey responses is necessary. There is ambiguity concerning who the women are who want no more children; and, more importantly, what the relationship is between a stated desire to cease childbearing and future behaviour. To date, there have been no attempts to measure the intensity of fertility preferences and, hence, there may be a gap between desire and behaviour which exceeds what would be expected.

Recent fertility patterns in "post-transitional" societies

Since the end of the 1960s, the birth rate in the United States of America and in most European countries has been declining. This decline has continued to the point where, in many developed countries, the current rate of fertility is below replacement level. Although the age structure in most of these countries is such that sub-replacement fertility does not imply immediate stationary populations, the Federal Republic of Germany, Luxembourg and the United Kingdom have registered more deaths than births for several years; and, recently, so has Austria. Thus, the prospect of a stationary if not declining population has become a real possibility in many of the industrialized countries before the end of the century.[39] In the 1950s and early 1960s, when birth rates were still fairly high, public concern with population growth increased; and it was generally assumed that in both the industrialized countries and the developing countries, there should be efforts to reduce growth rates. Because of the concern about lowering rates of population growth by reducing fertility in the developing world, comparatively less attention was focused on factors affecting fertility in countries where it had declined to very low levels. More recently, however, concern with regard to the social and economic implication of the continuing decline of fertility has emerged in several developed countries. Serious imbalances in the age structure, which would develop by the end of the century, would affect the size of the labour force, the dependency burden and the character of social and political institutions.

In these so-called "post-transitional" societies, fertility (more than mortality or migration) is the most important demographic component of population growth; and there is a renewed interest in the social, demographic and economic factors that affect its change. Several demographers have expressed the view that, in societies where reproduction is under almost complete control, the traditional explanations of fertility decline during the initial phase of demographic transition are not adequate for the current fertility fluctuations. Industrialization, urbanization and the spread of education are so advanced in these societies that the effect of these processes *per se* on fertility trends are minimal. Although demographers are hesitant to dismiss as impossible a return to higher levels of fertility in the industrialized countries, it is generally believed that existing low levels of fertility will be punctuated by periods of elevated fertility in response to economic conditions and/or governmental policies.[40]

In the following discussion, recent fertility trends in selected "post-transitional" countries are reviewed within the context of four groups of determinants: demographic factors; contraceptive use; governmental policy; and socio-economic factors. It is important to stress that, as in the pre-transitional phase, differences among countries in both levels and trends of fertility persist.

Fluctuations in period measures of fertility are caused by alterations in the age composition of the population, changes in nuptiality (either age at first marriage, proportions marrying or marital dissolution), changes in the tempo of childbearing and changes in the quantity of childbearing. With the availability of good vital statistics and the development of cohort methods of analysis, it has become possible to determine how these demographic processes have interacted in the most recent decline of fertility. As background to the current situation, the post-war rise in fertility which occurred in several developed countries is largely attributed to an increase in the propensity to marry and at younger ages, and changes too in the age patterns of childbearing within marriage rather than a return to larger families. During this period, cohort fertility rates increased much less than did period rates. In the United States, for example, the rise in the total fertility rate between 1936 and 1957 was 85 per cent, but the rise in the completed fertility rate between the cohorts of 1911-1915 and 1931-1975 will be only 40 per cent.[41]

The current decline of fertility is explained in part by a slight reversal of the downward trend in age at marriage and a major decline in the rate at which married women are bearing children. Since the Second World War, fertility has come under ever-increasing control throughout the industrialized world. The fall in marital fertility is probably composed equally of a fall in the rate of unwanted fertility and a decline in the number of wanted births. There has been no return to large families. Rather, there has been a slight increase in the frequency of childless and one-child families

[39] Jean Bourgeois-Pichat, "The economic and social implications of demographic trends in Europe up to and beyond 2000", *Population Bulletin of the United Nations, No. 8—1976* (United Nations publication, Sales No. E.76.XIII.3), pp. 34-88.

[40] See D. V. Glass, "Recent and prospective trends in fertility in developed countries", *Philosophical Transactions of the Royal Society of London*, vol. 274 (March 1976), pp. 1-52.

[41] A. A. Campbell, *loc. cit.*, p. 553.

and a greater ability to fulfil family size targets in the two- and three-child range.[42]

Consolidation of the norm of from two to three children is most clearly seen in birth-order changes. In the United States, decreases in birth rates for all birth orders have contributed to the declining fertility rate since 1970, but the rate of decline was greater for the higher birth orders. Between 1970 and 1973, first-, second- and third-order birth rates declined an average of 18 per cent, while the drop in fourth- and higher order births averaged 40 per cent.[43] Similarly, in the United Kingdom, among women participating in a longitudinal fertility survey, the proportion of women having a fourth or later child dropped from 14 per cent in 1967/68 to 9 per cent and 7 per cent in 1975.[44] Also, in Hungary, the proportion of large families defined fourth-parity women aged 35-39 dropped from 24 per cent in 1949 to 7 per cent in 1976.[45]

Another important development in reproductive behaviour in several post-transitional societies has been an alteration in both the length of the childbearing period and, most recently, a delay in the commencement of childbearing. Whereas in the past children were born throughout the reproductive period, usually until age 50, childbearing is now confined to the early portion of the reproductive career. In the United States, the fertility of women aged 35 and over declined by 60 per cent between 1960 and 1973.[46] The same trend has been documented in Finland. Until 1920, one third of the fertility of married women was in the age groups 35 and over. By 1972-1974, the share of these older age groups had declined to 9 per cent.[47] During the period 1971-1975, fertility rates for British women aged 35-39 were 62 per cent below those achieved in 1946-1950; for women aged 40-44, the reduction was 69 per cent.[48] The pattern is such that childbearing above age 35 is becoming rare.

A more recent alteration in the tempo of childbearing, which is a direct consequence of the spread of more effective contraception including abortion, has been the delay of the onset of childbearing. In recent years, young women have been having fewer births and more young women have been remaining childless. This trend has been documented for England and Wales and for the United States. In England and Wales, there has been a sharp increase in the percentage of marriages remaining childless at the early stages of marriage; and in the United States, also relatively larger number of younger women have so far elected not to have children. At the beginning of 1966, 13 per cent of white women who had reached age 30 had no children; by 1976, this figure had increased to 21 per cent.[49] Although the above-mentioned phenomenon is currently best described as a delay in childbearing, as the current cohorts complete their reproductive periods, there could be an increase in career childlessness.

The recent fertility decline in post-transitional societies, or developed countries, which is largely attributed to a dramatic reduction in births to women exposed to pregnancy risks rather than to a reduction in the number of women exposed to pregnancy, has been accomplished through the ever-increasing use of effective means of contraception. In short, the principal factors have been a decline in unwanted fertility and a drop in the number of children wanted.

In countries for which data are available, a steady increase in general use of contraception and in use of the most effective methods, the pill, the intra-uterine device (IUD) and sterilization, has been documented. According to results of the United States National Fertility Studies of 1965, 1970 and 1975, there was a dramatic change in the most commonly used methods of contraception among married couples during the period 1965-1975. Thus, couples using one of these three most effective methods increased from 37 per cent of all couples practising contraception in 1965 to 74 per cent in 1975.[50] Until the 1960s, *coitus interruptus* and the condom accounted for the majority of contraceptive use in the United Kingdom, but there was a significant change with the introduction of the pill and IUD. Their use has become widespread during the past few years. In a survey of English women who had a legitimate birth in 1975, nearly half of the respondents used either the pill or IUD for birth regulation compared with fewer than one quarter in a comparable survey taken in 1967/68. During the same period, the proportion of married couples using *coitus interruptus* fell from 21 to 4 per cent, those using the condom from 36 to 17 per cent and those applying no method of contraception at all dropped from 16 to 7 per cent.[51] In three family planning surveys carried out in Hungary in 1958, 1966 and 1974, it was found that there had been a steady increase in the total number of women practising some form of birth control, from 76 per cent of women in 1958 to 84 per cent in 1966 and 90 per cent in 1974.[52]

The use of sterilization has increased both in England and Wales, and Scotland, and in the United States, but much more so in the United States. By 1975, the proportion of white couples who had been sterilized for contraceptive purposes was almost equal to the proportion using the pill (31 per cent *versus* 34 per cent). Sterilization is now the single most popular method for couples married 10 years or more.[53]

[42] Gyorgy T. Acsádi and Gwendolyn Johnson-Acsádi, "Determinants of recent trends in fertility in developed countries", in Center for Population Research, National Health Institutes and World Health Organization, *Social, Economic and Health Aspects of Low Fertility* (Washington, D.C., Government Printing Office, in press).

[43] Selma Taffel, *Trends in Fertility in the United States*, Vital and Health Statistics Series 21, data from the National Vital Statistics System, No. 28; Department of Health, Education and Welfare publication No. (HRA) 78-1906 (Washington, D.C., 1977), p. 5.

[44] Ann Cartwright, *Recent Trends in Family Building and Contraception*, Studies on Medical and Population Subjects, No. 3 (London, H.M. Stationery Office, 1978), p. 5.

[45] András Klinger, "Fertility and family planning in Hungary", *Studies in Family Planning*, vol. 18, No. 7 (July 1977), p. 169.

[46] S. Taffel, *op. cit.*, p. 4.

[47] Gunnar Fougstedt, "Trends and factors of fertility in Finland", *Commentations Scientiarum Socialium*, vol. 7 (1977), p. 30.

[48] United Kingdom of Great Britain and Northern Ireland, Office of Population Censuses and Surveys, *Demographic Review, 1977* (London, H.M. Stationery Office, 1977), para. 3.12.

[49] S. Taffel, *op. cit.*, p. 11.

[50] Charles F. Westoff and Elise F. Jones, "Contraception and sterilization in the United States, 1965-1975", *Family Planning Perspectives*, vol. 9, No. 4 (July/August 1977), p. 154.

[51] United Kingdom, Office of Population Censuses and Surveys, *op. cit.*, para. 3.16.

[52] A. Klinger, *loc. cit.*, p. 174.

[53] C. F. Westoff and E. F. Jones, *loc. cit.*, p. 155.

Paralleling the increased use of contraception has been the extension of access to abortion. Within the past 10 years, abortion laws have been widely liberalized. After 1955, countries in Eastern Europe greatly extended the grounds and facilities for abortion, although conditions for abortion in those countries have been more restricted in recent years. Austria, Canada, Denmark, Finland, the Federal Republic of Germany, France, Norway and the United States have all adopted liberalized abortion laws. The most dramatic example of the effect of abortion legislation on fertility occurred in several Eastern European countries during the 1960s. When laws permitting legalized abortion were repealed, the birth rate rose sharply in a very short time. In Romania, the birth rate jumped from 14 per 1,000 in 1966, when abortion was abruptly prohibited in all but the most extreme circumstances, to 27 in 1967-1968; but by the early 1970s, the birth rate returned to the low twenties. Less change occurred in Bulgaria (1968-1970), Czechoslovakia (1964) and Hungary (1953-1955 and 1974), when those countries reduced the conditions for abortion. In general, however, reliance on abortion was always heavier in Eastern Europe than elsewhere in Europe, because access to modern contraceptives was limited.

In many countries, abortion is the most important contraceptive technique among young unmarried women. As a result, the role of abortion in countries where extramarital fertility has always been common has assumed great importance in affecting fertility trends. In Sweden, for example, one of the most significant changes in fertility patterns since the end of the 1960s has been the dramatic increase in fertility outside of legal marriage.[54] One fourth of all births in 1972 occurred to women who were not married; and between 1960 and 1972, the number of abortions increased eight times. Even though abortion legislation had been liberalized during the period, it is estimated that the major part of the increase was real, that is, including legal and illegal. The rising trend in Sweden coincided roughly with the decline in age-specific fertility rates which began around 1964. Abortion in Sweden appears to be one of the important ways in which women have curtailed childbearing and they have resorted to this means to an increasing extent in recent years.[55]

In England and the United States, the situation with respect to abortion has been different. After the Abortion Act (1967) the number of legal abortions in England and Wales, and Scotland (United Kingdom) increased rapidly. However, since it is believed that illegal abortions were common practice prior to liberalization of the law, much of the apparent rise was a transfer from the illegal to the legal sector. It is thus estimated that between 1971 and 1976, the effect of legal abortion on the fall in the number of births was insignificant and the increase in the number of legal abortions has been only a small factor in explaining the over-all

fall in the number of births.[56] The number of legal abortions has been significant for certain aspects of fertility, by preventing births outside marriage and reducing the incidence of pregnancy-related marriages.[57]

Given the availability and expanding use of efficient contraceptive techniques and abortion as outlined above, the question is to what family sizes will couples restrict their fertility. It appears certain that in these post-transitional societies, a return to large families is unlikely. It is more in the range from zero to three births that uncertainty remains. Even within this seemingly narrow range, socio-economic differentials persist, and economic conditions and government policy could affect couples' decisions about family size intentions. In Hungary, for example, where the aim of the government population policy is to increase the number of families with two or more children, only slight advances have been made. Currently, 48 per cent of the married women with one child are satisfied with the one-child family.[58] Such pro-natalist policies as increased opportunities for married women to work, expanded day-care facilities with the object of reducing the conflict between employment and childrearing and planned housing policies have had a history of limited success. It is clear that the psychological factors which influence human reproduction have not yet been sufficiently understood. Although social, economic and cultural variables are of enormous importance, it is possible that important clues to the conditions in which people will elect to bear children lie in the interaction of these variables with individual psychological phenomena.

C. LEVELS AND PATTERNS OF CONTRACEPTIVE USE

The discussion in this section is based also on the published reports[59] of data collected in eight countries that have participated in the World Fertility Survey: Colombia, Dominican Republic, Fiji, Malaysia, Nepal, Pakistan, Republic of Korea and Thailand.

The main purposes of this section are to ascertain the level of contraceptive use in the eight countries, to determine the patterns of such use as may be evident and, in so far as is possible, to throw some light on the factors that influence the use of contraceptives. The analysis relates to three categories of women: ever-married women; currently married fecund women; and "exposed" women, as defined below (table 18). Subclasses of women included in the analysis are those who had never practised contraception, those who were current users and those who were not current users. Excluded are previous users who were not current users.

In this discussion, distinction is made between efficient and other methods of contraception. The category, "efficient methods", includes oral contraceptives, intra-uterine devices, condoms, sterilization[60] and such other scientific methods as injectables, diaphragms and jellies. Rhythm and basic body temperature, abstinence, withdrawals and a

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[54] It should be mentioned that "marriage" patterns in this and several other developed countries are changing. Increasingly, couples are living together and even rearing children without a legal ceremony. Because the definitions of "married" have not changed, the recorded increases in extramarital fertility are by legal and not by social definitions.

[55] Eva M. Bernhardt and Britta Holmbeck, "Fertility trends in Sweden", in Population Research Institute, Yearbook of Population Research in Finland, vol. XIII, 1973/74 (Helsinki), pp. 67-69.

[56] United Kingdom, Office of Population Censuses and Surveys, op. cit., paras. 3.27-3.29.

[57] June Sklar and Beth Berkov, "Abortion, illegitimacy and the American birth rate", Science, vol. 185 (13 September 1974), p. 914.

[58] A. Klinger, loc. cit., p. 172.

[59] For complete citations of these reports, see foot-note 26.

TABLE 18. NUMBER OF WOMEN IN SAMPLE, BY EXPOSURE STATUS

Exposure status	Category No.	Colombia, 1974[a] Number	Percentage	Dominican Republic 1976[a] Number	Percentage	Fiji, 1974 Number	Percentage	Malaysia, 1974 Number	Percentage	Nepal, 1976 Number	Percentage	Republic of Korea 1974 Number	Percentage	Pakistan, 1975 Number	Percentage	Thailand, 1975 Number	Percentage
Currently pregnant	1	360	10.9	326	14.5	533	10.8	662	10.5	581	9.8	536	9.9	791	16.0	369	9.8
Not currently pregnant																	
Widowed, separated or divorced	2	459	13.9	414	18.4	270	5.5	510	8.0	438	7.4	369	6.8	282	5.7	292	7.7
Married and living with husband																	
Couple sterilized	3	118	3.6	224	9.9	735	14.9	220	3.5	87	1.5	255	4.7	46	.9	285	7.5
Other infecund	4	160	4.8	128	5.6	811[b]	16.5	662	10.5	596	10.0	667	12.3	541	10.9	577	15.3
Reported fecund	5	2 205	66.8	1 164	51.6	2 579	52.3	4 267	67.5	4 238	71.3	3 593	66.3	3 289	66.5	2 255	59.7
Total ever-married women		3 302	100.0	2 256	100.0	4 928	100.0	6 321	100.0	5 940	100.0	5 420	100.0	4 949	100.0	3 778	100.0
"Exposed" married women[c]		2 323	70.4	1 388	61.5	3 314	67.2	4 487	71.0	4 325	72.8	3 848	71.0	3 335	67.4	2 540	67.2
Currently married "fecund" women[d]		2 683	81.3	1 714	76.0	4 168[b]	84.6	5 149	81.5	4 906	82.6	4 383	80.9	4 126	83.4	2 909	77.0

Sources: World Fertility Survey, *Basic Documentation, Guidelines for Country Report No. 1* (London, International Statistical Institute, 1977), pp. 11-12; and data taken from the following World Fertility Survey reports: *Encuesta nacional de fecundidad de Colombia 1976, resultados generales,* p. 213, tables 1.5.4; Dominican Republic, *Encuesta nacional de fecundidad—informe general,* p. 381, table 4.5.4; *Fiji Fertility Survey 1974, Principal Report,* p. 422, table H16; *Malaysian Fertility and Family Survey—1974, First Country Report,* p. 349, table 4.5.4; *Nepal Fertility Survey 1976, First Report,* p. 227, table 4.5.4; *Pakistan Fertility Survey, First Report,* pp. A-II13, table 1.6.1; *The Korean National Fertility Survey 1974, First Country Report,* p. 231, table 1.6.1; *The Survey of Fertility in Thailand: Country Report No. 1,* vol. II, p. 401, table 4.5.1D. For complete citations of these reports, see table 11.

[a] Including legally and consensually married women.
[b] Including 321 women who were temporarily infecund.
[c] Including categories 3 and 5. Sterilized couples are considered to be exposed but contracepting.
[d] Including categories 1, 3 and 5. Sterilized couples are considered to be fecund but contracepting.

TABLE 19. PROBABILITIES THAT MARRIED WOMEN OF nth PARITY WILL HAVE $n + 1$ CHILDREN AND AVERAGE NUMBER OF CHILDREN EVER BORN; EXPERIENCE OF AGE GROUP 45-49

Country and year	a_0	a_1	a_2	a_3	a_4	a_5	a_6	a_7	a_8	Average number of children ever born[a]
Colombia, 1976	0.975	0.970	0.965	0.932	0.906	0.882	0.866	0.864	0.821	7.7
Dominican Republic, 1974	0.962	0.934	0.944	0.907	0.910	0.910	0.873	0.865	0.869	7.4
Fiji, 1974	0.942	0.960	0.947	0.936	0.931	0.879	0.840	0.800	0.687	6.7
Malaysia, 1974	0.969	0.947	0.924	0.907	0.889	0.861	0.822	0.808	0.726	6.3
Nepal, 1976	0.974	0.968	0.936	0.917	0.864	0.806	0.819	0.751	0.602	6.1
Pakistan, 1975	0.980	0.969	0.958	0.945	0.953	0.878	0.875	0.794	0.720	7.4
Republic of Korea, 1974	0.987	0.985	0.976	0.950	0.866	0.775	0.719	0.586	0.467	6.1
Thailand, 1975	0.969	0.981	0.958	0.953	0.886	0.867	0.836	0.835	0.738	7.0

Sources: Data taken from the following World Fertility Survey reports: *Encuesta nacional de fecundidad de Colombia 1976, resultados generales,* p. 117, table 2.2.1B; Dominican Republic, *Encuesta nacional de fecundidad—informe general,* p. 220, table 2.2.1B; *Fiji Fertility Survey 1974, Principal Report,* p. 232, table E2; *Malaysian Fertility and Family Survey—1974, First Country Report,* p. 104, table 2.2.1B; *Nepal Fertility Survey 1976, First Report,* p. 111, table 2.2.1B; *Pakistan Fertility Survey, First Report,* p. A-II-20, table 2.2.1B; *The Korean National Fertility Survey 1974, First Country Report,* p. 250, table 2.2.1B; *The Survey of Fertility in Thailand: Country Report No. 1,* vol. II, p. 76, table 2.2.1B. For complete citations of these reports, see table 11.

[a] Data for currently married women.

great variety of "folk" methods of birth control comprise the additional, "less efficient" methods. Thus, the women have been grouped into two categories: those using an efficient method; and those using any method at all. Abortions, which are not contraceptive methods, are not included in this classification.

Past contraceptive practice

Because these are single-round surveys and comparable data for an earlier period are not available, this discussion does not include an assessment of trends. The experience with respect to contraceptive use of the women in these samples is examined indirectly from patterns of parity progression ratios and directly from proportions of women who never used contraception. The parity progression ratios used here are cohort indicators of fertility, obtained from data on the parities achieved by married women[61] in the age group 45-49 years. These ratios define the probability that a woman who has n children will have an additional child before the end of her reproductive period. The higher the probability, the closer it is to natural fertility, i.e., to the absence of deliberate birth control. Maximum probabilities vary, of course, from one age group to the next, as a result of culture and customs relating to reproduction, such as breast-feeding, and the occurrence of secondary sterility. In a cross-national study such as this, comparisons are undertaken by age group and decreasing probabilities reflect, *a priori*, the presence of induced abortions, use of contraception or occurrence of secondary sterility.

Table 19 provides parity progression ratios and data on average number of children ever born for the eight countries. It is evident that elements in these societies encouraged large family size norms. The average number of children born alive to women aged 45-49 years varied from 6.1 in the Republic of Korea to 7.7 in Colombia.[62] At the initial stage of their reproductive life, women appear not to control births;[63] parity progression ratios are very high, being above 0.900, up to a_3, which is the probability that women with three children will have a fourth child.[64] The range among the countries is relatively narrow, from 0.907 for Malaysia and the Dominican Republic to 0.953 for Thailand. Beginning with a_4, some probabilities begin to decrease and the range among the countries widens, with the greatest tapering off occurring in Nepal and the Republic of Korea. The probabilities in Colombia and the Dominican Republic remain relatively high and apparently close to nat-

ural fertility; the slow decline can be largely attributed to secondary sterility.

The patterns for the remaining countries, Fiji, Malaysia, Pakistan and Thailand, may be interpreted as a reflection of the adoption of family planning by the older woman; or, in Pakistan, possibly the cessation of cohabitation at a comparatively early age. However, more detailed data and analyses are needed to link the timing of contraceptive use with completed family size and the occurrence of the last birth, in order to determine the extent to which family planning use has been directed to limiting or to spacing the number of children. It is possible, of course, that the pattern in these four countries is that women aged 45-49 years may have experienced a decline in exposure to risk of pregnancy.

In so far as these data may be taken as evidence, the family planning programme appears to have had the widest influence in the Republic of Korea, where the probabilities decline steeply after the fourth child. However, the average completed family sizes are very similar in Malaysia and the Republic of Korea, even though the patterns of progression from one parity to the next are quite different. Among these countries, Nepal is found to have one of the smallest average number of children born. It also has a strongly declining probability curve. There was some under-reporting of children in the World Fertility Survey of Nepal, which would account in some measures for the comparatively lower fertility.[65] But other cultural factors may also have been operating to lower fertility. Breast-feeding, for example, is said to be prolonged and customary; and very early age at marriage is associated with adolescent sterility and subfecundity. Nearly two thirds of girls aged 16 were married, as were over one third of those aged 15 years. Very few married at ages 20 and higher, but those who did had higher fertility during the first five years of marriage than was the case with women marrying at age 15 or earlier. Fertility regulation, being relatively rare, cannot account for the lower Nepalese fertility.

From the preceding discussion, it is possible to draw several conclusions. First, high fertility and little or no birth control produce a pattern of relatively high parity progression ratios at all parities, giving the corresponding curve a convex shape. When the populations begin consciously to regulate fertility, practice occurs first at the older ages and higher parities, as has often been observed, so that probabilities for achieving high parities are the first to fall, sometimes steeply at certain parities. Curtailment of high probabilities of achieving a birth of high order, which characterizes what might be regarded as the first stage in the dissemination of birth control, produces a parity progression curve of increased concavity with low values at high parities. As desired family size decreases and is followed by efficient contraceptive practice, the ratios tend to decline at lower parities, producing an indention in mid-curve that may be defined as a second stage in the spread of contraceptive practice. Possibly excluding the Republic of Korea, this

[60] International Statistical Institute, *Basic Documentation, Guidelines for Country Report No. 1* (London, World Fertility Survey, 1977), p. 10.

[61] Including remarriages, if any. For this methodology, see Louis Henry, *Fécondité des mariages: nouvelle méthode de mesure*, Institut national d'études démographiques, cahier No. 16, Travaux et documents (Paris, Presses Universitaires de France, 1953).

[62] If one assumes a certain amount of unreported births due, for instance, to recall lapses, these figures may well be underestimates. In addition, differential non-random and sampling errors may also affect the data.

[63] With respect to primary sterility, as would be inferred from a_0, there is a need for more careful analysis than is possible here, in order to distinguish it from voluntary childlessness, where that applies.

[64] Differences between countries may be due to various causes: age at marriage; primary sterility; duration of marriage; breast-feeding or other spacing customs; family size and its effect on secondary sterility; absent spouse (migrant workers); etc.

[65] For example, about 12 per cent of births to women aged 45-49 years are said to have been omitted. The cumulat fertility of 6.1 children per woman in this age group shown in table 19 has not been adjusted by this amount. See World Fertility Survey, *The Nepal Fertility Survey, 1976: A Summary of Findings*, No. 5 (London, April 1978), p. 5.

Table 20. Proportions of all ever-married women who had never used a contraceptive method or were currently using a contraceptive method and of "exposed" women who were currently using a contraceptive method, by age group

(Percentage)

Age group	Colombia, 1976	Dominican Republic, 1974	Fiji, 1974	Malaysia, 1974	Nepal, 1976	Pakistan, 1975[a]	Republic of Korea, 1974	Thailand, 1975
			Never used a contraceptive[b]					
15-19	47.9	69.8	58.8	76.3	98.8	100.0	83.6	73.6
20-24	32.8	53.7	39.1	54.6	97.7	96.0	69.9	57.8
25-29	28.9	39.8	26.7	42.1	95.1	89.0	46.4	44.3
30-34	21.3	43.8	21.7	41.5	93.6	86.0	31.0	44.4
35-39	27.0	47.1	28.3	48.2	93.0	82.0	26.4	46.3
40-44	30.8	58.8	32.8	53.0	95.4	84.0	38.8	60.7
45-49	26.7	70.2	48.2	73.0	97.3	88.0	64.5	75.0
15-49	29.3	52.6	32.4	52.4	95.9	90.0	43.4	54.7
Number of ever-married women	3 302	2 256	4 928	6 321	5 940	4 663	5 420	3 778
			Currently using a contraceptive[c]					
15-19	22.3	(10.3)[d]	20.6	14.5	0.3	0.0	12.7	(16.0)[d]
20-24	36.5	21.7	30.7	28.7	1.0	2.0	13.4	29.0
25-29	41.4	34.7	39.0	37.7	2.1	5.0	28.0	38.6
30-34	50.3	35.2	47.7	36.9	4.2	7.0	43.9	38.8
35-39	41.2	36.5	48.6	36.0	4.2	10.0	50.6	37.5
40-44	32.9	24.5	41.0	30.4	2.0	7.0	33.6	26.4
45-49	16.7	(17.3)[d]	26.7	11.6	1.4	7.0	10.7	11.6
15-49	36.8	27.0	38.9	30.2	2.2	5.0	32.5	30.5
Number of ever-married women	3 302	2 256	4 928	6 321	5 940	4 663[a]	5 420	3 778
Number of ever-married women currently using a contraceptive method	1 215	609	1 917	1 909	131	233	1 762	1 152
			"Exposed" women using a contraceptive[b]					
15-19	38.0	21.1	43.3	21.2	0.3	0.0	(17.9)[d]	22.9
20-24	52.0	36.1		38.2	1.3	3.0	18.7	38.5
25-29	56.0	50.2	53.8	48.0	2.5	7.0	35.9	46.2
30-34	65.0	49.1	61.5	44.7	5.3	8.0	50.9	46.9
35-39	53.0	44.1	63.1	41.8	5.7	11.0	60.3	44.9
40-44	45.0	30.1	61.7	36.5	3.8	8.0	52.1	29.4
45-49	31.0	18.8		16.2	5.3	7.0	45.2	13.0
15-49	52.0	38.4	56.2	38.0	2.9	6.0	45.7	37.0
Number of exposed women	2 323	1 493[e]	3 314	5 006[c]	4 325	3 900[c]	3 847	3 119[e]

Sources: Data taken from the following World Fertility Survey reports: Encuesta nacional de fecundidad de Colombia 1976, resultados generales, pp. 203 and 209, tables 4.4.2 and 4.5.1; Dominican Republic, Encuesta nacional de fecundidad—informe general, pp. 358 and 376, tables 4.4.2 and 4.5.1; Fiji Fertility Survey 1974, Principal Report, pp. 393, 408 and 417, tables H3(a), A8(a) and H13; Malaysian Fertility and Family Survey —1974, First Country Report, pp. 323 and 344, tables 4.4.2 and 4.5.1; Nepal Fertility Survey 1976, First Report, pp. 214 and 224, tables 4.4.2 and 4.5.1; Pakistan Fertility Survey, First Report, pp. A-II-22, A-II-24 and A-II-25, tables and 2.2.5; The Korean National Fertility Survey 1974, First Country Report, pp. 397 and 413, tables 4.4.2 and 4.5.1; The Survey of Fertility in Thailand: Country Report No. 1, vol. II, pp. 365 and 396, tables 4.4.2A and 4.5.1A. For complete citations, see table 11.

[a] Refers to currently married women only.
[b] Including sterilization, for all countries.
[c] Including sterilization, for all countries except Pakistan.
[d] Figures in parentheses relate to fewer than 50 observations.
[e] Including the infecund women; see table 18, category 4.

stage has not been reached by the countries under study. The low parity ratios tend to decline least, although the levelling at a_0 and a_1 may tend to come closer to the 0.900 level. But the continuous mid-curve decline ultimately will produce a downward concavity. This concave curve, representing a third stage, characterizes patterns of birth parities in societies that have undergone the transition from high to low fertility.[66]

Another dimension of the countries' past experience in family planning is in the proportions of ever-married women who never used contraceptives (table 20). Among these countries, the range in over-all rates of "never use" is very wide, from 96 per cent in Nepal to 29 per cent in Colombia.[67] Pakistan also had a high proportion of never-users, whereas in Fiji, as in Colombia, the proportions were comparatively very low. The Dominican Republic, Malaysia, the Republic of Korea and Thailand fall into an intermediary category in which the percentages of ever-married women who were never users varied between 43.4 (Republic of Korea) and 54.7 (Thailand).

Among these eight countries, the average proportion of ever-married women who had never used a contraceptive appears to be associated in some way with their distribution by age.

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[66] A discussion of patterns that deviate from this model is beyond the scope of this report.

[67] In a survey undertaken in Tunisia in 1973 on the continuation of use of contraceptive methods, it was found that between 70 and 75 per cent of the contraceptive acceptors interviewed had never used a method prior to acceptance. See Tunisia, Office national du planning familial et de la population, Enquête nationale sur la continuation des méthodes contraceptives, 1973; vol. II, Exploitation et résultats (Tunis, 1975), p. 36. This low value for Columbia appears inconsistent with the high parity progression ratios observed. Additional analysis of contraceptive use-effectiveness is needed to account for this situation.

Thus, Nepal and Pakistan, countries in which contraceptive use is least prevalent, are characterized by a rather flat age curve with a slight minimum of use in age group 35-39. For the Dominican Republic, Malaysia and Thailand, for which never-use was reported as moderate, the age curve for never-users has a U-shape with an apparent levelling-off between ages 25 and 34. Colombia and Fiji have had a similar pattern with the minimum at age group 30-34, although, at each age, proportions who never used are lower than in the preceding group of countries. The pattern seen for the Republic of Korea suggests that Korean women begin earlier to apply family regulation methods. Also, in this country, resort to abortion is widely prevalent; and inasmuch as abortion is not a method of contraception, its use is not taken into consideration in the age schedule shown in table 20. It is possible that the age schedules of never-use may be influenced by marriage patterns, which vary among these countries. Thus, for example, assuming that contraception would not generally be used prior to the birth of the first child, other things being equal, age at marriage would influence the woman's age at initial use.

Characteristics of current users[68]

Age[69]

The over-all levels of current contraceptive use permit the grouping of the eight countries into three categories (see table 20). Thus, low average prevalence, i.e., not higher than 5 per cent of all ever-married women aged 15-49 years characterizes contraceptive use in Nepal and Pakistan. The percentages range from 0.3 and 0.0 at ages 15-19 to 4.2 and 10.0 at ages 35-39 for the two countries, respectively, and this distribution is reflected in the rather flat age-specific use curves. In the second group are those with much higher averages of current use (about 30 per cent of ever-married women). These countries are the Dominican Republic, Malaysia, the Republic of Korea and Thailand. However, differences in the range, by age, are observed in this group. The widest range is found in the Republic of Korea, where use varies from about 13 per cent at ages 15-19 to 50 per cent at ages 35-39. In the other three countries, maximum values remain below 39 per cent and are found in age groups from 25-29 to 35-39 with little variation. Thus, the curves for these four countries have a normal-shaped distribution of use by age, with a broad peak for the three latter countries and a narrow late peak for the former. In the third category, Colombia and Fiji have still higher averages of current use, 36.8 and 38.9 per cent, respectively. The lower limit is much higher than in the other countries, i.e., 20.0 per cent or more in age group 15-19, and the upper limit reaches 50.0 per cent. The percentage distributions for these two countries remain, however, dissimilar: broad-peaked in Fiji and an early peak for the age group 30-34 in Colombia, thus reflecting differences in age patterns of use despite the similarity in average use.

It is postulated that these variations in age patterns of current use are a product of national differences in age at marriage, birth-spacing preferences, desired family size and/or desire for sons, and age at menopause or at marriage dissolution, as well as knowledge about and accessibility to contraceptives. In certain of these countries, contraceptive use either begins after the birth of the first child or becomes more consistent after the woman achieves first parity.[70] Thus, when women marry comparatively late, as in the Republic of Korea, maximum use would also occur at older ages, when desired family size or number of sons wanted had been achieved. Differences in the curves also reflect differences among the countries as to whether and at what parity women apply contraceptives for spacing as opposed to their use only as a limit to further childbearing.

Significantly, among these eight countries, the highest proportions of women under age 25 reporting current use of contraceptives were in Colombia, Fiji and Thailand, the countries in which reported current use of contraceptives was, on the whole, greatest. This finding implies that, as the practice of birth regulation spreads in a society, it may be used increasingly at younger ages for spacing births, whereas its introduction into a society mainly by older women is principally to prevent additional births.

The data presented in table 20 for several of these countries show that, in fact, considerably larger proportions of older women than of those aged 20-24 years reported that they had never used a contraceptive. Thus, a decline in exposure to pregnancy risks would not explain less prevalent current use among women aged 40 and over where family planning is widespread, as in the Republic of Korea, or where contraceptive use is almost universally absent among young women, as in Nepal and Pakistan.

Because exposure to risk of conception may be a major factor in the motivation of women or couples to apply contraceptives when they do not want more children, or want them at longer intervals, it is useful to examine age schedules of current use for "exposed" women only.[71] The most striking observation afforded by a comparison of the data in table 20 is the similarity of the age schedules of current use for exposed women and ever-married women in Nepal and Pakistan. The principal exception is the upward slope of the curve for exposed Nepalese women at ages 45-49 years, evidence that relatively few ever-married women remain exposed to pregnancy risks at these ages.

Additional conclusions to be drawn from these tables are that, among the eight countries, current contraceptive use is more widespread than was evident from the data on all ever-married women, that the age patterns for these countries are less similar, that use probably begins earlier and may be applied at later periods of the woman's life than had been thought and that variations among the countries in levels of use are considerably greater than the age schedules of current use for all ever-married women suggested. Table 21 shows for the eight countries the proportions of users among

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[68] A discrepancy in the number of contraceptive users and women not wanting more children in tables 3.2.1, 4.4.1 and 5.2.3 of the Pakistan report does not permit total consistency of current user and non-user data for this country.

[69] Age group 15-19 includes married women less than 15 years of age, where indicated.

[70] See a discussion by C. F. Westoff, "The unmet need for birth control in five Asian countries", *International Family Planning Perspectives and Digest*, vol. 4, No. 1 (Spring 1978), p. 17.

[71] "Exposed" women are those currently married, but not pregnant or sterilized, and who believe themselves to be fecund.

TABLE 21. RELATIVE INTENSITY OF CONTRACEPTIVE USE

| | | Proportion of users in age group 15-49 | | Modal values | | |
| | | | | | Narrow peak | |
Country	Year	Among ever-married women	Among "exposed" women	Broad peak	Early	Late
Fiji	1974	38.9	56.2	30-39		
Colombia	1976	36.8	52.0		30-34	
Republic of Korea	1974	32.5	45.7			35-39
Thailand	1975	30.5	37.0	25-39		
Malaysia	1974	30.2	38.0	25-39		
Dominican Republic	1974	27.0	38.4	25-39		
Pakistan	1975	5.0	6.0			
Nepal	1976	2.2	2.9			

Source: Table 20.

TABLE 22. UNSTANDARDIZED AND STANDARDIZED PROPORTIONS OF CONTRACEPTIVE USERS AMONG EVER-MARRIED WOMEN

| Country | Proportion of users among ever-married women | Standardized proportion of users among ever-married women[a] | Relative index of proportions of users | | Relative level of contraceptive use |
			Unstandardized	Standardized	
Fiji	38.9	40.3	100.0	100.0	Advanced
Colombia	36.8	38.0	94.6	94.3	Advanced
Republic of Korea	32.5	32.5	83.5	80.6	Intermediate
Thailand	30.5	32.0	78.4	79.4	Intermediate
Malaysia	30.2	31.6	77.6	78.4	Intermediate
Dominican Republic	27.0	29.7	69.4	73.7	Intermediate
Pakistan	5.0	6.6	12.9	16.4	Low
Nepal	2.2	2.6	5.7	6.5	Low

Sources: Table 21; and World Fertility Survey, *The Korean National Fertility Survey 1974, First Country Report* (Seoul, Korean Institute for Family Planning, 1977), p. 413, table 4.5.1.

[a] Age structure as reported for Republic of Korea used as standard.

TABLE 23. PROPORTIONS OF ALL EVER-MARRIED WOMEN WHO WERE CURRENTLY USING A CONTRACEPTIVE METHOD,[a] BY LEVEL OF EDUCATION

Level of education	Colombia, 1976	Dominican Republic, 1974	Fiji, 1974	Malaysia, 1974	Nepal, 1976	Pakistan, 1975	Republic of Korea, 1974	Thailand, 1975
None	17.8	(12.4)[b]	43.6	19.6	1.9	5.0	25.2	22.8
Lower primary			39.9	33.8[c]			32.9[d]	31.5[e]
}	46.3	26.5			7.2	10.0		
Upper primary }			34.1	44.1[f]			35.2[g]	37.7[h]
Secondary	61.0 { 67.1	41.1 { 38.9	40.7	58.6[i]	33.3	21.0	42.2 { 40.2[j]	(46.2)[b, k]
Above secondary	{ (50.0)	{ 51.3					{ 49.1	
Number of ever-married women	3 302	2 256	4 928	6 320	5 922	4 663[l]	5 410	3 775

Sources: Data taken from the following World Fertility Survey reports: *Encuesta nacional de fecundidad de Colombia 1976, resultados generales,* p. 218, table 4.5.5A; Dominican Republic, *Encuesta nacional de fecundidad—informe general,* p. 386, table 4.5.5A; *Fiji Fertility Survey 1974, Principal Report,* p. 425, table H17(a); *Malaysian Fertility and Family Survey—1974, First Country Report,* p. 354, table 4.4.5A; *Nepal Fertility Survey 1976, First Report,* p. 228, table 4.5.5A; *Pakistan Fertility Survey, First Report,* p. A-II-68, table 4.5.5; *The Korean National Fertility Survey 1974, First Country Report,* p. 417, table 4.5.5A; *The Survey of Fertility in Thailand: Country Report No. 1,* vol. II. p. 406, table 4.5.1E. For complete citations of these reports, see table 11.

[a] Including sterilization, all countries.

[b] Data relating to fewer than 50 observations.
[c] Less than seven years of schooling.
[d] Primary school.
[e] Less than five years of schooling.
[f] From 7 to 12 years of schooling.
[g] Middle school.
[h] From 5 to 10 years of schooling.
[i] Twelve years of schooling.
[j] High school.
[k] More than 10 years of schooling.
[l] Currently married women only.

all ever-married women and among the exposed women in the 15-49 age group.

In addition to the obvious influence of knowledge about and availability of contraceptive services, the proportion of women in these eight countries who are using a contraceptive at any given time may also be affected by the distribution of ever-married women in respect of such factors as age, urban/rural residence, labour force participation or educational level. To render the data internationally comparable would, therefore, involve a great deal of standardization. In order to examine the effects of at least one of these factors, as well as to provide a somewhat more meaningful, if synthetic, index of comparison, the proportions using contraception among ever-married women aged 15-49 were standardized for age structure and an index constructed with the proportion currently contracepting in Fiji as the base (table 22). The standardized proportions underscore the effect of age structure on the proportion using among all ever-married women, the Republic of Korea, Thailand, Malaysia and the Dominican Republic appear as a much more homogeneous group, and the position of Pakistan is improved when compared with that of Nepal, as is that of Fiji when compared with Colombia. If the prevalence of use in Fiji were the goal, the relative index shows that while Colombia and the Republic of Korea slightly retrogress, all other countries are closer to the goal than it would appear from the unstandardized rates.

Education

Among the various factors related to family planning practice, differences according to level of education generally appear to be the most significant. Although it is expected that low levels of education would be associated with low levels of contraceptive use and that, conversely, the proportions of users would be highest among the better educated,[72] the interest here is focused on the differential effect of education in different countries. Although the education indicators used in the different countries examined are not directly comparable, the relative order of magnitude of proportions of women who were currently using a contraceptive method can still be fairly well assessed and compared.[73] These data are shown in table 23.

As expected, the data for all countries (except Fiji) confirm the axiom that the higher the educational level, the higher the proportion of users. As concerns Fiji, the inverse relationship below secondary level is due apparently to the differences in educational structure between the two major ethnic groups, the Fijians and the Indians. Within each of these groups, the traditional hypothesis is sustained, although not consistently, and the highest educational level is in general associated with a higher proportion of users. But when the two groups are combined, the higher proportion of users is found in the "no education" group.

It is useful to observe the variations in extent of current use among women at given levels of education in order to gain additional insight into the role of education in contraceptive use. For instance, the proportion of ever-married women with no education who were current users varies from 1.9 per cent in Nepal to 43.6 per cent in Fiji; the proportion of contraceptors among ever-married women with secondary or higher education varies from 21 per cent in Pakistan to 61 per cent in Colombia. In fact, some countries have a larger proportion of contraceptors in the non-educated group than others have in the highest educational group. This finding points to the need for research on the extent to which the general prevalence of a trait in the society determines how variations in the amount of it that individuals possess can influence various facets of their reproductive behaviour.

Urban/rural characteristic

Family planning practice according to type of place of residence also conforms to the conventional hypothesis, i.e., more current contraceptive users among ever-married women in urban areas than in rural areas. The data are shown in table 24. Proportions of users in urban areas vary from 12 per cent in Pakistan to 44 per cent in Colombia, and in rural areas from 3 per cent in Pakistan to 36 per cent in Fiji. It is postulated that these differences reflect variations among the countries in the extent to which contraceptive use has permeated the society and, to some extent, in the relative accessibility of contraceptive information, services and supplies. Although the present data refer to ever-married women only, the same conclusions are reached with respect to "exposed" or currently married non-pregnant women,[74] excluding the Republic of Korea, where contraceptive use appears to cut across cities, towns and rural areas, as well as across educational strata.[75] One plausible explanation for this exception is the quality and scope of the national family planning programme in the Republic of Korea, which has been in effect for almost two decades.[76]

Like the educational variable, the intensity of contraceptive use among women according to urban or rural residence varies substantially from one country to another and presumably for identical reasons, namely, differences in the general socio-cultural background of the people. The characteristics of users is thus bound to be insufficient as an explanation for differences in levels of use beyond the frame of a single given country, i.e., outside a given socio-cultural context. Thus, cross-cultural comparison of the differentials may not be very meaningful.[77] At best, such a study can only reveal that women belonging to one category have a higher propensity to resort to family planning than those belonging to another category. The explanation would

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[72] It should be stated that, quite often, educational level and place of residence (urban/rural) are interacting variables.

[73] Education of husband may also influence contraceptive use, though this variable is not considered in the present discussion. A more intensive analysis would take it into account, relating it to wife's level of education.

[74] C. F. Westoff, *loc. cit.*, pp. 10-13.

[75] *Ibid.*, p. 13.

[76] *Measures, Policies and Programmes Affecting Fertility with Special Reference to National Family Planning Programmes*, p. 67.

[77] It is indisputable that urban and rural conditions vary from one country to another and that these differences are associated not only with family size norms regarding spacing and limitations of births but with availability of family planning methods, which may well be a non-negligible factor in differences of proportion users.

TABLE 24. PROPORTIONS OF ALL EVER-MARRIED WOMEN WHO WERE CURRENTLY USING A CONTRACEPTIVE METHOD,[a] BY PLACE OF RESIDENCE

Level of education	Colombia, 1976	Dominican Republic, 1974	Fiji, 1974	Malaysia, 1974	Nepal, 1976	Pakistan, 1975	Republic of Korea, 1974	Thailand, 1975
City }			42.2	43.3			35.6	
Urban	44.0	33.1	43.9	40.8	...	12.0 34.9		41.3
Town }			45.3	38.1			29.8	
Rural	23.7	20.6	36.3	25.3	...	3.0	29.0	28.8
Number of ever-married women	3 302	2 256	4 928	6 321	...	4 663[b]	5 420	3 780

Sources: Data taken from the following World Fertility Survey reports: Encuesta nacional de fecundidad de Colombia 1976, resultados generales, p. 216, table 4.5.5A; Dominican Republic, Encuesta nacional de fecundidad—informe general, p. 392, table 4.5.5C; Fiji Fertility Survey 1974, Principal Report, p. 431, table H19(a); Malaysian Fertility and Family Survey—1974, First Country Report, p. 362, table 4.5.5C; Pakistan Fertility Survey, First Report, p. A-II-67, table 4.5.5; The Korean National Fertility Survey 1974, First Country Report, p. 418, table 4.5.5B; The Survey of Fertility in Thailand: Country Report No. 1, vol. II, p. 409, table 4.5.1F. For complete citations of these reports, see table 11.

[a] Including sterilization, all countries.

[b] Currently married women only.

TABLE 25. CONTRACEPTIVE USE BY "EXPOSED" WOMEN WHO DID NOT WANT MORE CHILDREN AND WHO WERE NOT CURRENTLY USING A CONTRACEPTIVE METHOD

	Colombia, 1976	Dominican Republic, 1974[a]	Fiji, 1974	Malaysia, 1974[b]	Nepal, 1976	Pakistan, 1975[c]	Republic of Korea, 1974	Thailand, 1975[d]
Proportion of "exposed" women who did not want more children	61.3	52.4	51.1	46.1	29.7	45.0	74.2	61.1
Proportion of "exposed" women who did not want more children and who were not using:								
Any contraceptive method[e]	43.9	42.8	26.2	47.5	91.4	76.3	44.1	44.1
An efficient contraceptive method[f]	59.9	56.3	33.5	62.5	91.5	80.3	56.4	48.4

Sources: Table 18 and data taken from the following World Fertility Survey reports: Encuesta nacional de fecundidad de Colombia 1976, resultados generales, p. 244, table 5.2.3; Dominican Republic, Encuesta nacionale de fecundidad—informe general, p. 420, table 5.2.3; Fiji Fertility Survey 1974, Principal Report, pp. 445 and 448, tables 13 and 16; Malaysian Fertility and Family Survey—1974, First Country Report, pp. 397-398, table 5.2.3; Nepal Fertility Survey 1976, First Report, p. 234, table 5.2.3; Pakistan Fertility Survey, First Report, p. A-II-74, table 5.2.3; The Korean National Fertility Survey 1974, First Country Report, p. 551, table 5.2.1; The Survey of Fertility in Thailand: Country Report No. 1, vol. II, p. 444, table 5.2.1. For complete citations of these reports, see table 11.

[a] Including 224 sterilized women not reported in table 5.2.3 of the First Country Report.

[b] Including 220 sterilized women not reported in table 5.2.3 of the First Country Report.

[c] Including 46 sterilized women not reported in table 5.2.3 of the First Country Report.

[d] Including 285 sterilized women not reported in table 5.2.1 of the First Country Report.

[e] Including all contraceptive methods, traditional and modern.

[f] Including only modern methods, such as intra-uterine devices, oral contraceptives and injections.

require research in greater depth and with additional background variables.

Desire for no more children

The desire not to have more children, at any given point in time, should constitute a strong incentive to resort to contraception, regardless of the size of the family. As reported in section B, above, only about 30 per cent of currently married, fecund Nepalese women reported a desire to terminate childbearing, compared with 72 and 76 per cent, respectively, in the Republic of Korea and Pakistan. Because of differences among countries in age, parity structures and definition of the base population, the proportion of women reporting not wanting more children are not entirely comparable. However, the width of the gap among these countries in proportions of all married fecund women wanting no more children and, to the extent that comparisons can be made, also in the age specific values is reasonable evidence of national differences in potential contraceptive users.

Whether the wish to have no additional children is evidence of motivation sufficiently strong to cause women to use a contraceptive method may be determined from data on "exposed" women by comparing the desire for no more children with contraceptive use.

First, it may be observed from table 25 that the highest percentages of "exposed" women wanting no more children are reported for the Republic of Korea (74.2), Colombia (61.3) and Thailand (61.1), so that the potential for contraceptive use would seem greatest in these countries. In three countries, Malaysia, Nepal and Pakistan, proportions of "exposed" fecund women wanting no more children were less than 50 per cent. Although this finding may indicate comparatively low potential for contraceptive practice, it may reflect in part age and parity structures that are less favourable to family limitation.

The question arises again to what extent the expressed desire to limit the size of the family is confirmed by behaviour. The data in table 25 show, somewhat surprisingly, that in six of the eight countries, more than one half of the

women exposed to the risk of conception and who explicitly stated that they did not want more children were not currently using an efficient contraceptive method. In Pakistan, more than three quarters of the women at risk and wanting to curtail childbearing were non-users; and in Nepal, it may be said that non-use in this category of women was almost universal. The only exception is Fiji, where two thirds of women exposed to risk and wanting no more children were reported as current users of an efficient contraceptive. When both the efficient and the traditional types of contraceptive methods are taken into consideration, the proportions not using are somewhat lower, except in Nepal, and perhaps also in Pakistan.

How does one account for the sometimes large proportions of women who neither want more children nor use a contraceptive method? More data would be needed to analyse such a situation in detail, but some hypotheses may be formulated. It is convenient to distinguish two categories of women "not wanting" more children: one consists of those who should not be expected, at least currently, to be contraceptive users; and the other, of women who are true potential users. The first category includes women whose expressed desire not to have more children does not reflect a genuine attitude[78] and who were not going to adopt contraception in any case. Also included are women who genuinely wished not to have more children but who did not become users either because of ignorance or of too weak a motivation. Then, there are women who would adopt contraception were it not for the opposing pressures of the socio-cultural environment at large, from the extended family or simply from the husband. A certain percentage of women wanting no more children would not be current users because they are temporarily sterile as a result of a recent birth or abortion or prolonged breast-feeding. In addition, neither would women who systematically resort to induced abortion be current users.

The second category includes women who were actually current potential users, but who did not resort to contraception because of lack of information and/or contraceptive services.[79] This second category can constitute a rich target for family planning services.

CONCLUSION

As stated earlier, this analysis is mainly exploratory and its conclusions provisional. The eight countries for which data have been investigated in this research do not constitute a basis sufficient for wide generalization. The main objective of the analysis was the measurement of levels in contraceptive use and, if possible, the identification of certain patterns of use. On the basis of the eight countries examined, the data on users reveal a wide range in levels of use. Countries with similarities in levels could be grouped in three arbitrary categories, namely, advanced, intermediate and low. These categories are utilized mainly to underscore the relative order of magnitude of proportions of users when several countries are examined. When all countries from the World Fertility Survey are included in this scheme, a better image of the world situation should emerge.

In addition to the variations in levels, which interestingly enough do not reflect any geographical or regional homogeneity, some specific age patterns appear to be associated with these different levels. Low level of use are associated with flat curves of use distribution by age; intermediate and advanced levels have normal-shaped curves with variations in modal age: some curves are characterized by early peaks, others by late peaks. The determinants of these differences could not, however, be investigated with the available data. Another observation that emerges from the study is that characteristics of users, such as education and type of place of residence, have a differential effect in different countries. This finding suggests that more fundamental factors are determining levels of contraceptive use and indicates a need for more information on the reasons that make education or place of residence influential under certain conditions.

Dissemination and adoption of contraceptive behaviour has often been acknowledged as arising from a complex set of interrelations within a wide range of socio-cultural variables. This is once more underscored by the new data made available by the World Fertility Survey. Thus, one of the more important findings from this research is that large proportions of women who stated that they did not want additional children none the less do not resort to birth-regulating methods to ensure that their desired family size goal shall be reached.

The qualifications attending the foregoing discussion are evidence that additional research is greatly needed if one is to understand what is involved as human beings formulate their wishes about family size and either attempt to achieve their expressed desires or accept, more or less passively, the events as they occur. A more exhaustive analysis than was attempted here might relate desire to have no more children not only with age and use or non-use of contraceptives but, additionally, with parity and number of living children. Indeed, standardization for parity and family size would have improved the quality of interpretation in the foregoing discussion. An analysis that distinguishes contraceptive use for spacing and for limiting the number of children would also be of value, as only the latter is intended to influence completed family size. These and other studies would contribute greatly to enrich the understanding of fertility behaviour and family-building processes, and it is expected that findings from future reports of the World Fertility Survey will underscore this fact.

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[78] Expressions of a desire to have no more children may have been influenced by the interviewer. Many women often have not made up their mind with respect to this question. As with answers on desired family size, caution is required in accepting them as being reliable and of significance.

[79] There may be a total lack of family planning services; or if services are available, they may be of difficult access or too expensive, or may not provide acceptable methods etc.

Chapter III

MORTALITY*

Mortality is the demographic variable that bears the most direct and obvious relation to human welfare. As such, it occupies a special place in demographic inventories of change and progress. Not only is mortality one of the central components in the process of social development and modernization but it functions as a relatively sensitive indicator of other aspects of social and economic progress because levels of mortality closely reflect the level and distribution of living conditions within a population.

The past several years present a very mixed picture of world-wide trends in mortality. The more developed countries, which had experienced relatively little change in mortality in the past several decades, show some promising signs that an era of renewed progress may be beginning. The chronic diseases, long the obstacle to progress in these countries, appear in several places to be yielding somewhat to a variety of personal and medical measures. There is no evident relationship between recent changes in mortality and the level of mortality in these countries, suggesting that the limit to life expectancy may not have been reached even among the vanguard of countries who have achieved historically unprecedented levels. By the period from the early to mid-1970s, the range of life expectancies at birth in more developed countries was 64-73 years for males and 70-78 years for females. On average, females could expect to live about six years longer than males in these countries.

Levels of mortality can be determined with much less certainty for the less developed countries. Uncertainties and errors in measurement are, of course, compounded when attempts are made to ascertain trends. The most that can reliably be said about sub-Saharan Africa is that levels of mortality remain quite high. National life expectancies at birth appear uniformly to fall short of 50 years. The scant evidence on trends suggests that mortality has, generally, though not without exception, been declining. Some of the declines, however, are implausibly rapid, suggesting that measurement error may be dominating the trend evaluation. With the exception of the Sudan, it appears that the countries of Northern Africa have progressed from high to medium mortality, meaning that life expectancies at birth are currently between 50 and 60 years. Asian countries have made substantial progress, but in only a few relatively small countries has mortality declined enough for them to be clas-

sified as low-mortality areas with a life expectancy at birth that exceeds 60 years. All of the large, populous countries in Asia remain in the higher medium-mortality ranges. By contrast, all but two countries of Latin America have risen out of the high-mortality category and a sizable majority have entered the low-mortality zone.

More startling than evidence about mortality trends in developing countries is evidence on mortality differentials. Recent research has revealed enormous class differentials in mortality in a large number of developing countries. Within many countries, some groups enjoy mortality levels characteristic of more developed countries, but others appear to have been almost completely insulated from twentieth-century progress in public health and levels of living. These disparities have been best documented in Latin America, but they are clearly not confined to this area. At the same time, recent evidence has also suggested that large rural/urban differences in mortality in developing countries are primarily a product of the differing socio-economic structures in the two types of areas. Relatively little of the rural/urban difference remains when differences in social class are controlled. As the years have passed, high mortality has increasingly become the exclusive bane of poverty, whether encountered in urban or in rural areas.

A. MORE DEVELOPED COUNTRIES

General levels and trends

At least in terms of mortality, the more developed countries are far less diverse than the less developed countries. Recent trends are more readily identifiable because the vital statistics systems of the more developed countries have been well developed for many years. One indicator of mortality conditions is the crude death rate. But its value is limited because much of the variation in crude death rates is due to differences in the age structures of populations rather than to differences in mortality levels.

The crude death rate is, nevertheless, useful as a measure of one of the components of population change, the natural increase of population being determined by the difference between the crude birth rates and the crude death rates. During the past decade, for the first time since the 1930s, the crude death rates for several of the more developed countries have either equalled or exceeded the crude birth rates. This trend has produced a natural decrease in population size in each of the following countries during the periods indicated:

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* Prepared by the Population Division of the Department of International Economic and Social Affairs of the United Nations Secretariat in collaboration with the World Health Organization. In preparation of the subsection on Northern Africa, the United Nations-sponsored Cairo Demographic Centre also collaborated.

Country	Period
Austria	1975-1977
German Democratic Republic	1969-1977
Germany, Federal Republic of	1972-1977
Luxembourg	1972-1977
United Kingdom	
England and Wales	1976-1977
Scotland	1976-1977

In 1976, the highest crude death rate was 13.9 per 1,000 population in the German Democratic Republic (see table 26). But the absolute range of crude death rates among the more developed countries is quite small when compared with that of the less developed countries, although the relative differences are large. Thus, in 1976, the crude death rate for the German Democratic Republic was about twice the lowest rates among the more developed countries, which were found in Iceland, Israel and Japan, and ranged from 6.3 to 6.8 per 1,000 population.

Life expectancy at birth provides a summary measure of mortality which is unaffected by the age structure of a population; thus, it is a more useful tool than the crude death rate for evaluating time trends within countries and for making international comparisons. In table 27, the life expectancies at birth for 37 more developed countries are ranked by sex from highest to lowest. The rankings are only approximately correct since they are based on the most recent life tables available for each country and the dates of those tables vary from 1965 to 1977. Among the life tables, male life expectancies ranged from a high of 72.7 years in Japan to a low of 64 in the Soviet Union, and female life expectancies varied between 78.1 years in Norway and 70.2 years in Yugoslavia.[1] Excluding Japan, the highest life expectancies for each sex occurred in the Scandinavian countries. Japan is an important exception because the recent life expectancies reflect extraordinary gains during the past quarter of a century. Around 1950, Japan ranked thirty-fourth among the same group of 37 countries, with a life expectancy for both sexes combined of 57.9 years.

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[1] The 1975-1976 life table for Iceland gives life expectancies at birth of 73.0 years for males and 79.2 for females, and these would be the highest ranking figures for each sex. However, because of possible random fluctuations due to the small number of deaths per annum, values based on a five-year period (1971-1975) are given in table 27.

TABLE 26. CRUDE DEATH RATES, MORE DEVELOPED COUNTRIES AND SELECTED LESS DEVELOPED COUNTRIES HAVING RELATIVELY GOOD STATISTICS, 1960-1977

Major area, region and country	Number of deaths per 1,000 population					
	1960-1964	1965-1969	1970-1974	1975	1976	1977
Africa						
Northern Africa						
Egypt	16.3	14.9	13.5	12.3[a]	...	11.8[a]
Eastern Africa						
Mauritius	9.7	8.6	7.7	8.1	7.9	7.9[a]
Réunion[b]	11.2	9.3	7.6[c]	...	...	6.4
Latin America						
Caribbean						
Barbados[d]	9.2	8.0	8.7	8.8	9.2[a]	...
Cuba[d]	6.6	6.5	5.8	5.4	5.6	
Dominican Republic	7.5	7.0	6.1	5.4	...	...
Martinique[b]	8.5[e]	7.5	6.9	6.3	...	...
Puerto Rico	6.9	6.6	6.6	6.1	...	5.7[a]
Trinidad and Tobago	7.4	6.9	6.8	6.5	6.9[a]	...
Middle America						
Costa Rica	8.1	7.1	5.7	4.9	4.6[a]	...
El Salvador	11.2	9.8	8.6	8.0	7.5	...
Guatemala	16.7	16.4	13.1	9.6	9.8	...
Mexico	10.4	9.8	8.7	6.7	6.5[a]	...
Panama	7.4	7.0	6.2	5.2	5.2[a]	4.8[a]
Temperate South America						
Argentina	8.5	9.0	9.4[f]	...	...	...
Chile	11.8	9.6	8.6	7.2	7.8	...
Uruguay	8.8	9.3	9.5	9.9	10.3	...
Tropical South America						
Colombia	11.7	8.9	...	6.5	...	...
Ecuador	...	...	9.9	...	...	...

Sources: United Nations, Demographic Yearbook, various issues; files of the United Nations Statistical Office; and World Health Organization data bank.

NOTE: Data are for countries that evaluate their completeness of death registration as 90 per cent or above.

[a] Provisional.

[b] Rates excluding live-born infants dying before registration of birth.

[c] For 1970-1973.

[d] Data tabulated by year of registration rather than by occurrence.

[e] Inclusion of deaths of infants dying before registration of birth (which are registered as stillbirths although they are known to have breathed) produces an average annual rate of 8.8 for 1960-1963. Inclusion of an additional number of stillbirths whose ability to breathe was not reported would increase rate to 9.2 for 1960-1963.

[f] For 1970.

Major area, region and country	Number of deaths per 1,000 population					
	1960-1964	1965-1969	1970-1974	1975	1976	1977
Guyana[d]	8.5	6.9	6.9[g]	. . .	7.1[a]	. . .
Suriname[h]	7.8	. . .	. . .	. . .	. . .	. . .
Venezuela	7.5	7.0	6.6	6.2	. . .	. . .
Northern America						
Canada	7.7	7.4	7.4	7.4	7.2	7.3
United States of America	9.5	9.5	9.3	8.9	8.9	8.8[a]
Asia						
East Asia						
Japan	7.3	6.9	6.6	6.4	6.3	6.1[a]
Other East Asia						
Hong Kong[i]	5.8	5.0	5.2	4.9	5.1	5.2
Eastern South Asia						
Philippines	7.2	7.1	6.9	. . .	. . .	. . .
Singapore[d]	5.9	5.4	5.4	5.1	5.1	5.2
Middle South Asia						
Sri Lanka	8.5	8.1	7.6	. . .	. . .	. . .
Europe						
Eastern Europe						
Bulgaria	8.2	8.7	9.6	10.3	10.1[a]	10.7[a]
Czechoslovakia	9.5	10.4	11.5	11.5	11.5	11.5[a]
German Democratic Republic[j]	13.3	13.7	13.8	14.3	13.9	13.4[a]
Hungary	10.1	10.8	11.8	12.4	12.5	12.4[a]
Poland	7.6	7.7	8.3	8.7	8.9	9.0[a]
Romania	8.6	9.1	9.4	9.3	9.6	9.6
Northern Europe						
Denmark[k]	9.7	9.9	10.0	10.1	10.6	9.9[a]
Finland	9.3	9.7	9.6	9.3	9.5	9.4[a]
Ireland[d]	11.8	11.4	11.2	10.6	10.5	10.5[a]
Norway	9.5	9.7	10.0	10.0	10.0	9.7[a]
Sweden	10.0	10.2	10.3	10.8	11.0	10.7[a]
United Kingdom	11.8	11.7	11.9	11.8	12.2	11.7
England and Wales	11.8	11.6	11.9	11.8	12.2	. . .
Northern Ireland[d]	10.8	10.6	11.0	10.7	11.1	. . .
Scotland[d]	12.1	12.0	12.3	12.1	12.5	. . .
Southern Europe[l]						
Albania	9.8	8.3	8.1[g]	. . .	. . .	. . .
Cyprus[m]	7.5	7.2	9.5	7.9	8.6	9.0
Greece	7.8	8.1	8.5	8.9	8.9	8.9[a]
Israel[n]	6.0	6.6	7.4	7.1	6.8	6.8[a]
Italy	9.8	9.9	9.7	9.9[a]	9.7[a]	9.6[a]
Malta	8.7	9.3	9.1	8.8	9.0	8.9[a]
Portugal	10.8	10.9	11.0	10.4	10.5	. . .
Spain[o]	8.8	8.7	8.6	8.4[a]	8.0[a]	7.7[a]
Yugoslavia	9.4	8.8	8.8	8.7	8.5	8.4
Western Europe						
Austria	12.5	13.0	12.8	12.8	12.7	12.2[a]
Belgium	12.2	12.4	12.2	12.2	12.1	11.4[a]
France	11.2	11.1	10.6	10.6[a]	10.5[a]	10.1[a]
Germany, Federal Republic of[j]	11.4	11.8	11.9	12.1	11.9	11.5
Luxembourg	11.9	12.3	12.1	12.2	12.6	11.5[a]
Netherlands	7.8	8.1	8.3	8.3	8.3	7.9[a]
Switzerland	9.5	9.3	9.1	8.7	9.0	8.7[a]
Oceania						
Australia-New Zealand						
Australia[d]	8.7	8.9	8.7	7.9	8.1	7.7[a]
New Zealand[d]	8.9	8.7	8.5	8.1	8.2	. . .
USSR	7.2	7.6	8.5	9.3	9.5	9.7

[g] For 1970-1971.

[h] Deaths of Indian and Negro population living in tribes are excluded but rates are computed on total population.

[i] Prior to 1965 data tabulated by year of registration rather than occurrence.

[j] The data relating to the Federal Republic of Germany and the German Democratic Republic include the relevant data relating to Berlin for which separate data have not been supplied. This is without prejudice to any question of status which may be involved.

[k] Excluding Faeroe Islands and Greenland.

[l] Including Cyprus and Israel, which are currently included in the region of Western South Asia.

[m] Rates computed from data including upward adjustment based on experience of 1952-1954.

[n] Beginning in 1970, including East Jerusalem.

[o] Excluding Ceuta and Melilla.

TABLE 27. RANKING OF MORE DEVELOPED COUNTRIES ACCORDING TO LIFE EXPECTANCY AT BIRTH, MALES AND FEMALES, 1970s

(Years)

	Males				Females		
Rank	Country	Period	Life expectancy at birth	Rank	Country	Period	Life expectancy at birth
1.	Japan	1977	72.7	1.	Norway	1975-1976	78.1
2.	Sweden	1976	72.1	2.	Japan	1977	78.0
3.	Norway	1975-1976	71.9	3.	Sweden	1976	77.9
4.	Iceland	1971-1975	71.6	4.	Iceland	1971-1975	77.5
5.	Netherlands	1971-1975	71.2	5.	Netherlands	1971-1975	77.2
6.	Denmark	1975-1976	71.1	6.	France	1974	76.9
7.	Israel	1975	70.3	7.	Denmark	1975-1976	76.8
8.	Switzerland	1968-1973	70.3	8.	United States of America	1976	76.7
9.	Greece	1970	70.1	9.	Canada	1970-1972	76.4
10.	Cyprus	1973	70.0	10.	Switzerland	1968-1973	76.2
11.	Spain	1970	69.7	11.	Finland	1975	75.9
12.	United Kingdom England and Wales	1974-1976	69.6	12.	Australia	1975	75.9
13.	Canada	1970-1972	69.3	13.	United Kingdom England and Wales	1974-1976	75.8
14.	France	1974	69.0	14.	Austria	1976	75.1
15.	United States of America	1976	69.0	15.	Spain	1970	75.0
16.	Italy	1970-1972	69.0	16.	Italy	1970-1972	74.9
17.	Australia	1975	68.9	17.	Germany, Federal Republic of	1974-1976	74.8
18.	German Democratic Republic	1976	68.8	18.	New Zealand	1970-1972	74.6
19.	Bulgaria	1969-1971	68.6	19.	German Democratic Republic	1976	74.4
20.	Ireland	1965-1967	68.6	20.	Poland	1975	74.3
21.	New Zealand	1970-1972	68.6	21.	Belgium	1968-1972	74.2
22.	Germany, Federal Republic of	1974-1976	68.3	22.	USSR	1971-1972	74
23.	Malta	1976	68.3	23.	United Kingdom Scotland	1973-1975	73.9
24.	Austria	1976	68.1	24.	Luxembourg	1971-1973	73.9
25.	Belgium	1968-1972	67.8	25.	Israel	1975	73.9
26.	United Kingdom Scotland	1973-1975	67.4	26.	Bulgaria	1969-1971	73.9
27.	Finland	1975	67.4	27.	Greece	1970	73.6
28.	Romania	1974-1976	67.4	28.	Czechoslovakia	1977	73.6[a]
29.	Poland	1975	67.0	29.	Malta	1976	73.1
30.	Luxembourg	1971-1973	67.0	30.	Cyprus	1973	72.9
31.	United Kingdom Northern Ireland	1974-1976	66.8	31.	Ireland	1965-1967	72.9
32.	Czechoslovakia	1977	66.7[a]	32.	Hungary	1974	72.4
33.	Hungary	1974	66.5	33.	Portugal	1974	72.0
34.	Albania	1969-1970	66.5	34.	Romania	1974-1976	72.0
35.	Yugoslavia	1970-1972	65.4	35.	United Kingdom Northern Ireland	1974-1976	70.7
36.	Portugal	1974	65.3	36.	Albania	1969-1970	70.4
37.	USSR	1971-1972	64	37.	Yugoslavia	1970-1972	70.2

Sources: Files of the United Nations Statistical Office and official publications of the countries concerned.

[a] Provisional.

In order to illustrate over-all changes in expectation of life at birth among the more developed countries, the data in table 27 are shown graphically with the corresponding figures for the same countries around 1950 (see figure II). As can be seen, there was a marked upward shift in the range of life expectancy values between the two dates, as well as the emergence of a bi-modal distribution of male and female values. In the mid-1970s there was a high degree of concentration of life expectancy values within each sex, the range being nine years for males and females alike, with little overlap between the sexes. In 16 of the 37 countries, male life expectancies were 67 or 68 years; and in the same number of countries, female life expectancies were 73 or 74 years. By contrast, in the earlier period the range was much broader, from 52 to 73 years; and the area of overlap between the sexes was 16 years, from 54 to 69 years.

Changes in levels and trends of mortality during the 1970s are more difficult to assess than the net changes since 1950. Life expectancies are available for at least two dates beginning with 1970 for only 25 of the 37 countries discussed previously (see table 28). For many of the 25 countries there are too few observations over a long enough period to do more than suggest recent tendencies and any generalizations made must be tentative. On balance, female life expectancies appear to have increased in more countries than have male. In about half of the countries, the fluctuations in male life expectancies arguably show no discernible trends and the same is true for females in, perhaps, seven of the 25 countries. The Eastern and Southern European countries and the Soviet Union predominate among the group of countries showing no trend for both males and females. Within the varying time periods, Japan and the United

Figure II. Frequency distributions of life expectancies at birth, males and females, 37 more developed countries, around 1950 and mid-1970s
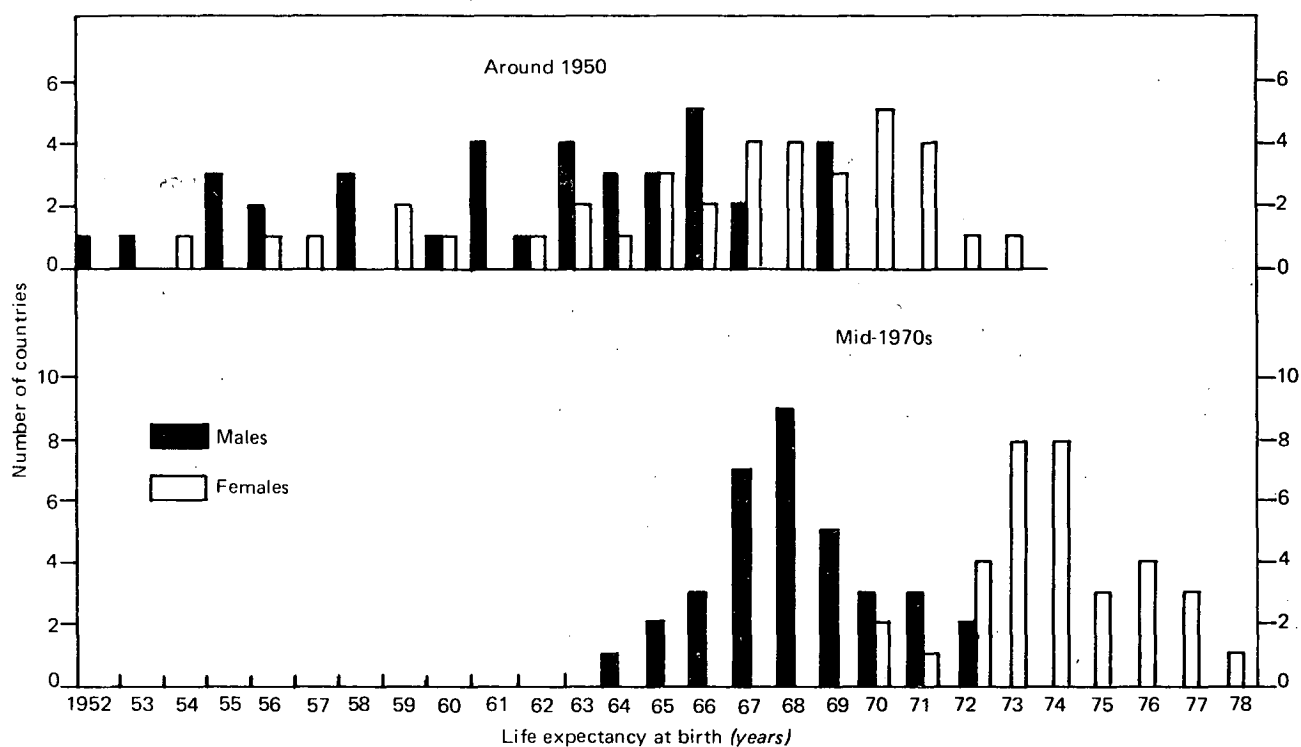
States of America had the largest absolute increases in life expectancy for both males (3.4 and 1.9 years, respectively) and females (3.3 and 2.1 years). Since Japan had already achieved an exceptionally high life expectancy at the beginning of the decade, its subsequent progress suggests that limits to life expectancy in developed countries may still not have been reached. Judging from a comparison of the data from the earlier and more recent date for each of the countries in table 28, female life expectancies increased by slightly more than male life expectancies. The average female life expectancy at the earlier date was 6.1 years higher than the average male life expectancy. At the more recent date the average had risen to 6.3 years. The countries in table 28, of course, are not a representative sample of the more developed countries. On the basis of changes in the age-specific death rates for a larger number of countries (see text given below and tables 32 and 33), it would appear that the gap between male and female mortality has widened by more during the 1970s than the life expectancies indicate.

Age patterns of mortality

Age curves of mortality for low-mortality countries are J-shaped, with the relatively high death rates for the first year of life marking the left-hand boundary of the "J" hook. The death rates decline rapidly during the early years of life and reach a low point between the ages of 10 and 12 years.

There is a steep rise in rates at 15-19 years, followed by a flattening of the curve. In the late twenties or early thirties the rates begin to increase again, gradually at first and then more rapidly. Death rates similar to those of infancy are reached again, typically, by around 55-59 years of age among males, but not until 60-64 years or even later among females.

The median patterns of age-specific death rates for 33 more developed countries around 1970 and 35 countries at mid-decade are given in table 29. The medians for the mid-1970s are elevated above the levels they would be otherwise by the inclusion of data from Luxembourg and the Soviet Union, both of which had higher than average age-specific death rates, so the two pairs of medians are not strictly compara3le. Their comparability is also affected by the exclusion of incompatible data from the Soviet Union for the age groups under 5 years and over 70 years. Nevertheless, with only two insignificant exceptions, the medians for the mid-1970s, for each sex, are lower than those for the beginning of the decade. The exceptions are males in the age group 50-54 years, for whom the slightly higher rate for the mid-1970s is clearly within the normal limits of fluctuation for stable or slowly changing rates in either direction, and females in the age group 15-19 years, where the two median rates show no change.

At almost all ages the median rates changed more rapidly for females than for males, indicating that females continue

| Major area, region and country | Period | Life expectancy at birth | |
		Males	Females
Northern America			
United States			
of America	1970	67.1	74.8
	1976	69.0	76.7
East Asia			
Japan	1970	69.3	74.7
	1977	72.7	78.0
Europe			
Eastern Europe			
Czechoslovakia	1970	66.2	72.9
	1977[a]	66.7	73.6
German Democratic			
Republic	1976	68.1	73.3
	1970	68.8	74.4
Hungary	1970	66.3	72.1
	1974	66.5	72.4
Poland	1970-1972	66.8	73.8
	1975	67.0	74.3
Romania	1970-1972	66.3	70.9
	1974-1976	67.4	72.0
Northern Europe			
Denmark	1970-1971	70.7	75.9
	1975-1976	71.1	76.8
Finland	1971	65.9	74.2
	1975	67.4	75.9
Iceland	1971-1975	71.6	77.5
	1975-1976	73.0	79.2
Norway	1971-1972	71.2	77.4
	1975-1976	71.9	78.1
Sweden	1970-1974	72.1	77.5
	1976	72.1	77.9
United Kingdom			
England and Wales	1970-1972	68.9	75.1
	1974-1976	69.6	75.8
Northern Ireland	1970-1972	67.6	73.7
	1973-1975	67.2	73.6
Scotland	1970-1972	67.2	73.5
	1973-1975	67.4	73.9
Southern Europe[b]			
Israel	1972	70.1	72.8
	1975	70.3	73.9
Malta	1970-1972	68.6	73.1
	1976	68.3	73.1
Portugal	1970	65.3	71.0
	1974	65.3	72.0
Yugoslavia	1970-1971	65.3	70.1
	1970-1972	65.6	70.4
Western Europe			
Austria	1970	66.3	73.5
	1976	68.1	75.1
France	1970	68.6	76.1
	1974	69.0	76.9
Germany, Federal			
Republic of	1970-1972	67.4	73.8
	1974-1976	68.3	74.8
Netherlands	1970	70.7	76.5
	1971-1975	71.2	77.2
Oceania			
Australia-New Zealand			
Australia	1970-1972	67.8	74.5
	1975	68.9	75.9
USSR	1968-1971	64.6	73.5
	1971-1972	64	74

to be the major beneficiaries of additional reductions in mortality. For both sexes, the youngest benefited the most, proportionally as well as absolutely. The percentage reduction in median mortality for male children was about eight times greater than the average for men in the age groups from 30 to 44 years. The relative decline in median female child mortality was only about twice the average for women in their twenties. In so far as measured by the median rates, it would appear that men between 30 and 54 years of age have scarcely shared in the general reductions in mortality levels that have occurred so far during the 1970s.

The range of age-specific death rates among these countries is presented in table 30. At the youngest and oldest ages for each sex, Sweden and the United States of America, respectively, had the lowest rates. The highest rates in the same age categories were those of Portugal, Romania and Yugoslavia. At other ages, most of the minimum death rates came from Norway, the Netherlands, Switzerland and Japan, while about half of the maximum rates were from the Soviet Union. In general, the relative difference between maximum and minimum rates diminished for each sex with advancing age. The maximum varied from five to six times the minimum during the early years of life and dropped to less than twice the minimum between 40 and 60 years of age. For males, there was a pronounced increase in the relative range of rates between 25 and 39 years of age, when the highest national level of male mortality exceeded the lowest by a factor of around four.

In table 31, the age-specific rates for a date around 1975 are expressed as percentages of the corresponding rates around 1970. The percentages in table 31 may be summarized by classifying them in the following manner: (a) a percentage of from 97 to 103 may be considered to reflect no change; (b) percentages of 104 and more show increasing age-specific death rates; (c) percentages from 91 to 96 mark a slight decline in age-specific rates; (d) those from 81 to 90 show a moderate decline; and (e) percentages of 80 or less denote a large decline in age-specific death rates (see table 32). In the most general of terms, the magnitude and ubiquity of recent reductions in age-specific death rates varied inversely with age. In this sense, recent changes show much the same age pattern as the current differentials just described. Thus, the most impressive improvements during recent years have been made in the four youngest age groups. In from 19 to 24 countries, age-specific death rates for infancy and early childhood declined by at least 20 per cent. For the groups from 5 to 14 years of age, from 20 to 25 countries showed reductions in age-specific death rates of 10 per cent or more. From 40 years of age through the remainder of the life span, the recorded age-specific death rates declined in fewer countries and the relative size of reductions was smaller. In almost every age group, beginning with 40 years of age, a majority of the percentages for each sex showed a reduction of less than 10 per cent in age-specific death rates.

Despite the similarities just pointed out, some important differences are evident in table 32 between recent changes in male and female death rates. In relatively few instances did female rates show an increase, but there was some

TABLE 29. MEDIAN AGE-SPECIFIC DEATH RATES, MORE DEVELOPED COUNTRIES, AROUND 1970 AND MID-1970S
(Deaths under one year per 100,000 live births, deaths at other ages per
100,000 population of the appropriate sex-age category)

Age group	Around 1970[a]		Mid-1970s[b]		Percentage change from 1970 to mid-1970s	
	Males	Females	Males	Females	Males	Females
Under 1	2 237	1 752	1 860	1 406	−16.9	−19.7
1-4	101	80	83	66	−17.8	−17.5
5-9	54	34	43	30	−20.4	−11.8
10-14	45	28	40	24	−11.1	−14.3
15-19	110	45	104	45	−5.5	0.0
20-24	145	53	138	49	−4.8	−7.5
25-29	143	63	136	58	−4.9	−7.9
30-34	162	90	158	79	−2.5	−12.2
35-39	223	134	218	116	−2.2	−13.4
40-44	348	211	339	196	−2.6	−7.1
45-49	559	336	556	316	−0.5	−6.0
50-54	911	519	913	489	+0.2	−5.8
55-59	1 523	791	1 444	752	−5.2	−4.9
60-64	2 506	1 310	2 283	1 183	−5.3	−9.7
65-69	4 032	2 239	3 751	1 962	−7.0	−12.4
70-74	6 235	3 883	5 868	3 495	−5.9	−10.0
75-79	9 813	6 724	9 556	6 279	−2.6	−6.6
80-84	14 718	10 980	14 619	10 943	−0.7	−0.3
85+	23 569	20 842	22 852	20 087	−3.0	−3.6

Source: Compiled mainly from data provided by the World Health Organization.
[a] Data are medians of rates for 33 countries: all countries listed in Table 31, excluding the Union of Soviet Socialist Republics.
[b] Data are medians of rates for 35 countries: those listed in table 31, plus Luxembourg.

deterioration in male mortality over a broad span of age groups. Death rates for males increased in five or more countries within each of the groups between the ages of 15 and 55 years, and for those of 80 years or more. The most striking feature of changes in female mortality, as contrasted to male, was the continued, and sizable, improvement in the middle and older ages. At least 10 countries showed improvements of 10 per cent or more at these ages. However, large reductions at older ages translate into only small gains in life expectancy at birth.

As mentioned above, life expectancy at birth for females exceeds that of males by an average of over six years in the more developed countries. Such a differential reflects not only the fact that, almost without exception, the age-specific death rates for males are higher than for females at all ages, but also that they are often substantially higher. In table 33, the ratios of male to female age-specific death rates are summarized for 30 more developed countries at dates around 1970 and 1975. The most interesting feature of this table is the way in which ratios increase from birth to around 20 years of age and then decrease. The range of ratios is also narrowest at the youngest and oldest ages. During the working years, at both dates, male death rates averaged about twice the female rates, or more. In the young adult ages male risks were even higher. At both dates, male rates were more than 2.5 times female rates in the 20-24 age group in a majority of countries.

A comparison of the two distributions in table 33 highlights some of the changes that have occurred during the 1970s. During the period, an increase has occurred in the number of countries in which male death rates above the age of 20 years were at least twice as high as female rates. This

reflects the continued more rapid improvement in female mortality in the adult ages.

Causes of death

The shape of the age curve of mortality is determined by the levels of mortality that prevail at each age for the various causes of death. Currently, among infants the most important group of causes of death in the more developed countries comprise the so-called "endogenous" causes, which are the causes related to the pre-natal and early neonatal environments and to the birth process. Also, as in the past, influenza and pneumonia are important causes of infant deaths, especially in those more developed countries where infant mortality remains high—for example, in Portugal and Yugoslavia. After the first year of life, and continuing to the twenties, accidents are usually the leading cause of death for both males and females, with malignant neoplasms generally in second place.

With adulthood, the patterns of causes of death for men and women begin to differ significantly. At ages 20-24, male death rates are three or more times the female rates in many countries. Accidents of all kinds, but particularly motor-vehicle accidents, play a leading role in this phenomenon. Throughout the twenties, accidents continue to inflate male death rates; but in the thirties, cardio-vascular diseases and malignant neoplasms supersede accidents as the leading causes of death among men. From then to the end of the life span, cardio-vascular diseases are usually followed by malignant neoplasms as the two leading causes of deaths among men. During early middle age, death rates from cardio-vascular diseases are roughly from two to three times

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higher for males than for females. Thereafter, the ratio diminishes but never reaches unity.

Among females, malignant neoplasms emerge as the leading cause of death during the twenties, followed by either accidents or cardio-vascular diseases. Neoplasms remain the leading cause of death up to the fifties or sixties, while cardio-vascular diseases assume an increasing proportion of the total. By the fifties or sixties, cardio-vascular diseases become the leading cause of death, with malignant neoplasms in second place. This pattern persists to the end of the life span. During early middle age, age-specific death rates for malignant neoplasms are somewhat higher for women than for men, but male death rates from malignant neoplasms eventually exceed those for women at more advanced ages.

The causes of death responsible for continuing international differences in mortality among developed countries are indicated in table 30, which lists the causes accounting for 15 per cent or more of the difference in death rates between countries having the highest and lowest rates for a particular age and sex group. Among infants, two disease groups accounted for more than half of the variation between Sweden and Portugal for males, and between Sweden and Yugoslavia for females. The first disease group, designated "certain diseases of early infancy", includes mortality arising from conditions of the pre-natal environment as well as the birth process, but excludes congenital malformations, which are also an important cause of death among infants. "Certain diseases of early infancy" accounted for slightly more than 25 per cent of the variation. Mortality from the second disease group—influenza, pneumonia and bronchitis—accounted for another 25 per cent of the variation.

For the age group 1-4 years, Sweden had the lowest mortality and Romania had the highest for both sexes. The leading cause of death for this age group in Sweden was accidents; but in Romania, it was influenza, pneumonia and bronchitis. The latter disease group accounted for around two fifths of the total variation between the two countries, with accidents accounting for one fourth of the variation.

From 5 to 34 years of age, accidents were the leading cause of death among males and accounted for the largest portion of the variation between the countries with the lowest and highest death rates at each age. Among females, malignant neoplasms alternated with accidents as the leading cause of death at these ages; however, below the age of 30 years, accidents accounted for the largest portion of the variation among female death rates.

From 35 to 44 years of age, as at younger ages, accidents contributed most of the difference between lowest and highest rates for males, but thereafter cardio-vascular diseases accounted for the largest portion of the variation. From 55 to 79 years of age, cancer of the respiratory system (trachea, bronchus and lung) becomes an important cause of variation, accounting for 17-26 per cent of the difference between the lowest and highest death rates. However, although male mortality from cancer of the respiratory system was much greater among countries having the highest death rates than among those with the lowest death rates, mortality from other malignant neoplasms tended to be of similar magnitude in both groups of countries. Influenza, pneumonia and bronchitis, which were important causes of variation in the two youngest age groups, become prominent again at the end of the life span. At ages from 70 to 84 years, they accounted for roughly 25-35 per cent of the range between the highest and lowest countries.

Although neoplasms were the leading causes of death for females from 25 to 64 years of age in the countries with the lowest death rates, and from 30 to 49 years of age in the countries with the highest, in no case did they account for the largest portion of the difference between the lowest and highest death rates. From age 30 onward cardio-vascular diseases contributed the most to the variation between the lowest and highest death rates for females. Malignant neoplasms were the second most important cause of variation from 35 to 64 years of age; and influenza, pneumonia and bronchitis were important causes of variation at ages from 75 to 84, accounting for some 30 per cent of the difference.

Because they are so prominent a cause of death, cardio-vascular (including cerebro-vascular) diseases deserve special attention. One of the most noteworthy features of recent mortality trends has been the very substantial reduction in cardio-vascular disease mortality achieved by some of the more developed countries. Age-standardized death rates from these diseases in the late 1960s and around 1975 for the age group 35 years and over, and the percentage change between those dates, are given for selected more developed countries in table 34. Since the rates were standardized to the population at the earlier date for each country, they can be used to measure change within countries but they cannot be used for intercountry comparisons.

During recent years, the greatest relative reductions in the cardio-vascular disease death rates among males occurred in Japan and the United States. Between the late 1960s and the mid-1970s these rates dropped by about 22 and 17 per cent, respectively (see table 34). The United States also showed the largest decline for female rates (22 per cent). The percentage decline in the cardio-vascular death rate for Japanese women was 17, ranking third among the more developed countries listed in table 34. It will be recalled that over roughly the same period Japan and the United States also achieved the largest recorded gains in life expectancy at birth. Although it would be necessary to decompose all changes in mortality by cause in order to attribute precisely the shares of life expectancy increases resulting from changes in different causes of death, it is clear that reductions in mortality from cardio-vascular diseases have made an important contribution to the substantial gain in life expectancy in both countries. Decreases in mortality from this group of diseases also had a favourable effect on life expectancy in a number of other countries, including Australia, Belgium and Italy, where the age-standardized cardio-vascular death rate for males fell by 10 per cent or more; and the 13 countries (see table 34) in which female rates declined by 10 per cent or more. As can be seen, the relative reductions in female rates were much more pervasive and generally larger.

Of the countries included in table 34, only Bulgaria, Czechoslovakia, Poland and Yugoslavia appear not to have benefited from a reduction in cardio-vascular mortality dur-

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TABLE 30. RANGE OF AGE-SPECIFIC DEATH RATES, MORE DEVELOPED COUNTRIES, MID-1970s, AND CAUSES OF DEATH
RESPONSIBLE FOR GREATEST PERCENTAGES OF DIFFERENCES

*(Deaths under one year per 100,000 live births, deaths at other ages per 100,000 population
of the appropriate sex/age category)*

Age group	Lowest		Highest[a]		Cause(s) of death[b] responsible for greatest differences in death rates between "lowest" and "highest" countries and percentage[c] of difference accounted for by given cause
	Rate	Country	Rate	Country	
Males					
Under 1[d]	906	Sweden	4 286	Portugal	Certain diseases of early infancy (30); influenza, pneumonia and bronchitis (25)
1-4[d]	44	Sweden	208	Romania	Influenza etc. (43), accidents (26)[e]
5-9	33	Hungary	86	Portugal	Accidents (38), influenza etc. (18)
10-14	29	Japan	67	Portugal	Accidents (57)
15-19	80	Sweden	164	Canada	Accidents (90)
20-24	96	England and Wales	250	USSR (Portugal, 230)	Accidents (68)
25-29	82	Netherlands	310	USSR (Portugal, 210)	Accidents (58)
30-34	97	Netherlands	440	USSR (Portugal, 258)	Accidents (46)
35-39	140	Netherlands	540	USSR (Portugal, 353)	Accidents (37)
40-44	236	Netherlands	740	USSR (Portugal, 509)	Accidents (30)
45-49	432	Sweden	970	USSR (Finland, 859)	Cardio-vascular diseases (69), accidents (20)
50-54	634	Japan	1 390	USSR (Finland, 1 293)	Cardio-vascular diseases (75)
55-59	1 039	Japan	1 950	USSR (Finland, 1 989)	Cardio-vascular diseases (77), respiratory cancer (17)
60-64	1 681	Japan	2 972	Finland	Cardio-vascular diseases (77), respiratory cancer (19)
65-69	2 834	Japan	4 632	Scotland	Cardio-vascular diseases (70), respiratory cancer (24)
70-74[d]	5 001	Sweden	7 231	Scotland	Cardio-vascular diseases (48), influenza etc. (29), respiratory cancer (26)
75-79[d]	7 712	Norway	10 931	Czechoslovakia (Scotland, 10 697)	Cardio-vascular diseases (56), influenza etc. (23), respiratory cancer (22)
80-84[d]	11 521	United States of America	17 835	Portugal (Czechoslovakia, 1974, 16 465)	Cardio-vascular diseases (42), influenza etc. (34)
85+[d]	17 984	United States of America	33 841	Portugal (German Democratic, 28 383)	Cardio-vascular diseases (73)
Females					
Under 1[d]	749	Sweden	3 761	Yugoslavia	Certain diseases of early infancy (26); influenza, pneumonia and bronchitis (26)
1-4[d]	31	Sweden	182	Romania	Influenza etc. (42), accidents (25)[e]
5-9	23	Norway, Belgium	59	Portugal	Accidents (27), influenza etc. (16)
10-14	18	Japan, Scotland	40	USSR (Romania, 38)	Accidents (61)[e]
15-19	31	Ireland, Japan	60	USSR (Romania, 60)	Accidents (39)[e]
20-24	35	Denmark	80	USSR (Romania, 77)	Accidents (39)[e]
25-29	41	Norway	95	Romania	Accidents (26), cardio-vascular diseases (17)[e]
30-34	55	Norway	140	USSR (Romania, 111)	Cardio-vascular diseases (24), accidents (22)[e]
35-39	73	Norway	180	USSR (New Zealand, 152)	Cardio-vascular diseases (36), neoplasms (26)
40-44	132	Norway	260	USSR (Hungary, 252)	Cardio-vascular diseases (32), neoplasms (24)
45-49	208	Norway	404	Hungary	Cardio-vascular diseases (38), neoplasms (25)
50-54	367	Switzerland	653	Scotland	Cardio-vascular diseases (49), neoplasms (30)
55-59	546	Switzerland	975	Scotland	Cardio-vascular diseases (61), neoplasms (20)
60-64	854	Switzerland	1 561	Scotland	Cardio-vascular diseases (65), neoplasms (22)
65-69	1 480	Sweden	2 554	Israel	Cardio-vascular diseases (71)
70-74[d]	2 600	Switzerland	4 337	Israel	Cardio-vascular diseases (76)
75-79[d]	4 551	Canada	7 945	Romania	Cardio-vascular diseases (90), influenza etc. (27)[e]
80-84[d]	7 633	United States of America	13 824	Portugal (Romania, 13 761)	Cardio-vascular diseases (86), influenza etc. (30)[e]
85+[d]	14 312	United States of America	25 907	Portugal (German Democratic Republic, 24 900)	Cardio-vascular diseases (80)

Sources: World Health Organization, files of the United Nations Statistical Office and official publications of the countries concerned.

NOTES: Ranking excluding Iceland, Luxembourg and Malta because of the small numbers of deaths per annum. Excluding Greece because of implausibly low rates for certain sex/age categories. Unless otherwise indicated, rates pertain to the more recent of the two periods indicated for each country listed in table 31.

[a] Countries outside parentheses are those with the highest death rates for the given age group. When cause-of-death data were not available for countries with the highest death rates or when a large proportion of total deaths was in the residual category, suitable substitutes were selected for the cause-of-death analysis presented in the last column. The names of these countries, with the death rates, are given in parentheses.

[b] The specified cause-of-death groups pertain to items of the International Classification of Diseases, 8th revision, List A of 150 causes, as follows: certain diseases of early infancy, items A131-135; influenza,

pneumonia and bronchitis, A89-93; accidents and operations of war, AE138-146, AE150; cardio-vascular diseases (including heart disease, cerebro-vascular disease, hypertensive disease and other diseases of the circulatory system), A80-88; cancer of the respiratory system (trachea, bronchus and lung), A51; all neoplasms (malignant and benign), A45-61.

Where more than one country is listed for a given age group in the "lowest" column, data for the first country listed have been used. Where two countries are listed for a given age group in the "highest" column, data for the country given in parentheses have been used. The sum of the percentages shown for an age group may exceed 100 because of negative contributions from other causes.

[c] Percentages shown in parentheses following cause of death.

[d] Rankings excluding Union of Soviet Socialist Republics, for which data are not available.

[e] For Romania, rate for accidents including deaths from suicide and homicide.

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TABLE 31. CHANGES IN AGE-SPECIFIC DEATH RATES FROM AROUND 1970 TO MID-1970s, MORE DEVELOPED COUNTRIES

(Rates for mid-1970s as percentage of 1970 rates)

Major area, region and country	Period	All ages	Under 1	1-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85+
							Males														
Northern America																					
Canada	1970-1975	100	78	91	89	87	122	112	106	98	103	98	99	98	97	94	93	97	101	98	106
United States of America	1970-1976	93	80	87	85	85	88	89	94	85	83	84	87	86	86	88	88	88	97	100	97
East Asia																					
Japan	1970-1976	89	70	70	67	69	75	78	68	73	72	87	92	80	79	77	76	82	82	88	91
Europe																					
Eastern Europe																					
Bulgaria	1970-1976	113	87	90	90	85	86	94	98	100	102	108	117	116	107	99	100	104	112	110	105
Czechoslovakia	1970-1976	99	95	79	108	83	85	79	90	78	97	104	97	105	96	93	92	95	97	103	105
German Democratic Republic	1970-1976	95	78	72	96	89	104	107	91	104	100	98	105	101	89	94	91	95	101	101	106
Hungary	1970-1976	107	82	68	72	78	89	85	105	111	107	120	119	104	102	97	104	102	101	97	
Poland	1970-1976	110	72	77	87	85	102	105	102	114	116	114	122	118	100	100	99	96	104	92	82
Romania	1970-1976	100	62	84	76	81	88	87	85	85	99	100	111	99	97	95	95	94	98	105	109
Northern Europe																					
Denmark	1969-1970–1975-1976	105	69	84	77	95	101	104	113	88	102	104	96	111	101	100	98	97	105	100	103
Finland	1969-1970–1975-1976	98	73	69	91	86	108	122	103	81	83	84	90	91	85	91	92	88	92	87	88
Iceland	1965-1969–1972-1976	99	75	92	56	78	73	77	83	83	114	97	109	93	111	96	96	100	89	83	93
Ireland	1968-1970–1973-1975	96	92	106	83	97	108	113	107	99	107	100	95	109	95	96	97	101	98	106	97
Norway	1969-1970–1975-1976	99	78	75	72	103	100	97	100	73	96	84	94	97	96	97	91	95	98	98	96
Sweden	1970-1976	112	72	69	76	97	85	104	104	93	112	103	104	106	108	102	104	105	107	107	107
United Kingdom																					
England and Wales	1970-1976	102	79	100	87	86	97	100	98	94	101	90	93	99	92	93	92	95	98	102	98
Northern Ireland	1968-1970–1973-1975	103	81	77	113	129	217	205	175	169	129	107	107	116	103	99	100	99	104	111	131
Scotland	1969-1970–1975-1976	100	78	77	84	93	103	97	91	101	94	96	102	97	95	94	96	96	100	108	96
Southern Europe[a]																					
Greece	1969-1970–1975-1976	104	79	79	91	91	104	107	108	105	94	95	92	89	100	96	92	96	97	100	86
Israel	1969-1971–1973-1975	102	98	92	75	105	79	70	75	78	89	98	98	101	104	93	95	95	96	101	102
Italy	1970-1974	99	76	72	79	79	89	88	86	91	91	92	101	101	97	92	90	90	95	102	103
Malta	1965-1969–1970-1974	101	75	33	118	82	101	104	182	109	95	86	90	105	90	99	95	102	89	93	88
Portugal	1971-1975	93	78	58	77	85	110	131	105	105	103	105	103	104	92	98	93	86	91	99	102
Spain	1970-1974	103	67	52	91	95	97	94	90	95	97	99	95	103	102	100	105	107	104	98	96
Yugoslavia	1970-1975	96	73	73	86	82	88	89	94	92	91	94	93	95	92	93	92	90	95	104	99
Western Europe																					
Austria	1970-1976	91	69	77	59	71	96	88	102	112	71	99	100	98	90	82	85	91	95	95	97
Belgium	1970-1975	98	76	87	80	82	101	106	88	97	86	92	94	95	91	91	95	100	101	105	100
France	1970-1974	99	81	96	88	100	109	104	89	89	92	101	107	105	100	96	96	99	100	95	99
Germany, Federal Republic of	1970-1976	96	73	74	73	75	93	88	83	92	96	98	102	97	92	89	90	93	97	99[a]	96
Netherlands	1970-1976	99	81	74	66	73	81	90	86	89	91	93	101	93	91	95	99	102	102	102	98
Switzerland	1969-1970–1975-1976	97	72	73	68	67	98	99	95	81	79	91	92	90	88	88	89	87	92	90	96
Oceania																					
Australia-New Zealand																					
Australia	1970-1975	88	79	79	77	95	102	90	92	93	87	91	95	91	88	86	82	87	81	87	91
New Zealand	1968-1970–1973-1975	94	94	84	91	100	117	103	95	86	91	92	100	101	99	96	94	97	91	94	98
USSR[b]	1969-1970–1975-1976	115	—126—		100	83	100	106	95	107	103	113	115	107	115	105	102	———99———			

Females

Northern America																					
Canada	1970-1975	101	82	89	92	91	104	102	95	85	95	97	102	92	94	95	92	94	95	89	84
United States of America	1970-1976	97	81	84	85	83	85	85	83	80	75	81	85	87	90	92	82	84	93	90	81
East Asia																					
Japan	1970-1976	92	71	71	75	72	70	75	68	73	73	75	78	77	76	74	74	79[b]	81	87	89
Europe																					
Eastern Europe																					
Bulgaria	1970-1976	109	85	96	95	117	77	100	83	100	90	95	95	101	95	100	99	93	105	105	104
Czechoslovakia	1970-1976	100	93	72	106	80	75	79	85	88	84	92	89	95	92	91	91	90	93	96	101
German Democratic Republic	1970-1976	102	72	77	94	100	98	92	93	88	83	92	91	95	90	92	92	93	92	95	102
Hungary	1970-1976	108	85	68	82	96	112	94	101	109	103	109	111	112	106	104	97	96	94	96	98
Poland	1970-1976	106	71	70	97	80	95	81	88	92	93	97	95	99	97	94	93	90	100	82	77
Romania	1970-1976	101	65	78	86	90	94	88	97	87	86	95	94	90	93	94	93	90	98	100	108
Northern Europe																					
Denmark	1969-1970–1975-1976	105	73	74	84	92	73	76	88	86	83	95	103	100	104	94	91	89	93	90	98
Finland	1969-1970–1975-1976	94	68	79	70	91	91	87	92	85	88	89	79	85	88	79	81	79	79	80	81
Iceland	1965-1969–1972-1976	92	82	136	133	68	91	75	108	66	101	80	77	85	104	91	83	88	84	80	83
Ireland	1968-1970–1973-1975	96	82	89	77	79	69	98	92	80	93	83	94	94	96	93	96	100	95	101	101
Norway	1969-1970–1975-1976	100	87	74	74	113	90	90	111	102	74	84	81	102	94	93	86	84	89	90	100
Sweden	1970-1976	109	80	76	67	95	96	109	106	114	96	99	87	91	95	95	90	93	93	95	103
United Kingdom																					
England and Wales	1970-1976	106	77	71	89	88	100	91	94	97	92	90	93	101	98	99	93	94	97	102	99
Northern Ireland	1968-1970–1973-1975	104	96	118	82	88	196	135	81	107	94	93	97	94	101	98	92	93	98	111	107
Scotland	1969-1970–1975-1976	102	79	83	80	69	97	96	100	91	95	96	88	94	96	102	94	90	89	97	96
Southern Europe[a]																					
Greece	1969-1970–1975-1976	106	76	76	82	96	92	102	86	87	90	87	91	85	93	92	92	92	97	104	83
Israel	1969-1971–1973-1975	104	98	99	100	85	98	92	87	94	101	91	98	88	93	98	93	96	99	93	104
Italy	1970-1974	99	74	65	82	77	86	80	81	88	84	90	91	91	94	88	88	86	91	98	105
Malta	1965-1969–1970-1974	99	81	58	146	167	111	103	97	64	82	87	84	96	87	97	83	99	83	89	89
Portugal	1971-1975	88	78	57	77	77	98	86	76	79	82	92	90	94	88	85	86	81	85	96	102
Spain	1970-1974	102	66	49	97	90	92	85	85	89	86	93	97	94	96	99	94	105	100	104	94
Yugoslavia	1970-1975	98	70	66	98	81	87	84	81	86	90	92	92	93	92	90	96	86	99	103	104
Western Europe																					
Austria	1970-1976	98	72	65	82	81	77	98	93	102	80	86	85	95	89	84	85	84	90	96	100
Belgium	1970-1975	100	78	76	68	77	110	100	92	87	89	93	93	100	95	88	89	92	94	98	98
France	1970-1974	98	80	91	91	96	102	97	90	98	86	93	96	94	96	92	92	93	92	97	97
Germany, Federal Republic of	1970-1976	101	74	74	76	81	100	94	86	93	85	88	87	90	92	88	86	86	88	90	94
Netherlands	1970-1976	98	88	73	97	85	80	87	86	91	83	90	88	90	89	85	88	85	88	87	92
Switzerland	1969-1970–1975-1976	94	69	73	74	85	100	88	92	93	88	85	82	83	83	81	80	78	80	83	90
Oceania																					
Australia-New Zealand																					
Australia	1970-1975	87	81	83	79	70	91	88	75	84	79	87	90	85	88	85	85	81	80	83	87
New Zealand	1968-1970–1973-1975	95	88	97	94	93	113	106	98	92	97	98	88	94	94	105	92	94	91	92	98
USSR[c]	1969-1970–1975-1976	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...

Source: Percentages computed mainly from data provided by the World Health Organization.

[a] Including Israel, which is currently included in the region of Western South Asia.

[b] For both sexes.

[c] Not available separately; data for both sexes are shown in "males" section of table.

| | Males | | | | | Females | | | | |
| | Size of decrease | | | | Increase (4 per cent or more) | Size of decrease | | | | Increase (4 per cent or more) |
Age group	20 per cent and over	10-19 per cent	4-9 per cent	No change		20 per cent and over	10-19 per cent	4-9 per cent	No change	
Under 1	24	6	2	1	—	19	11	1	2	—
1-4	21	6	3	2	1	22	5	1	3	2
5-9	16	9	4	1	3	11	9	5	5	3
10-14	8	13	5	5	2	10	11	5	4	3
15-19	3	9	1	13	7	7	4	7	10	5
20-24	4	9	2	9	9	5	11	5	9	3
25-29	2	10	7	7	7	3	14	8	5	3
30-34	4	9	7	6	7	6	12	7	5	3
35-39	3	5	8	11	6	5	17	6	5	—
40-44	—	6	8	14	5	2	13	12	4	2
45-49	—	3	10	12	8	3	13	10	6	1
50-54	1	3	6	13	10	1	10	14	7	1
55-59	1	7	8	14	3	1	9	13	9	1
60-64	1	5	12	15	—	2	9	13	8	1
65-69	1	6	14	11	1	2	13	14	4	—
70-74	—	8	8	15	2	3	15	10	4	1
75-79	—	4	7	19	3	2	10	12	8	1
80-84	—	5	5	16	7	2	11	5	13	2
85+	—	3	4	19	7	1	9	3	17	3

NOTE: Tabulation is for countries, dates and percentages presented in table 31 but excluding the Union of Soviet Socialist Republics. Percentage changes from 97 to 103 are classified here as "no change"

| | Around 1970 | | | | | | | | Mid-1970s | | | | | | | |
Age group	Less than 1.00	1.00-1.24	1.25-1.49	1.50-1.74	1.75-1.99	2.00-2.49	2.50-2.99	3.00 and over	Less than 1.00	1.00-1.24	1.25-1.49	1.50-1.74	1.75-1.99	2.00-2.49	2.50-2.99	3.00 and over
Under 1	—	5	25	—	—	—	—	—	—	8	22	—	—	—	—	—
1-4	1	15	12	2	—	—	—	—	—	11	17	2	—	—	—	—
5-9	—	—	12	16	1	1	—	—	—	3	15	9	2	1	—	—
10-14	—	2	4	19	3	2	—	—	—	—	3	21	5	1	—	—
15-19	—	—	—	—	3	13	13	1	—	—	—	1	2	13	11	3
20-24	—	—	—	—	2	11	10	7	—	—	—	—	1	8	9	12
25-29	—	—	—	3	8	13	6	—	—	—	—	2	5	13	7	3
30-34	—	—	2	9	9	7	3	—	—	—	1	6	11	9	2	1
35-39	—	—	6	13	5	5	1	—	—	—	3	9	9	7	2	—
40-44	—	—	4	13	7	5	1	—	—	—	4	9	11	5	1	—
45-49	—	—	7	10	9	3	1	—	—	—	3	7	12	7	—	1
50-54	—	1	2	11	12	3	1	—	—	—	1	7	14	7	1	—
55-59	—	—	1	5	12	11	1	—	—	—	1	3	12	13	1	—
60-64	—	—	1	5	8	16	—	—	—	—	1	5	9	14	1	—
65-69	—	—	2	5	17	6	—	—	—	—	1	5	12	12	—	—
70-74	—	1	5	18	6	—	—	—	—	1	4	9	14	2	—	—
75-79	—	—	11	15	4	—	—	—	—	3	10	17	—	—	—	—
80-84	—	17	13	—	—	—	—	—	—	6	21	3	—	—	—	—
85+	2	25	3	—	—	—	—	—	1	23	6	—	—	—	—	—

Source: Compiled mainly from data provided by the World Health Organization.

ing recent years. However, the apparent large increases in the Yugoslav death rates may be artifacts. The proportion of all deaths allocated to the residual category of "symptoms and ill-defined conditions" declined substantially in Yugoslavia during the period. It is possible that a proportion of deaths that would have been so classified at the earlier date were more properly attributed to cardio-vascular diseases in 1975, and that this attribution contributed at least part of the registered increase in the death rate from these causes. The same explanation does not appear to be applicable to the large increase in rates for Bulgarian males. Consequently, further investigation is required to identify the causes for that increase and to determine if it was real.

It is beyond the scope of this report to explain the recent reductions in deaths from cardio-vascular diseases in many of the more developed countries. For females, these reduc-

TABLE 34.   AGE-STANDARDIZED DEATH RATES FOR CARDIO-VASCULAR DISEASES, POPULATION AGED 35 YEARS OR OVER, SELECTED MORE DEVELOPED COUNTRIES, LATE 1960s AND MID-1970s

(Deaths per 100,000 population aged 35 years or over)

Major area, region and country	Dates	Males			Females		
		Rates		Percentage change in rates	Rates		Percentage change in rates
		Earlier date	More recent date		Earlier date	More recent date	
Northern America							
Canada	1969, 1974	1 108	1 071	− 3.3	795	703	− 11.6
United States of America	1968, 1975	1 427	1 189	− 16.7	1 067	829	− 22.3
East Asia							
Japan	1968, 1976	776	606	− 21.9	622	516	− 17.0
Europe							
Eastern Europe							
Bulgaria	1968, 1976	803	1 016	+ 26.5	905	983	+ 8.6
Czechoslovakia	1968, 1974	1 133	1 211	+ 6.9	1 048	1 075	+ 2.6
Hungary	1969, 1976	1 309	1 278	− 2.4	1 207	1 111	− 8.0
Poland	1969, 1976	799	875	+ 9.5	701	727	+ 3.7
Romania	1969, 1976	1 014	999	− 1.5	1 112	1 046	− 5.9
Northern Europe							
Denmark	1969-1970, 1975-1976	1 174	1 171	− 0.3	887	798	− 10.0
Finland	1969-1970, 1973-1974	1 359	1 259	− 7.4	1 092	914	− 16.3
Norway	1969-1970, 1975-1976	1 191	1 098	− 7.8	907	802	− 11.6
Sweden	1969, 1976	1 189	1 181	− 0.7	972	836	− 14.0
United Kingdom							
England and Wales	1968, 1976	1 267	1 172	− 7.5	1 169	1 033	− 11.6
Southern Europe							
Italy	1968, 1974	1 040	932	− 10.4	969	844	− 12.9
Yugoslavia	1968, 1975	679	817	+ 20.3	685	795	+ 16.1
Western Europe							
Austria	1969, 1976	1 341	1 306	− 2.6	1 208	1 139	− 5.7
Belgium	1968, 1975	1 284	1 118	− 12.9	1 089	897	− 17.6
France	1968, 1974	911	831	− 8.8	856	775	− 9.5
Germany, Federal Republic of	1968, 1975	1 093	1 062	− 2.8	848	779	− 8.1
Netherlands	1969-1970, 1975-1976	1 009	981	− 2.8	775	669	− 13.7
Switzerland	1969-1970, 1975-1976	1 236	1 183	− 4.3	686	575	− 16.2
Oceania							
Australia-New Zealand							
Australia	1969, 1975	1 230	1 086	− 11.7	1 056	907	− 14.1

Source: Compiled from sex-age-cause specific death rates provided by the World Health Organization.

NOTE: Rates for cardio-vascular diseases pertain to items A80-A88 of the International Classification of Diseases, 8th revision, list "A" of 150 causes, and include heart disease, cerebro-vascular disease, hypertensive disease and other diseases of the circulatory system. Rates for each country are standardized to the population of the country at the earlier of the two dates shown.

TABLE 35.   LIFE EXPECTANCY AT SELECTED AGES, BY SEX, COUNTRIES OF NORTHERN AFRICA, SINCE 1960

(Years)

Country	Year	Male life expectancy at age:				Female life expectancy at age:			
		0	5	10	60	0	5	10	60
Algeria	1966	50.2	58.4	54.8	14.6	53.8	61.7	58.0	16.6
Egypt	1960	48.3	58.2	55.5	16.2	49.4	59.9	57.3	17.3
	1965	49.3	59.6	57.2	17.3	50.1	61.9	59.5	18.7
Libyan Arab Jamahiriya	1972	49.7	57.7	53.9	14.4	51.3	59.1	55.3	15.9
Morocco	1970	47.6	56.6	52.7	14.0	49.4	57.0	53.2	13.9
Tunisia	1968	52.2	59.6	55.4	13.6	50.1	58.3	54.1	13.2

Sources: Data taken from the following publications and documents of the Cairo Demographic Centre: Hussein Al-Baradei and K. E. Vaidyanathan, "Trends and differentials of mortality in Algeria, 1948, 1970", Doc. CDC/S75/15, 1975; V. G. Valaoras and others, *Population Analysis of Egypt 1935-1970 (With Special Reference to Mortality)*, Occasional Paper, No. 1 (Cairo, 1973); Mahmoud Issa, "Estimation of mortality level in Libya, 1972", Doc. CDC/S75/5, 1975; Laila Nawar and K. E. Vaidyanathan, "Trends and differentials in mortality in Morocco", Doc. CDC/S75/10, 1975; Ali B. Taher Ouni and S. Zaghloul Amin, "An analysis of mortality in Tunisia, 1968", Doc. CDC/S75/13, 1975.

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tions continue a long-standing trend. For males, however, they reflect in a number of countries a cessation or reversal of what had been upward trends in cardio-vascular mortality. Among the factors mentioned as contributing to the favourable trends have been improvements in identification and treatment of patients in high-risk categories. Particularly noteworthy has been the extensive deployment of drug therapy for patients with high blood pressure. At the same time, publicity concerning the adverse effects of physical inactivity, cigarette smoking, obesity and consumption of animal fats may have led many people to change personal habits in beneficial ways.

B. Less developed countries

Africa

Africa is as diverse a continent in terms of demographic statistics as it is in other ways. However, generally speaking, the information available for Northern Africa is far more complete and reliable than it is for the remainder of the continent. For this reason, it is convenient to treat each part separately. Northern Africa is discussed first, followed by sub-Saharan Africa.

Northern Africa

In Northern Africa, death registration is nearly complete in only two countries—Egypt and Tunisia. A comparison of registered deaths with survey-based information suggests that an inflation factor of at least 1.5 should be applied to registered deaths in Algeria, the Libyan Arab Jamahiriya and Morocco, whereas very little adjustment appears needed in Egypt and Tunisia. When adjusted, the crude death rates for these five countries fall in the range of from 15 to 20 deaths per 1,000 population.

Reliable estimates of life expectancy at birth cannot be made for the Sudan during recent years. However, it is assumed that life expectancy in the Sudan is at least several years lower than in the other countries of Northern Africa and it can be safely said that during the early 1970s it remained below 50 years. As shown in table 35, average national life expectancies for the other five countries of Northern Africa at the most recent dates available hovered around 50 years at birth. Assuming some progress since the dates of estimation, it can be concluded that, except for the Sudan, average life expectancies in Northern Africa by the mid-1970s had reached the medium mortality range of from 50 to 60 years. The data for Egypt suggest that progress in reducing mortality has been quite slow; and if they are representative of Northern Africa, life expectancies at birth probably had not reached 55 years by the mid-1970s.

For the most part, age-specific death rates for males are higher than those for females in the countries of Northern Africa. But at one point during the reproductive years, the data for Algeria, the Libyan Arab Jamahiriya and Morocco show death rates higher for women than for men. The difference is small enough to be attributed to the poor quality of the data, but the fact that the estimated rates during the ages from 20 to 49 are so similar for each sex in all three countries suggests that, although female mortality as a whole may not exceed male mortality, female death rates are uncommonly high for reasons related to childbearing.

In the two countries for which the data are best, Egypt and Tunisia, sharply contrasting patterns are found for all ages over 5 years. In Egypt, the excess in male mortality at all ages is very similar to that found in the more developed countries and in Latin America, and the changes in rates from 1960 to 1965 indicate a more rapid decrease in male than in female mortality. Data for Tunisia, on the other hand, show a higher female than male mortality at nearly all ages. During the reproductive ages, the ratios of male to female death rates for Tunisia are close to the reciprocals of the ratios for Egypt. For the age group from 20 to 49, the average Egyptian male death rate in 1965 was about 35 per cent higher than the female, whereas the average female death rate for Tunisia in 1968 was about 25 per cent higher than the male.[2] Female mortality was high enough in Tunisia to produce a female life expectancy that was lower than that of males at all ages. In Tunisia, female life expectancy at birth was two years less than male life expectancy; but in Egypt female life expectancy at birth remained slightly higher than that of males (table 35).

In Northern Africa, mortality during infancy and early childhood is less variable than mortality at the other ages appears to be. The estimates for Algeria, the Libyan Arab Jamahiriya and Morocco show the predictable pattern of higher male than female mortality during infancy. However, the more reliable data for Egypt and Tunisia, which differed so much at other ages, show male and female mortality during infancy to have been virtually the same. Similarly, estimates for mortality between ages 1 and 4 years in Algeria and Morocco give nearly the same death rates for each sex as one would find in model life tables. But in Egypt, the Libyan Arab Jamahiriya and Tunisia, female mortality exceeds male mortality during early childhood by a significant margin of approximately 25 per cent. The excessive female mortality during infancy and early childhood in these countries probably reflects the consequences of preferential treatment given to male children. Judging from mortality rates, males continue to receive significantly preferential treatment throughout life only in Tunisia.

Estimated and adjusted infant mortality rates for the most recent dates available from 1965 to 1972, range from about 125 in Egypt and Tunisia to 152 in Morocco, for males; and from 121 in Algeria to 131 in Egypt for females (see table 36). It is likely that there has been some recent improvement in infant mortality rates during the 1970s and that the average rate for each country has fallen below 125. Data are not available for the Sudan but it may be assumed that infant mortality rates have been higher there than elsewhere in Northern Africa.

Historically, at life expectancies of about 50 years at birth, early childhood mortality rates in more developed countries have averaged from 40 to 70 per cent of infant mortality rates. For the most part, the percentages for the

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[2] For documentation and additional discussion, see *Levels and Trends of Mortality Since 1950* (United Nations publication, forthcoming).

Country	Year	Males			Females		
		(1) Infant mortality rate $(1,000_1 q_0)$	(2) Early childhood rates: ages 1-4 years[a] (X 1,000)	Col. (2) as percentage of Col. (1)	(1) Infant mortality rate $(1,000_1 q_0)$	(2) Early childhood rates: ages 1-4 years[a] (X 1,000)	Col. (2) as percentage of Col. (1)
Algeria	1966	135	87	65	121	86	71
Egypt	1960	126	119	95	130	131	101
	1965	128	131	103	131	143	109
Libyan Arab Jamahiriya	1972	148	74	50	129	87	67
Morocco	1970	152	95	63	120	100	83
Tunisia	1968	124	80	64	124	100	81

Sources: Data taken from the following publications and documents of the Cairo Demographic Centre: Hussein Al-Baradei and K. E. Vaidyanathan, "Trends and differentials of mortality in Algeria", Doc. CDC/S75/15, 1975; V. G. Valaoras, *Population Analysis of Egypt 1935-1970 (With Special Reference to Mortality)*, Occasional Paper, No. 1 (Cairo, 1973); Mahmoud Issa, "Estimation of mortality level in Libya, 1972", Doc.

CDC/S75/5, 1975; Laila Nawar and K. E. Vaidyanathan, "Trends and differentials of mortality in "Morocco", Doc. CDC/S75/10, 1975; Ali B. Taher Ouni and S. Zaghloul Amin, "An analysis of mortality in Tunisia, 1968", Doc. CDC/S75/13, 1975.

[a] Probability of death before age 5 for a child aged 1 year.

five countries of Northern Africa for which data are given in table 36 fall within the same range. Egypt is the notable exception: there the probabilities of dying between the first and fifth birthday have been approximately equal to the probabilities of dying during infancy. Presumably, the high mortality between 1 and 4 years of age is primarily a consequence of the continued heavy toll taken by the infectious and parasitic diseases after weaning, but the exact causes of such high early childhood mortality rates have not been investigated thoroughly. Neither have differences between Northern Africa and historical experience in those other parts of the world where it is well documented. High early-childhood mortality rates have been found in parts of sub-Saharan Africa and in Asia, but they have not been documented on as large a scale as in Northern Africa. Existing model life tables and indirect methods of estimating mortality cannot serve well where Northern African patterns of mortality during the first five years of life prevail.

Socio-economic and urban-rural differentials in mortality were discussed briefly in the previous report on monitoring.[3] No new information has been found which treats the period since 1970, and there is nothing new to add to what was already known. The largest volume of research published during recent years has dealt with Algeria; and like previously published materials, it shows the familiar patterns of higher mortality in rural than in urban areas and an inverse relationship between mortality levels and socio-economic status—the lowest mortality associated with the highest socio-economic status, and vice versa.

Sub-Saharan Africa

The direct measurement of mortality for all but a few, unrepresentative areas in sub-Saharan Africa (namely, Mauritius, Réunion and Cape Verde) has not yet become possible. Consequently, levels, trends and patterns have so far been estimated by indirect or inferential means. None of the techniques used is fully satisfactory, and in the absence

of hard data for a significant portion of the populations involved, it is impossible to gauge either the accuracy or the comparability of the various estimates. The principal data that provide country level or nationally representative information are summarized in table 37. These data may be considered to be the best estimates currently available. Almost all of them are based on one or another of the indirect methods of estimating mortality levels which were spawned from a technique originally developed by William Brass.[4] These methods estimate the numbers of survivors to various ages in particular birth cohorts. The figures given in table 37 show the estimated number of children surviving to age 2 on the basis of the number of children reportedly ever born to women who gave their age as between 20 and 24 years, inclusive, and the number of their children reported to be still alive at the time of the census or survey interview. The margin of error in such estimates may be significant due to errors in the statements of age, number of children ever born, number of children still living; and, in addition, to the fertility pattern assumed and the population reference model selected, not to mention sampling errors, faulty census coverage etc. It follows that the figures given in table 37 must not be taken literally. Furthermore, within any five-year period, only a small fraction of the sub-Saharan population is represented and within the whole 25-year period there are no data in any way covering a full half of the estimated total population in 1970. Southern Africa is especially under-represented in the estimates.

Estimates for two points in time are available for only six countries, which account for a bare 17 per cent of the sub-Saharan population, and only four of the six sets of estimates produce credible trends. When fitted to the Coale and Demeny North models,[5] the values for the United Republic of Tanzania imply an annual gain of two years in life expectancy at birth during the six-year period from 1967 to 1973—or a more than 4 per cent annual rate of increase in life expectancy, which is implausibly rapid. Likewise, the

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[3] *World Population Trends and Policies, 1977 Monitoring Report*, vol. I, *Population Trends* (United Nations publication, Sales No. E.78.XIII.3), hereinafter referred to as *1977 Monitoring Report*.

[4] William Brass and others, *The Demography of Tropical Africa* (Princeton, New Jersey, Princeton University Press, 1968), chap. 3.

[5] Ansley J. Coale and Paul Demeny, *Regional Model Life Tables and Stable Populations* (Princeton, New Jersey, Princeton University Press, 1966).

TABLE 37. CHILD SURVIVAL IN SUB-SAHARAN AFRICA, 1950-1975

Region and country	Period	Probability of dying during first two years of life $(1,000\,{}_2q_0)$	Region and country	Period	Probability of dying during first two years of life $(1,000\,{}_2q_0)$
Eastern Africa			Gabon	1960/1961	206
Burundi	1952-1957	204	Zaire	1955-1957	208
Kenya	1962	171	Southern Africa		
	1969	151	Botswana	1971	130
Madagascar	1966	136	Lesotho	1966	140
Malawi	1970	347	Swaziland	1966	202
Mozambique	1950	271	Western Africa		
Rwanda	1952-1957	204	Benin	1961	281
	1970	1952	Ghana	1960	194
Uganda	1959	220	Guinea	1954/1955	312
	1969	162	Guinea-Bissau	1950	272
United Republic of			Liberia	1970	245
Tanzania	1967	197		1974	149
	1973	115	Mali	1956/1958	300
Zambia	1969	171		1960/1961	298
			Mauritania	1964/1965	240
Middle Africa			Niger	1960	269
Central African Empire	1959/1960	273	Sierra Leone	1973	316
Chad	1964	252	Togo	1961	262
Congo	1960/1961	225	Upper Volta	1960/1961	340

Source: Prepared by the Population Division of the Department of International Economic and Social Affairs of the United Nations Secretariat.

Liberian estimates imply an annual growth in life expectancy of three and a quarter years in the four-year period from 1970 to 1974. These figures would have life expectancy "mushrooming" in Liberia at an annual rate of 8 per cent. If the figures for those two countries are dismissed, one is left with the estimates for three countries in Eastern Africa (Kenya, Rwanda and Uganda) and one in Western Africa (Mali) upon which to base an analysis and interpretation of time trends in mortality in sub-Saharan Africa. The four countries contain a bare 11 per cent of the estimated sub-Saharan population. The estimates for Mali bridge a very short time span, less than five years. Perhaps, surprisingly, in light of the other data, the two estimates for Mali do not differ significantly and no trend can be inferred from them. The estimates for the three Eastern African countries span the period from 1954 to 1970. From these estimates it may be inferred that there was a moderately paced mortality decline between the late 1950s and 1970, but nothing can be said about the period since 1970. However, the sizable error likely in the data for both Liberia and the United Republic of Tanzania suggests by extension that none of the data justifies conclusions about mortality trends in the region. The fact that five of six countries with available data show mortality declines and that no rise is recorded anywhere is, perhaps, the strongest inference that can be drawn about trends from this flimsy web of evidence.

Data presented in table 37 are plotted in figure III. Linear regression lines relating $q(2)$ to date of observation for each of the four regions and for all of the data for sub-Saharan Africa are given in figure IV. The correlation coefficients, except that for Southern Africa which is based on only three data points, are all less than 0.200. The line for Middle Africa has mortality increasing during the period from 1950

to 1978, and it has the same correlation coefficient as the line for all of the data for sub-Saharan Africa. Of the other three regional lines, only the one for Eastern Africa can be said to be credible in terms of the life expectancies in model life tables associated with the probabilities of dying during the first two years of life. If the regression line for all sub-Saharan Africa can be taken seriously, the probability of dying during the first two years of life declined moderately during the period. In the North model life tables,[6] the probabilities of dying imply an increase in life expectancy at birth of from about 31.5 years in 1950 to about 41.5 years in 1970, and by extrapolation, to about 45.5 years in 1978. According to this standard, life expectancy increased during the period at an over-all average of about 1.3 per cent per annum. In absolute terms, the regression line and the North models imply that life expectancy increased at about 0.5 year per annum, but at somewhat higher average annual rate at the beginning of the period (1.53 per cent between 1950 and 1955) than at the end of the period (1.17 per cent between 1970 and 1975).

If mortality during the first two years of life had changed at a constant rate during the period since 1950, and if the data in table 37 were correct, the exponential curve showing its decline would be the one given by the broken line in figure III. This curve gives a slightly better fit to the data in table 37 than does the regression line, and in some respects it may be more believable. Over all, the life expectancies at birth in the North models which are associated with the exponential curve increased at an average annual rate of 1.5 per cent between 1950 and 1978. At the beginning of the period life expectancy at birth was about 31 years. In 1970,

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[6] Ibid.

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it would have been about 43 years; and in 1978, 47 years. Life expectancy at birth would have increased at about 0.6 year per annum during the early 1950s but at about 0.5 year per annum during the period since 1970. Both these results and those derived from the regression line mentioned above have the virtue of at least being consistent with both the levels and the time trends in mortality that demographers have commonly assumed to have prevailed.

In view of the paucity of data on trends in African mortality, it is useful to examine developments in some of its most important precipitating factors. Many of these developments suggest that optimism about mortality trends is not warranted. The index of agricultural production in Nigeria, the most populous country in Africa, has been declining in recent years. Food prices at Lagos apparently increased by more than 50 per cent just in the year ending November 1975, continuing a price inflation of earlier years that had been more gradual. By July 1975, "the price of such things as beef, poultry and pigs had gone up to such a level that it had become almost impossible for the low-income groups to afford them", and authorities were beginning to predict the development of "a famine situation unknown in Nigeria's

living memory".[7] Nevertheless, figures published by the Nigerian Central Bank show that the consumer price index increased from 236 at the beginning of 1975 to 342 by the middle of 1976 (1960 = 100). Food prices alone reportedly climbed from 294 to 457 during the same period. In acknowledging that "the food supply in general is inadequate in terms both of quantity and quality," the Government had, none the less, stated in 1975 that it did not expect the situation to change substantially between then and 1980.[8]

For years, the World Food Conference and the World Food Council have warned that agricultural production in Africa is falling ever further behind needs and demand. Few countries appear to have been unaffected by the combination of declining production and inflation. The consequence is that in many places the level of living is reportedly declining. One report suggests that in Zaire it has dropped precipitously since 1963; and in 1977, the World Bank reported that "the average *per capita* consumption has declined since 1971. Even in 1980 the *per capita* consumption level will not recover to the peak of 1971".[9] Similarly, medical

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[7] *New African Development*, vol. 10, No. 3 (March 1976), pp. 236-237.

[8] Citations from *New African Development*, vol. 10, No. 12 (December 1976). p. 1329.

[9] International Bank for Reconstruction and Development. Eastern Africa Regional Office, Report No. 1407-ZR. 13 April 1977.

Figure III. Estimated national probabilities of dying during the first two years of life, sub-Saharan Africa, 1950-1975
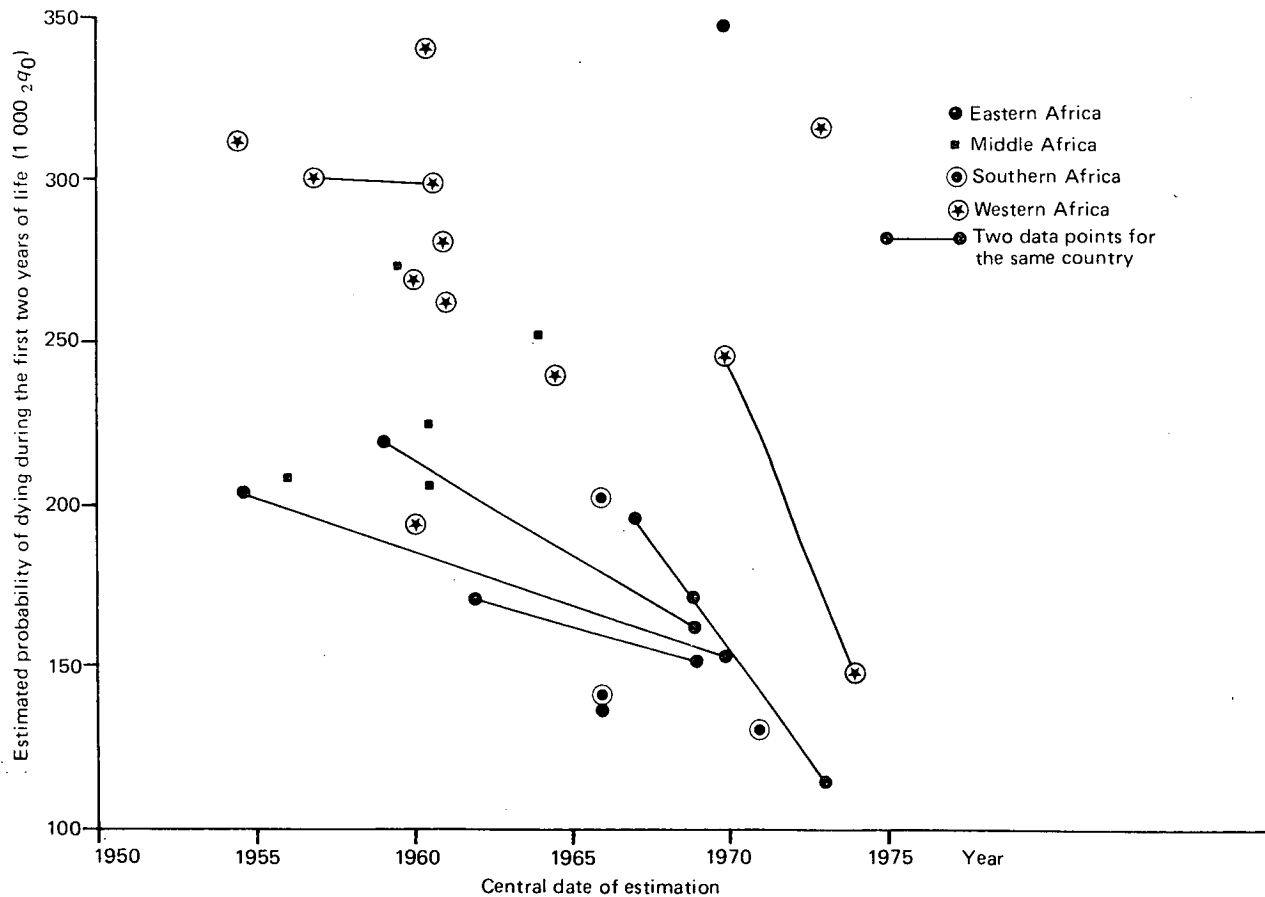
Figure IV. Linear regression lines for childhood mortality, sub-Saharan Africa, 1950-1978

Plotted regression lines (estimated probability of dying during the first two years of life, $1\,000\,_2q_0$, versus Year Y):

Western Africa: $1\,000\,_2q_0 = 6\,089 - 2.967Y$ $(r^2 = 0.1557)$

Middle Africa: $1\,000\,_2q_0 = 4.239Y - 8\,075$ $(r^2 = 0.1739)$

Southern Africa: $1\,000\,_2q_0 = 16\,289 - 8.198Y$ $(r^2 = 0.3682)$

Sub-Saharan Africa:
(1) $1\,000\,_2q_0 = 8\,271 - 4.099Y$ $(r^2 = 0.1740)$
(2) $1\,000\,_2q_0 = (9.512 \times 10^{20})e^{-0.0219Y}$ $(r^2 = 0.2272)$

Eastern Africa: $1\,000\,_2q_0 = 6\,246 - 3.092Y$ $(r^2 = 0.1350)$
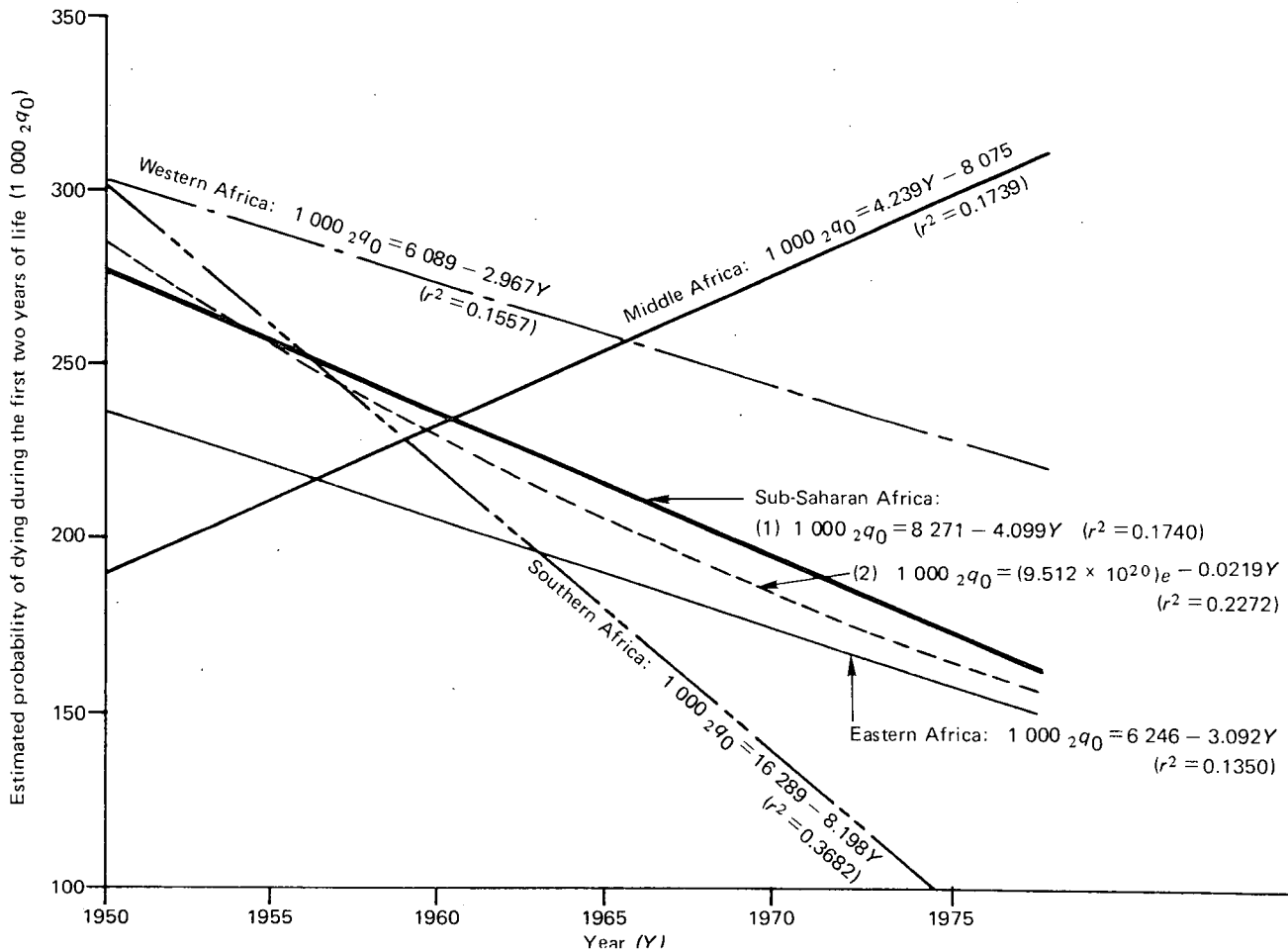
Source: Based on data given in table 37.

services in Kenya appear to have become less adequate than in the past and demand is greater for them. Thus, it is estimated that in 1976/77, 90 per cent of all physicians were located in urban areas, leaving only about 100 to take care of the more than 10 million people in the rural areas. "In many rural areas, it is not unusual to find a health centre which only three years ago catered for 20,000 people now caring for 66,000 people."[10]

Reports such as those cited above are numerous and come from virtually every country of sub-Saharan Africa. None demonstrates or substantiates directly either a cessation of mortality decline or a recent increase. However, taken collectively, they indicate that health and mortality conditions in much of the continent have probably not improved significantly during the past decade. But the picture is not clearly perceived. Even in the cases where droughts and other natural catastrophes have caused famines and threats of famines, it is uncertain just how much mortality as a whole was increased or what the long-term morbidity and mortality impact of these events may be or may have been.[11]

There is no basis for assuming that the age sex, urban rural and socio-economic differentials in sub-Saharan Africa are different in kind from those found in other parts of the world.[12] It may be assumed that male mortality generally exceeds female mortality at all or nearly all ages, that rural mortality is commonly higher than urban and that mortality decreases as one moves up the socio-economic ladder in each African society. It may be that the development of a highly educated upper class and of urban health facilities has increased the gap between urban and rural mortality and between the mortality of the highest and lowest classes of society, but data to substantiate this idea do not exist.

Asia

This discussion of mortality in the major area of Asia excludes Cyprus, Israel, Turkey and Japan, which are discussed with the more developed countries. For all the

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[10] *New African Development*, vol. 11 (April 1977), p. 317.

[11] See, for example, John C. Caldwell, *The Sahelian Drought and Its Demographic Implications*, OLC Paper No. 8 (Washington, D.C., American Council on Education, 1975).

[12] Differentials in mortality are discussed in *1977 Monitoring Report* and there is nothing new to be added at this time. Differentials are also discussed in *Levels and Trends of Mortality Since 1950* (United Nations publication, forthcoming).

largest countries of Asia—indeed, for over 98 per cent of the population of Asia—vital registration systems are so deficient that estimates of mortality must be based on survey data and indirect measures. These measures are considered accurate only within rather large margins of error and it follows that both levels and trends cannot always be determined with certainty. Age patterns of mortality are all but impossible to ascertain satisfactorily by indirect methods, even in the most tenuous of terms. Consequently, perhaps a disproportionate amount of the discussion deals with the relatively few countries that have better than average data, which may not be as representative of mortality in Asia as is desirable.

General levels and trends

The range of mortality in Asia around 1975 may be conveniently if arbitrarily represented by placing countries into one of three groups: a low-mortality group in which life expectancy at birth for both sexes is 60 years or more; a medium-level group in which life expectancy appears to be between 50 and 60 years; and a high-mortality group in which life expectancy is estimated to be less than 50 years. Using this classification, table 38 shows six of 23 countries for which estimates are available to be low-mortality areas. Another six fall into the medium category and 11 must be characterized as high-mortality areas. No recent estimates are available for another eight countries, which may, none the less, be classified with some degree of certainty. China, the Democratic People's Republic of Korea, Iran and Mongolia would appear to fall in the medium-mortality category; and Afghanistan, Bhutan, the Lao People's Democratic Republic and Viet Nam probably rank among the high-mortality areas. In this way, it is possible to account for a total of 31 countries and territories (three of which, however, are parts of Malaysia).

It is possible to estimate changes in mortality since the 1950s for 18 of the countries mentioned above or listed in table 38. About half of the estimates are subject to fairly large error, but mortality levels declined in 14 of the 18 countries, and it is likely that some fall in mortality occurred during the past quarter of a century in most parts of Asia. Of the countries for which there are data, there is no clear indication of a decline in mortality in Afghanistan, Bangladesh, Democratic Kampuchea and the Lao People's Democratic Republic.

Assessing changes in mortality trends during the past quarter of a century requires three rather than two observations. These changes can be examined in only the nine countries given in table 39, for which data are available for at least three points in time. For a number of these countries, it is necessary to rely upon data of uncertain quality. The figures for Nepal, Sri Lanka and Thailand show a more rapid decline in mortality during the earlier than during the later periods. In contrast, the figures for urban Burma and the Philippines indicate an acceleration in the decline of mortality during the more recent period. The Indian data are especially useful to illustrate the uncertainty of trend analysis because either an acceleration or deceleration in life expectancy gains can be inferred, depending upon which set of estimates is chosen. In this case, the figures showing a more rapid increase in life expectancy during recent years is most compatible with the timing of public health and developmental programmes known to have been implemented than are the figures showing a recent deceleration in the increase in life expectancy.[13] As the Indian figures suggest, the data in table 39 as a whole are too scanty to permit useful generalizations for either Asia or its major regions. More and better data might easily provide different trends than those indicated, except in the case of Sri Lanka, where it is quite clear that the increase in life expectancy has slowed almost to a stop in recent years.

Age and sex patterns of mortality

In most other parts of the world, the best available data indicate that age-specific death rates of males are either commonly or universally higher than those for females. However, in a number of high-mortality countries in Asia, many instances of reversal have been observed. Female mortality has sometimes exceeded that of males in early childhood, in the childbearing years or at advanced ages where many women, often widowed, are left without the support of their family. Such excess female mortality existed in Sri Lanka at the beginning of the 1950s; but as life expectancy increased, females benefited disproportionately, with the result that during more recent years the typical pattern of excess male mortality at almost every age has been exhibited in the data. This particular case is well documented and is discussed thoroughly in the *1977 Monitoring Report.*

Most of the examples of higher female than male mortality, even in populations characterized by moderate and high mortality, are limited to a relatively narrow range of ages. Moreover, the differentials are not usually very large; and, as a consequence, the difference does not become apparent in life expectancies at birth, which remain higher for females than for males. In addition, the poor quality of data often raises doubts as to the validity of observed differentials. There are only four countries in Asia where, in the early 1970s, excess female mortality was great enough to reduce female life expectancies at birth below those of males: Iraq; India; Pakistan; and Sabah (in Malaysia).

The reasons for male/female differentials in mortality are uncertain; but it appears that life-styles, occupational hazards and working conditions and culturally circumscribed sex roles contribute as much or more than do biological or generic differences between the sexes. Although the emphasis here has been on excess female mortality, the common feature in Asia as in the rest of the world is for male mortality to exceed female. Also, as in other parts of the world, Asian females seem to benefit disproportionately from general reductions in mortality. Where time series show lower

[13] For further discussion of this point, see Arjun Adlakha and Dudley Kirk, "Vital rates in India, 1961-71, estimated from 1971 census data", *Population Studies*, vol. 28 (1974), pp. 381-400; P. M. Visaria and Anrudh K. Jain, *India*, Country Profiles (New York, The Population Council, 1976); J. P. Ambannavar, *Second India Studies: Population* (Delhi, Macmillan Co. of India, 1975); and P. M. Visaria, "Mortality and fertility in India, 1951-61", *The Milbank Memorial Fund Quarterly*, vol. XLVII, No. 1 (January 1969), pp. 91-116.

TABLE 38. CLASSIFICATION OF COUNTRIES IN ASIA ACCORDING TO BROAD
CATEGORIES OF MORTALITY LEVELS, AROUND 1960 AND EARLY 1970s

Mortality category and country	Date of estimate	Estimated life expectancy at birth (years)			Estimated number of survivors at age 1, 2 or 5 out of every 1,000 live births		
		Both sexes[a]	Males	Females	Both sexes[a]	Males	Females
Low mortality							
Hong Kong[b] ...1971		71	67	75	978[c]	975[c]	981[c]
Kuwait[b] ...1970		69	66	72	956[d]	954[d]	958[d]
					942[e]	940[e]	944[e]
Lebanon[f] ...1975		65	...	...	...	...	...
Malaysia							
Peninsular Malaysia[b] ...1972		66	63	68	963[d]	958[d]	968[d]
					949[e]	944[e]	954[e]
Republic of Korea[g] ...1970		65	63	67	951[d]	945[d]	957[d]
					936[e]	929[e]	943[e]
Singapore[b] ...1970		68	65	70	980[d]	977[d]	982[d]
					975[e]	972[e]	977[e]
Sri Lanka[h] ...1970-1977		66	64	67	946[c]	943[c]	949[c]
Medium mortality							
Malaysia							
Sarawak[b] ...1970		53	52	53	911[d]	902[d]	919[d]
					873[e]	865[e]	881[e]
Iraq[f] ...1972		53	...	...	...	...	...
Jordan[f] ...1972		54	...	...	...	...	...
Philippines[i] ...1973		58-60	...	...	...	...	...
Syrian Arab Republic[b] ...1970		57	54	59	896[d]	890[d]	901[d]
					834[e]	850[e]	817[e]
Thailand[j] ...1969-1971		60	58	61	940[d]	937[d]	942[d]
					906[e]	899[e]	913[e]
High mortality							
Afghanistan[k] ...1972/73		35	34	36			
Bangladesh[l] ...1974		47	46	47	809[c]	801[c]	817[c]
Burma(urban)[m] ...1971		58	56	59	934[d]	930[d]	938[d]
					889[e]	887[d]	891[d]
Democratic Kampuchea[b] ...1958/59		44	44	43	873[d]	873[d]	873[d]
					782[e]	786[e]	777[e]
Democratic Yemen[f] ...1973		42	...	...	...	...	...
India[n] ...1961-1970		46	46	45	840[c]	837[c]	842[c]
Indonesia[o] ...1971		47	45	48	860[d]	848[d]	871[d]
Malaysia							
Sabah[b] ...1970		47	49	45	902[d]	903[d]	901[d]
					857[e]	863[e]	851[e]
Nepal[p] ...1971		45	46	43	...	...	...
Pakistan[q] ...1962/1965		46	47	45	861[d]	862[d]	860[d]
					769[e]	786[e]	752[e]
Saudi Arabia[f] ...1970-1975		45	...	...	...	...	...
Yemen[f] ...1975		38	...	...	...	...	...

NOTE: Low mortality = life expectancy over 60 years;
medium mortality = life expectancy between 50 and 60 years;
high mortality = life expectancy under 50 years.

[a] Simple average of figures for males and females.
[b] *Demographic Yearbook, 1974* (United Nations publication, Sales No. E/F.75.XIII.1).
[c] Survivors to age 2 (l_2).
[d] Survivors to first birthday (l_1).
[e] Survivors to age 5 (l_5).
[f] Economic Commission for Western Asia, *Demographic and Related Socio-Economic Data Sheets for Countries of the Economic Commission for Western Asia* (Beirut, 1978).
[g] Economic and Social Commission for Asia and the Pacific, *Population of Republic of Korea*, Country Monograph Series, No. 2 (E/CN.11/1241) (Bangkok, 1975).
[h] Sri Lanka, Department of Census and Statistics, *Life Tables 1970-1972, Sri Lanka* (Colombo, 1978).
[i] Zelda C. Zablan, "The evaluation of existing mortality estimates: Philippines, 1902-1973", Manila, Population Institute of the University of the Philippines System, 1975.
[j] Economic and Social Commission for Asia and the Pacific, *The Population of Thailand*, Country Monograph Series, No. 3 (ST/ESCAP/18/76) (Bangkok, 1976).
[k] James F. Spitler, *Afghanistan, A Demographic Uncertainty*, International Research Document, No. 6 (Washington, D.C., Bureau of the Census, 1978), pp. 3-7. These estimates are for the settled population. Estimates for the nomadic population would almost certainly lower the estimates given here for the country.
[l] United Kingdom, Ministry of Overseas Development, Population Bureau; and Bangladesh, Ministry of Planning, Census Commission, Statistics Division, *Report on the 1974 Bangladesh Retrospective Survey of Fertility and Mortality* (London and Dacca, 1977);
[m] Burma, Central Statistical Organization, *Statistical Yearbook, 1973* (Rangoon, 1974).
[n] India, Office of the Registrar General, *Life Tables, Census of India, 1971*, Series I, India, Paper 1 of 1977 (New Delhi, 1977).
[o] Lee-Jay Cho and others, *Estimates of Fertility and Mortality in Indonesia, Based on the 1971 Population Census* (Jakarta, Biro Pusat Statistik, 1976).
[p] World Health Organization, South-East Asia Regional Office, Country Health Information Profiles, 1975.
[q] Mohammad Afzal, *The Population of Pakistan*, CICRED Monograph Series, World Population Year 1974 (Islamabad, 1974).

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Country	Period	Males Life expectancy at birth	Males Average annual increment	Females Life expectancy at birth	Females Average annual increment
Burma (urban)	1954[a]	40.8	. . .	43.8	. . .
	1960-1962[a]	45.2	0.63	47.0	0.46
	1971[b]	55.9	1.07	59.1	1.21
Hong Kong	1961[c]	63.6	. . .	70.5	. . .
	1968[d]	66.7	0.44	73.3	0.48
	1971[c]	67.4	0.21	75.0	0.57
India					
Data of Registrar General	1941-1950[e]	32.5	. . .	31.7	. . .
	1951-1960[e]	41.9	0.94	40.6	0.89
	1961-1970[f]	46.4	0.45	44.7	0.41
Data of Visaria, and of					
Adlakha and Kirk	1941-1950[g]	33.3	. . .	32.8	. . .
	1951-1960[g]	37.8	0.45	37.0	0.42
	1961-1970[g]	46.5	0.87	44.5	0.75
Malaysia					
Peninsular Malaysia	1956-1958[h]	55.8	. . .	58.2	. . .
	1969-1971[i]	63.5	0.59	68.2	0.77
	1972[j]	63.4	−0.05	68.0	−0.10
Nepal	1952-1954[k]	25.6	. . .	25.7	. . .
	1961[l]	34.2	1.08	33.4	0.96
	1971[m]	46.0	1.18	42.5	0.91
Philippines[n]	1948	48.8	. . .	53.4	. . .
	1960	51.2	0.20	55.0	0.13
	1970	55.2	0.40	60.9	0.59
Singapore	1956-1958[o]	60.5	. . .	66.6	. . .
	1961-1963[o]	63.3	0.56	69.7	0.62
	1970[j]	65.1	0.23	70.0	0.04
Sri Lanka	1945-1947[p]	46.8	. . .	44.7	. . .
	1950[p]	56.4	2.40	54.8	2.52
	1955[q]	58.1	0.34	57.1	0.45
	1960[q]	61.9	0.76	61.4	0.86
	1965[q]	63.7	0.36	65.0	0.72
	1967[q]	64.8	0.55	66.9	0.95
	1971[r]	64.2	−0.15	67.0	0.02
Thailand	1947[s]	48.5	. . .	51.4	. . .
	1959-1961[s]	53.6	0.40	58.7	0.53
	1964-1965[s]	55.2	0.35	61.8	0.68
	1974-1975[t]	58.0	0.28	64.0	0.22

[a] U Khin Maung Lwin and M. Mya-Tu, *Handbook of Biological Data on Burma,* Special Report Series, No. 3 (Rangoon, Medical Research Institute, 1967).

[b] Burma, Central Statistical Organization, *Statistical Yearbook, 1973* (Rangoon, 1974).

[c] Hong Kong, Census and Statistics Department, *Hong Kong Life Tables 1971-1991* (1973).

[d] *Demographic Yearbook, 1974* (United Nations publication, Sales No. E/F.75.XIII.1).

[e] *Demographic Yearbook, 1957; ibid., 1966* (United Nations publications, Sales Nos. 57.XIII.1 and 67.XIII.1).

[f] India, Office of the Registrar General, *Life Tables, Census of India, 1971,* Series 1, India, Paper 1 of 1977 (New Delhi, 1977).

[g] P. M. Visaria, "Mortality and Fertility in India, 1951-1961", *The Milbank Memorial Fund Quarterly,* vol. XLVII, No. 1 (1969), pp. 110-111; and Arjun Adlakha and Dudley Kirk, "Vital rates in India, 1961-1971, estimated from 1971 census data", *Population Studies,* vol. 28, No. 2 (1974), pp. 381-400.

[h] Lee-Jay Cho, *Life Tables for West Malaysia (1966),* Research Paper No. 2 (Kuala Lumpur, Department of Statistics, West Malaysia, 1969).

[i] R. Chander, ed., *The Population of Malaysia,* CICRED Monograph Series, World Population Year 1974 (Kuala Lumpur, 1974; Paris, 1975).

[j] *Demographic Yearbook, 1974* (United Nations publication, Sales No. E/F.75.XIII.1).

[k] Economic and Social Commission for Asia and the Pacific, *Comparative Study of Mortality Trends in ECAFE Countries,* Asian Population Studies Series, No. 14 (E/CN.11/1108) (Bangkok, 1973).

[l] G. Rama Rao and V. S. Kulkarni, "Derivation of life tables for Nepal by an application of the Coale-Demeny stable population model", Bombay, Demographic Training and Research Centre, 1969 (mimeographed).

[m] World Health Organization, South-East Asia Regional Office, Country Health Information Profiles 1975.

[n] Economic and Social Commission for Asia and the Pacific, *Population of the Philippines,* Country Monograph Series, No. 5 (ST/ESCAP/63/78) (Bangkok, 1978).

[o] Saw Swee-Hock, *Singapore: Population in Transition* (Philadelphia, University of Pennsylvania Press, 1970).

[p] S. J. Somasundram and R. Raja Indra, *Life, Births and Deaths in Ceylon, 1920-1952* (Colombo, Department of the Census and Statistics, 1954).

[q] Ceylon, Department of Census and Statistics, *Life Tables, Ceylon 1962-1967* (Colombo, 1970).

[r] Sri Lanka, Department of Census and Statistics, *Life Tables 1970-1972, Sri Lanka* (Colombo, 1978).

[s] Thailand, Ministry of Public Health, Division of Vital Statistics, *Public Health Statistics, Thailand 1970.*

[t] United States of America, Department of Commerce, Bureau of the Census, *Country Demographic Profiles: Thailand,* ISP-DP-15 (Washington, D. C., 1978).

female than male mortality in the past, for example, the difference has usually increased. As can be seen from the more reliable figures presented in table 39 (those for Hong Kong, Peninsular Malaysia, Singapore and Sri Lanka) female life expectancies exceeded male by from approximately 3 to over 7.5 years in the early 1970s, and the larger differentials were associated with the higher life expectancies at birth.

Infant mortality

Infant mortality deserves special treatment because it is such a sensitive indicator of general health conditions and also because it can serve when necessary as a substitute for, or an index of, life expectancy. Table 40 summarizes the information available on infant mortality in Asia for the period from 1950 to 1975. The table includes a combination of life-table probabilities, rates based on complete vital registration and estimates derived indirectly. Where it is known, the manner in which estimates were derived is indicated in the last column of the table.

China is the major imponderable in any demographic study of East Asia, since it stopped publishing population and vital events data in the late 1950s. From the fragmentary data summarized in table 40, it appears as if both rural and urban mortality were rather high around 1950, but that both had been reduced radically by the second half of the decade. The estimates for Peking, which show a drop from 118 to 35-40 deaths per 1,000 live births between 1940 and 1957, suggest an annual average rate of decline in infant mortality of 7-8 per cent. The implied rural rates of decline are equally impressive. Of the other East Asian countries, only Hong Kong has dependable vital registration data. These data show an average annual decline in infant mortality of 3.3 per cent—from 91.8 deaths per 1,000 live births in 1951 to 15 in 1975. However, these rates may be understated by several points if it is true, as suspected, that infant deaths during the first day of life are under-registered. Indirect estimates for the Republic of Korea show that about 10 per cent of all children born did not survive to their first birthday between 1955 and 1960, but according to an official life table for 1971 the infant mortality rate had been halved by that date.

In Eastern South Asia, only Peninsular Malaysia and Singapore provide "complete" statistics for infant deaths. According to these statistics, the infant mortality rate for Peninsular Malaysia dropped from about 91 in the early 1950s to roughly 35 in 1974, or at an average annual rate of decline of 2.7 per cent. During the same period, the rate for Singapore dropped at an annual rate of 3.6 per cent—from about 69 in the early 1950s to about 14 in 1975. Infant mortality rates for Burma, Indonesia, the Philippines and Thailand are based mainly on survey data because the vital statistics are incomplete. The rates for Burma come from urban vital registration and are necessarily subject to variations in the urban population of the country as well as to fluctuations in deaths that occur in urban areas, which make the data especially difficult to interpret. On the face of it, the official figures show a very high infant mortality rate of 240 in the early 1950s, which fell at an average annual rate

of about 6.8 per cent to about 66 in 1971.[14] The estimates for Indonesia do not indicate a significant change from about 140-145 infant deaths per 1,000 live births during the period covered in table 40. The margin of error in the Philippine data is probably large enough to preclude any statement other than there appears to have been some slight improvement in infant mortality between 1960 and 1973. The estimate for Thailand in 1974/75 (about 56 deaths per 1,000 live births) is approximately half the level estimated for 1947, which implies an average annual decrease of about 2.5 per cent over 27.5 years. For the remaining countries of Eastern South Asia, no dependable information exists from which to infer either recent or past levels of infant mortality.

It is conservatively estimated that in Middle South Asia, which includes the subcontinent of India, over 4 million of the at least 30 million children born each year die before their first birthday. This works out to be an average infant mortality rate of about 130-135. However, adequate information is available only for Sri Lanka, where but a small fraction of the births and deaths occur. In 1971, the recorded infant mortality rate for Sri Lanka was 44.8, an all-time low; it has since risen to 51.2 (in 1974). This represents an over-all decline of about a third since the early 1950s. Data from the Indian Sample Registration System only cover a four-year period and cannot be used for estimating changes in infant mortality but they do illustrate the existence of a significant urban/rural differential. The intercensal estimates of the actuary's reports show a net decline for male and female infant mortality of only about 10 per cent between the periods 1951-1961 and 1961-1971. At the latter period, the infant mortality rate for India remained very high, approximately 130, which was almost 2.5 times the rate for Sri Lanka during the period 1961-1971.

Estimates of infant mortality in the next two largest countries in Middle South Asia—Pakistan and Bangladesh—are based on sample survey data. They are exceedingly hard to interpret, but it is probably safe to say that on balance they offer no evidence of a significant change in infant mortality since 1960. They appear to have hovered around the level estimated for India around 1960—between 120 and 150. The figures for Iran, as those for India, illustrate the predictable urban/rural differential and also show a substantial decline in infant mortality during the past decade or more. Taken at face value, the estimates for Iran indicate a nearly 50 per cent reduction in infant mortality between 1965 and 1976. As can be seen in table 40, the figures for Afghanistan and Nepal cover a large range; and given the absence of a time series, it is not possible to estimate either the real levels or the recent trends in infant mortality in either country.

The infant mortality rates given in table 40 for the countries of Western South Asia suggest as great a range in levels from country to country as is found in other regions. Only in the case of Kuwait can it be said with any degree of

[14] Rates taken from *Demographic Yearbook, 1966* (United Nations publication, Sales No. 67.XIII.1). However, the Director of Health Services of Burma gives the infant mortality rate for 1949 as 350.6 deaths per 1,000 live births. See *Health Report of 1970* (Rangoon, 1971), p. 114.

TABLE 40. INFANT MORTALITY RATES, ASIA

Major area, region and country	Period	Infant deaths per 1,000 live births $(1,000 \, {}_1q_0)$	Comments
East Asia			
China[a]	Before 1950	125-200	Rural
	1949	118	Peking
	1949	126	Ch'eng-tu
	1956-1958	35-40	Peking
	1955	{ 74	Rural sample
		{ 44	Urban sample
Other East Asia			
Hong Kong[b]	1951	91.8	Registered births and deaths
	1975	15.0	
Republic of Korea	1925-1930[c]	180-250	
	1955[c]	{ 125 (M)	
		{ 103 (F)	
	1971[d]	{ 54.9 (M)	
		{ 43.1 (F)	
South Asia			
Eastern South Asia			
Burma (urban)	1950-1954[b]	240	Registered births and deaths in a varying number of municipal towns
	1965[e]	115	
	1967[e]	64	
	1970[e]	63	
	1973[e]	48	
	1965[e]	{ 147.8 (M)	
		{ 128.4 (F)	
	1971[e]	{ 69.5 (M)	
	1971[e]	{ 61.7 (F)	
Indonesia	1971[f]	143	Implied from 2(2) to 2(3)
	1961[g]	{ 151 (M)	
		{ 136 (F)	
	1971[g]	{ 132 (M)	
		{ 118 (F)	
	1971[h]	{ 152.2 (M)	
		{ 128.9 (F)	
	Latter half of the 1960s[i]	140	Excluding Jakarta, Bali, Kalimantan, Muan, Tenggara, Maluku and West Irian
Malaysia			
Peninsular Malaysia	1950-1954[b]	91	
	1972[b]	{ 43.7 (M)	
		{ 33.2 (F)	
	1974[b]	35.4	
	1973[j]	{ 50.5 (M)	
		{ 38.6 (F)	
Philippines	1960[k]	98-116	Implied values based on q(3) to q(5) and on
	1968[k]	69-81	
	1973[k]	65-72	q(15) to q(35)
Singapore	1950-1954[b]	69.4	
	1975[b]	13.9	

NOTE: (M) = males only; (F) = females only.

[a] J. W. Salaff, "Mortality decline in the People's Republic of China and the United States", *Population Studies*, vol. 27 (1973), pp. 551-576.

[b] *Demographic Yearbook, 1961; ibid., 1966; ibid., 1967; ibid., 1974* (United Nations publications, Sales Nos. 62.XIII.1, 67.XIII.1, E/F.68.XIII.1 and E/F.75.XIII.1), as appropriate.

[c] Tai Hwan Kwan and others, *The Population of Korea*, CICRED Monograph Series, World Population Year 1974 (Seoul, Population and Development Studies Centre, 1974), p. 27.

[d] Economic and Social Commission for Asia and the Pacific, *Population of the Republic of Korea*, Country Monograph Series, No. 2 (E/CN.11/241) (Bangkok, 1975), p. 176.

[e] Burma, Central Statistical Organization, *Statistical Yearbook, 1973* (Rangoon, 1974).

[f] Geoffrey McNicoll and Si Gde Made Mamas, *The Demographic Situation in Indonesia*, Papers of the East-West Population Institute, No. 28 (Honolulu, East-West Center, 1973).

[g] United States of America, Department of Commerce, Bureau of the Census, *Levels and Trends of Mortality in Indonesia, 1961-1971*, International Research Document, No. 2 (Washington, D.C., 1975).

[h] Lee-Jay Cho and others, *Estimates of Fertility and Mortality in Indonesia, Based on the 1971 Population Census* (Jakarta, Biro Pusat Statistik, 1976).

[i] P. F. McDonald, M. Yasin and G. Jones, *Levels and Trends in Fertility and Childhood Mortality in Indonesia*, Indonesian Fertility-Mortality Survey 1973, Monograph No. 1 (Jakarta, Universitas Indonesia, 1976).

[j] World Fertility Survey, *The Malaysian Fertility and Family Survey, 1974* (Kuala Lumpur, Department of Statistics and National Family Planning Board, 1977).

[k] Mercedes B. Concepción and P. C. Smith, *The Demographic Situation in the Philippines: An Assessment in 1977*, Papers of the East-West Population Institute, No. 44 (Honolulu, East-West Center, 1977).

TABLE 40. INFANT MORTALITY RATES, ASIA (continued)

Major area, region and country	Period	Infant deaths per 1,000 live births ($1,000 \, {}_1q_0$)	Comments
Thailand	1950-1954[b]	64	Registration
	1972[b]	27	Registration
	1947[l]	121.8 (M) / 102.7 (F)	
	1960[l]	116.9 (M) / 96.0 (F)	
	1970[l]	81.5 (M) / 66.5 (F)	
	1971[m]	65.0 (M) / 59.6 (F)	
	1974/1975[n]	91.9 (M) / 59.6 (F)	
	1964/1965[o]	84	Survey of Population Change
	1974/1975[o]	56	
Middle South Asia			
Afghanistan	1972/1973[p]	217-235	
	1972/1973[q]	185	
	1973/1974[r]	117	Greater Kabul
Bangladesh	1974[s]	153	
	1974[s]	160.2(M) / 145.2 (F)	
	1960-1962[r]	139	Impact survey
	1963-1965[t]	116	
	1966-1968[t]	113	
	1962-1965[t]	147	Population Growth Estimation
	1961/1962[t]	15	Demographic survey, E. Pakistan
	1962/1963[u]	153.3 (M) / 128.3 (F)	
India	1941-1951[v]	190 (M) / 175 (F)	Intercensal estimates
	1951-1961[v]	153.2 (M) / 138.3 (F)	Actuary's reports
	1961-1971[w]	130.1 (M) / 128.4 (F)	
	1968[v]	136.8	Rural
	1969[v]	139.9	Rural
	1970[x]	118.7	Rural
	1971[x]	114.8	Rural
	1970[x]	80.3	Urban
	1971[x]	77.5	Urban
Iran	1965[y]	176 / 58	Rural / Teheran
	1973/1974[y]	95 / 110 / 75	Entire country / Rural / Urban
	1976[z]	... / 61	Rural / Urban
Nepal	1971[aa]	172.2	
	1971[bb]	200	

[l] B. Rungpitarangsi, *Mortality Trends in Thailand, Estimation for the Period 1937-1970,* Institute of Population Studies Paper, No. 10 (Bangkok, Chulalongkorn University, 1974).

[m] Economic and Social Commission for Asia and the Pacific, *Population of Thailand,* Country Monograph Series, No. 3 (ST/ESCAP/18/76) (Bangkok, 1976).

[n] Fred Arnold, Robert D. Retherford and Anuri Wanglee, *The Demographic Situation in Thailand,* Papers of the East-West Population Institute, No. 45 (Honolulu, East-West Center, 1977).

[o] United States of America, Department of Commerce, Bureau of the Census, *Country Demographic Profiles: Thailand,* ISP-DP-15 (Washington, D.C., 1978).

[p] United States of America, Department of Commerce, Bureau of the Census, *World Population 1977* (Washington, D.C., 1978). Estimate refers to settled population only.

[q] Afghanistan and United States Agency for International Development, "National Demographic and Family Guidance Survey of the Settled Population of Afghanistan", vol. I (Buffalo, 1975).

[r] World Health Organization, *Infant and Early Childhood Mortality in Relation to Fertility; Report of an* Ad Hoc *Survey in Greater Kabul, Republic of Afghanistan, 1973/74* (Geneva, 1976).

[s] United Kingdom, Ministry of Overseas Development, Population Bureau; and Bangladesh, Ministry of Planning, Census Commission, Statis-

tics Division, *Report on the 1974 Bangladesh Retrospective Survey of Fertility and Mortality* (London and Dacca, 1977).

[t] Ismail Sirageldin, Douglas Norris and Mahbubuddin Ahmad, "Fertility in Bangladesh: facts and fancies", *Population Studies,* vol. 29, No. 2 (1975), pp. 207-215.

[u] Lee L. Bean and M. R. Kahn, "Mortality patterns in Pakistan", Karachi, 1967 (mimeographed).

[v] India, Office of the Registrar General, Vital Statistics Division, *Infant Mortality in India,* Sample Registration Scheme, Analytical Series, No. 1 (New Delhi, 1971).

[w] India, Office of the Registrar General, *Life Tables, Census of India, 1971,* Series I, India, Paper 1 of 1977 (New Delhi, 1977).

[x] India, Office of the Registrar General, *Sample Registration Bulletin,* vol. VII, No. 1 (January-March 1973).

[y] Djamchid Bebnam and Mehdi Amani, eds., *La population de l'Iran,* CICRED Monograph Series, World Population Year 1974 (Teheran, 1974), p. 13.

[z] Mahepetian and Khazanch, *Vital Rates in Iran.*

[aa] Nepal, Central Bureau of Statistics, Kathmandu. Information supplied to the World Health Organization, South-East Asia Regional Office, New Delhi. Estimate is based on the Demographic Survey of the National Planning Commission.

[bb] Estimate used by the Country Health Programming in Nepal in the "Proposed strategies for the major health concerns".

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TABLE 40. INFANT MORTALITY RATES, ASIA (continued)

Major area, region and country	Period	Infant deaths per 1,000 live births (1,000 $_1q_0$)	Comments
Pakistan	1961-1965[cc]	135	Population Growth Estimation
	1961[cc]	131	National impact survey
	1967[cc]	121	
	1962-1965[cc]	{ 138.1 (M) 140.3 (F)	
	1968[dd]	124	
	1969[dd]	111	
	1970[dd]	106	
Sri Lanka	1951-1955[ee]	75	
	1956-1960[ee]	63	
	1961-1965[cc]	54	
	1966-1970[ee]	51	
	1971[ff]	44.8	
	1972[ff]	45.6	
	1973[ff]	46.3	
	1974[ff]	51.2	
Western South Asia			
Democratic Yemen	1973[gg]	190.7	
Iraq	1960-1965[hh]	137	
	1973[gg]	91.8	
	1975[gg]	85.8	
Jordan	1956-1961[hh]	110	Implied from $q(2)$ to $q(5)$
	1966-1972[hh]	67	
	1972[gg]	86	
	1976[gg]	89	
Kuwait	1952-1957[hh]	105	
	1970[hh]	42	
	1970[gg]	42.6	
	1975[gg]	43.4	
	1965[ii]	{ 65.5 (M) 47.6 (F)	Registered births and deaths
	1970[ii]	{ 43.8 (M) 41.4 (F)	
Lebanon	1970[jj]	67	
Syrian Arab Republic	1965-1970[hh]	105	
	1970[gg]	123	
	1975[gg]	112.5	
Yemen	1970[gg]	159	
	1975[gg]	210	

[cc] Mohammad Afzal, *The Population of Pakistan*, CICRED Monograph Series, World Population Year 1974 (Islamabad, 1974).

[dd] Pakistan, Ministry of Finance, Planning and Economic Affairs, Statistics Division, *Population Growth Survey, 1969* (Islamabad, 1975).

[ee] Economic and Social Commission for Asia and the Pacific, *Population of Sri Lanka*, Country Monograph Series, No. 4 (ST/ESCAP/30/76) (Bangkok, 1976).

[ff] Sri Lanka, Department of Census and Statistics, *Bulletin of Vital Statistics, 1976* (Colombo, 1978).

[gg] Economic Commission for Western Asia, *Demographic and Related Socio-Economic Data Sheets for Countries of the Economic Commission for Western Asia*, No. 2 (Beirut, 1978).

[hh] K. E. Vaidyanathan, "A study of infant and child mortality in Arab countries" (Cairo Demographic Centre Doc. CDC/S75/12), paper presented to the Seminar on Mortality Trends and Differentials in Some Arab and African Countries, Cairo, 17-23 December 1975.

[ii] Allan G. Hill, "The demography of the Kuwaiti population in Kuwait", *Demography*, vol. 12, No. 3 (1975), pp. 537-548.

[jj] Youssef Courbage and Philippe Fargues, *La situation démographique au Liban* (Beirut, Librairie Orientale, 1973), quoted in Huda Zurayk, "Sources of demographic data in Lebanon", *Population Bulletin of the UN-ECWA* (Beirut), No. 12 (1977), pp. 27-33.

certainty that infant mortality rates have declined during the past decade or more. In the other countries, estimates range from the sixties to figures in excess of 200 deaths per 1,000 live births. The data for this region, as those for the others, give the impression of a widening gap between a few relatively small countries with very low infant mortality, on the one hand, and the large, populous countries where infant losses still run well above 100 deaths per 1,000 live births. It is not coincidental that the latter are also the countries with the highest fertility rates and the lowest levels of urbanization, literacy and living conditions.

The distribution of deaths by months or days of age during the first year of life appears to vary somewhat with the level of infant mortality. It is generally assumed that, when infant mortality is high, about one third of all infant deaths occur during the first month of life, or during the neonatal period, and that the proportion of all infant deaths occurring during the neonatal period increases as the infant mortality rate decreases. This changing distribution of infant deaths is closely associated with causes of death. The importance of a particular disease undoubtedly varies from one country to another, and even from season to season and from year to year within a country. Nevertheless, although it is not possible to document the incidence of particular causes of death with reliable data for high-mortality countries, it is well known that the infectious and parasitic diseases play a major role. These diseases are the most readily prevented and controlled causes of death; and as their impact is reduced and the infant mortality rate declines, the remaining causes of death tend to be concentrated in the first month of life. Perhaps the most important other cause of death during infancy is under-nutrition or malnutrition, which does not

come into play usually until after the neonatal period and which can be manifested as either an immediate or an associated cause of death.

To summarize, the countries listed in table 40 may be grouped into low, medium and high infant mortality clusters by using an infant mortality rate of less than 40 to define the low and a rate in excess of 120 to define the high clusters. Using this scheme and the most recent estimates (but excluding from consideration China, because of the uncertainty of its current rate, and Burma, for which only an urban rate is available), one finds that only two places fall in the low infant mortality category—Hong Kong and Singapore, which have less than 1 per cent of the Asian population and where less than half of 1 per cent of all Asian births occur. At the other end of the distribution are seven countries with high infant mortality, which contain over a quarter of the Asian population and account for more than a quarter of all births in Asia. The remaining 12 countries and territories fall in the medium infant-mortality range of from 40 to 120 infant deaths per 1,000 live births. These 12 countries contain over 35 per cent of the Asian population as defined at the beginning of the section.

Mortality during early childhood

After infancy, death rates for children are, comparatively speaking, usually quite low. In Hong Kong and Singapore, which have good data, the death rates per 1,000 children between ages 1 and 4—the conventional definition of early childhood—have averaged about one or less during recent years. By contrast, the infant mortality rates for the same two places have averaged from 10 to 15 times the early childhood mortality rates. Recent early childhood mortality rates in Peninsular Malaysia and Sri Lanka, the only other Asian countries with reliable registration statistics, have stood as high as 6 per 1,000 at risk. The Malaysian data indicate that rates have been dropping steadily during the 1970s. Information for the rest of Asia is fragmentary. As in the case of infant mortality, a variety of estimation techniques have been used to derive rates from sample surveys and censuses. The results suggest that in many of the parts of Asia for which it can be estimated early childhood mortality has remained substantially higher than the rates given above. Estimates for the early 1970s for Afghanistan, Bangladesh and Indonesia, for example, vary from about 25 to 30 per 1,000 for both sexes combined, but most figures are lower. In the few cases where there are time series, childhood mortality has usually appeared to be declining. The estimates for China, for example, indicate a dramatic decline in early childhood mortality from about 55 in 1949 to about 6 in 1957. As in the case of infant mortality, the excessive levels of childhood mortality can be attributed primarily to the effects of infectious, parasitic and respiratory diseases, and to malnutrition or under-nutrition.

Urban/rural differentials in mortality

Aside from the international differences already discussed, there is usually considerable variation in mortality levels within countries. One of the most common distinctions made is between urban and rural parts of a country,

and as already noted with reference to infant mortality, mortality is usually lower in urban than in rural areas. This phenomenon is further elaborated by the data presented in table 41. In most cases urban mortality is lower than rural, but Sri Lanka appears to be an exception. Sri Lanka is an especially notable exception because its data are better than most and cannot be dismissed as spurious. Indeed, they are to some extent further supported by preliminary results from the 1975 World Fertility Survey in Sri Lanka, which found no significant urban rural differential. It has been suggested that the higher urban than rural mortality in Sri Lanka arises from poorer economic conditions, less sanitary housing and more inadequate environmental hygiene of the poorer sections of urban centres.[15] However, as Rao states, "there [also] seems to be a great disparity in the actual residence and that reported in the death certificates".[16] Higher mortality figures come from districts where general hospitals are located and a local address is commonly given by persons admitted to the hospitals for treatment. This address is often the basis for determining residence in statistical compilations, and it may be inferred that the convention of giving a local address at hospitals (which are located in towns) may have the effect of inflating urban mortality rates with the deaths of people from rural areas if a local address is commonly given that is within the urban limits. In so far as this inference is correct, it may be concluded that, where all factors are taken into account, urban mortality would be found to be consistently lower than rural mortality in Asia.

The difference between urban and rural mortality, however, is not the same in all parts of any country. Infant mortality rates for 17 states of India in 1970 and 1971, for example, show that in each state and at each date the urban rates are lower than the rural, but that there is a very large area of overlap between the urban and rural rates. The urban rates vary from 11 to 134 while the rural rates range from 27 to 173. The accuracy of these figures, particularly the lower rates, is uncertain but not especially pertinent to the point being made.[17]

Latin America

General levels and trends

In all the regions of Latin America, the crude death rate declined more rapidly during the 1950s than it appears to have done in recent years. This situation reflects both a real decline in the rate of improvement of mortality conditions and changes in the age structure of population which accompany changes in fertility and mortality. Changing age structures, of course, obscure the real nature of mortality decline. Consequently, the present discussion of crude death rates is limited to a few generalizations. The observed and estimated rates, both for countries and for regions,

[15] Economic and Social Commission for Asia and the Pacific, *Population of Sri Lanka*, Country Monograph Series, No. 4 (ST/ESCAP/30/76) (Bangkok, 1976), p. 143; Sri Lanka, Department of Census and Statistics, *World Fertility Survey—Sri Lanka, 1975, First Report* (Colombo, 1978).

[16] S. L. N. Rao, "Mortality and morbidity in Sri Lanka", in University of Sri Lanka, Demographic Training and Research Unit, *Population Problems of Sri Lanka* (Colombo, 1976), p. 32.

[17] India, Office of the Registrar General, *Sample Registration Bulletin*, vol. VII, No. 1 (January-March 1973).

TABLE 41. URBAN/RURAL DIFFERENTIALS IN MORTALITY, ASIA, 1952-1975

Country	Period	Area	Deaths per 1,000 population	Infants deaths per 1,000 live births	Survivors to a given age, l_x, per 1,000 live births 2	3	5
Bangladesh[a]	1974	Urban	. . .	. . .	809	844[b]	808[b]
		Rural	. . .	. . .	801	789	774
India	1969[c]	Urban	11.4[d]	. . .	. . .	. . .	. . .
		Rural	19.1[d]	139.9	. . .	. . .	. . .
	1970[e]	Urban	. . .	80.3	. . .	. . .	. . .
		Rural	. . .	118.7	. . .	. . .	. . .
	1971[c]	Urban	. . .	77.5	. . .	. . .	. . .
		Rural	. . .	114.8	. . .	. . .	. . .
	July 1974	Urban	9.6[d]	. . .	. . .	. . .	. . .
	June 1975	Rural	16.1[d]	. . .	. . .	. . .	. . .
	1970-1972[f] annual average	Cities and towns by population size (thousands)					
		100 and over	8.8[d]	. . .	. . .	. . .	. . .
		50-100	10.0[d]	. . .	. . .	. . .	. . .
		20-50	11.4[d]	. . .	. . .	. . .	. . .
		Under 50	11.4[d]	. . .	. . .	. . .	. . .
Indonesia[g]		Urban—Java	. . .	. . .	872	857	826
		Other islands	. . .	. . .	859	839	815
		Rural—Java	. . .	. . .	838	809	786
		Other islands	. . .	. . .	818	775	759
Iran[h]	1965	Teheran	. . .	58	. . .	. . .	. . .
		Rural	. . .	176	. . .	. . .	. . .
	1974	Urban	. . .	75	. . .	. . .	. . .
		Rural	. . .	110	. . .	. . .	. . .
Iraq[i]	1973/74	Urban	9.4[d]	77	. . .	. . .	. . .
		Rural	13.3[d]	111	. . .	. . .	. . .
Malaysia Peninsular Malaysia[j]	1964-1968	Metropolitan					
		Malays	. . .	38.8	. . .	. . .	. . .
		Chinese	. . .	31.3	. . .	. . .	. . .
		Indians	. . .	46.6	. . .	. . .	. . .
		Other urban					
		Malays	. . .	48.3	. . .	. . .	. . .
		Chinese	. . .	26.5	. . .	. . .	. . .
		Indians	. . .	40.0	. . .	. . .	. . .
		Rural					
		Malays	. . .	61.6	. . .	. . .	. . .
		Chinese	. . .	33.1	. . .	. . .	. . .
		Indians	. . .	57.1	. . .	. . .	. . .
Pakistan[k]	1968-1971	Urban	7-10[d]	. . .	. . .	. . .	. . .
		Rural	12-13[d]	. . .	. . .	. . .	. . .
Philippines[l]	1968	Urban					
		Present[m]	. . .	47.3	. . .	. . .	. . .
		Past[m]	. . .	72.2	. . .	. . .	. . .
		Rural					
		Present	. . .	61.0	. . .	. . .	. . .
		Past	. . .	76.4	. . .	. . .	. . .
	1973	Urban					
		Present	. . .	49.1	. . .	. . .	. . .
		Past	. . .	63.8	. . .	. . .	. . .
		Rural					
		Present	. . .	61.0	. . .	. . .	. . .
		Past	. . .	77.6	. . .	. . .	. . .

[a] M. Kabir, "Levels and patterns of infant and child mortality in Bangladesh", Social Biology, vol. 24, No. 2 (1977), pp. 158-165.

[b] Irregularities probably due to insufficient data.

[c] India, Office of the Registrar General, Sample Registration Bulletin, vol. X, No. 2 (April 1976).

[d] Not standardized for sex and age differences in population structure.

[e] India, Office of the Registrar General, Sample Registration Bulletin, vol. VII, No. 1 (January-March 1973).

[f] Sent Ram Gupta, "Variations in vital rates in India", Sample Registration Bulletin, vol. IX, No. 3 (1975), pp. 29-32.

[g] Geoffrey McNicoll and Si Gde Made Mamas, The Demographic Situation in Indonesia, Papers of the East-West Population Institute, No. 28 (Honolulu, East-West Center, 1973).

[h] Djamchid Behnam and Mehdi Amani, eds., La population de l'Iran, CICRED Monograph Series, World Population Year 1974 (Teheran, 1974), p. 13.

[i] Iraq, Ministry of Health, Directorate of Vital and Health Statistics, Statistical Compass for 1974/1975, Based on Vital Rates Survey 1973-74, p. 13, table 4-A.

[j] Malaysia, Department of Statistics, Evaluation of Mortality Data in the Vital Statistics of West Malaysia, Research Paper No. 5 (Kuala Lumpur, 1971).

[k] Nepal, Statistics Division, Population Growth Survey, 1968, 1969, 1970.

[l] Adelamar M. Alcantara, Differential Mortality among Population Sub-groups, Population Institute Research Note, No. 63 (Manila, University of the Philippines System, 1975).

[m] Present = estimated on the basis of $q(2)$ and $q(3)$; past estimated on basis of from $q(5)$ to $q(35)$. In both estimates Coale-Demeny West model life tables were used.

| Country | Period | Area | Deaths per 1,000 population | Infants deaths per 1,000 live births | Survivors to a given age, l_x, per 1,000 live births | | |
					2	3	5
Republic of Korea	1956	Urban	...	...	951	942	926
		Rural	...	...	932	927	905
	1970[n]	Urban	...	...	969	958	941
		Rural	...	...	952	942	922
	1973-1974[o]	Urban	5.6	...	...	...	...
		Rural	9.6	...	...	...	...
Sri Lanka[p]	1952-1954	Urban	11.6[d]	79.5	...	...	...
		Rural	10.8[d]	72.8	...	...	...
	1962-1964	Urban	7.8	64.6	...	...	...
		Rural	8.8	53.4	...	...	...
Syrian Arab Republic[q]	1970	Urban	...	80.7	888	873	865
		Rural	...	112.3	846	827	810

[n] Lee-Jay Cho, *The Demographic Situation in the Republic of Korea,* Papers of the East-West Population Institute, No. 29 (Honolulu, East-West Center, 1973), p. 35.

[o] Economic and Social Commission for Asia and the Pacific, *Population of the Republic of Korea,* Country Monograph Series, No. 2 (E/CN.11/1241) (Bangkok, 1975), pp. 182-184.

[p] Economic and Social Commission for Asia and the Pacific, *Population of Sri Lanka,* Country Monograph Series, No. 4 (ST/ESCAP/30/76) (Bangkok, 1976), pp. 141-143.

[q] K. E. Vaidyanathan, *Estimation of Infant and Child Mortality in Syria from the 1970 Census Data,* Syrian Population Studies Series, No. 10 (Damascus, Centre of Population Studies and Research, 1976).

show a marked convergence during the past quarter of a century or so. As is shown below, this is the opposite of the trend shown by life expectancies. By the early 1970s, crude death rates in the countries of Latin America had reached very low absolute values in the vicinity of 10 per 1,000 population, which either equalled or compared favourably with those of most more developed countries.

Excluding Paraguay, good life tables and other estimates of life expectancy at birth are available for the 28 countries of Latin America that have a population of at least 250,000. These data are summarized in table 42 for the period since 1960. Data for the periods since 1950 are to appear in the forthcoming United Nations publication on levels of mortality. One way of generalizing the data in this table and other supporting information is to fit them into the classification scheme used above, whereby countries with a life expectancy of more than 60 years are considered low-mortality areas, those with a life expectancy of 50-60 years are medium and those with a life expectancy estimated at less than 50 years at birth are classified as high-mortality areas. Using this scheme, only Argentina and Puerto Rico appear definitely to have belonged in the low-mortality category around 1950. The correct classification of Suriname and Uruguay is uncertain. They may have been either low- or medium-mortality countries. Similarly, Mexico could have been either a high- or medium-mortality country. The Dominican Republic, Haiti, Guatemala, Honduras, Nicaragua, Bolivia, Colombia and Peru definitely belonged in the high-mortality category. This left a clear majority of countries in Latin America in the medium-mortality range around 1950. By the early to mid-1970s, mortality conditions had improved significantly, as shown in table 43. As can be seen, the correct classification of only Brazil and Colombia is in doubt. By the early 1970s a substantial majority—between 17 and 19 of the 28 countries—were in the low-mortality category. From seven to nine were in the medium range, and only Bolivia and Haiti remained in the high-mortality category.

For purposes of initial generalization, the changes in mortality since 1950 have also been summarized by fitting the time trends to the data in table 42 and to supplementary data. Instead of using probabilities of dying, as was done with the African data, the Latin American life expectancies and the central dates to which they pertained were fitted to four simple types of curves. The best fits were obtained by fitting the linear regression lines, but the correlation coefficients were not much better than those obtained from the African data. The regression lines for Latin America—for each region and for all of the data—are shown in figure V. The lines show a divergence in regional life expectancies between 1950 and the 1970s that might not be immediately evident from an examination of the data in table 42. They also highlight the rapid progress made in the Caribbean as compared with the rather sluggish pace of change in South America. By the early 1970s, it appears that the life expectancies at birth in seven of the nine Caribbean countries given in table 42 either equalled or exceeded those for several states and the District of Columbia in the United States of America.

The regression lines suggest more regularity in the growth of life expectancies than actually occurred. During the past quarter of a century there has been a divergence in the national life expectancies within as well as among regions, and the rates at which mortality has been declining have decreased. As life expectancies increase, especially in countries where it is already high, each new increment is harder to achieve without added efforts; and as apparent current global limits are approached, both the absolute and relative increases in life span necessarily diminish. This accounts for the levelling off in most Caribbean countries and, perhaps, in all the countries classified as low-mortality areas. However, it cannot explain the relatively slow progress made in the countries with high and medium mortality.

As recent experience in Cuba shows, mortality can be reduced rapidly without rapid industrialization and eco-

TABLE 42. LIFE EXPECTANCY AT BIRTH, BOTH SEXES, LATIN AMERICA, 1960-1975

Region and country	Life expectancy at birth for both sexes combined			
	1960	1965	1970	1975
Caribbean				
Barbados	65.0[a]	...	...	...
Cuba	64.1	67.2	70.0	70.2[b]
Dominican Republic	...	54.3[c]	...	57.2[d]
Guadeloupe	...	64.9[e]	...	...
Haiti	41.0	...	...	...
Jamaica	64.7[f]	...	68.5[g]	...
Martinique	...	65.4[e]	...	...
Puerto Rico	69.5[f]	...	72.1[h]	72.5[i]
Trinidad and Tobago	64.3[f]	...	66.1	...
Middle America				
Costa Rica	...	63.4[j]	...	68.4[k]
El Salvador	58.5[l]	...	...	...
Guatemala	49.0[m]	...	...	52.9[n]
Honduras	...	...	53.2[o]	...
Mexico	59.0	...	61.4	64.7
Nicaragua	...	...	53.2[d]	...
Panama	60.7[p]	...	62.2[h]	...
Temperate South America				
Argentina	66.6[f]	...	65.8[h]	...
Chile	57.2[i]	...	63.1[g]	...
Uruguay	...	68.6[q]	...	...
Tropical South America				
Bolivia	...	...	...	48.8
Brazil	...	59.2[c]	...	...
Colombia	...	55.4[r]	...	59.0
Ecuador	52.4[s]	...	...	...
Guyana	61.0[f]	...	...	...
Peru	...	...	52.0[t]	54.9[u]
Suriname	...	64.6[v]	...	...
Venezuela	63.0[w]	...	66.7[x]	...

Sources: Unless otherwise noted, simple average of the male and female figures given in table 44. Data from table 44 supplemented with infant mortality rates based on "complete" birth and death registration statistics as given in United Nations, *Demographic Yearbook*, various issues. For Haiti, John Hobcroft, "The demographic situation in Haiti", Centro Latino-americano de Demografía, September 1977.

[a] 1950-1952.
[b] 1974.
[c] 1960-1970.
[d] Based on female value and assumed 3.4 year differential between male and female values.
[e] 1963-1967.
[f] 1959-1961.
[g] 1969-1970.
[h] 1969-1971.
[i] 1971-1973.
[j] 1962-1964.
[k] 1972-1974.
[l] 1960-1961.
[m] 1963-1965.
[n] 1973.
[o] 1971-1972.
[p] Average of 1960 and 1960-1961.
[q] 1963-1964.
[r] 1964.
[s] 1961-1963.
[t] 1972.
[u] 1974-1976.
[v] 1963.
[w] 1961.
[x] 1971.

all people shall be met.[18] Being a relatively small, insular country has undoubtedly worked to advantage for Cuba. A similar achievement would be much more difficult in one of the larger and more diversified mainland countries. Nevertheless, Cuba serves as a good example of the extent to which health and mortality can be improved with a modest investment if the commitment of a Government is strong enough.

Argentina provides a disturbing example, not of a levelling off, but of a recent increase in mortality at the national level. In 1970, life expectancy at birth at Argentina had fallen to 65.8 years—from 66.8 in 1960. The two figures are almost the same as those for the District of Columbia, in the United States, at the same dates.[19] However, in Argentina, unlike the latter area, selective migration cannot be the primary explanation for the declining life expectancy. For reasons that have yet to be explained, the decline in Argentine life expectancy between 1960 and 1970 occurred primarily in the region of Buenos Aires, with the largest drop in the city itself. In the north-western region of the country, life expectancy continued to increase between the censuses, although at a slower pace than previously.

Age and sex differentials in mortality

The best data available for age and sex differentials in mortality in Latin America are summarized in table 44. These data show that during the past quarter of a century or more male mortality has consistently been higher than female. At each of the selected ages for all observations, female life expectancy has been higher than that of male and female infant mortality has been lower than male. As discussed in more detail in the forthcoming publication on recent levels and trends in mortality, the differences in female and male life expectancies have increased during the period under review, as females benefited proportionately more than males from general improvements in levels of mortality.

By the early 1970s, the sex differentials between the mean life expectancies at birth for the Caribbean and Temperate South America were on the order of five and seven years, respectively, whereas those for Middle America and Tropical South America were in the vicinity of 3.5 years. Similar differentials existed at other ages. The mean differentials for each region for life expectancies at ages 5, 15, 30 and 65, as well as at birth, are plotted in figure VI. The averages of figures for each age are plotted as a curve for all of Latin America. The differentials at all ages are significantly higher in Temperate South America than in the other regions, and this phenomenon has not been explained. In each region, the difference between male and female mortality decreased to age 5, then increased throughout the rest of the life span. From age 30 onward, the percentage by

nomic growth. The impressive achievements in Cuba appear to have been made primarily by a combination of decentralizing health services, extending basic public health measures to all segments of the population, expanding educational programmes to the point of eliminating illiteracy and attempting to ensure that the basic nutritional needs of

[18] Sergio Diaz-Briquets, "Income redistribution and mortality change: the case of Cuba", paper presented at the 1978 annual meeting of the Population Association of America.

[19] United States of America, Department of Health, Education and Welfare, National Center for Health Statistics, "Some trends and comparisons of United States life-table data, 1900-1971", *U.S. Decennial Life Tables for 1969-1971*, vol. 1, No. 4, DHEW Publication No. (HRA) 75-1150 (Washington, D.C., 1975).

TABLE 43. CLASSIFICATION OF COUNTRIES OF LATIN AMERICA
BY LIFE EXPECTANCY AT BIRTH, AROUND 1975

Region	High mortality (e_0^o = less than 50 years)	Medium mortality (e_0^o = 50-60 years)	Low mortality (e_0^o = more than 60 years)
Caribbean	Haiti	Dominican Republic	Barbados Cuba Guadeloupe Jamaica Martinique Puerto Rico Trinidad and Tobago
Middle America		El Salvador Guatemala Honduras Nicaragua	Costa Rica Mexico Panama
Temperate South America			Argentina Chile Uruguay
Tropical South America	Bolivia	—Brazil— —Colombia— Ecuador Peru	Guyana Suriname Paraguay Venezuela

Figure V.   Regional trends in life expectancy, Latin America, regression lines, 1950-1978

Figure V.   Regional trends in life expectancy, Latin America, regression lines, 1950-1978

Caribbean: $e_0^o = 0.6192Y - 1\ 152.12$ ($r^2 = 0.3554$)

Temperate South America: $e_0^o = 0.3015Y - 528.57$ ($r^2 = 0.2547$)

All Latin America: $e_0^o = 0.3925Y - 710.53$ ($r^2 = 0.1824$)

Middle America: $e_0^o = 0.4075Y - 743.21$ ($r^2 = 0.2947$)

Tropical South America: $e_0^o = 0.1818Y - 300.40$ ($r^2 = 0.0623$)
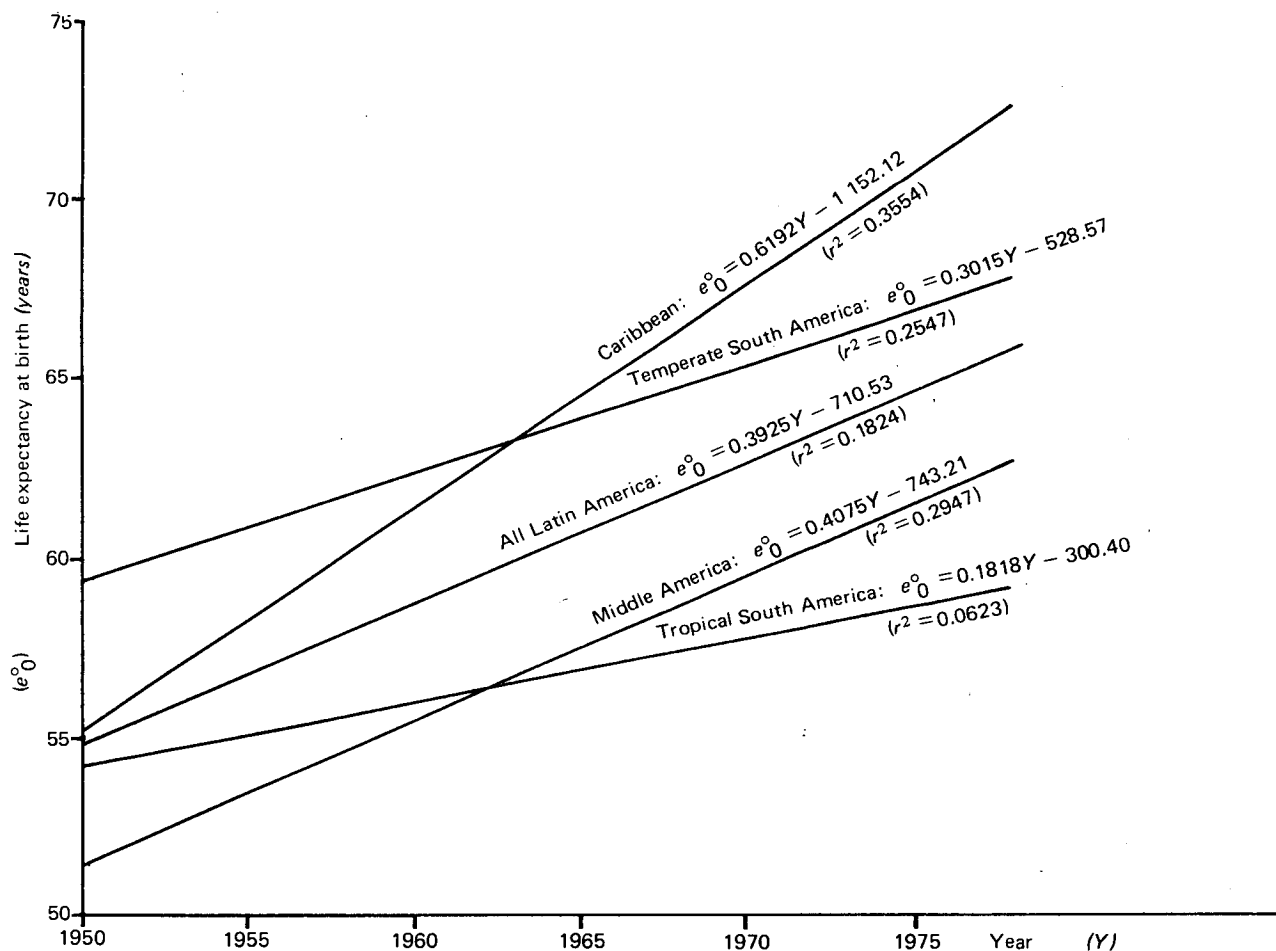
Source: Based on data given in table 42.

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TABLE 44. MORTALITY IN LATIN AMERICA: CRUDE DEATH RATE, INFANT MORTALITY RATE
AND LIFE EXPECTANCY AT SELECTED AGES, 1960-1976

Region and country	Period	Crude death rate, both sexes	Infant mortality rate $(1.000\,_1q_0)$		Life expectancy at selected ages (e_x)					
					At birth		At age 5		At age 30	
			Male	Female	Male	Female	Male	Female	Male	Female
Caribbean										
Barbados	1959-1961	...	77.8	65.6	62.7	67.4	64.2	68.2	40.5	44.4
Cuba	1960[a]	...	70.2	53.9	62.0	66.1	63.1	66.2	40.5	43.2
	1970[a]	6.3	43.6	31.9	68.4	71.5	67.5	69.7	44.1	46.1
	1974[b]	5.6	51.2	39.7	68.5	71.8	67.6	70.1	44.0	46.3
Dominican Republic	1960-1970[c]	...	111.4	93.4	52.6	56.0	57.2	59.9	36.6	39.4
	1975[d]	...	...	85.5	...	58.9	...	63.1	...	41.2
Guadeloupe	1963-1967	8.1[e]	53.1	43.4	62.5	67.3	62.1	66.6	38.7	43.1
Jamaica	1959-1961	...	59.8	51.6	62.7	66.6	63.5	66.9	40.2	43.4
	1969-1970[f]	7.6 (1969)[g] 7.7 (1970)[g]	36.5	33.3	66.7	70.2	65.3	68.6	41.8	44.7
Martinique	1963-1967	10.5 (1953) 7.3 (1965)	47.9	38.8	63.3	67.4	62.5	66.4	39.2	42.6
Puerto Rico	1959-1961[h]	6.7	48.8	39.6	67.1	71.9	66.4	70.8	43.2	47.0
	1969-1971	6.7	32.9	24.1	69.0	75.2	66.6	72.3	43.3	48.1
	1971-1973	6.6	30.3	23.5	68.9	76.1	66.3	73.1	43.0	48.4
Trinidad and Tobago	1959-1961	...	53.3	43.7	62.2	66.3	61.4	65.0	38.0	41.3
	1970	6.8	37.6	31.2	64.1	68.1	61.2	65.8	38.6	41.9
Middle America										
Costa Rica	1962-1964[i]	8.5 (1963)	87.9	72.2	61.9	64.8	64.9	67.1	42.1	43.7
	1972-1974[j]	5.2	55.2	43.6	66.3	70.5	66.0	69.6	42.8	45.7
El Salvador	1960-1961	11.4 (1960) 11.3 (1961)	84.4	69.6	56.6	60.4	60.9	64.2	40.1	42.5
Guatemala	1963-1965[k]	16.9 (1965)	118.2	102.7	48.3	49.7	54.4	55.8	35.3	36.9
	1973[l]	15.4	111.4	93.4	51.2	54.5	58.4	61.1	35.7	38.4
Honduras[m, n]..........	1971/72	7.9 (1971) 8.1 (1972)	139.1	92.1	50.9	55.5	59.0	60.3	38.5	39.6
Mexico	1960[o]	10-11 (1960-1965)[g]	78.9	68.5	57.6	60.3	60.5	63.0	39.0	41.1
	1970	9.9	73.3	62.2	59.4	63.4	61.4	65.2	39.4	42.6
	1975	6.7	...	...	62.8	66.6	63.7	67.1	41.2	44.1
Nicaragua[p]	1971	...	...	113.9	...	54.9	...	61.1	...	40.1
Panama[q]	1960	...	63.9	59.8	60.5	63.4	62.1	64.8	40.5	43.1
	1960-1961[r, s]	...	95.1	82.4	57.8	60.9	62.6	64.9	40.6	42.9
	1969-1971[t]	...	56.7	45.0	63.5	66.3	64.6	66.6	42.1	43.8

Sources: For crude death rates, *Demographic Yearbook*, various issues, for areas reporting death registration to be at least 90 per cent complete. For other values, *Demographic Yearbook, 1966, 1967, 1974, 1976* (United Nations publications, Sales Nos. 67.XIII.1, E/F.68.XIII.1, E/F.75.XIII.1 and E/F.77.XIII.1); and/or the sources indicated below in foot-notes.

[a] Alfonso Farnós Morejón, *Cuba: tablas de mortalidad 1955-1970* (Havana, University of Havana, 1976), pp. 32-43. See also E. Velazquez and L. Toirao, *Cuba: tablas de mortalidad 1900-1950* (Havana, 1975), pp. 71-82.

[b] Cuba, Junta Central de Planificación, *La Esperanza o expectiva de vida* (Havana, 1974), pp. 35-36.

[c] Agustín L. García, "República Dominicana: estudio de la evolución demográfica en el período 1950-1970 y proyección de la población total, período 1970-2000, CELADE SUBSEDE Series A, No. 19 (San José, Costa Rica, 1974), pp. 57-58, 61-62.

[d] Miguel Guzmán M., *República Dominicana: estimación de la evolución demográfica 1950-1970*, CELADE SUBSEDE Series (San José, Costa Rica, 1974), pp. 34-36 and 61-65.

[e] Rates excluding deaths of infants dying before registration of birth.

[f] G. W. Roberts and others, *Recent Population Movements in Jamaica*, CICRED Monograph Series, World Population Year 1974 (Kingston, 1974), pp. 96, 97 and 99.

[g] Data tabulated by year of registration rather than occurrence.

[h] J. Vasquez, "The demographic evolution of Puerto Rico", unpublished doctoral dissertation, University of Chicago, 1964, pp. 229-363.

[i] Costa Rica, *Tablas de vida de 1962-64* (San José, 1966), pp. 1-9.

[j] Costa Rica, *Tablas de vida de 1972-74* (San José, 1976), pp. 8-14.

[k] Zulma C. Camisa, *Las estadísticas demográficas y la mortalidad en Guatemala hacia 1950 y 1964*, CELADE SUBSEDE Series AS, No. 2 (San José, Costa Rica, 1969), pp. 48-49.

[l] K. S. Ray and others, *Evaluación del censo de 1973 y estimaciones de los índices y vitales* (Guatemala, 1976).

[m] Death registration estimated to be 75-85 per cent complete.

[n] Antonio Ortega and Manuel Rincón, *Encuesta demográfica nacional de Honduras, Fascículo IV. Mortalidad* (Santiago, Chile, Centro Latinoamericano de Demografía, 1975), pp. 49-52.

[o] Raul Benítez Zenteno and Gustavo Cabrera Acevedo, *Tablas abreviadas de México: 1930, 1940, 1950, 1960* (Mexico City, El Colegio de México, 1967), pp. 53-61; and Zulma L. Recchini, *Tabla abreviada de mortalidad, República de México 1959-61* (1963). See also Eduardo Arriaga, *New Life Tables for Latin American Populations* (Berkeley, University of California, 1968), pp. 275-276.

[p] Juan Chackiel and Manuel Ortega, *Tablas de mortalidad femenina de Guatemala, Honduras y Nicaragua,* CELADE SUBSEDE Series, No. 1033 (San José, Costa Rica, 1977).

[q] Vilma N. Médica, *Estadística Panameña, año XXXVI, suplemento: El Crecimiento de la población de Panamá, 1950 a 1980* (Panama, 1966), pp. 23-24.

[r] Hildebrance Araica, *Estadística Panameña, año XXVI, suplemento tablas de mortalidad de Panamá, 1960 y 1961* (Panama, 1966), pp. 305.

[s] Excluding tribal Indian population numbering 62,187 in 1960.

[t] United States of America, Department of Commerce, Bureau of the Census, *Country Demographic Profiles: Panama*, ISP-DP-7 (Washington, D.C., 1977), pp. 6-7.

Region and country	Period	Crude death-rate, both sexes	Infant mortality rate $(1,000 \, {}_1q_0)$		Life expectancy at selected ages (e_x)					
					At birth		At age 5		At age 30	
			Male	Female	Male	Female	Male	Female	Male	Female
Temperate South America										
Argentina[u]	1959-1961[v]	8.7 (1960)	59.2	51.0	63.7	69.5	63.5	69.2	40.2	45.5
	1969-1971[w]	9.4	64.8	54.4	61.9	69.7	61.8	69.4	38.5	45.6
Chile	1960-1961[x]	12.4 (1960) 11.6 (1961)	...	...	54.4	59.9	59.2	64.2	37.1	41.6
	1969-1970[y]	8.8 (1969) 8.5 (1970)	82.8	71.2	60.1	66.0	60.2	65.9	37.4	42.4
Uruguay	1963-1964	...	...	...	65.5	71.6	64.4	70.1	40.7	46.0
Tropical South America										
Bolivia[z]	1975	...	169.0	156.0	46.5	51.1	56.5	59.7	37.3	39.7
Brazil[aa]	1960-1970	...	79.1	59.7	57.1	61.3	60.2	62.7	39.4	41.1
Colombia[bb]	1964[cc]	...	117.0	105.0	53.7	57.0	59.8	62.8	38.4	41.2
	1973[dd]	...	102.8	92.0	57.1	60.8	61.8	65.1	39.7	42.7
Ecuador[ee]	1961-1963	...	...	...	51.0	53.7	58.5	60.7	38.3	40.0
Guyana[ff]	1959-1961	...	58.9	50.3	59.0	63.0	59.1	62.6	36.2	39.7
Peru	1972[gg]	...	150.4	133.3	50.8	53.2	58.9	60.2	39.0	39.9
	1974-1976[hh]	...	130.0	107.3	53.1	56.7	59.9	61.9	39.5	40.9
Suriname	1963	7.8[ii]	...	...	62.5	66.7	61.6	65.5	38.6	41.9
Venezuela	1961[jj]	...	60.0	51.0	61.2	64.7	61.8	65.8	39.3	42.0
	1971[kk]	...	56.0	46.0	64.9	68.4	65.1	68.2	41.7	44.5

[u] These values for life expectancy at birth are slightly higher than those given in the life tables in *Demographic Yearbook.*

[v] Jorge L. Somoza, *La Mortalidad en la Argentina entre 1869 y 1960* (Santiago, Chile, Centro Latinoamericano de Demografía and Centro de Investigaciones Sociales del Instituto Di Tella), pp. 114 and 115-116.

[w] Maria S. Müller, *La Mortalidad in la Argentina: su evolución historica y situación a 1970* (Santiago, Chile, Centro Latinoamericano de Demografía and CENEP), pp. 51-52.

[x] Jorge L. Somoza, "La mortalidad", in Centro Latinoamericano de Demografía, *Chile,* Series 1, No. 1 (1969), p. 285.

[y] José M. Pujol, *Chile: tablas abreviadas de mortalidad a nivel nacional y regional 1969-1970,* CELADE Series A, No. 141 (Santiago, Chile, 1976). See also Hector G. Roldan, *La Población de Chile,* CICRED Monograph Series, World Population Year 1974 (Santiago, 1974), pp. 29, 31 and 32.

[z] Kenneth H. Hill and others, *La Situación de la mortalidad en Bolivia* (Santiago, Chile, Centro Latinoamericano de Demografía, 1976), pp. 7-7a. See also Jorge L. Somoza, *Encuesta demográfica nacional de Bolivia: informe sobre aspectos demográficos* (La Paz, 1976).

[aa] J. A. M. Carvalho, "Regional trends in fertility and mortality in Brazil", *Population,* vol. 28 (1974), p. 419.

[bb] Alberto N. Nuñez, *La Medida de la mortalidad en Colombia . . . y tablas abreviados en 1964 y 1973* (Bogotá, Pantífica Universidad Javeriana, 1977).

[cc] Life tables prepared by the Departamento Administrativo Nacional de Estadística for 1951, 1957-1958 and 1963-1965 have life expectancies higher than those shown here for 1950-1952 and 1964.

[dd] Based on sample of data for 11 departments.

[ee] Excluding nomadic Indian tribes.

[ff] Excluding Amerindian population.

[gg] Peru, Instituto Nacional de Estadística, "Perspectivas de crecimiento de la poblacion del Peru 1960-2000", *Boletin de analisis demográfico,* No. 16 (1975), p. 111.

[hh] Peru, Instituto Nacional de Estadística, *Encuesta demográfica nacional del Peru* (Lima, 1977).

[ii] Beginning in 1960, deaths of Indian and Negro population living in tribes excluded but rates computed on total population.

[jj] Eduardo Arriago, *New Life Tables for Latin American Populations* (Berkeley, University of California, 1968), pp. 175-176.

[kk] Venezuela, Ministerio de Encuesta, Dirección General de Estadística y Censos Nacionales, *Estadística Venezolana. Tablas de mortalidad de Venezuela; y Venezuela: breve bibliografía sobre temas de población* (Caracas, 1976).
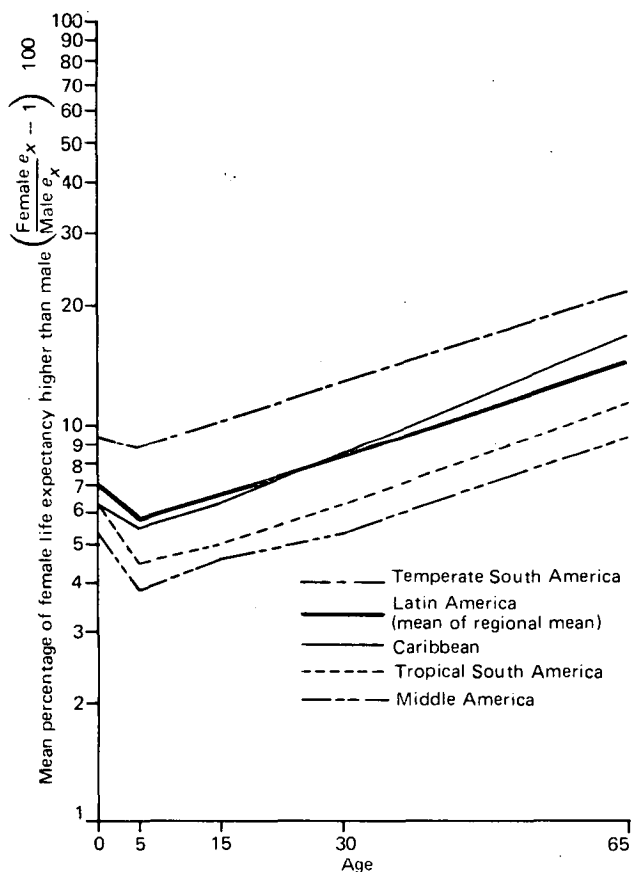
which female exceeded male life expectancy was greater than the relative difference at birth.

Infant mortality

The fact that recorded male infant mortality is always higher than female in Latin America has already been mentioned and is abundantly clear from the data in table 44. The simple averages of those male and female infant mortality rates, supplemented by reliable data from various issues of the *Demographic Yearbook,* are given in table 45. The figures which correspond to the life expectancies presented in table 42 have been paired with them and plotted in figure VII to illustrate the linear relationship between the infant mortality rate and life expectancy at birth. The regression line in figure VII most closely corresponds to that given for the Coale and Demeny North models but the Latin American line inditates that for any given infant mortality rate the life expectancy at birth would be between 1.5 and 2.0 years higher than would be the case in the North models.

The real experience of individual countries, of course, does not conform to the regression line. Indeed, as a cursory examination of the data given in table 45 shows, no single time trend is evident. However, some idea of the lack of consistency found in time trends is illustrated in figure VIII. It will be noted that the rates of change have varied substantially both in magnitude and in the direction of trends. In most cases infant mortality decreased more rapidly in the earlier part of the period than more recently. In two countries—Cuba and Argentina—infant mortality rates apparently increased during the most recent period represented. It is not known whether the figures show real, secular increases or simply different points within the normal ranges of fluctuation for essentially stable infant mortality rates. The large percentage change for Cuba, however, must be discounted at least in part on the latter grounds since there is no evidence to support the former hypothesis. Also, the percentage increase for Cuba must be viewed in the light of the small base that serves as denominator for the calculation. Similarly, the apparent increase in Mexican infant

Figure VI. Mean percentage difference between female and male life expectancy at selected ages, selected countries of Latin America grouped in four regions, 1950-1975

group status and the spatial distribution of the population. Chile offers a clear recent example of regional differences. Life tables for 1969-1970, for the 12 regions of the country and the metropolitan Santiago area, show that, with a few exceptions which can be attributed to poor data from the most remote areas, mortality increases with distance from the metropolitan centre. This finding suggests that the quality of all health services in any place is related to its distance from the capital—the more remote the place, the poorer the services. The same types of differences in levels are evident in the data for both Argentina and Bolivia.[20]

Just as regional mortality levels differ within countries, so do both the levels of urban and rural mortality vary from region to region. The sometimes substantial variability in urban, or municipal, mortality is well illustrated by the Brazilian data. In addition, within regions of a country one consistently finds differences between the levels of mortality in cities or towns and in the countryside. Currently, the best set of compatible estimates of urban/rural differentials for a number of countries has been made using indirect methods. These estimates are summarized in table 46 in terms of the estimated number of survivors at exact age 2 out of every 1,000 live births. In every case the national figures show a higher urban than rural survivorship, but the same is not true of all national subdivisions. At the upper end of the ranges of survivorship for subdivisions, there is either no difference or a higher survivorship in rural than in urban areas in three instances (Colombia, the Dominican Republic and El Salvador). At the lower end of the ranges, urban survivorship is lower than rural in four instances (Colombia, the Dominican Republic, Nicaragua and Paraguay). In sum, there is a broad range of overlap in urban and rural survivorship by geographical subdivision within countries, and urban mortality is not always lower than rural in these data.

Thus, although on the face of it, national-level data show lower average urban than rural mortality and reinforce the notion that the availability of public health and medical services in cities and towns are the primary determinants of the differentials, the proposition is not so well supported by disaggregated data. On the contrary, such data indicate that the variability found in urban and rural mortality can be explained almost exclusively by differences in the socio-economic structure of each type of area. Specifically, if the data are controlled completely for differences in socio-economic status, it appears that virtually all urban/rural differentials for a given territory vanish. That this is likely true is indicated, albeit very crudely, by the data in table 47, which show levels of child survival for national urban and rural aggregates according to general levels of education of

mortality must be considered in terms of both the other figures for the country and recent attempts by the Government to improve the quality of the data.

Although there is no single trend evident from the time series for the countries of Latin America, it is clear from the data available (presented in the forthcoming United Nations report on mortality) that since 1950 substantial progress has been made in reducing infant mortality. Around 1950, infant mortality rates well in excess of 100 were common, and the lowest figures exceeded 60 per 1,000 live births. By the early 1970s, the rates in many areas had been reduced by half or more. Nevertheless, in some countries infant mortality rates have remained very high, as in Bolivia where it still exceeds 160, with the result that the national range of infant mortality rates in Latin America has increased significantly during the past quarter of a century. If Jamaica and Bolivia are taken as defining that range during the 1970s, the high rate of the latter country is over six times that of the former. By contrast, the Haitian rate around 1960 was substantially less than three times the rate for Puerto Rico at the same time.

Regional, urban-rural and socio-economic differentials in mortality

Within countries, mortality levels—and perhaps sometimes trends and patterns—differ according to individual or

[20] José M. Pujol, *Chile: tablas abreviadas de mortalidad a nivel nacional y regional, 1969-1970*, CELADE Series A, No. 141 (Santiago, Chile, 1976); Jorge L. Somoza, "La mortalidad en la Argentina entre 1869 y 1960", in Centro Latinoamericano de Demografía, *Temas de población de la Argentina, aspectos demográficos*, CELADE Series E, No. 13 (Santiago, Chile, 1973), pp. 21-40; and Maria S. Müller, *Tablas de mortalidad para la ciudad de Buenos Aires, 1970* (Buenos Aires, INEC, 1975), pp. 18, 26, 41 and 56; and *idem*, "La mortalidad en la Argentina: su evolución historica y situación a 1970* (Santiago, Chile, Centro Latinoamericano de Demografía and CENEP). For a more complete discussion of the differentials mentioned here and for the citations for Brazil, see *Levels and Trends of Mortality Since 1950* (forthcoming).

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TABLE 45. INFANT MORTALITY RATES, LATIN AMERICA, 1960-1975

Region and country	Infant mortality rates $(1,000\,q_0)$ both sexes combined			
	1960	1965	1970	1975
Caribbean				
Barbados	71.7[a]	...	46.3	...
Cuba	62.1	48.5	37.8	45.5[b]
Dominican Republic	...	102.4[c]	...	94.0[d]
Guadeloupe	...	48.3[e]	...	...
Jamaica	55.7[a]	...	34.9[c]	26.6[b]
Martinique	...	43.4[e]	...	...
Puerto Rico	44.2[a]	...	28.5[f]	26.9[g]
Trinidad and Tobago	48.5[a]	...	34.4	...
Middle America				
Costa Rica	...	80.1[h]	...	49.4[i]
El Salvador	77.0[j]	...	...	...
Guatemala	110.5[k]	...	...	102.4[l]
Honduras	...	...	115.6[m]	...
Mexico	73.7	...	67.8	...
Nicaragua	...	...	125.0[d]	...
Panama	75.3[n]	...	50.9[f]	...
Temperate South America				
Argentina	55.1[a]	...	59.6[f]	...
Chile	114.6[e]	107.1	77.0[o]	...
Uruguay	...	49.8	43.9[f]	...
Tropical South America				
Bolivia	...	...	...	162.5
Brazil	...	69.4[c]	...	...
Colombia	...	111.0[p]	...	97.4[l]
Guyana	54.6[a]	48.4	...	...
Peru	...	...	141.9[q]	118.7[r]
Suriname	...	33.6	...	...
Venezuela	55.5[s]	...	51.0[t]	...

Sources: Unless otherwise noted, rates are simple averages of the male and female figures given in table 44. Data from table 44, supplemented by infant mortality rates based on birth and death registration statistics reported to be at least 90 per cent complete, as given in United Nations, *Demographic Yearbook,* various issues.

[a] 1959-1961.
[b] 1974.
[c] 1960-1970.
[d] Based on female infant mortality rates and an assumed ratio of male to female infant mortality of 1.2.
[e] 1963-1967.
[f] 1969-1971.
[g] 1971-1973.
[h] 1962-1964.
[i] 1972-1974.
[j] 1960-1961.
[k] 1963-1965.
[l] 1973.
[m] 1971-1972.
[n] Average of 1960 and 1960-1961.
[o] 1969-1970.
[p] 1964.
[q] 1972.
[r] 1974-1976.
[s] 1961.
[t] 1971.

Figure VII. Relationship of infant mortality and life expectancy at birth, selected countries of Latin America
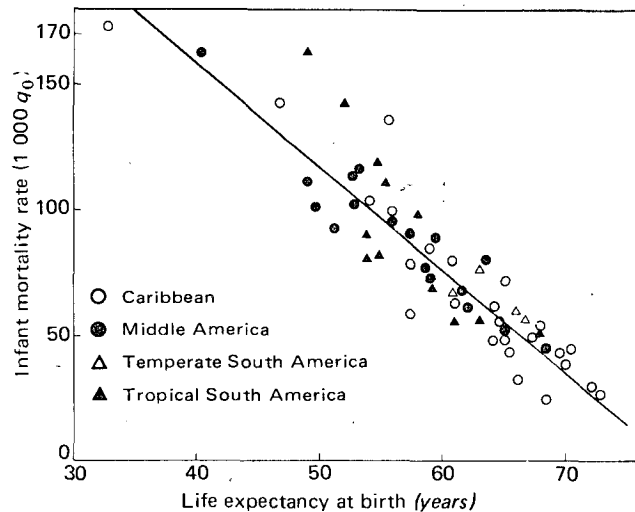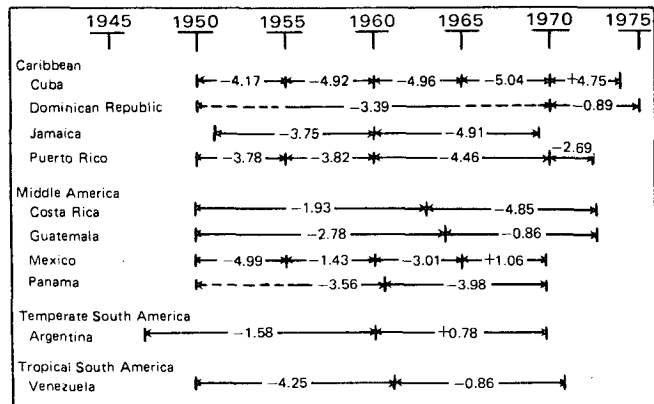

Figure VIII. Annual average percentage rates of change in infant mortality, selected countries of Latin America, 1950-1975

more refined measurements would show no significant difference between urban and rural mortality within similar socio-economic groups in carefully defined territorial boundaries. On the other hand, the class disparities in child mortality revealed in table 47 are extremely large. If translated into estimates of life expectancy at birth, they typically imply a gap of 10-15 years between families in which the wife has no education and those in which she has completed from seven to nine years of schooling.

Morbidity and causes of death

Wherever there are differentials in mortality among populations or subgroups, there are also differentials in the frequencies or prevalence of different diseases and in the causes of death. As discussed in the *1977 Monitoring Report,* for example, it is well established that under-nutrition is a malady which affects the poor almost exclusively, that it is a precursor of various diseases and that it is often an associated or immediate cause of a large proportion of

the children's mothers. Mother's educational attainment is taken as a surrogate measure of family socio-economic status. Although it is only a rough approximation, it nevertheless produces striking results. Almost without exception (which may be explained by the uneven quality of the data, sample sizes and the imprecision of methodologies used and in other ways), the level of child survivorship increases with mother's education, and within each educational category the range of difference between urban and rural childhood survival all but disappears. It can scarcely be doubted that

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TABLE 46. CHILD SURVIVORSHIP DURING THE FIRST TWO YEARS OF LIFE,
LATIN AMERICA, URBAN AND RURAL AVERAGES AND REGIONAL RANGES

Country	Census date	Number of survivors at exact age 2 (l_2) per 1,000 live births		
		Total	Urban	Rural
Bolivia	1975	798	834	776
3 regions		855-782	885-796	828-764
Chile	1970	909	916	888
13 regions		939-881	938-888	911-868
Colombia	1973	912	925	891
23 departments		952-830	952-825	952-838
Costa Rica	1973	919	940	908
7 provinces		940-894	952-910	926-886
Dominican Republic[a]	1975	877	885	870
6 regions		907-850	903-837	913-854
Ecuador	1974	873	902	855
3 regions		879-865	907-899	866-842
El Salvador	1971	855	861	852
14 departments		881-821	882-827	888-818
Guatemala	1973	851	880	839
4 regions		913-826	918-850	889-829
Nicaragua	1971	851	857	848
16 departments		871-821	874-816	866-818
Paraguay	1972	925	931	923
17 departments		940-886	940-879	936-893
Peru	1972	831	868	787
24 departments		910-731	911-770	875-718

Sources: Hugo Behm and others, La Mortalidad en los primeros años de vida en países de la América Latina (San José, Costa Rica, Centro Latinoamericano de Demografía, various dates). Individual volume for each country.

[a] Excluding data for Region XI in the Dominican Republic; l_2 not calculated because there were fewer than 100 children for the women in the group.

deaths in Latin America, as it is in Asia and Africa. Unfortunately, it is not possible accurately to identify either national or regional levels, trends and patterns of disease and causes of death for Latin America. In only a couple of countries are cause-of-death data considered to be nearly complete, by which it is meant that less than a quarter of all deaths fall in the residual category of ill-defined symptoms and unknown causes. Even in those countries for which acceptable data currently exist—Chile, Costa Rica, Mexico, Panama, Paraguay and Venezuela—time series of sufficient compatibility cannot be constructed to permit analysis of trends. Consequently, the discussion that follows must be rather tentative and incomplete.

Among the six countries mentioned above, the 10 leading causes of death around 1970, for people of all ages, in each case includes the following six clusters: (1) influenza and pneumonia; (2) enteritis and other diarrhoeal diseases; (3) heart diseases; (4) malignant neoplasms; (5) cerebrovascular diseases; and (6) accidents (see table 48). Tuberculosis is among the 10 leading causes of death in five of the six countries; and birth injuries, difficult labour and other anoxic conditions are among the leading 10 in four of the six. The first two clusters of diseases reportedly accounted for between 14 and 30 per cent of all deaths in each country around 1970. The 10 leading causes of death accounted for just over 50 per cent of all deaths in Paraguay in 1971 and over 70 per cent of all deaths in Chile the previous year. The percentages for the other four countries fell between these two figures.

The degree to which preventable or controllable diseases elevate mortality and reduce life expectancy is somewhat obscured by the data given above, as such diseases afflict the young most heavily. Thus, in the age group 1-4 years, anywhere from well over a third to well over half of all deaths in each country were caused by the diseases in the first two clusters mentioned above or by either measles or avitaminoses and nutritional deficiencies. A broader grouping of preventable and controllable diseases—which, in addition to the four clusters just mentioned, includes tuberculosis; bronchitis, emphysema and asthma; anaemias, whooping cough and acute poliomyelitis—would raise the reported percentages of all deaths in the age group 1-4 to a range of from 42 to 64 per cent.

The extent to which infectious and parasitic diseases are related to life expectancy has been dramatically illustrated in a study done by the Latin American Demographic Centre (CELADE).[21] Figure IX summarizes the results for four groups of countries of Latin America in 1965. The data point for each group is determined by the average estimated life expectancy at birth for that year and the estimated percentage of all deaths caused by infectious and parasitic diseases. The curve demonstrates a nearly perfect linear inverse relationship between life expectancy and the proportion of deaths caused by said diseases. Especially for the lower life expectancies, this curve is a useful predictor of

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[21] Centro Latinoamericano de Demografía, Determinantes de la evolución de la población: mortalidad (Santiago, Chile, 1970).

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Country	Census date		Mother's educational attainment (years of instruction)					
			None	1-3	4-6	7-9	10 or more	12 or more
Bolivia 1975		Total	755	791	824	890[a]	. . .	. . .
		Urban	788	795	834	900[a]	. . .	. . .
		Rural	745	792	819	856[a]	. . .	. . .
Chile 1970		Total	869	892	908	934	954	. . .
		Urban	875	896	911	935	953	. . .
		Rural	864	887	895	921	[b]	. . .
Colombia 1973		Total	874	905	937[c]	958[d]	968[e]	969
		Urban	878	914	943[c]	958[d]	970[e]	971
		Rural	871	896	915[c]	954[d]	935[e]	[b]
Costa Rica 1973		Total	875	907	930	949	967	. . .
		Urban	908	917	942	946	968	. . .
		Rural	873	904	921	960	963	. . .
Dominican Republic 1975		Total	837	869	892	917	945	. . .
		Urban	829	865	896	918	951	. . .
		Rural	841	870	888	917	[b]	. . .
Ecuador 1974		Total	824	866	899	939	954	. . .
		Urban	827	875	911	942	956	. . .
		Rural	824	862	887	925	939	. . .
El Salvador 1971		Total	842	858	889	942	970	. . .
		Urban[f]	816	864	902	963[a]	. . .	. . .
		Rural[g]	844	856	882	940[a]	. . .	. . .
Guatemala 1973		Total	831	875	915	942	974	. . .
		Urban	837	887	923	940	975	. . .
		Rural	830	868	895	961[a]	. . .	. . .
Nicaragua 1971		Total	832	858	885	927	952	. . .
		Urban	815	855	886	931	950	. . .
		Rural	837	862	880	[b]	[b]	. . .
Paraguay 1972		Total	896	920	939	955	973	. . .
		Urban	894	911	942	955	976	. . .
		Rural	897	922	938	959	[b]	. . .
Peru 1972		Total	. . .	793[h]	864[i]	898[j]	923[k]	930[l]
		Urban	. . .	824[h]	873[i]	901[j]	924[k]	931[l]
		Rural	. . .	777[h]	844[i]	880[j]	903[k]	899[l, m]

Sources: Hugo Behm and others, *La Mortalidad en los primeros años de vida en paises de la América Latina* (San José, Costa Rica, Centro Latinoamericano de Demografía, various dates). Individual volume for each country.

[a] Seven or more years of instruction.
[b] Not calculated because the women as a group had fewer than 100 children.
[c] From four to five years of instruction.
[d] From six to eight years of instruction.
[e] From 9 to 11 years of instruction.
[f] Urban San Salvador.
[g] Remainder of El Salvador.
[h] Less than three years of instruction.
[i] Did not complete primary education.
[j] Primary level completed.
[k] Secondary education not completed.
[l] Secondary or higher education completed.
[m] Estimate based on sample of women who as a group had fewer than 100 children.

the effects reductions in such diseases are likely to have on mortality because these diseases are the principal killers in high-mortality areas. Thus, although the curve illustrates international relationships between life expectancy and the proportion of deaths caused by infectious and parasitic diseases at a single point in time, it is equally useful as a graph of changes that can occur over time within a single country.

C. PERINATAL AND MATERNAL MORTALITY

Any attempt to monitor levels and trends of mortality for national populations on an annual, or even a biennial, basis inevitably confronts a number of important problems. First, such a monitoring process necessarily implies a regular flow of data from year to year. Annual data on perinatal and maternal mortality can, in practice, only come from systems of vital registration or from continuous surveys. And, as was detailed in the *1977 Monitoring Report,* very few such systems or surveys are in operation in the developing countries. A second problem, also stressed in the first report, is that the error attached to estimates of mortality levels in most of the developing countries is almost always large enough to preclude comparisons over short periods of time. Indeed, some methods of estimation of infant and child mortality give results that cannot in any straightforward sense be termed time-specific. For these and related reasons any assessment of very recent mortality levels and trends is necessarily biased towards an examination of the experience of the more developed countries.

Perinatal mortality

Perinatal mortality is the death of foetuses during or after the twenty-eighth week of gestation and of infants during the first week of life. The *1977 Monitoring Report* presents

Cause of death	1965 ICD "B" list no.	All ages						Ages 1-4					
		Chile, 1970	Costa Rica, 1971	Mexico, 1971	Panama, 1971	Paraguay, 1971	Venezuela, 1971	Chile, 1970	Costa Rica, 1971	Mexico, 1971	Panama, 1971	Paraguay, 1971	Venezuela, 1971
1. Influenza and pneumonia	B31,B32	1	4	1	2	3	5	1	2	2	1	2	2
2. Heart diseases	B25,B29	2	1	3	1	2	1	10		9			
3. Malignant neoplasms	B19	3	2	5	3	4	2	8					10
4. Cerebro-vascular disease	B30	4	6	6	6	5	7						
5. Enteritis and other diarrhoeal diseases	B4	5	3	2	5	1	3	2	1	1	2	1	1
6. All other external causes	BE50	6		4			10	3		8			
7. Accidents	BE47,48	7	5	8	4	6	4	4	4	6	7	6	4
8. Cirrhosis of the liver	BE37	8		7									
9. Birth injuries etc.	B43	10	8		8		6						
10. Tuberculosis	B4,B6	9		9	10	9	9				9		
11. Bronchitis, emphysema, asthma	B33		7		9	10			3	7	5	5	6
12. Congenital anomalies	B42		9				8	9	10			9	8
13. Diabetes mellitus	B21		10	10									
14. Measles	B14					7	8	5	5	3	3	3	3
15. Avitaminoses, nutritional deficiencies	B22						7	6	9	5	6	4	5
16. Meningitis	B24							7	6		10	8	7
17. Anaemias	B23								7	10	8	7	9
18. Whooping cough	B9								8	4	4		
19. Acute poliomyelitis	B12											10	
Sum of 1, 5, 14, 16 as percentage of total		21.5	18.4	29.3	16.1	24.5	14.1	55.8	39.7	56.0	46.8	57.7	38.1
Sum of 1,5,10,11,14,15,17,18,19 as percentage of total		24.6	21.3	31.3	18.6	29.0	15.6	58.3	50.5	64.4	62.8	64.3	41.7
Percentage of all deaths due to accidents	BE47,BE48	4.0	6.5	2.3	5.8	3.5	7.0	7.8	4.9	2.4	2.3	2.5	6.4
Percentage of deaths among the 10 leading causes		71.5	62.9	56.6	54.0	50.5	53.8	80.2	60.4	70.2	66.7	69.2	53.4
Percentage due to all other causes		28.5	37.1	43.4	46.0	49.5	46.2	19.8	39.6	29.8	33.3	30.8	46.6

Source: World Health Statistics Report, vol. 27, Nos. 3-4 (1974), pp. 153-156 and 159-162.

NOTE: ICD = International Classification of Diseases.

perinatal mortality rates for selected more developed countries for years up to and including 1972. Table 49 presents data through 1975, where available, for the same countries. These data support the general conclusion that perinatal mortality has continued to decline during recent years. Excluding Australia and Romania, the most recent perinatal mortality rates given in table 49 are lower than those in either 1970 or 1972. The Australian rates suggest that perinatal mortality in that country has levelled off at somewhere between 20 and 22 per 1,000 live births. The Romanian data are somewhat harder to interpret, since they may reflect either a levelling off or a pause in what may prove to be a continuing decline. Despite the continued recent decline, however, it is clear that even in the more developed countries there is considerable room remaining for improvement if Sweden is used as the yardstick. It is also noteworthy that, although it has the world's lowest perinatal mortality rate, Sweden registered one of the largest average annual reductions in its rate (8.1 per cent) as it dropped to 11.0 per 1,000 live births in 1975.

The results of a major study, sponsored by WHO, in eight countries (Austria, Cuba, Hungary, Japan, New Zealand, Sweden and part of the United States of America) highlight patterns and causes of perinatal mortality. A similar pattern of social and biological factors was associated with perinatal mortality rates in each country. The study indicates that, in general, the level of perinatal mortality in a population increases with the proportion of births occurring with a gestation period of less than 37 weeks. In addition, it was found that in most countries the optimum interval between births was from 18 months to 3 years and that infants born after a shorter birth interval were at markedly greater risk. Consequently, childbirth spacing or family planning alone may have a positive effect in bringing down perinatal mortality rates. Other factors that apparently elevate perinatal mortality are births to high-parity mothers and to either very young or old mothers. Infants born in plural births (twins, triplets etc.) face a sixfold risk as compared with singletons. Low birth weight, however, appears to be the major factor in determining the perinatal mortality rate in a country. In all of the eight countries included in the study, male mortality was greater than female during the early neonatal period, and the difference was particularly large among infants having a birth weight of between 2,000 and 2,999 grams.[22]

[22] World Health Organization, Social and Biological Effects on Perinatal Mortality, vol. I, Report of an international comparative study (Geneva, in press).

Figure IX. Percentage of deaths caused by infectious and parasitic diseases according to levels of life expectancy at birth, Latin America, 1965

Percentage
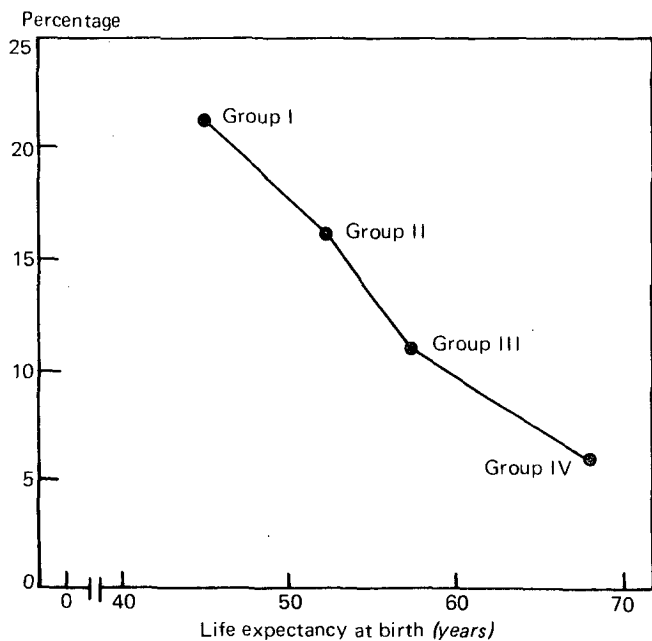
Source: Centro Latinoamericano de Demografía, *Determinantes de la evolución de la población: mortalidad* (Santiago, Chile, 1970), figure 4.

NOTES: Group I: Bolivia, Guatemala, Haiti, Honduras, Nicaragua and Paraguay.

Group II: Colombia, Costa Rica, Ecuador, El Salvador, Peru and Dominican Republic.

Group III: Brazil, Chile and Mexico.

Group IV: Argentina, Cuba, Panama, Uruguay and Venezuela.

The same study shows that, like infant mortality, perinatal mortality rates are inversely related to socio-economic status, which is to say that perinatal mortality is higher in lower classes than in higher classes of society. Education proved to be a better index of socio-economic status gradients than occupation in those countries for which both types of measure were possible. Higher perinatal mortality rates were associated with women of lower socio-economic status largely because their children tended to have a lower birth weight and a shorter period of gestation, and because the mothers had a higher parity than women of higher socio-economic status. In addition, a higher than average proportion of births to women of lower socio-economic status occurred outside the optimum maternal age range. Moreover, although the definition of "legitimate" varied greatly among participating countries, higher than average perinatal mortality rates were associated with illegitimacy in all countries, but there were indications that much of the higher perinatal mortality could be ascribed to the generally lower birth weights of illegitimate children. Lastly, no consistency was found in the urban-rural differentials. In three of the four European countries (England and Wales, Austria and Hungary), the urban perinatal mortality rates exceeded the rural; whereas in Cuba, Japan and the United States the reverse was the case, and in Sweden and New Zealand no significant differentials were found.

The results of the international comparative study pertain largely to a group of countries that must be classified as "developed". The little information available concerning perinatal mortality in less developed countries indicates, first, that the mortality rates are considerably higher than in the more developed countries. Rates ranging from 40 to 80 per 1,000 live births are apparently quite common. Secondly, it is certain that some of the main factors (most notably, low birth weight), which were found to be associated with higher than average perinatal mortality in the eight-country study, are also of critical importance in the less developed regions. Thus, it has been estimated that 94 per cent of the approximately 22 million low birth-weight babies born during 1975 were born in less developed countries.[23] Also, a recent study of 11,845 deaths which occurred in Indian teaching hospitals over a two-year period found both that perinatal death rates were higher for higher parity births and that perinatal mortality was several times higher among the lower than among other socio-economic groups.[24]

Maternal mortality

Maternal mortality, as used here, includes all deaths attributed to complications of pregnancy, childbirth and the puerperium, excluding abortion-related mortality. Table 50 updates the previous monitoring report by providing unstandardized non-abortion maternal mortality rates for selected countries since 1970. The data for more developed countries were chosen so as to include relatively few rates that were based on fewer than 30 maternal deaths each year. It is not possible to be so selective among the less developed countries, for which very few pertinent data are available. Moreover, the quality of data, especially for the less developed countries, gives cause for concern. One study has found that in some Latin American cities maternal mortality deaths were under-recorded by as much as 60 per cent.[25] In countries where a large proportion of deaths are attributed to "symptoms and ill-defined causes", the under-registration of maternal mortality may be even higher. Thus, for many less developed countries the data in table 50 may reflect nothing more than the tip of an iceberg, particularly when it is recalled that abortion-related maternal mortality could increase those figures by as much as 40 per cent or more.

Table 50 shows that there are substantial differences between the levels of maternal mortality in the more developed and the less developed countries, but it also shows that in most cases maternal mortality has continued to decline during recent years. Although the decline in maternal mortality appears to have been both real and substantial, some

[23] See, for example, A. Lechtig and others, "Low birth weight babies: world-wide incidence, economic cost and program needs", in G. Rooth and L. Engstrom, eds., *Perinatal Care in Developing Countries* (Uppsala, Perinatal Research Laboratory, 1977).

[24] M. K. Krishna Menon, "Perinatal mortality in India", in G. Rooth and L. Engstrom, *op. cit.* See also *New Trends and Approaches in the Delivery of Maternal and Child Care in Health Services*, Sixth Report of the WHO Expert Committee on Maternal and Child Health, Technical Report Series, No. 600 (Geneva, 1976).

[25] Ruth Rice Puffer and G. Wynne Griffith, *Patterns of Urban Mortality* (Washington, D.C., Pan American Health Organization, 1967).

Major area and country	1970	1971	1972	1973	1974	1975	Average annual percentage change between 1970 and most recent available year
Northern America							
Canada	21.8	20.1	19.2	17.7	. . .	. . .	−6.9
United States of America	. . .	26.3	. . .	23.6	22.2	. . .	. . .
East Asia							
Japan	21.3	20.5	19.0	18.0	. . .	16.1	−7.0
Europe							
Austria	26.7	25.9	26.1	24.8	23.2	21.3	−4.5
Bulgaria	18.8	19.1	18.7	19.1	18.0	. . .	−1.1
Denmark	17.9	17.4	16.2	14.6	13.1	. . .	−7.8
German Democratic Republic	21.5	20.4	19.4	. . .	18.1	. . .	−4.3
Greece	27.4	27.9	27.4	25.8	26.1	25.8	−1.2
Hungary	34.1	34.9	33.4	33.6	34.4	31.6	−1.5
Ireland	24.3	22.8	23.5	23.1	. . .	. . .	−1.7
Luxembourg	24.7	21.6	16.2	17.9	16.8	16.1	−8.5
Netherlands	18.6	17.6	16.7	16.4	16.9	14.0	−5.7
Norway	19.1	17.7	17.6	16.8	15.7	14.2	−5.9
Poland	24.1	22.6	21.5	21.3	20.7	19.6	−4.1
Portugal	38.1	37.2	35.2	33.8	32.7	. . .	−3.8
Romania	24.2	20.9	19.3	19.3	19.4	. . .	−5.5
Sweden	16.5	15.6	14.4	14.1	12.9	11.0	−8.1
Switzerland	18.1	17.0	17.5	15.5	. . .	13.5	−5.7
United Kingdom							
England and Wales	23.5	22.3	22.0	21.3	20.6	19.9	−3.3
Northern Ireland	27.6	27.2	26.3	25.9	25.6	. . .	−1.9
Scotland	24.8	24.5	24.0	22.7	23.1	21.3	−3.0
Yugoslavia	24.9	23.6	22.8	23.4	22.3	. . .	−2.7
Oceania							
Australia	21.3	20.1	22.5	22.4	22.2	. . .	+1.0
New Zealand	19.6	19.3	. . .	16.6	16.6	16.5	−3.4

Sources: Data taken from World Health Organization, *World Health Statistics Annual, 1973-1976* and *1977* (Geneva, 1976 and 1977). Perinatal mortality rates for 1975 mostly taken directly from World Health Organization data bank.

figures, particularly for less developed countries, should be viewed with caution because they may reflect changes in the coverage of registration as much as changes in maternal mortality rates. This said, among the more developed countries represented in table 50, maternal mortality rates in 1970 ranged from 73.5 per 100,000 live births for Portugal to 7.7 for Finland. By 1974 the rates for the same two countries had dropped to 40.1 and 3.2, a rather remarkable decline over such a short period of time.

The *1977 Monitoring Report* states that the age pattern of maternal mortality is essentially J-shaped. Maternal mortality is usually lowest between 20 and 24 years of age. The Sixth Report of the WHO Expert Committee on Maternal and Child Health[26] points out that recent studies have shown that, at least in less developed countries, there is also a J-shaped pattern among maternal mortality rates when they are distributed according to the number of pregnancies a woman has had. Maternal mortality has been found to be high for the first pregnancy, to drop to lower levels for the second and third, to rise at the time of the fourth pregnancy and to reach high levels again at the fifth. Multiparity thus plays an important role in maternal mortality among less developed countries where fertility is high and nearly 40 per cent of all deliveries result from fourth or higher order

pregnancies. That report also shows that exceptionally short or long birth intervals are associated with higher maternal mortality as well as with higher perinatal mortality. The Expert Committee concluded that obstetrical causes of maternal mortality follow the same pattern in both more and less developed countries but at much higher levels in the latter group. There is every reason to think that maternal mortality rates, like other mortality rates, vary inversely with socio-economic status, even though the subject has not been studied carefully.

Although maternal mortality has been declining in most countries for which there are data, there are some notable exceptions. The figures for the Bahamas and the Philippines given in table 50 show a slight increase in maternal mortality rates between 1970 and 1974. The Expert Committee found indications that maternal mortality also increased in Colombia, Mauritius and Trinidad during the period from 1966 to 1972.[27] The most likely explanation for this phenomenon is that during each interval the registration of maternal deaths improved rather than that the real death rate increased. None the less, as a general conclusion, it is probably true to say that during recent years the most marked relative decreases in maternal mortality have continued to occur in countries with already low maternal mortality rates and higher levels of socio-economic development. It may

[26] *New Trends and Approaches in the Delivery of Maternal and Child Health Care in Health Services*, p. 89.

[27] *Ibid.* ♦

TABLE 50. MATERNAL MORTALITY RATES[a] PER 100,000 LIVE BIRTHS, SELECTED COUNTRIES, 1970-1975

Major area and country	1970	1971	1972	1973	1974	1975	Percentage change between 1970 and most recent available year[b]	Average annual percentage decline
Africa								
Cape Verde	277.2[c]	147.5[c]	...	118.8[c]	82.4[c]	...	(−70)	−30.0
Mauritius	118.6[c]	82.0[c]	88.2[c]	67.6[c]	89.1[c]	...	(−25)	−7.1
Latin America								
Bahamas	93.9[c]	67.2[c]	106.6[c]	117.5[c]	114.1[c]	...	(+21)	+4.8
Costa Rica	105.6	90.5	83.6	69.2	45.8	...	−57	−20.9
Ecuador	220.3	194.7	191.0	181.3	...	...	−18	−6.5
Mexico	135.3	138.6	122.5	110.8	...	...	−18	−6.6
Panama	118.2	105.6	102.0	97.9	83.1	...	−30	−8.8
Puerto Rico	26.7[c]	28.1[c]	36.3[c]	10.2[c]	...	...	(−62)	−32.0
Northern America								
Canada	16.4	16.6	15.3	10.5	...	...	−36	−14.8
United States of America	18.1	17.2	16.6	14.1	13.8	...	−24	−6.8
East and South Asia								
Hong Kong	17.7[c]	12.5[c]	16.2[c]	8.5[c]	15.6[c]	...	(−12)	−3.1
Israel	21.9[c]	12.8[c]	17.5[c]	12.4[c]	11.7[c]	...	(−47)	−15.6
Japan	50.0[c]	43.3[c]	39.4[c]	37.1[c]	33.5[c]	27.6	(−45)	−11.9
Jordan	46.9	51.4	54.8	41.8	19.6	...	−58	−21.8
Kuwait	11.8[c]	25.3[c]	13.3[c]	17.4[c]	12.2[c]	...	(+3)	+0.8
Philippines	132.0	130.8	142.4	...	137.8	...	+4	+1.0
Europe								
Austria	23.2[c]	25.8[c]	22.1[c]	10.2[c]	18.5[c]	16.0	(−31)	−7.4
Bulgaria	31.7	25.8	19.0[c]	18.6[c]	20.1[c]	16.6	(−48)	−12.9
Czechoslovakia	20.6	16.0	15.1	12.7	...	...	−38	−16.1
Denmark	8.5	5.3[c]	4.0[c]	2.8[c]	5.6[c]	5.6	(−44)	−8.3
Finland	7.7	8.2[c]	10.2[c]	7.0	3.2[c]	...	(−59)	−21.9
German Democratic Republic	32.1	28.1	24.4	23.8	17.9	22.0	−41	−7.5
Greece	28.3	40.4	29.8	25.4	18.0[c]	...	(−44)	−11.3
Hungary	33.6	29.2	34.6	32.6	36.0	22.2	−44	−8.3
Norway	10.8[c]	18.3[c]	6.2[c]	3.3[c]	...	...	(−69)	−39.5
Poland	26.9	21.3	17.0	17.0	16.9	14.3	−47	−12.6
Portugal	73.5	46.6	43.5	52.2	40.1	37.7	−49	−13.3
Romania	42.2	—	34.9	38.3	30.9	...	−27	−7.8
Spain	30.8	28.6	29.0	24.2	...	...	−21	−8.0
United Kingdom								
England and Wales	14.5	13.5	11.9	11.2	10.9	...	−25	−7.1
Scotland	19.5[c]	13.8[c]	12.7[c]	18.8[c]	20.0[c]	...	(+3)	+0.6
Oceania								
Australia	20.2	14.5	10.2[c]	10.9[c]	...	...	(−44)	−20.6
New Zealand	30.5[c]	21.6[c]	14.2[c]	23.1[c]	...	...	(−24)	−9.3

Sources: Demographic Yearbook 1974 (United Nations publication, Sales No. E/F.75.XIII.1), pp. 306-309; and World Health Organization data bank.

[a] Rates are the number of maternal deaths (caused by delivery and complications of pregnancy, childbirth and the puerperium) per 100,000 live births, specifically excluding deaths due to abortions.

[b] Percentage changes for countries with fewer than 30 maternal deaths are given in parentheses.

[c] Rates based on 30 or fewer maternal deaths.

be assumed that better maternal and child health facilities, lower levels of fertility and higher levels of living would all lead to a more rapid reduction of maternal mortality in less developed countries.

With the growing recognition of the importance of the health of women in the development process, it is becoming increasingly clear that the high maternal mortality found in less developed countries gives cause for concern. In many such countries, a woman's chance of surviving from age 15 to age 45 is lower than a man's, with the result that in some countries of Asia and Africa life expectancy at birth is lower for females than for males. Despite the known under-reporting, maternal mortality is still among the leading causes of death for women in the childbearing ages. It may be estimated that maternal mortality is among the five leading causes of death for women between the ages of 15 and 45 in close to nine out of every 10 less developed countries.

It may be among the first two leading causes of death for women the same ages in a third or more of those countries.

Conclusion

It may be concluded that the same general nexus of factors is associated with elevated perinatal as with elevated infant and childhood mortality and that many of the same factors affect maternal mortality rates. Particularly high and in some cases very low parity, multiple births, childbearing intervals that are less than optimum and maternal ages at the extremes of the reproductive cycle all appear to be shared factors in elevating perinatal and maternal mortality rates, as well as infant and, perhaps, childhood mortality rates. Low birth weights and unusually short periods of gestation also elevate perinatal mortality and arise from the same set

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of conditions that increase the risks of maternal mortality. Both within and between countries the principal correlate and, perhaps, determinant of the level of perinatal and maternal mortality differences appears to lie in the differing socio-economic statuses of individuals and groups. The root causes of excess mortality can probably be attributed to poor general health status, a poor level of living, inadequate maternal and child health facilities and related deficiencies. These causes are certainly more important than any biological considerations.

The world situation with respect to levels and trends in perinatal and maternal mortality remains essentially the same as outlined in the *1977 Monitoring Report*. The additional information provided in the present report, though marginal, indicates a continuing decline in both types of mortality in the countries for which there are data. It is probably true, however, that there has been little or no improvement during recent years in many of the less developed countries for which there are no data. Among the more developed countries, perinatal mortality and maternal mortality have continued to decline. Despite the predictions of some experts that they would soon reach an irreducible minimum or floor, based on the lowest levels found in such countries as Sweden, there is no evidence that this is about to happen. If Sweden represents the floor, it is a floor that is continuing to move downward. Furthermore, although there may be an element of convergence in recent trends, which is by no means certain, international and interregional differences remain very large, among both perinatal and maternal mortality rates, even among the more developed countries.

Lastly, looking to the future, the collection, analysis and dissemination of good data on mortality levels and trends should be given high priority. There should be a greater standardization in the type of data as well as general improvement in the quality of data collected. Among other things, there is a need for much greater standardization when recording cause of death. Currently, a high proportion of deaths are assigned to non-specific causes, which makes direct comparisons between and within countries very difficult. In this respect, the introduction of a standard perinatal death certificate would be a useful first step. But, whatever else is done, it is imperative that the information which is collected and analysed be disseminated to the grass-roots—to the primary health care centres—for only at that level of implementation can it have an impact on the health of both mothers and children.

Chapter IV

INTERNATIONAL MIGRATION*

Since the middle of the decade, there have continued to be significant shifts in patterns and levels of international migration. Although most of the current patterns had begun to emerge by the mid-1970s, some features were largely unanticipated.

The predominant movement is from poorer to richer countries and especially to selected richer countries which are experiencing rapid economic growth. There is also a growing tendency for all concerned (that is, countries of origin and destination, as well as the migrants themselves) in many regions to view the move as temporary, rather than as a permanent resettlement. Thus, current patterns of international migration quite clearly reflect the prevailing international economic and social order.

Almost certainly the most rapidly changing regional focus of international migration at this time is the set of oil-producing countries of Northern Africa and Middle and Western South Asia. Migrants come from an ever-widening range of countries and participate in substantial figures at most levels of the labour forces of the countries to which they go.

At the global level, there is some indication that the movement of technical and professional personnel to the traditional rich countries of destination has levelled off or possibly even declined a bit. There continues to be a significant flow of undocumented migrants in many regions of the world.

This discussion considers separately current trends in each of the various leading types of international migration flows: long-term and permanent resettlement in general; the "brain drain"; labour migration; and undocumented movement. In practice, of course, it is not always easy to make a clear distinction between these different types of international migration. To some degree, the categories overlap. Nevertheless, the approach may be useful. First, it is with just such terminology that much of the discussion of international migration is currently conceptualized and responded to. Secondly, a report[1] covering aggregate international trends in migration for the period 1950-1975 has just been published; comparatively little new information of the kind that would alter the aggregate view (especially that based on population censuses) is available yet and so a routine update would involve a good deal of repetition. The following remarks are based largely on data that have recently become available and give attention especially to those situations for which there appears to have been some notable divergence after 1974 from prevailing trends. Wherever not specified to the contrary, the data used are those which come closest to the United Nations recommended definition of a long-term migrant—a person who has entered or left a country for one year or more.

A. LONG-TERM AND PERMANENT MOVES IN GENERAL

In Northern Africa, there appear to have been some substantial shifts in patterns and levels of international migration, mostly in response to rapid economic growth in resource-rich countries in the vicinity. Preliminary results of the 1976 census of Egypt suggest that it has moved somewhat away from its traditional role as a supplier of comparatively modest numbers of teachers and other better educated personnel to other countries of Northern Africa and Western South Asia. To the continuing flow of such emigrants there is now added an increased number of less well educated. It is estimated that as of 1976, between 1.4 million and 1.5 million Egyptians were resident outside the country (that is, about 3.5 per cent of the total population). Chief countries of destination are Kuwait, the Libyan Arab Jamahiriya and Saudi Arabia. On the other hand, as a receiving country, Egypt appears to have experienced a reduction in numbers of foreign-born residents. By 1976, fewer than 100,000 non-Egyptians were living in the country.

The Sudan also appears to have had a recent increase in emigration. It is estimated that between 100,000 and 150,000 Sudanese were outside the country in 1976, chiefly in Egypt, the Libyan Arab Jamahiriya and Saudi Arabia.

According to provisional tabulations of the 1973 census of the Libyan Arab Jamahiriya, some 9 per cent of the population, about 200,000 persons, were non-Libyans. Since that date, the inflow of foreigners has continued at a high rate. By early 1976, there were estimated to be some 270,000 expatriate workers in the country and their numbers were growing at well over 20 per cent per annum. The majority of these immigrants were from Egypt, with very large numbers coming also from the Syrian Arab Republic and Tunisia.

For the countries of the Maghreb, the severe curtailment of labour recruitment in Europe, and especially in France, has been associated with a marked slow-down of emigration after 1974. In the case of Algeria, there appears to have been an upturn in immigration from countries in the vicinity.

In sub-Saharan Africa, there is every indication that international movements continue to be substantial but there is no evidence to suggest that any major shifts in direction or magnitude have taken place during the most recent years.

In Western Africa, the predominant pattern continues to be one of movement from the interior towards the Atlantic Coast. The Ivory Coast is the leading country of immigration; some 1.4 million, or over 20 per cent of the population enumerated in the recent census (1975), were foreign nationals. Other countries in the region that have substantial proportions of foreign-born residents are the Gambia, Ghana and Senegal. The leading countries of emigration are Togo and the Upper Volta, each with well over 10 per cent of the population living outside the country. In all, it is estimated that some 2.8 million persons from within the region are living in a country other than their own in Western Africa.

The major international flow in Southern Africa continues to be the movement of workers into South Africa from countries in the vicinity. There has been little change in the magnitude of the flow, which amounts to some 250,000 per annum. However, there has recently been a decline in intercontinental immigration. Southern Rhodesia has recently experienced a net outflow of non-African migrants, a great many of whom are presumably intercontinental movers.

In Asia, the leading international flows of long-term migrants fall mainly into one of the two broad categories. The most important is the large recent growth in the number of migrant workers and members of their families, who have moved from countries throughout Asia and elsewhere into the oil-producing countries of Western South Asia. Secondly, there is a continuing movement of long-term or permanent migrants towards some of the more highly developed countries.

The leading countries of labour immigration in Asia are Bahrain, Iran, Kuwait, Oman, Qatar, Saudi Arabia and the United Arab Emirates. In all, it is estimated that there were some 3 million migrants (including both workers and dependants) in these countries as of 1975 and it is almost certain that the number has increased substantially in most of the countries since then.

Reliable information about movement into the region is not easy to obtain for all countries. It must be recognized that in some cases, estimates have substantial margins of possible error. The estimates reported here are those which appear to be the most firmly based on the best available sources and analysis.[2] The largest number of migrants are found in Saudi Arabia. Detailed results of the 1975 census have not yet been made available, but it is generally estimated that there were on the order of 1.5 million foreigners in the country in 1975 and that the number has increased since then. It is likely that between one fifth and one fourth

[2] Migration and employment data for this region have been most systematically reviewed by the International Migration Project of the Department of Economics of the University of Durham, England. The project was commissioned by the International Labour Office. See, for example, J. S. Birks and C. A. Sinclair, "A preliminary assessment of labour movement in the Arab region: background, perspectives and prospects", World Employment Programme working paper, WEP-2-26/WP.15, Geneva, 1977.

of the population is of expatriate origin. Countries of origin are also unspecified. However, India and Pakistan are generally believed to be major source countries along with migrants from within the Arab world. There are also reports of smaller but significant numbers of migrants from elsewhere in Asia, including those from Bangladesh, the Philippines and the Republic of Korea.

Other major receiving countries include Kuwait and the United Arab Emirates, both of which reported some 500,000 expatriates in their population in 1975. Thus, over half of the total population of Kuwait and over three fourths of that of the United Arab Emirates are foreigners. In Kuwait, about 40 per cent of the expatriates are of Jordanian/Palestinian origin. Another 12 per cent are Egyptian and there are also substantial numbers of Iraqis and Syrians. About 20 per cent of the foreigners are of non-Arab origin, mostly from India, Iran and Pakistan. The United Arab Emirates has received some two thirds of their migrants from India and Pakistan (slightly more from the latter). There are also very large numbers from Iran and Egypt.

Iran was estimated to have 180,000 immigrant workers in 1975. About two thirds were from Afghanistan and another 15 per cent were from the United States of America. Recent political events in Iran have almost certainly led to changes in the situation. Qatar had over 115,000 foreigners who made up nearly 70 per cent of the total population. Over half were from India and Pakistan.

It is estimated that there were well over 70,000 foreigners in Oman; over half were from India and more than a third from Pakistan. There were well over 35,000 immigrants in Bahrain, with substantial numbers from India, Iran, Oman and Pakistan.

It is rather more difficult to obtain detailed information about levels of emigration than of immigration. However, it is clear that the leading countries of emigration in Asia sending migrants into the oil-producing countries of Western South Asia are Democratic Yemen, Jordan, Lebanon, Oman, the Syrian Arab Republic and Yemen; and of continuously increasing importance, India and Pakistan. From farther away (Bangladesh, the Philippines and the Republic of Korea) and from outside Asia (Egypt, the United Kingdom and the United States of America), there are reports of notable flows.

It is important to observe that although countries may be usefully categorized as either chiefly origins or destinations in these flows, the actual movements are a good deal more complex. First, there is of course some amount of interchange in both directions among almost all countries involved. Thus, some 12,500 Saudis in Kuwait were reported in the 1975 census; and at the same time, small numbers of Kuwaitis were reported in Bahrain and Oman. Iran and Oman, two countries of substantial immigration, both also have substantial outflows of migrants to other countries in the region. There were over 40,000 Iranians in Kuwait in 1975 and another more than 25,000 workers in the United Arab Emirates. Significant numbers of Omanis are reported in most of the countries in the vicinity, including Saudi Arabia, for which precise estimates are lacking. There were over 7,000 Omanis in Kuwait, 10,000 in Bahrain and 3,000 in Qatar. Lastly, there are reports of labour shortages in

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selected sectors even in some of the resource-poor countries directly related to large-scale emigration, which are in turn being met by migration from other countries in the vicinity. For example, there are reports of growing numbers of Syrians going to Jordan to take places vacated by Jordanians who have gone into the Gulf States.

The other leading flow of long-term migration affecting Asia is the movement towards countries of traditional resettlement. During the 1960s and the early 1970s, the leading countries to which intercontinental migrants from Asia have gone have been Canada, the United Kingdom and the United States of America. In Asia, Israel has been the destination of a large number of long-term migrants.

The United States reported about 200,000 long-term and permanent immigrants from Asia for the fiscal years ending June 1975 and June 1976. (These were persons admitted as intended immigrants plus those entering in visa categories—students and their dependants, for example—that suggest a stay of one year or more.) Migrants of Asian origin thus comprise about one third of all those entering the United States. The countries that were the chief contributors were the Philippines, which sent nearly 40,000 in 1976; the Republic of Korea, with some 33,000; and China and India, with just over 20,000 each. This flow appears to be quite stable.

Another important country of destination for migrants from Asia has been Canada. In 1977, some 25,000 citizens of Asian countries entered the country for permanent resettlement. However, the numbers have been declining during recent years, as has all immigration into Canada. In 1975, over 37,000 Asians moved to Canada; and in 1976, the number was 34,000. A further decline appears likely. The leading countries of emigration for the period from 1975 to 1977 were India and the Philippines, followed by Lebanon and the Republic of Korea.

As of mid-1976, it was estimated that about 750,000 persons of Asian origin were residing in the United Kingdom. Over half were from India and most of the rest were from Bangladesh and Pakistan. However, the largest number had entered the United Kingdom during the later 1960s and early 1970s. By 1976 the annual number of newly arriving immigrants from the Asian subcontinent had declined to about 16,000. (Highs in the late 1960s were about 40,000 per annum.)

Israel has been a country of substantial immigration; about half of its population is of immigrant origin. During recent years, however, immigration has been at a relatively low level, approximately 20,000 per annum in 1975 and 1976. Just over one third of the immigrants in both years were from the Soviet Union. Other substantial proportions arrived from Argentina, France and the United States.

There is very little new information about patterns of migration in Latin America. The continuing pattern of migration appears to be a movement towards two or three chief receiving countries. The most notable is the United States of America, which is the leading destination for migrants from Mexico, the countries of Middle America and the Caribbean; and from some of the countries of the western coast of South America, such as Ecuador and Peru. A second focus

of emigration has been Argentina, which attracts substantial numbers of migrants from neighbouring countries of the Cono del Sur and from Brazil. A third region of attraction is the oil-producing countries in the northern part of South America. The most important of these countries has for quite a number of years been Venezuela, which attracts substantial numbers of migrants from Colombia and, more recently, Ecuador. Lastly, Canada serves as a chief destination for migrants for some of the English-speaking countries of the Caribbean and South America. This last flow has tended to moderate in very recent years, along with the over-all decline of migration into Canada.

For a large number of the countries of Latin America, the census is the chief source of information concerning international migration. Since there have been only two new censuses in the region since 1975 (Bolivia and Uruguay), rather little new information is available. In addition, it has been observed that a substantial amount of the migration between countries within Latin America is undocumented. One reason for this is said to be the fact that sending and receiving countries share a comparatively homogeneous culture and make wide use of the same language. A second factor is that at least some of the countries welcome emigrants as a matter of policy; there may be concern to regularize and document the immigration but no official desire to discourage it. As a result, the data have to be treated with a certain amount of caution. For many countries, even the most recent estimates are comparatively old. Furthermore, reports on documented migration may reflect statistical practices as much as they do actual migration flows. It is not at all impossible that the apparent predominance of the United States as a destination for migrants from Latin America is to some extent a reflection of a greater concern in that country to record the flow as accurately as possible.

Both in 1975 and in 1976, the United States received about 215,000 documented immigrants from Latin America; about one third of this total came from Mexico. Other major sending countries were Cuba, the Dominican Republic and Mexico. Thus, in Latin America, the leading countries of emigration to the United States are all very near to its borders.

The same kind of pattern—a tendency for migrants to come predominantly from a country in the vicinity—is evident in the statistics for all of Latin America and is especially apparent if one ignores for the moment the migration to the United States. For example, the great majority of all migrants into Paraguay came from just two countries, Argentina and Brazil. The same was the case for Uruguay. Venezuela received the overwhelming majority of its migrants from Colombia. The great majority of immigrants into Costa Rica come from Nicaragua. In other words, there appears to be very little long distance international migration within and between the Americas. In virtually every case, the great majority of all immigrants to a country come from just one or two adjacent countries.

In Europe, data on international migration are much more widely available. Indeed, in this major area, the supply of data is so much larger and so varied that the problem of analysis becomes more a matter of trying to resolve discrepancies that reflect differences in definition and data-

gathering procedures than it is of simply trying to find a single estimate.

The over-all pattern of long-term migration in Europe appears to be in the direction of a slow but steady decline in the numbers of persons involved. Although there are some individual exceptions, the generalization holds true both for movement within Europe and for movement into Europe from other regions.

A second broad generalization is that international migration between European countries with centrally planned economies is at a much lower level than in the case of the market economies.[3] For this group of countries, it is estimated that as of 1975-1976 there were some 150,000 foreign workers, nearly all of them having moved for a temporary stay and nearly all of whom came from other countries within the region (excluding Yugoslavia). The chief countries of destination were the German Democratic Republic with some 60,000 foreign workers, chiefly from Poland; Czechoslovakia with some 40,000 foreign workers, again, chiefly from Poland; and the Soviet Union, with some 50,000 foreign workers, chiefly from Bulgaria. It is also estimated that just fewer than 25,000 workers from within this region were employed elsewhere.

For the market economies of Europe, along with Yugoslavia, the well-known pattern of international migration was for large-scale movement into countries of Northern and Western Europe during the 1960s and the first half of the 1970s. Most of the migrants came from Southern Europe, including Turkey;[4] Northern Africa; and Finland and Ireland. The United Kingdom also received a large number of migrants from entirely outside the region, especially from the countries of the New Commonwealth. In the leading net receiving countries, the proportion of foreign-born residents in the populations rose to very substantial levels. In the United Kingdom, Sweden, the Federal Republic of Germany, Belgium and Austria, the proportions of foreign-born residents were between 5 and 8 per cent. The figure was higher in France, where it reached some 9 per cent by 1975; and in Luxembourg and Switzerland, where the proportion of foreign-born was over 15 per cent.

According to recent estimates for selected countries, the total proportion of foreign-born has begun to decline in the Federal Republic of Germany and in Switzerland. But in most of the other net receiving countries the proportion has continued to rise, chiefly as a result of continuing immigration of members of the families of migrant workers who had arrived earlier.

During the most recent years, net flows into the leading receiving countries have tended to remain positive but to be comparatively stable or to decline. Sweden is an exception; immigration into that country has risen and emigration has declined to the end of 1976, so that net immigration rose from about 9,000 in 1974 to around 20,000 in 1976. The chief country of origin is Finland.

Another notable shift of pattern has been for a net inflow of migrants to countries that were major suppliers of migrant workers during the 1960s and early 1970s. Italy is a notable case in point, having experienced net immigration during recent years—about 30,000 in 1975 and nearly 19,000 in 1976. It is surmised that this situation is chiefly due to the return of former migrants. On the other hand, Finland appears to have experienced an acceleration of emigration in 1976 and the first part of 1977.

The two large countries of Northern America, Canada and the United States of America have during most of their history been net receivers of substantial numbers of long-term immigrants. They have continued this role during the most recent years, although some important changes in pattern and level have occurred. Neither of the countries has directly gathered information on emigration. The following comments refer to recently recorded immigration.

The population of Canada has been more heavily influenced by immigration than has that of the United States. Around 15 per cent of the population are foreign-born.

During recent years, however, the annual inflow of immigrants has changed quite substantially. In 1974, some 218,000 immigrants entered Canada. The number has declined steadily since then; it dropped to 188,000 in 1975, 149,000 in 1976 and 115,000 in 1977. There may be further declines since the Government has recommended that gross immigration for 1979 be set at the level of 100,000.

The majority of all immigrants into Canada come from countries of Africa, Asia, the Caribbean and other regions of Latin America. In 1977, about 36 per cent of all immigrants came from Europe, 27 per cent were from Asia and some 18 per cent came from the Caribbean and other regions of Latin America. The single country from which the largest number of immigrants came was the United Kingdom; in 1977, just a little less than 20 per cent of all immigrants came from that country. The next most important country was the United States, which contributed 11 per cent of the immigration. Other countries with a substantial number of immigrants to Canada were India, Jamaica, the Philippines and Portugal.

There has been little change in the level of immigration to the United States during the most recent years. There was a slight increase in the number of persons admitted for permanent residence between 1975 and 1976, but it was well within the level of year-to-year fluctuations during the past decade. In all, just slightly fewer than 400,000 permanent immigrants were admitted each year. If other long-term immigrants—persons admitted as students, exchange visitors and so forth—are added, the documented number entering annually comes to just fewer than 600,000. Approximately 5 per cent of the population of the United States are foreign-born.

The chief regions from which immigrants come to the United States are Asia and Latin America. Less than 20 per cent of all immigrants entering during 1975 or 1976 were born in Europe. Some 38 per cent were from Asia, 6 per cent were from South America and some 34 per cent were from Mexico, Middle America and the Caribbean. The single country from which the largest number of documented immigrants came to the United States was Mexico, which,

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[3] Frederich Levcik, "Migration und Ausländerbeschäftigung in den RGW-Ländern und ihre Probleme", *Forschungsberichte der wiener Institut für Internationale Wirtschaftsvergleiche*, No. 32 (December 1975).

[4] Turkey is currently included in the region of Western South Asia.

in 1976, was the country of origin of nearly 15 per cent of all documented immigrants. Nearly 10 per cent of the immigrants came from the Philippines, and very large numbers also came from Cuba and the Republic of Korea. Recent changes in immigration legislation, imposing a system of country limitations on the western hemisphere to conform with that already existing for the eastern hemisphere, are expected to reduce the amount of variations between countries.

In general, the United States exhibits considerable stability in current patterns of documented immigration.

The two largest countries of Oceania—Australia and New Zealand—share with the United States and Canada the traditional role of receivers of permanent immigration. Australia is particularly distinguished by the fact that foreign-born residents make up some 20 per cent of the total population of the country.

The annual flow of migrants into Australia had reached an interim peak in the fiscal year 1974, when just over 200,000 permanent and long-term arrivals were recorded. It then declined into fiscal year 1976, when the number was around 135,000, but recovered in the year ending in June 1977 with 156,000 arrivals.

During recent years, the great majority of all long-term and permanent immigrants to Australia came from countries of the British Commonwealth. For the year ending in June 1976, they comprised some 74 per cent of the total number of immigrants. The single country contributing the largest number was the United Kingdom and its overseas territories. However, it should be noted that immigration from the United Kingdom has been falling steadily for nearly a decade and that Australian immigration is drawing from an increasingly wider range of countries. It appears likely that such a trend will continue. Australia has very recently announced a new set of immigration regulations which have as a target an average net gain through international migration of about 70,000 per annum for the coming three years. A new system of selection, weighing equally economic factors and personal and settlement factors, was put into effect at the beginning of 1979.

In New Zealand, as in Canada, about one fifth of the population is of immigrant origin. However, immigration has been declining during recent years. There were nearly 70,000 immigrants in 1974, but the number was reduced to about 37,000 in the year ending March 1977. Indeed, during that final year, permanent and long-term emigrants outnumbered permanent and long-term immigrants so that the country experienced a net loss of about 19,000.

Australia continues to be the most important country with which New Zealand exchanges migrants. In 1977, 36 per cent of the immigrants and 50 per cent of the emigrants were exchanged with Australia. The next most important country was the United Kingdom, which supplied 24 per cent of the immigrants and accepted about 24 per cent of the emigrants. Between them, the net outflow from New Zealand to Australia and the United Kingdom in 1977 accounted for just about all of the total net loss.

During recent years, New Zealand has made some use of temporary migrant labourers, chiefly coming from Samoa, Tonga and other islands of the Pacific. The inflow reached a level of some 25,000 persons in 1975, but declined to around just less than 17,000 in the year ending March 1977. During that year, the net balance of arrivals and departures in the flow was just about equal and it appears there is no anticipation that it will rise in the near future.

Thus, at the global level the trend in aggregate long-term and permanent international migration is towards stabilization or decline in the rate of movement into developed countries from developing countries, and between developed countries. On the other hand, there is an acceleration of movement between developing countries.

B. THE "BRAIN DRAIN"

The subject of reverse flow of technology (the "brain drain"), the movement of professionally and technically trained personnel from poorer to richer countries, is an important component of the general topic of international migration. The actual number of movers involved in this flow is quite small. The issue is important not because of its demographic significance as such but because of its economic and political character. In general, it involves the movement of people who have had an opportunity to acquire valuable and necessary skills from countries where they are in short supply to countries that are much better endowed with such personnel.

The following comments do not attempt to review the whole literature on the subject, which has become quite vast; rather, they summarize some general findings on the over-all size and nature of the brain drain and then point out directions which have most recently begun to emerge.

There are difficulties in obtaining an over-all view of the over-all flow of professional and technical personnel from developing to developed countries. Data made available by both the sending and receiving countries have serious limitations and the phenomenon in itself is not entirely simple to conceptualize or measure. Nevertheless, it is possible to get a good sense of the over-all outlines of the flows. The leading countries of immigration have traditionally been Canada, the United States and the United Kingdom. More recently, other countries have begun to attract highly skilled immigrants in larger numbers, but the great bulk of the migrants continues to be found in the countries mentioned. It was estimated in a study prepared by the United Nations Conference on Trade and Development (UNCTAD) that during the 1960s and early 1970s, the total flow from developing to developed countries of professionally and technically trained personnel was on the order of 300,000.[5] Of this total, some 230,000 went to the United States, the United Kingdom and Canada. At the outset of the period in question, the great majority of all such migrants (some 72 per cent) moved between two developed countries. By 1972, nearly two fifths of all the moves were from a developing to a developed country. By that date, the largest

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[5] *The Reverse Transfer of Technology: Economic Effects of the Outflow of Trained Personnel from Developing Countries* (United Nations publication, Sales No. E.75.II.D.1).

single recipient country—the United States—received some 85 per cent of its professional and technical immigrants from a developing country. The leading countries of emigration have been in Asia, especially India and the Philippines. Nearly half of the flow consists of engineers and physicians and surgeons, in about equal numbers.

It is extremely difficult to estimate the economic consequences of the migration of the highly skilled. The estimate prepared by UNCTAD for the total inputted capital value of the brain drain in the developed countries for the 1960s and early 1970s amounted to some 50 billion. However, this sum should be offset by an unknown but perhaps significant amount of money remitted by migrants back to their country of origin.

One sector of the brain drain of particular importance is the movement of medical personnel, especially physicians and nurses. In the recipient countries, foreign medical graduates have become a very substantial proportion of the total trained personnel.[6] For example, by the beginning of 1974, foreign medical graduates comprised about one fifth of all the physicians in the United States and one third of all interns or medical residents. In the United States, at that time, there were some 72,000 foreign-trained physicians: some 9,500 came from the Philippines; 7,000 came from India; and a large number also came from Italy, the Federal Republic of Germany, the Republic of Korea and Cuba. At the same time, in the United Kingdom, about one out of every four physicians was foreign-born, as was one out of every three in Canada. In the Federal Republic of Germany, the next most important country of immigration for physicians, one out of every 20 was of foreign origin.

The pattern of international movement of nurses is apparently quite similar to that of physicians and surgeons. It is estimated that about 14,000 move across international boundaries each year.

During recent years some important changes in the brain drain flows have begun to appear. In the United States, the number of persons entering each year with an occupational skill classified as professional or technical has during recent years been steady at about 10 per cent of all entrants for whom an occupation was indicated. However, the number of physicians and surgeons within that total rose. In the fiscal year 1974, about 4,500 physicians entered the United States; the number increased to over 6,000 for the year ending June 1976. In part, this increase may have reflected anticipation of regulations at that time under discussion to restrict the inflow of foreign medical graduates. The United States has now adopted a series of regulations with respect to licensing of foreign medical graduates which will not completely halt the flow but which will make entry by reference to medical training rather more difficult. There appears to have been a general decline in the numbers of persons entering Canada with professional and technical skills during the past decade. In 1969, nearly one third of all

immigrants for whom an occupational group was listed were professional and technical. The proportion has tended to decline since that date and by 1977 about 23 per cent of immigrants for whom an occupation was listed were in that category. In general, it is the expectation of the Canadian Government that the relative importance of immigration by reference to family reunification will continue to be of more importance and that by reference to occupation will decline in over-all importance in the total flow. In part, this is a consequence of existing regulations establishing criteria for selection of immigrants along with reduced ceilings for total immigration.

The United Kingdom has continued to attract substantial numbers of persons with professional and managerial skills. During 1975 and the early part of 1976, one third or more of all immigrants aged 16 and over were classified in that occupational category. However, the implications for the international flows of professionally trained personnel are made more complex by the fact that the United Kingdom had experienced a very substantial net outflow of persons in such categories. Just about half of all immigrants from the United Kingdom have professional and managerial occupations.

In general, the flow of professionally and technically trained migrants into the traditional countries of immigration appears likely to remain comparatively stable or possibly even to decline slightly in importance. On the other hand, the new leading centre of attraction of international migrants, the oil-producing countries, has begun to attract substantial numbers of professionally and technically trained persons along with the numerically larger flow of semi-skilled and unskilled workers and dependants. Movement into these countries tends to be organized somewhat differently than that into the traditional beneficiaries of the brain drain. In particular, such countries as Canada, the United Kingdom and the United States have tended to view such immigration as being predominantly a permanent re-settlement. Movement into the resource-rich countries of Western South Asia and Northern Africa tends more to be viewed as a temporary measure, with the expectation that the migrants will eventually return to their country of origin.

There are, of course, some difficulties in obtaining the data needed to appraise the migration of professionally and technically trained personnel into those regions. The flow is of comparatively recent origin and is never easy to deal with anywhere. However, there are useful indicative figures for selected countries.

One of the best documented cases is that of Kuwait, a country which had a substantially better than average stock of trained citizens to begin with. According to the census of 1975, just about 90 per cent of all occupations requiring a university degree in mathematics or in science were filled by non-Kuwaitis. The leading countries of origin were Jordan and Egypt, which between them supplied over half of all professionals in these categories. Kuwait was itself able to meet about half its needs in managerial and non-technical professions. In general, though, the heavy dependence on immigrants was very clear. For all occupations requiring education beyond secondary school, Kuwait depended upon

[6] Alfonso, Mejía, "Migration of physicians and nurses, a world-wide picture", report of the World Health Organization Multinational Study of the International Migration of Physicians and Nurses; and Rosemary Stevens and others, *Alien Doctors: Foreign Medical Graduates in American Hospitals* (New York, Wiley-Interscience, 1978).

some 25,000 immigrants in the total of just over 35,000 such positions in the country.

In Qatar, detailed data for all occupations are not available. However, it is of interest to observe that of all teachers in the country for academic year 1976/77, 83 per cent of all male instructors and 67 per cent of all women instructors were non-Qatari. Of course, virtually all of the teachers were from an Arabic-speaking country; over 25 per cent were from Egypt and about one fifth each were either Jordanian or Palestinian. For Oman, it is estimated that 90 per cent of all professionals, technical and related workers are immigrants. On the other hand, the Libyan Arab Jamahiriya is somewhat less dependent on non-nationals: some 56 per cent of professionals had come from outside the country, according to preliminary results of the census of 1973.

In general, it appears that countries of these regions have become the destination of a very substantial number of professional and technical international migrants, predominantly from developing countries but also from some of the developed countries. Precise documentation is lacking, but the trend appears to be to draw professionals and technically trained personnel increasingly from countries farther away—especially from India, Pakistan and some countries of East Asia.

C. International labour migration

An issue that has emerged in recent years to take on very considerable socio-economic and political, as well as demographic, importance is the movement of workers across borders for temporary employment. Of course, labour migration is a component of total migration and it also overlaps the flow of professionally and technically trained personnel. Nevertheless, it is useful to discuss it as a separate issue in order to highlight its importance as a policy issue.

The emphasis in the following remarks is upon those migrants who are active participants in the labour force in terms of their numbers and labour force characteristics, and upon what may be known of the economic, social and political impact of the flows.[7]

The systematic import of temporarily recruited labour is not a new phenomenon. For nearly a century, South Africa, for instance, has imported significant numbers of temporarily recruited labour to meet manpower shortages in the mining sector. In Western Africa, during much of this century, temporary emigrants from Mali, Togo, and the Upper Volta have supplied much of the labour requirements to the plantations in Ghana and the Ivory Coast. However, it was only after labour migration from less developed European countries had reached significant numbers in the late 1960s that the phenomenon of temporarily recruited labour gained world-wide attention. Of the 9.8 million documented temporary immigrants living away from home in 1975, 6.3 million were working in the developed countries of Europe, 2 million in the oil-exporting countries of Northern Africa and Middle and Western South Asia; and the balance, 1.5 million, mainly in Southern and Western Africa.

In Europe in 1973, before the onset of the economic slow-down, the numbers of immigrant workers reached approximately 7.5 million. Since then, the number has decreased gradually. In 1975, there were about 6,349,000 immigrant workers in Western and Northern Europe, making up 2.8 per cent of the total population of those countries and 6.8 per cent of total employment. There have since been further declines (see table 51).

In 1975, there were about 2 million immigrant labourers in the oil-exporting countries of Northern Africa and Middle and Western South Asia. Although the volume of labour flows to the region in 1975 was not as large as the move-

[7] This section is taken very largely from a report on international labour migration prepared for the World Bank by Z. Ecevit and K. C. Zachariah.

TABLE 51. ESTIMATED NUMBER OF FOREIGN WORKERS, NORTHERN AND WESTERN EUROPE, 1976

Country of origin	Country of employment								
	Austria	Belgium[a]	France[b]	Germany, Federal Republic of[c]	Luxembourg	Netherlands	Sweden[d]	Switzerland[e]	United Kingdom[f]
Total	171 700	316 800	1 584 300	1 937 100	46 800	180 500	235 500	516 040	866 000
Algeria	...	3 500	331 100	1 400	...	...	200	...	500
Austria	...	1 000	...	76 000	...	...	3 100	20 413	3 000
Finland	...	—	—	—	...	...	105 000	...	1 000
Greece	...	10 000	...	178 800	...	2 200	9 000	5 165	10 500
Italy	1 700	96 000	199 200	276 400	10 700	10 100	3 000	261 566	56 500
Morocco	...	28 000	152 300	15 600	...	29 100	500	...	500
Portugal	...	6 000	360 700	63 600	12 500	5 000	1 100	4 144	3 000
Spain	200	30 000	204 000	111 000	1 900	16 000	1 900	68 894	24 000
Tunisia	...	2 000	73 000	12 000	...	1 000	300	...	—
Turkey	24 600	16 000	31 200	527 500	...	38 200	3 800	15 168	4 500
Yugoslavia	120 500	3 000	42 200	390 100	600	9 500	27 000	24 110	8 500
Others	24 700	121 300	190 600	296 100	21 100	70 000[g]	80 600	116 560	753 500[h]

Source: Organization for Economic Co-operation and Development, Directorate for Social Affairs, Manpower and Education, Continuous Reporting System on Migration (SOPEMI), 1977 report.

NOTE: Because of rounding, totals do not necessarily correspond to the sum of column entries.

[a] New estimates by Professor Dumon.
[b] Results of 1975 census (one fifth sample).
[c] At 30 June 1976.
[d] New estimates from the Statistical Services.
[e] Established and yearly workers at 31 December 1976.
[f] New estimates from European Economic Community labour force survey (reduced sample).
[g] Including 40,000 from West Indies and Suriname.
[h] Including 293,500 Irish.

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ment to Western and Northern Europe, its proportion to total employment in these countries was considerably higher; 11 per cent of total employment in the oil-exporting countries in 1975 was contributed by immigrant labour. In several of these countries, foreign workers outnumbered nationals by large margins. Immigrant labour constituted 71 per cent of total employment in Kuwait, for instance, 77 per cent in Qatar and 89 per cent in the United Arab Emirates (see table 52).

Total immigrant labour in the South African mines in 1975 was around 243,000, providing about 67 per cent of the total employment in that sector. This total comprised 118,000 workers from Mozambique, 86,000 from Lesotho, 17,000 from Botswana and 7,000 from Swaziland. It appears that immigration from Malawi also has very recently been resumed. Furthermore, although substantial numbers of immigrant labourers also seek seasonal employment in the agricultural section, relatively little is known about their magnitude and origin.

In Western Africa, international labour movements are subject to less control, more often spontaneous and certainly not organized in the sense of labour migration to South Africa or Europe. They are thus harder to distinguish from total long-term migration. International migrants in nine countries of Western Africa numbered about 2.8 million in 1975, out of a total population of 40 million. The

mainstream of migration has been from the Upper Volta, Mali, Guinea and Togo to the Ivory Coast, Ghana and Senegal (see table 53). Currently, the principal labour-importing country in the region is the Ivory Coast. According to 1975 census results, there were 1,426,000 foreign nationals in the Ivory Coast. Of this total, 719,000 were economically active and made up about 26 per cent of the total economically active population in the country.

Historically, Ghana was the focus for migrants in Western Africa. But in recent years, because of economic problems in the country and the implementation of more stringent regulations affecting immigrants, relatively fewer have come to Ghana. In fact, during 1960-1970, there was a net emigration of 400,000 persons. In spite of this emigration, the 1970 census of Ghana enumerated about 562,000 foreign nationals. In 1975, total immigrant labour in Ghana was estimated at 224,000.

The most recent estimate of foreign nationals in Senegal is put at about 355,000 (157,000 of these being economically active). Of this total, 51,000 are from outside Africa and the remainder from within the major area, mainly from Guinea and Guinea-Bissau (180,000), the Gambia (46,000) and the Upper Volta (14,000).

Available data on the age characteristics of immigrant labour indicate that the majority are between 18 and 35; this age span comprises close to 60 per cent of the total immi-

TABLE 52. IMMIGRANT LABOUR IN NORTHERN AFRICA AND IN MIDDLE AND WESTERN SOUTH ASIA, BY COUNTRIES OF ORIGIN AND DESTINATION, 1975
(Thousands)

Country of origin	Destination								
	Bahrain	Iran	Iraq	Kuwait	Libyan Arab Jamahiriya	Oman	Qatar	Saudi Arabia	United Arab Emirates
Egypt	1.2	—	2.3	37.6	175.0	5.3	2.7	...	(12.7)
India	9.0	(4.4)	0.3	21.5	2.0	24.8	19.8	...	(73.0)
Jordan[a]	0.8	—	3.1	47.7	7.0	2.6	1.7	...	(6.4)
Morocco	—	—	—	—	1.8	—	—	...	—
Pakistan	6.7	(2.4)	0.9	11.0	5.0	20.2	14.5	...	(94.0)
Syrian Arab Republic	0.1	—	0.2	16.5	15.0	1.5	0.4	...	(3.4)
Tunisia	—	—	—	—	29.0	—	—	...	—
Turkey	—	(1.2)	—	—	8.0	—	—	...	—
Yemen[b]	1.3	—	—	11.4	—	1.0	2.6	...	(3.5)
Other Asian	1.0	(5.0)	—	1.1	—	—	0.5	...	(0.4)
Europe and Northern America	4.4[c]	(35.0)[d]	0.7	2.0	28.0[e]	3.6	9.2	...	(9.1)[f]
Others	5.0[g]	(134.0)[h]	0.9	62.7[i]	24.2	8.2	10.5	...	(43.3)[j]
Total	29.4	(182.0)	8.4	211.4	295.0	67.2	61.8	770.0	(245.8)
Percentage of total employment	38	2	1	71	35	64	77	39	89

Source: World Bank data.

NOTE: Figures in parentheses are rough estimates.

[a] Jordanians and Palestinians.
[b] Including Democratic Yemen and Yemen Arab Republic.
[c] Including: United Kingdom, 3,497; United States of America, 843; others, 43.
[d] Including approximately 25,000 from the United States.
[e] Including: Bulgaria, 2,000; France, 2,000; Poland, 6,000; Romania, 3,000; United Kingdom, 4,000; United States, 2,000; Yugoslavia, 9,000.

[f] Including: France, 1,572; United Kingdom, 3,167; United States, 1,318.
[g] Including: Egypt, 411; Iran, 1,980; Iraq, 126; Kuwait, 65; Lebanon, 128; Oman, 1,385; Saudi Arabia, 226; other countries of Africa, 58; others, 656.
[h] Including about 120,000 from Afghanistan and others from the Gulf States.
[i] Including: Iran, 28,953; Iraq, 17,999; Lebanon, 7,232; Saudi Arabia, 2,644; the Sudan, 873; others, 4,954.
[j] Including: Bangladesh, 2,450; Iran, 25,444; Iraq, 620; Lebanon, 4,068; Somalia, 1,620; the Sudan, 1,776; others, 7,035.

TABLE 53. INTERNATIONAL MIGRATION IN WESTERN AFRICA
(Thousands)

Country of origin	Destination							
	Gambia[a] (1973)	Ghana[a] (1970)	Ivory Coast[a] (1975)	Liberia[a] (1974)	Senegal[a] (1971)	Sierra Leone[a] (1974)	Togo[b] (1970)	Upper Volta[b] (1975)
Total	52.8	562.1	1 425.9	55.7	355.1	79.4	143.6	120.8
Gambia		0.1	0.1	—	45.6	3.4	—	0.2
Ghana	—		42.5	3.5	1.0	4.6	100.0	20.9
Guinea	17.0	c	105.8	c	180.2[d]	41.0	—	c
Ivory Coast	—	18.3		13.7	1.4	—	2.0	53.6
Liberia	0.3	4.6	3.4		0.7	11.0	—	0.9
Mali	5.5	13.4	348.5	—	28.9	—	—	26.0
Nigeria	—	55.5	49.6	c	c	7.3	c	2.3
Senegal	25.3	0.1	19.2	...		—	—	2.5
Sierra Leone	0.4	3.0	1.1	5.5	0.8		—	0.5
Togo	—	244.7	12.1	—	—	—		3.5
Upper Volta	—	159.3	726.2	6.4	13.7	0.8	2.0	
Other countries of Africa	2.4	48.1	82.7	23.8	31.7	1.3	37.6	6.7
Others	1.9	15.0	34.7	2.8	51.1	10.0	2.0	3.7

Sources: K. C. Zachariah, "Demographic aspects of migration in West Africa", World Bank draft report, 1978. Most recent census results of the corresponding countries. Where distribution by country of origin is not shown in censuses, distribution is estimated by using patterns from previous censuses or surveys.

[a] Foreign nationals.
[b] Foreign-born persons.
[c] Not known but included in "other countries of Africa".
[d] Including Guinea-Bissau.

grant labour in France and the Federal Republic of Germany, 57 per cent in Kuwait, 66 per cent in the United Arab Emirates and 55 per cent in Western Africa.

As might be expected, the share of female migrant workers in the total is highest in Europe. In 1976, 26 per cent of all those entering France in the status of permanent workers were women. Statistics for the Federal Republic of Germany for the same year show that 42.5 per cent of Greek, 24.6 per cent of Italian, 22.4 per cent of Turkish and 33.5 per cent of Yugoslav workers in that country were women. The proportion of female migrant labour is lowest in Western South Asia: less than 2 per cent in Saudi Arabia and the United Arab Emirates; and about 13 per cent in Kuwait. In the two principal labour-importing countries of Western Africa, sex ratios (males per 100 females) for immigrant population were 163 in the Ivory Coast (1975) and 175 in Ghana (1970).

Information on the skills of immigrant labour in Europe is scanty. The available data in France and Switzerland, for instance, give only a very broad breakdown between skilled, semi-skilled and unskilled migrants. Out of 27,000 workers who entered France in 1976, 46 per cent were classified as semi-skilled, 23 per cent unskilled and 31 per cent skilled. For the period 1964-1978, 73.2 per cent of temporary work permits issued to migrants by the Swiss authorities were for skilled and semi-skilled workers, the remaining 26.8 per cent going to unskilled workers. The majority of immigrant labourers in Europe are employed in the manufacturing sectors, especially in Austria and in the Federal Republic of Germany.

The demand of the oil-exporting countries in Middle and Western South Asia and in Northern Africa is both for highly skilled and unskilled labour (unlike demand in Western Europe, which has been primarily for semi-skilled and unskilled labour). The available data on the occupational characteristics of the immigrant labour cover about 1.3 million workers in Bahrain, Kuwait, the Libyan Arab Jamahiriya, Saudi Arabia and the United Arab Emirates. About 14 per cent of this total are employed in professional, technical and managerial occupations. About 19 per cent are employed in clerical, sales and service jobs; and the remaining 67 per cent are semi-skilled and unskilled workers. The largest proportion of the immigrant workers is in the construction sector (36.1 per cent), which is followed in importance by services (21.3 per cent), commerce (14.8 per cent) and agriculture (10.3 per cent). Relatively smaller proportions are employed in mining (2.1 per cent), which is predominantly hydrocarbons; manufacturing (6.7 per cent), utilities (1.4 per cent) and transportation/communications (7.1 per cent). However, sectoral distribution patterns indicate considerable differences among individual countries (see table 54).

Immigrant workers in South Africa are predominantly unskilled and work in the mining sector. However, skill levels open to African workers, including immigrants, are reportedly rising. Substantial numbers of immigrants also seek work in agriculture and service occupations, but there are no official statistics on these sectors. The 1970 census enumerated 490,000 foreign-born Africans in South Africa. Officially recruited labour reported by the Chamber of Mines for the same year is 303,000. Since very few workers migrate with their families, as much as one third of the total immigrant labour could be working outside the mining sector.

Western Africa primarily employs immigrant labour in unskilled agricultural jobs. In the Ivory Coast, the major labour-importing country of the region, there were 719,000 economically active immigrants in 1975: 52.0 per cent were farmers; 22.8 per cent, production workers; 23.5 per cent, clerical, sales and service workers; and only 1.7 per cent,

TABLE 54. SECTORAL DISTRIBUTION OF IMMIGRANT LABOUR, 1975
(Percentage)

| | Europe | | | Northern Africa | Western South Asia | |
	Austria	France	Germany, Federal Republic of	Libyan Arab Jamahiriya	Kuwait	Saudi Arabia
Total	100.0	100.0	100.0	100.0	100.0	100.0
Agriculture	2.2	5.3	1.0	10.4	1.9	14.6
Manufacturing	52.6	24.6	59.8	10.6	18.0	5.9
Construction	15.0	14.2	11.2	49.5	22.9	32.3
Commerce	6.3	23.9	5.6	4.2	14.8	19.2
Services	23.9	13.8	13.4	20.4	33.7	17.6
Other	—	18.2	9.0	4.9	8.7	10.4

Sources: Organization for Economic Co-operation and Development, Directorate for Affairs, Manpower and Education, *SOPEMI—Continuous Reporting System on Migration, 1976 report* (Paris); and World Bank data.

professional, technical and administrative workers. Ghana is the second largest labour importer in Western Africa; here, 54.6 per cent of the migrant labour worked in agriculture, 13.7 per cent in the service sector, 10.8 per cent in manufacturing, 11.0 per cent in construction; and the remaining 9.9 per cent in transportation, utilities and other activities. However, the proportion working in the agricultural sector is less among the immigrants than among the natives.

One of the most widely recognized economic consequences of labour migration is the flow of remittances. For the country of origin, this flow not only bolsters the volume of scarce foreign exchange earnings but provides a potential source for additional savings and capital formation. Excluding remittances in kind and those sent through unofficial channels, the net flow of workers' remittances to the developing countries was about $4.6 billion in 1972. By 1975, this flow had nearly doubled, approaching $8.1 billion. Since then, the volume of remittances, especially to the labour-exporting countries of Middle and Western South Asia, has increased considerably.

The over-all impact of remittances on the balance of payments in the countries of emigration has, of course, been very favourable. The additional flow of hard currency has generally alleviated the traditional foreign exchange bottle-necks in major labour-exporting countries and was instrumental in cushioning the adverse effects of recent oil price increases. Remittances from Europe to six major labour-exporting countries (Algeria, Greece, Morocco, Tunisia, Turkey and Yugoslavia), for example, accounted for more than 25 per cent of the value of their export of goods and met about 14 per cent of the value of total imports in 1976. Similarly, total remittances received in 1976 by the major labour exporters to Western South Asia and Northern Africa (Egypt, India, Jordan, Pakistan, the Syrian Arab Republic and Yemen) equalled 33 per cent of the value of their total exports of goods and 15 per cent of total imports.

Little empirical work has been done on the use of remittances and their over-all impact on economic growth. However, what little has been done indicates that only a small portion of the remittances has been successfully channeled into productive investment; the bulk has been spent on con-

sumer goods (often with high import content) and housing.[8] Local production has generally been unable to meet the new demand and the resulting supply bottle-necks have fuelled inflationary pressures and increased import demand.

In the host country also, migrant workers have a direct economic impact in addition to their direct labour force participation. They contribute, although often to a comparatively limited degree, to demand for consumer goods. In some cases they may put a significant strain on the supply of housing, services and consumables.

The effects of international labour migration on employment are also difficult to predict precisely; much depends upon the skill composition of the migrant flow. The migration of the unskilled and the unemployed from developing countries would presumably act chiefly to decrease domestic unemployment and underemployment. On the other hand, if the emigrants are skilled employed workers who cannot be readily replaced, their departure may adversely affect employment, decrease output and create manpower bottle-necks in related industries.

In general, emigration of labour can be beneficial only up to the point where it begins to draw upon the pool of productively employed whose positions cannot be filled promptly by other equally qualified unemployed in the labour market. With few exceptions, labour-exporting developing countries experience widespread open and disguised unemployment primarily among unskilled labour. Therefore, the emigration of both urban and rural unskilled labour has generally been effective in reducing unemployment without creating serious manpower bottle-necks and loss of output.

However, emigration to Europe and, to a greater extent, to Northern Africa and Middle and Western South Asia has included large numbers of skilled labours, of which the sending countries themselves have been in short supply all along. In Turkey, for example, of the 750,000 workers sent abroad through the Turkish Employment Service between

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[8] Ivo Baučic, *The Effect of Emigration from Yugoslavia and the Problem of Returning Emigrant Workers*, European Demographic Monographs (The Hague, Martinus Nijhoff, 1972); and Nermin Abadan-Unat, *Migration and Development* (Ankara, Ajans Turk Press, 1975).

1964 and 1976, 33.7 per cent were classified as skilled workers.

Flows of skilled labour from the developing world to the oil-exporting countries of Middle and Western South Asia and Northern Africa warrant greater concern since the share of the skilled labour in total demand is relatively higher than in Europe or elsewhere. In the Libyan Arab Jamahiriya and Saudi Arabia, for example, the share of unskilled labour in total labour imports was only 38 and 54 per cent, respectively, in 1975. Egypt, Jordan, the Syrian Arab Republic and, to a lesser extent, Pakistan, which have so far provided the bulk of the skilled manpower flows to these countries, are now experiencing manpower shortages in different categories of skilled labour. The drain from Jordan, for example, reached such a level in the period 1976-1977 that the Government itself was forced to import labour to avoid further bottle-necks in its own development programme.

Social and political consequences are also difficult to determine precisely but are no less real. The unbalanced sex composition of the migrant flows is likely to have some effect on patterns of nuptiality and family and household composition. Migrant workers bring certain skills with them but also acquire new skills, attitudes and expectations which they may eventually carry with them back to their country of origin.

From the point of view of the receiving country, the presence of substantial numbers of aliens in the labour force and in the society as a whole has at times given rise to intergroup friction and even to open strife. Especially in countries where migrant worker populations have been established over a longer period, Governments have begun to adopt a variety of measures to adapt to their presence. In some European countries, these have included such steps as special educational arrangements for children of migrants, the right to participate in elections at some governmental levels (in Sweden), protection in the area of civil rights and so forth.

Lastly, the existence of significant numbers of expatriate workers inevitably becomes a factor in the political relationship between the sending and the receiving countries.

D. UNDOCUMENTED MIGRATION

There is another flow of international migration which has received increasing attention: undocumented migration.

Despite the fact that it is a basic principle of the nation-state system that all countries have a sovereign right to decide who may enter and under what conditions, it is known and is a source of concern for some Governments that some amount of migration across international boundaries takes place without documentation or other formal contact with officials of the country of immigration. It is also clear that other migrants fail to abide by terms under which they were admitted. By its very nature, undocumented migration is an extremely difficult subject to deal with. Direct quantitative data are fragmentary and unreliable at best. Nevertheless, such movement exists and has demographic,

socio-economic and political consequences. Precise estimates of the amount of undocumented migration taking place cannot be made. What may be of use is to try to summarize the information currently before the public regarding the issue.

In Northern Africa, there are reports of undocumented migration into the Libyan Arab Jamahiriya from the Sudan and especially from Tunisia.[9] In sub-Saharan Africa, much of the migration across borders by land has been undocumented. Many countries have tolerated and even welcomed these movements but there have also been a number of attempts to control borders and expel undocumented aliens. The expulsion of large numbers of foreigners from Ghana in 1969 under the Alien Compliance Order was a notable but by no means unique event in the region.

In Asia, undocumented migration into some of the resource-rich countries has begun to be reported. For example, the international press recently made reference to efforts by the Government of Saudi Arabia to identify and regulate undocumented migrants from Pakistan and other countries who are believed to be present in substantial numbers.[10]

In Latin America, there is reported to be quite a bit of undocumented movement across national borders. Venezuela has used an estimate of at least 300,000 Colombians in the country without authorization.[11] There are also thought to be significant numbers of undocumented migrants into Argentina from countries in the vicinity—notably Paraguay—and more recently into Ecuador.

For Europe, the estimate is commonly given that there is one undocumented migrant worker for every 10 who were duly authorized to enter. Some European countries of net emigration are reported to have also experienced an influx of undocumented workers. For example, Greece and Italy are reported to have received "tens of thousands" of such immigrants, chiefly from Northern Africa.[12]

The number of undocumented migrants in the United States has recently been estimated to be on the order of from 4 million to 6 million. The chief country of origin is Mexico, with other significant numbers coming from the Caribbean region and the northern coast of South America. There have also been reports on the order of 200,000 of undocumented movements into Canada, chiefly from the Caribbean, and also between the countries of the Caribbean and Central America.

If these kinds of rough estimates give any useful measure of undocumented migration at all, they suggest three points. First, it appears that the undocumented flows do not differ markedly in direction and pattern from the documented and authorized streams. They are again predominantly a flow from poorer to richer countries in search of economic op-

[9] A. Findlay, "Country case study: Tunisia", University of Durham, Department of Economics, International Migration Project, 1978.

[10] The Washington Post, 6 October 1978.

[11] Boletín de Estadística (May 1977).

[12] Organization for Economic Co-operation and Development, SOPEMI, 1977 Report (Paris).

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portunities. Secondly, the numbers are significant in magnitude, even if they are subject to a wide margin of error. However, except in sub-Saharan Africa and Latin America, they by no means outweigh legal documented flows. Thirdly—and this is the more speculative point—the shreds of evidence available suggest that socio-economic and political consequences of undocumented migration are unlikely to differ strikingly from the authorized flows. The individual undocumented mover is, of course, in a far more vulnerable position and the consequences themselves for the sending and receiving countries may be either desirable or undesirable. In their nature, though, they are likely to resemble broadly the effects of documented international migration; it may be useful to view undocumented migration as, in many ways, a functional equivalent adjunct or substitute to documented labour migration.

Chapter V

URBANIZATION AND POPULATION DISTRIBUTION*

The spatial distribution of a population has many social consequences. It affects a population's level of production of goods and services and the possibilities of their exchange among areas, the ability of Governments to provide basic public services, the degree of national integration and the breadth of participation in national development efforts; and the degree of crowding, congestion and stress under which people live. In recognition of the many social consequences of population distribution, Governments responding to the Fourth United Nations Inquiry on Population Policy cite population distribution as one of their most serious and widespread concerns.

In addition to a geographical dimension, population distribution has an important social dimension: the distribution of people by size of place, in particular by rural and urban residence. One purpose of this chapter is to present newly revised estimates and projections of the urban and rural populations of the world's major areas. Another is to present new estimates of the components of rural and urban growth for selected countries and to identify factors associated cross-nationally with rates of rural-urban migration. A third section examines recent patterns of growth of large cities for the world and its major areas. An underlying theme that emerges in each of the sections is the importance of national rates of population growth, in the main a product of natural increase, for the growth of the different areas.

A. URBAN AND RURAL ESTIMATES AND PROJECTIONS

The estimates and projections of urban and rural population presented here differ somewhat from earlier United Nations estimates for three reasons:

(1) New information from population censuses has become available since the last round of estimates and projections, particularly in Africa;[1]

(2) Old estimates of urban and rural populations were revised in order to achieve as closely as possible a consistency in urban definition for a particular country over time;

(3) The projection technique was modified in order to incorporate a newly emergent relationship between the pro-

portion urban and the growth rate difference between urban and rural areas. As shown in table 55, countries that have achieved higher urban proportions in the recent past have experienced, on average, smaller differences in growth rates between their urban and rural areas. This table is based on the two most recent censuses or other concrete estimates for the 110 countries that currently have over 2 million population. Such a relationship between the proportion urban and the urban/rural growth differences is not surprising because higher urban proportions necessarily entail fewer potential rural-to-urban migrants per member of the urban population. The coefficient of correlation between the urban proportion and the urban/rural growth difference is -0.280 for these 110 countries. Because of its implication for urban and rural prospects, this relation was incorporated into the urban and rural projections.[2]

TABLE 55. DIFFERENCES IN GROWTH RATES OF URBAN AND RURAL AREAS BETWEEN THE TWO MOST RECENT OBSERVATIONS FOR 110 LARGEST COUNTRIES

Range of initial proportion urban	Number of countries in range	Mean of annual urban-rural growth rate differences between two most recent censuses or other concrete estimates
0-0.2499	49	0.0395
0.2500-0.4999	34	0.0349
0.5000-0.7499	16	0.0276
0.7500-1.0000	11	0.0198

During the projection period, the most recently observed urban/rural growth difference for a particular country was projected to approach linearly the difference implied by this computed relationship, so that by the period 1995-2000 the urban and rural populations of each country would be growing at the implied rate.

Table 56 shows the estimated and projected urban population of the world, the major geographical areas and the more developed and less developed regions between 1950 and 2000. The urban population of the world is estimated to have increased by 207 million in the short period between 1970 and 1975, or at a rate of 41 million per annum. Of this growth, 31 per cent occurred in the more developed regions and 69 per cent in the less developed. The more rapid urban accretion in the less developed regions had brought the urban populations of the two groups of countries into ap-

[1] The most recent estimates are contained in two working papers presented in 1975: "Trends and prospects in urban and rural population, 1950-2000, as assessed in 1973-1974" (ESA/P/WP.54): and "Trends and prospects in the populations of urban agglomerations, 1950-2000, as assessed in 1973-1975" (ESA/P/WP.58).

[2] In particular, the relationship was computed by ordinary least-squares techniques, as applied to these 110 observations, to be:

Urban/rural growth rate difference = 0.044177 - 0.028274 (initial proportion urban).

TABLE 56. URBAN POPULATION, MAJOR AREAS AND REGIONS, 1950-2000
(Thousands)

	1950	1960	1970	1975	1980	1990	2000
World total	724 147	1 012 084	1 354 357	1 560 860	1 806 809	2 422 293	3 208 028
More developed regions	448 929	572 730	702 876	767 302	834 401	969 226	1 092 470
Less developed regions	275 218	439 354	651 481	793 558	972 408	1 453 067	2 115 558
Africa	31 818	49 506	80 373	103 032	132 951	219 202	345 757
Eastern Africa	3 403	5 821	10 675	15 109	21 303	40 345	70 535
Middle Africa	3 827	5 751	10 176	13 437	17 598	29 130	45 235
Northern Africa	12 698	19 570	31 344	39 391	49 557	76 960	111 914
Southern Africa	5 338	7 592	10 650	12 481	14 959	21 958	32 560
Western Africa	6 552	10 772	17 528	22 614	29 534	50 809	85 513
Latin America	67 511	106 599	162 355	198 366	240 592	343 304	466 234
Caribbean	5 604	7 731	11 098	13 184	15 653	21 645	28 760
Middle America	14 245	22 744	36 102	45 123	56 275	85 804	124 610
Temperate South America	16 475	22 419	28 090	31 060	34 157	40 292	45 741
Tropical South America	31 187	53 705	87 065	108 999	134 507	195 563	267 123
Northern America	106 019	133 281	159 493	170 501	183 281	212 393	239 199
East Asia	112 812	194 734	265 153	308 943	359 457	476 462	622 441
China	61 393	121 716	166 710	195 355	230 652	320 393	443 213
Japan	41 977	58 712	74 386	83 424	91 970	104 668	114 128
Other East Asia	9 442	14 306	24 057	30 164	36 835	51 401	65 100
South Asia	104 883	146 902	217 290	265 568	329 760	515 685	790 685
Eastern South Asia	25 694	38 014	56 640	69 234	85 863	134 525	207 672
Middle South Asia	74 096	99 794	143 883	173 993	214 900	335 677	517 642
Western South Asia	5 093	9 094	16 767	22 341	28 997	45 483	65 371
Europe	222 603	266 032	318 374	343 504	369 286	423 291	476 953
Eastern Europe	36 708	46 323	54 828	59 785	65 028	75 405	85 688
Northern Europe	53 866	58 191	65 273	68 305	71 276	76 889	82 119
Southern Europe	53 763	68 433	88 095	99 134	111 141	137 641	165 002
Western Europe	78 266	93 085	110 178	116 280	121 841	133 356	144 144
Oceania	7 736	10 443	13 675	15 630	17 829	22 590	27 145
USSR	70 765	104 587	137 644	155 316	173 653	209 366	239 614

proximate parity by 1975, when 49.2 per cent of the world urban population lived in the more developed regions. Urban growth between 1970 and 1975 was distributed very widely among the different regions of the less developed world. Africa is estimated to have gained 23 million urbanites; Latin America, 36 million; East Asia (excluding Japan), 35 million; and South Asia, 48 million. In terms of the growth rate of the urban population between 1970 and 1975, in Africa, the average annual growth rate of 4.97 per cent clearly outstripped that of other major regions.

By the end of the twentieth century, the large bulk of the world urban population will reside in less developed regions. In fact, the projected gain of 1,320 million in the urban population in these areas between 1975 and 2000 is nearly double the total urban population of more developed regions in 1975 (767 million). By the year 2000, nearly two thirds (65.9 per cent) of the world urban population are projected to reside in less developed regions. While the urban population of more developed regions is anticipated to grow by 42 per cent in the last quarter of the century, the projected growth in Africa is 336 per cent; in Latin America, 235 per cent; in East Asia (excluding Japan), 225 per cent; and in South Asia, 298 per cent. In 1975, Europe still had a larger urban population, 344 million, than any other region in the world. But by 2000, its anticipated urban population of 477 million is expected to be eclipsed by that of South Asia (791 million) and East Asia (622 million),

and to be virtually matched by that of Latin America (466 million). In Africa, the urban population is expected to surpass that of Northern America somewhere around 1990. It is clear that the less developed regions must prepare for an unprecedented magnitude of urban increment during this quarter of a century.

The bulk of the difference in urban growth rates between the more developed and the less developed regions is not attributable to differences in rates of urbanization (i.e., the growth rate of the urban population). Instead, it is attributable primarily to more rapid population growth rates in the less developed regions. One informative exercise that illustrates the importance of population growth for urban growth is simply to correlate the two growth rates across countries. For 108 of the 110 countries with over 2 million population, the growth rate of the urban and total populations between the two most recent censuses are correlated at 0.819.[3] In contrast, the correlations between urban growth rates and the initial proportion urban, the initial level of gross national product *per capita*, the growth rate of gross domestic product *per capita* and a set of regional indicators are all below 0.550 in absolute value. As a single predictor of

[3] Two countries were omitted from the group of 110 because other types of data were not available for them that would permit the computation of equivalent correlation coefficients for other variables.

urban growth in a country, the rate of population growth serves quite adequately.

Table 57 gives the estimated and projected total rural population. The rural gain for the world as a whole between 1970 and 1975 is estimated to be 151 million, or 56 million fewer than the gain for urban areas. However, in the less developed regions, the rural gain of 165 million is actually 16 per cent higher than the urban gain for those same countries. The rural gain for the world as a whole is diminished as a result of a slow rural decline totalling 14 million which is projected to occur in the more developed regions.

The demographic present and future of rural populations lies preponderantly in the less developed regions. These areas contained 85 per cent of the world rural population in 1975 and are projected to contain 90 per cent by the end of the century. Both East Asia and South Asia had larger rural populations in 1975 than did all the more developed regions combined. The projected growth of the rural population in South Asia alone between 1975 and 2000 exceeds the total 1975 rural population of the more developed regions. The projected rural increments in the past quarter of a century are not nearly so evenly distributed among less developed regions as are the urban increments. South Asia is projected to gain 457 million rural residents; Africa, 170 million; East Asia (excluding Japan), 59 million; and Latin America, only 28 million. In percentage terms, the rural population of South Asia is expected to grow by 49 per cent, Africa by 57

per cent, East Asia (excluding Japan) by 9 per cent and Latin America by 22 per cent. Although these percentages are much lower than the percentage expansion of urban areas, it must be remembered that they are being applied to a much larger base. The projected absolute growth by 2000 in rural areas of the less developed regions (714 million) is about one half of the projected growth of their urban areas (1,320 million). Unless startling increases occur in the rate of urbanization, probably about one third of the huge anticipated increase in populations of the less developed regions during the remainder of this century will be accommodated in rural areas.

It is interesting to observe that the ratio of urban to rural populations for the world as a whole is growing considerably more slowly than is this ratio for either the more developed or the less developed regions. The growth rate of this ratio is simply the difference between growth rates for urban and rural areas. For the period 1975-1980, this difference for the less developed regions is estimated to be 2.41 per cent per annum and for the more developed regions, 2.49 per cent. The difference for the world as a whole lies well outside of this narrow range. The difference for the world as a whole is only 1.64 per cent, about one third less than that of either the more developed or the less developed regions. The reason for the apparent anomaly is simply that the more developed and the less developed regions receive very different weights in the calculation of urban growth rates than

TABLE 57. RURAL POPULATION, MAJOR AREAS AND REGIONS, 1950-2000
(Thousands)

	1950	1960	1970	1975	1980	1990	2000
World total	1 776 924	1 973 733	2 255 816	2 406 771	2 567 042	2 857 409	3 045 956
More developed regions	405 502	402 396	383 894	369 606	355 013	325 258	294 700
Less developed regions	1 371 422	1 571 337	1 871 922	2 037 165	2 212 029	2 532 151	2 751 256
Africa	186 986	223 290	271 355	298 281	327 963	394 881	467 923
Eastern Africa	58 474	71 372	89 143	99 389	110 688	137 235	169 325
Middle Africa	22 431	26 025	30 270	31 873	33 602	37 605	42 497
Northern Africa	39 108	46 162	54 283	58 793	63 497	72 787	79 909
Southern Africa	8 986	10 614	13 685	15 372	17 220	20 734	23 671
Western Africa	57 987	69 117	83 974	92 854	102 956	126 520	152 521
Latin America	96 411	108 982	120 670	125 728	131 042	142 283	153 695
Caribbean	11 120	12 500	13 520	13 933	14 364	15 204	15 744
Middle America	21 589	25 946	30 902	33 528	36 356	42 356	48 060
Temperate South America	8 962	8 402	7 984	7 687	7 407	6 860	6 338
Tropical South America	54 740	62 134	68 264	70 580	72 915	77 863	83 553
Northern America	60 054	65 381	66 896	66 340	65 552	62 743	57 000
East Asia	562 008	593 246	661 713	697 437	728 292	757 036	747 621
China	496 797	532 772	605 130	643 448	676 957	710 749	704 774
Japan	41 648	35 384	29 945	27 696	25 576	21 545	18 801
Other East Asia	23 563	25 090	26 638	26 293	25 759	24 742	24 046
South Asia	565 336	678 453	844 886	940 033	1 046 859	1 256 031	1 397 199
Eastern South Asia	147 533	178 972	226 330	254 604	284 991	344 187	383 949
Middle South Asia	401 114	480 609	597 626	663 583	738 849	885 687	983 190
West South Asia	16 689	18 872	20 930	21 846	23 019	26 157	30 060
Europe	191 926	189 318	179 534	173 563	167 229	154 551	141 548
Eastern Europe	51 792	50 386	48 114	46 481	44 619	40 201	35 749
Northern Europe	18 611	17 643	15 037	13 671	12 463	10 537	9 103
Southern Europe	77 350	79 861	78 424	77 190	75 939	73 264	69 683
Western Europe	44 173	41 428	37 959	36 221	34 208	30 549	26 913
Oceania	4 893	5 321	5 638	5 667	5 643	5 508	5 557
USSR	109 310	109 742	105 124	99 722	94 462	84 376	75 413

they do in the calculation of rural rates. Since the more developed regions contain roughly half of the world urban population, the relatively slow demographic growth in these countries is weighted much more heavily in the total urban growth rate than in the rural rate, where the slow-growing more developed regions constitute only 15 per cent of the total. The simple fact is that the world is urbanizing much less rapidly than either group of regions is individually because differentials in demographic growth rates between the two groups give rapidly increasing weight to the less urbanized group. If the anticipated demographic growth actually materializes, however, this disparity will begin to disappear as the less developed regions come to constitute an ever-larger fraction of both urban and rural populations.

Table 58 presents the percentage urban in the world and its major areas and regions. In 1975, 39.3 per cent of the world population was estimated to reside in urban areas (67.5 per cent of the population in more developed regions and 28.0 per cent of that in less developed regions). As shown in figure X, the annual increment in the urban percentage has been relatively steady between 1950 and 1975 in the world, the more developed regions and the less developed regions alike; and it is expected to remain so for the rest of the century. The average annual gain in the percentage urban between 1975 and 2000 for the less developed regions is projected at 0.62 percentage point; for the more developed regions, at 0.45 percentage point; and for the world, 0.48. By the end of the century, the annual increment in the percentage urban is expected to be on the up-

swing for the less developed regions and to be tailing off for the more developed. The world percentage urban can be seen to draw closer to the percentage urban in the less developed regions as the century progresses. If the projections prove to be accurate, the next century will begin just after the world population achieves an urban majority; in 2000, the world is projected to be 51.3 per cent urban. Nevertheless, in Eastern Africa, Western Africa, China and South Asia, rural residents are still expected to outnumber urban population by more than 50 per cent.

## B. COMPONENTS OF URBAN AND RURAL POPULATION CHANGE

When the boundaries of a territory are fixed, its population can change only as a result of births to residents, deaths of residents and movement across those boundaries. When boundaries are flexible, as in the case of populations defined as rural and urban, the additional element of reclassification is added to the sources of change. Identifying these sources is an important first step in understanding the social, economic and biological processes that underlie demographic development. If urban populations are growing rapidly in relation to rural populations because of their lower mortality, the implications for policy and planning are quite different than if the source is job-inspired migration.

In this section, a standardized method is applied to data from many countries in order to estimate the components of

TABLE 58. PROPORTIONS OF POPULATION LIVING IN URBAN AREAS,
BY MAJOR AREAS AND REGIONS, 1950-2000
(Percentage)

	1950	1960	1970	1975	1980	1990	2000
World total	28.95	33.89	37.51	39.34	41.31	45.88	51.29
More developed regions	52.54	58.73	64.68	67.49	70.15	74.87	78.75
Less developed regions	16.71	21.85	25.82	28.03	30.53	36.46	43.46
Africa	14.54	18.15	22.85	25.67	28.85	35.70	42.49
Eastern Africa	5.50	7.54	10.69	13.20	16.14	22.72	29.41
Middle Africa	14.57	18.10	25.16	29.66	34.37	43.65	51.36
Northern Africa	24.51	29.77	36.61	40.12	43.83	51.39	58.34
Southern Africa	37.27	41.70	43.76	44.81	46.49	51.43	57.90
Western Africa	10.15	13.48	17.27	19.58	22.29	28.65	35.92
Latin America	41.18	49.45	57.37	61.21	64.74	70.70	75.21
Caribbean	33.51	38.22	45.08	48.62	52.15	58.74	64.62
Middle America	39.75	46.71	53.88	57.37	60.75	66.95	72.17
Temperate South America	64.77	72.74	77.87	80.16	82.18	85.45	87.83
Tropical South America	36.29	46.36	56.05	60.70	64.85	71.52	76.17
Northern America	63.84	67.09	70.45	71.99	73.66	77.20	80.76
East Asia	16.72	24.71	28.61	30.70	33.05	38.63	45.43
China	11.00	18.60	21.60	23.29	25.41	31.07	38.61
Japan	50.20	62.40	71.30	75.08	78.24	82.93	85.86
Other East Asia	28.61	36.31	47.46	53.43	58.85	67.51	73.03
South Asia	15.65	17.80	20.45	22.02	23.95	29.10	36.13
Eastern South Asia	14.83	17.52	20.02	21.38	23.15	28.10	35.10
Middle South Asia	15.59	17.19	19.40	20.77	22.53	27.48	34.48
Western South Asia	23.38	32.52	44.48	50.45	55.75	63.49	68.50
Europe	53.70	58.42	63.94	66.45	68.83	73.25	77.11
Eastern Europe	41.48	47.90	53.26	56.26	59.31	65.23	70.56
Northern Europe	74.32	76.73	81.28	83.32	85.12	87.95	89.92
Southern Europe	41.01	46.15	52.90	56.25	59.41	65.26	70.31
Western Europe	63.92	69.20	74.38	76.25	78.08	81.36	84.27
Oceania	61.24	66.22	70.77	73.35	75.93	80.37	82.97
USSR	39.30	48.80	56.70	60.90	64.77	71.28	76.06

Figure X. Time path of percentage urban in the world, more developed regions and less developed regions, 1950-2000
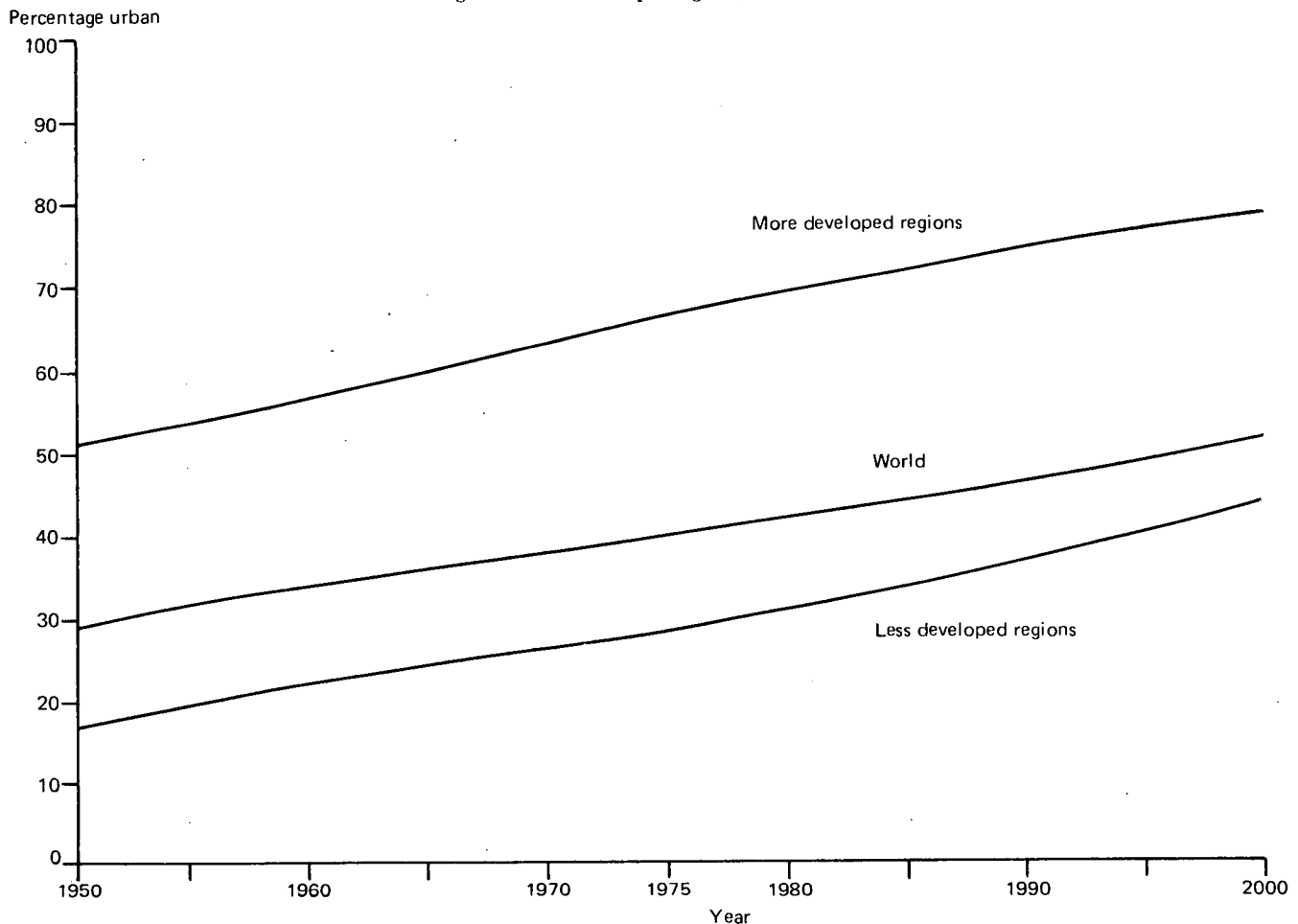
change in urban and rural populations. The method involves intercensal cohort comparisons of the total and urban populations. The urban population in a particular cohort is survived forward by applying some variant of the intercensal survival ratio for that cohort in the population as a whole. Exceptional changes between the censuses in urban cohort size are ascribed to net internal migration and reclassification. Summing these changes among cohorts produces an estimate of the total change attributable to this source. This total change is then added to or subtracted from the intercensal change in the urban and rural populations in order to estimate urban and rural natural increase. A computerized procedure was devised to produce estimates when the censuses of a country are separated by any distance between 5 and 15 years.[4] For the less developed countries, in particu-

lar, the procedure produces the first large body of comparably derived data on rural-urban migration.

In interpreting the results of applying this procedure, it should be recognized that people can "move" from a rural to an urban area without ever changing their residence, provided that the area in which they live has been reclassified as urban. Reclassification can occur as a result of annexation into an already-urban area, because a town grows past the urban-defining boundary or because the definition of urban has changed. The estimates of migration will obviously include all of these elements, although the effect of definitional changes is minimized by excluding countries having experienced major changes. Further, it should be recognized that international migration that is disproportionately directed to urban or rural areas will affect estimates of internal migration. On the other hand, international migration, regardless of whether it is differentially directed, obviously affects the growth rates of urban and rural areas themselves. Because "natural increase" is estimated by adding or subtracting internal net migration from the total changes in urban and rural populations, the remainder will necessarily include international migration. This remainder is referred to throughout this chapter as "natural increase", but it should be borne in mind that it may also

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[4] For details regarding the method, demonstrations of its effectiveness and consistency with other estimation techniques, and a demonstration of the insensitivity of results to departures from mortality assumptions, see *Patterns of Urban and Rural Population Growth* (United Nations publication, Sales No. E.79.XIII.9), chap. III. For the results implied in this section, the assumption was made that age-specific mortality was equal in rural and urban areas of more developed countries and that rural age-specific death rates exceeded urban rates by 25 per cent in less developed countries.

comprise international migration. Lastly, it should be reaffirmed that urban definitions vary from country to country. Even though analysis is confined to changes in urban and rural populations under constant definitions within a country, results may nevertheless be affected by different definitions if, for example, some definitions are more prone to produce reclassification of areas than others.

Sources of urban growth

As documented in the previous section, rural and urban populations alike are growing throughout most of the world. Attention is now turned to those countries which can supply information on the sources of this growth. Europe in particular, and the more developed countries in general, show the highest proportionate contribution of migration/reclassification to urban growth. An average of two thirds of recent urban growth in European countries has resulted from this source.[5] The figure is similar for the Soviet Union. Only in the countries of oversea Western European settlement in Northern America and Oceania is the proportion lower, with the growth contribution of migration/reclassification in Canada, the United States and Australia in the range of 20-35 per cent. The unusual position of these countries reflects in part their retention of relatively high rates of urban natural increase. It should be re-emphasized that, for many European countries in particular, natural increase as measured in table 59 contains a substantial amount of international migration. Natural increase is almost certainly inflated by international migration in France, Luxembourg, Sweden and Switzerland, while it is deflated in Finland, Greece, Ireland and Spain.[6]

In contrast, the bulk of urban growth in the less developed countries is attributable to the natural increase of urban populations. Considering only the most recent observation for a country, an average of 60.7 per cent of growth is attributable to this source, compared with only 39.3 per cent for migration reclassification. These figures are nearly reversed for the more developed countries (40.2 and 59.8 per cent). Much of this disparity between the groups of countries is attributable to the much higher rates of urban natural increase in the less developed countries, particularly in Latin America and Western South Asia. From the data given at the foot of table 59, it can be seen that the average urban growth rate of the 29 developing countries is 0.04324, which exceeds the average urban growth rate of the 20 developed countries by 0.01851. Of this difference, 0.01558 (or $0.02533 - 0.00975$) is attributable to differences in average rates of natural increase, which represent 84.2 per cent of the difference in urban growth rates between the two groups of countries. Only 15.9 per cent

$$\left(\frac{0.01792 - 0.01498}{0.01851} \right)$$

is attributable to higher rates of urban in-migration/reclassification in the developing countries.

Thus, despite the much larger pool of potential rural-urban migrants in developing countries, the rate of urban in-

[5] Because countries rather than regions are the units of analysis in this section, the averages reported refer to averages among countries and are not population-weighted.

[6] For an alternative treatment that places international migration in the migration component, see Economic Survey of Europe in 1977, part II, Labour Supply and Migration in Europe: Demographic Dimensions 1950-1975 and Prospects (United Nations publication, Sales No. E.78.II.E.20).

TABLE 59. SOURCES OF INTERCENSAL GROWTH OF URBAN POPULATIONS

Major area or region and country	Intercensal period	Annual intercensal population growth rate of urban areas (1)	Estimated annual urban rate of natural increase (2)	Estimated annual rate of urban growth from internal migration and reclassification (3)	Estimated percentage of growth attributable to internal migration and reclassification $(4) = \frac{(3)}{(1)}$
Africa					
Ghana	1960-1970	0.04685	0.02697	0.01988	42.4
Morocco	1960-1971	0.04100	0.02581	0.01519	37.0
South Africa	1960-1970	0.03423	0.02548	0.00875	25.6
Mean, Africa					(36.9)
Northern America[a]					
Canada	1951-1961	0.03866	0.02562	0.01304	33.7
	1961-1971	0.02563	0.01644	0.00919	35.9
Dominican Republic	1950-1960	0.05952	0.03360	0.02592	43.5
	1960-1970	0.05804	0.03004	0.02800	48.2
El Salvador	1950-1961	0.03296	0.02536	0.00760	23.1
	1961-1971	0.03671	0.02861	0.00810	22.1
Guatemala	1964-1973	0.02999	0.01982	0.01017	33.9
Mexico	1960-1970	0.04904	0.03349	0.01555	31.7
Nicaragua	1950-1963	0.04109	0.02868	0.01241	30.2
Panama	1950-1960	0.04325	0.02972	0.01353	31.2
	1960-1970	0.04465	0.02668	0.01797	40.2
Puerto Rico	1960-1970	0.04180	0.01498	0.02682	64.2
United States of America	1950-1960	0.02646	0.01708	0.00938	35.4
	1960-1970	0.01755	0.01243	0.00513	29.2
Mean, Northern America[a]					(35.9)

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TABLE 59. SOURCES OF INTERCENSAL GROWTH OF URBAN POPULATIONS *(continued)*

Major area or region and country	Intercensal period	Annual intercensal population growth rate of urban areas (1)	Estimated annual urban rate of natural increase (2)	Estimated annual rate of urban growth from internal migration and reclassification (3)	Estimated percentage of growth attributable to internal migration and reclassification (4) = $\frac{(3)}{(1)}$
South America					
Argentina	1947-1960	0.02906	0.01431	0.01475	50.8
Brazil	1950-1960	0.05408	0.02625	0.02683	49.6
	1960-1970	0.04708	0.02594	0.02114	44.9
Chile	1952-1960	0.04020	0.02548	0.01472	36.6
	1960-1970	0.02941	0.01842	0.01099	37.4
Colombia	1951-1964	0.05435	0.03446	0.01989	36.6
Ecuador	1950-1962	0.04771	0.02975	0.01796	37.6
	1962-1974	0.04490	0.03161	0.01329	29.6
Paraguay	1962-1972	0.03124	0.02033	0.01091	34.9
Peru	1961-1972	0.04923	0.02875	0.02048	41.6
Uruguay	1963-1975	0.00736	0.00682	0.00054	7.3
Venezuela	1950-1961	0.06143	0.03890	0.02253	36.7
	1961-1971	0.04580	0.03307	0.01273	27.8
Mean, South America					(36.3)
Asia					
Bangladesh	1961-1974	0.06613	0.02948	0.03665	55.4
India	1951-1961	0.03080	0.02152	0.00928	30.1
	1961-1971	0.03211	0.02173	0.01038	32.3
Indonesia	1961-1971	0.03739	0.02405	0.01334	35.7
Iran	1956-1966	0.04971	0.02813	0.02158	43.4
Iraq	1957-1965	0.06446	0.03497	0.02949	45.7
Japan	1955-1965	0.02857	0.01017	0.01840	64.4
Nepal	1961-1971	0.03323	0.02088	0.01235	37.2
Republic of Korea	1960-1970	0.06250	0.02468	0.03782	60.5
Sri Lanka	1953-1963	0.04650	0.02262	0.02388	51.4
	1963-1971	0.04281	0.02196	0.02085	48.7
Syrian Arab Republic	1960-1970	0.04869	0.03333	0.01536	31.5
Turkey	1955-1960	0.05959	0.02324	0.03635	61.0
	1960-1970	0.05552	0.02117	0.03435	61.9
Mean, Asia					(46.6)
Europe					
Austria	1961-1971	0.00884	0.00053	0.00830	94.0
Bulgaria	1956-1965	0.04472	0.01025	0.03447	77.1
Finland	1950-1960	0.02797	0.00866	0.01931	69.0
	1960-1970	0.03058	0.00460	0.02598	84.9
France	1962-1968	0.02817	0.01242	0.01575	55.9
Greece	1961-1971	0.02519	0.00364	0.02155	85.5
Hungary	1960-1970	0.01607	0.00197	0.01410	87.7
Ireland	1961-1971	0.01797	0.00934	0.00864	48.1
Luxembourg	1960-1970	0.01715	0.00830	0.00885	51.6
Norway	1950-1960	0.00892	0.00567	0.00325	36.4
	1960-1970	0.03583	0.00674	0.02909	81.2
Poland	1960-1970	0.01832	0.00879	0.00953	52.0
Romania	1956-1966	0.02860	0.00643	0.02217	77.5
Spain	1950-1960	0.02344	0.00801	0.01543	65.8
Sweden	1960-1970	0.01870	0.00944	0.00925	49.5
Switzerland	1960-1970	0.02605	0.01313	0.01292	49.6
Mean, Europe					66.6
Oceania					
Australia	1961-1971	0.02370	0.01889	0.00481	20.3
New Zealand	1951-1961	0.03620	0.01833	0.01788	49.4
Mean, Oceania					(34.8)
USSR	1959-1970	0.02788	0.01083	0.01705	61.1
Mean, sample (N = 65)					45.9
Mean, developing countries (N = 40);					39.6
last observation only (N = 29)		0.04324	0.02533	0.01792	39.3
Mean, developed countries (N = 25);					57.4
last observation only (N = 20)		0.02473	0.00975	0.01498	59.8

[a] Including the following countries of Latin America: Dominican Republic; El Salvador; Guatemala; Mexico; Nicaragua; Panama and Puerto Rico.

migration/reclassification in this group scarcely differs from that of developed countries. Urban growth is typically much more rapid, by 75 per cent on average (0.04324/0.02473), but the preponderance of the difference is caused by faster rates of urban natural increase in the developing world. The causes of rapid urban growth in developing countries are clearly interwoven with the causes of rapid natural increase.

The estimated proportion of urban growth in developing countries attributable to net rural-urban migration represents a slight downward movement in relation to United Nations estimates pertaining to 1960, in which population transfers were estimated to have accounted for 49.1 per cent of urban growth in the less developed countries.[7] Excluding China, however, the estimate was 42.2 per cent, and China does not appear among the countries listed in table 59. The question arises whether the slight downward revision is a reflection of real trends, since most of the present data pertain to the period after 1960; or whether it reflects differences in methods of procedure or in the sampling of countries. There are some reasons to expect that the fraction of urban growth represented by net internal migration should decline somewhat as the urban proportion rises, because the number of potential in-migrants per urban dweller must decline in the process. One way of answering the question is to examine countries where the intercensal survival procedure could be applied twice, in order to see whether trends exist when comparable procedures are used for two periods. In table 59, two temporarily adjacent estimates are provided by 11 less developed countries: five show absolute changes in the percentage contribution of net migration to urban growth of less than 3 per cent in either direction (Chile, El Salvador, India, Sri Lanka and Turkey); four show a decline greater than 3 per cent (Brazil, 4.7; Ecuador, 8.0; Venezuela, 8.9; South Africa, 17.0); and two show an increase of 4.0 or more (Panama, 4.0; Dominican Republic, 4.7). There is no striking tendency for change in this group of countries, but the hint of a general downturn is maintained. It appears most judicious to conclude that the proportionate contribution of migration to urban growth in the less developed countries has been relatively stable within countries but with a slight tendency, on average, for decline to occur.

Net rural-urban migration is estimated to account for more than half of urban growth during the most recent period in only five specimen less developed countries: Puerto Rico, 64.2; Turkey, 61.9; the Republic of Korea, 60.5; Bangladesh, 55.4; and Argentina (1947-1960), 50.8. This list is striking for the over-representation of countries with unusually rapid economic growth.[8] Where economic growth is slower—that is, in the majority of the less developed countries—it is suggested that the large majority of urban growth, perhaps some two thirds, is a result of the natural increase of urban populations themselves. However, it should be emphasized that the countries of Africa are poorly represented in the data set.

In several cases, the estimates presented in table 59 can be compared with more detailed estimates of components of urban growth for similar or identical periods in a particular country. The most valuable additional detail is information on the portion of growth assigned to reclassification. For the USSR between 1959 and 1970, one author[9] assigns 41 per cent of urban growth to natural increase, which is very close to the estimate of 39 per cent for this period which appears in table 59. Of the remaining 59 per cent, he assigns 15 per cent to the redefinition of previously rural settlements as urban and 44 per cent to net rural-urban migration *per se*. Thus, about a quarter of the migration/reclassification component for this country, as given in table 59, is in fact attributable to reclassification.

Very similar figures are presented for the Republic of Korea for the period 1960-1966: natural increase contributed 42.1 per cent of urban growth, compared with the present estimate of 39.5 per cent for the more inclusive period of 1960-1970.[10] Net rural-urban migration contributed 40.6 per cent and reclassification of areas, 17.3 per cent. Once again, about a quarter of the present migration/ reclassification component is attributable to reclassification. Of the 17.3 per cent ascribed to reclassification, 9.3 per cent was attributable to the boundary expansions of urban areas and 8.0 per cent to the graduation of previously rural areas into the status of urban.[11] The decomposition of migration/reclassification for the Republic of Korea and for the USSR takes on added significance in view of the relatively high rates of migration/reclassification in those countries. When these rates are lower, its components become more unstable because of a small base.

Using a very indirect procedure based on an assumed size distribution of rural places, it has been estimated that 6.7 per cent of 1960-1970 urban growth for the world as a whole was attributable to graduation, or to the growth of rural places beyond the urban-defining boundary.[12] For purposes of this exercise, a town size of 3,125 was used as the lower boundary of urban, but results should not be very sensitive to this choice. The equivalent figures for the more developed regions (6.6 per cent) and the less developed (7.7), were in close agreement with the figure previously cited for the Republic of Korea. This estimate implies that about one fifth of the migration reclassification component in the average less developed country, and about one tenth in the more developed, is attributable to graduation. Another source[13] gives a figure of 29 per cent to represent the fraction of the migration component attributable to gradua-

[7] "The components of urban and rural population change: tentative estimates for the world and twenty-four regions for 1960" (ESA/P/WP.46), table 3.

[8] The exception is Bangladesh, where international migration and population upheavals were considerable and where the very low initial urban proportion of 5.2 per cent gives a very unstable base.

[9] V. I. Perevedentsev, "Migratsiia naseleniia i ispol'zovanie trudovykh resursov", *Voprosy ekonomiki* (Moscow), No. 9 (September 1970), pp. 34-43.

[10] Eui-Young Yu, "Components of population growth in urban (*shi*) areas of Korea: 1960-1970", in Korean Institute for Family Planning, *Population and Family Planning in the Republic of Korea* (Seoul, 1974), vol. II, pp. 490-511.

[11] *Ibid.*, compiled from figures presented on p. 491.

[12] Kingsley Davis, *World Urbanization, 1950-1970*; vol. II, *Analysis of Trends, Relationships, and Development*, Population Monograph Series, No. 9 (Berkeley, University of California, 1972), p. 314.

[13] Frederic C. Shorter, *Computational Methods for Population Projections: With Particular Reference to Development Planning* (New York, The Population Council, 1974), p. 86.

tion in Turkey during the period 1960-1965. This estimate is again in line with results obtained by others. There is certainly variation in this percentage, however. A study of urban growth in Latin America[14] between 1950 and 1960 found that, at its highest contribution, one third or more of "urban growth" during the decade in Chile, the Dominican Republic, El Salvador and Peru was attributable to graduation. It should be stated that the minimum size for an urban community in this study was set at the relatively high figure of 20,000, which increases the contribution of graduation.

Sources of rural population change

Rather than acting additively, natural increase and migration/reclassification have countervailing effects on rates of population growth. In each of the populations and periods to which the intercensal survival procedure was applied, rural natural increase is positive and net rural migration is negative. In developing countries, the balance of these forces produces positive rates of rural population growth. On average, as seen from the foot of table 60, rural out-migration is about one half of the value of rural natural increase. However, there is a great deal of variability in rural out-migration rates in these countries, the reasons for which are discussed below. On the other hand, the balance of natural increase and migration in developed countries is such as to produce, on average, rural population decline. The average rural growth rates in the 29 developing countries exceeds that in the 20 developed countries by 21.05 per 1,000, of which 77 per cent ((0.02672 − 0.01046)/0.02105) is attributable to the higher rural out-migration rate in the developed countries. As in the case of urban growth, contrasts in rates of rural population change between these groups of countries are dominated by differences in rates of natural increase.

It is perhaps surprising that rural out-migration has recently been more rapid in the more developed countries than in the less developed. In part, this trend may reflect more rapid technical changes in agriculture in the more developed countries. However, it should be remembered that reclassification affects both rural and urban growth. Although information is very limited, it appears that reclassification is about equally important as a source of urban growth in both groups. Equality implies that reclassification is a more important source of rural loss in the more developed countries, simply because their rural populations are generally a much smaller fraction of the total. Hence, it appears likely that a sizable fraction of the difference in rural out-migration rates between the two groups results from higher reclassification-loss rates in the latter group. It should also be mentioned that international migration is more likely to distort estimates of both rural migration and natural increase in the more developed countries than in the less developed. For these reasons and because much policy interest has recently focused on rural-urban migration in the less developed countries, the remainder of this section is concentrated on this group.

Rural out-migration rates can be measured in two successive intercensal periods for 11 less developed countries, as shown in table 60. The resulting rates show a good deal of stability. Low out-migration countries in the earlier period tend also to experience low out-migration in the later period. Changes in the rates are generally quite small, but in eight of the 11 countries a rise was recorded, as well as in three of the four where changes were larger than 3 per 1,000.[15] Only in South Africa was a relatively large decline recorded (4.34 per 1,000), but there a very active policy restricting urban growth may have interfered with natural processes. A rise in rural out-migration rates is consistent with the tendency for the more developed countries to have higher rates than the less developed countries, and also with the tendency documented below for economic level to be positively associated with rural out-migration rates in the less developed countries.

On average, the countries of Latin America have typically had more rapid net movement out of rural areas than those of Africa and Asia.[16] The effects of this tendency on rural growth are partially offset by the generally higher rates of rural natural increase that prevail in Latin American populations. However, there remains enormous intraregional disparity in rural out-migration rates. In Middle America, such countries as El Salvador and Guatemala have low rates, in the range of those in Bangladesh, India and Sri Lanka; whereas Chile, Brazil and Colombia have rates many times higher, placing them in a group with Iraq and Turkey. It seems clear that there are factors at work to promote or inhibit migration which cuts across regional boundaries. Since the set of rural-urban migration rates assembled here is the largest available for developing countries, it is useful to use it to examine relations between levels of migration and other socio-economic variables in order to identify more clearly the contexts most conducive to rapid or slow rural-urban migration.

Factors influencing the probabilities of an individual's migration from a rural to an urban area have been investigated in literally thousands of studies—and many useful generalizations have emerged.[17] Comparative studies of factors influencing the national volume of rural-urban migration, on the other hand, are quite uncommon. Undoubtedly, the causes of migration to urban areas are manifold and vary in type and intensity from population to population. But it appears reasonable to propose that three basic

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[15] A small rise in rural out-migration rates is not inconsistent with the small declines in the contribution of rural-urban net migration to urban growth that was suggested above for these same 11 countries. The point is simply that the same volume of rural-urban migration will represent a larger fraction of rural population and a smaller fraction of urban population as the urban proportion increases with time.

[16] Although only three observations are available in Africa, they all fall within the 0.005-0.010 range which is cited as typical in African countries. Derek Byerlee and others, "Rural employment in tropical Africa: summary of findings", African Rural Economy Working Paper, No. 20; East Lansing, Michigan, Michigan State University, Department of Agricultural Economics, February 1977, p. 114 (mimeographed).

[17] For recent reviews, see Lorene Y. L. Yap, "The attraction of cities", Journal of Development Economics, vol. IV (1977), pp. 239-264; M. P. Todaro, Internal Migration in Developing Countries (Geneva, International Labour Office, 1976), chap. 5; John Connell and others, Migration from Rural Areas: The Evidence from Village Studies (Delhi, Oxford University Press, 1976).

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[14] John D. Durand and César A. Peláez, "Patterns of urbanization in Latin America", The Milbank Memorial Fund Quarterly, vol. XLIII, No. 4, part 2 (1965), p. 180.

TABLE 60.   SOURCES OF INTERCENSAL GROWTH OF RURAL POPULATIONS

Major area or region and country	Intercensal period	Annual intercensal population growth rate of rural areas (1)	Estimated annual rural rate of natural increase (2)	Estimated annual rate of rural population loss from internal migration and reclassification (3)	Rural out-migration and reclassification as a percentage of natural increase $(4) = \frac{(3)}{(2)} \times 100$
Africa					
Ghana	1960-1970	0.01631	0.02340	0.00710	30.3
Morocco	1960-1971	0.01603	0.02436	0.00832	34.2
South Africa	1960-1970	0.03027	0.03815	0.00787	20.6
Northern America[a]					
Canada	1951-1961	0.00287	0.02833	0.02546	89.9
	1961-1971	0.00712	0.01791	0.02502	139.7
Dominican Republic	1950-1960	0.02667	0.03655	0.00988	27.0
	1960-1970	0.01350	0.02901	0.01552	53.5
El Salvador	1950-1961	0.02471	0.02928	0.00457	15.6
	1961-1971	0.03245	0.03765	0.00520	13.8
Guatemala	1964-1973	0.01853	0.02408	0.00555	23.0
Mexico	1960-1970	0.01543	0.03471	0.01928	55.5
Nicaragua	1950-1963	0.02155	0.02930	0.00775	26.5
Panama	1950-1960	0.03000	0.03908	0.00908	23.2
	1960-1970	0.01845	0.03245	0.01400	43.1
Puerto Rico	1960-1970	0.01438	0.01423	0.02860	201.0
United States					
of America	1950-1960	0.00090	0.01823	0.01913	104.9
	1960-1970	0.00028	0.01276	0.01304	102.2
South America					
Argentina	1947-1960	0.00901	0.02353	0.03254	138.3
Brazil	1950-1960	0.01269	0.03211	0.01942	60.5
	1960-1970	0.00862	0.03131	0.02269	72.5
Chile	1952-1960	0.00035	0.02655	0.02690	101.3
	1960-1970	0.01157	0.01721	0.02878	167.2
Colombia	1951-1964	0.01609	0.03383	0.01773	52.4
Ecuador	1950-1962	0.01884	0.02765	0.00881	31.9
	1962-1974	0.02555	0.03410	0.00855	25.1
Paraguay.	1962-1972	0.02348	0.02984	0.00636	21.3
Peru	1961-1972	0.00453	0.02896	0.02443	84.4
Uruguay	1963-1975	0.00313	0.00567	0.00254	44.8
Venezuela	1950-1961	0.00518	0.04190	0.03672	87.6
	1961-1971	0.00020	0.03452	0.03473	100.6
Asia					
Bangladesh	1961-1974	0.02310	0.02597	0.00288	11.1
India	1951-1961	0.01854	0.02047	0.00193	9.4
	1961-1971	0.01971	0.02215	0.00244	11.0
Indonesia	1961-1971	0.01786	0.02046	0.00260	12.7
Iran	1956-1966	0.01617	0.02819	0.01201	42.6
Iraq	1957-1965	−0.00101	0.02528	0.02629	104.0
Japan	1955-1965	−0.02178	0.00888	0.03066	345.3
	1965-1975	−0.01507	0.00943	0.02449	259.7
Nepal	1961-1971	0.02037	0.02085	0.00048	2.3
Republic of Korea	1960-1970	0.00293	0.02357	0.02065	87.6
Sri Lanka	1953-1963	0.02097	0.02600	0.00503	19.3
	1963-1971	0.01758	0.02309	0.00551	23.9
Syrian Arab Republic	1960-1970	0.02130	0.03186	0.01055	33.1
Turkey	1955-1960	0.01845	0.03029	0.01184	39.1
	1960-1970	0.01142	0.02730	0.01589	58.2
Europe					
Austria	1961-1971	0.00144	0.01006	0.00862	85.7
Bulgaria	1956-1965	−0.01535	0.00789	0.02324	294.6
Finland	1950-1960	0.00038	0.01102	0.01064	96.6
	1960-1970	−0.01858	0.00247	0.02105	852.2
France	1962-1968	−0.02296	0.00859	0.03155	367.3
Greece	1961-1971	−0.01489	0.00528	0.02017	382.0
Hungary	1960-1970	−0.00574	0.00466	0.01040	223.2
Ireland	1961-1971	−0.00655	0.00183	0.00838	457.9
Luxembourg	1960-1970	−0.01033	0.00642	0.01674	260.7
Norway	1950-1960	0.00932	0.01086	0.00154	14.2
	1960-1970	−0.00853	0.00889	0.01742	195.9
Poland	1960-1970	0.00249	0.01217	0.00968	79.5
Romania	1956-1966	−0.00190	0.01000	0.01190	119.0
Spain	1950-1960	−0.00217	0.00819	0.01035	126.4

TABLE 60. SOURCES OF INTERCENSAL GROWTH OF RURAL POPULATIONS *(continued)*

Major area or region and country	Intercensal period	Annual intercensal population growth rate of rural areas (1)	Estimated annual rural rate of natural increase (2)	Estimated annual rate of rural population loss from internal migration and reclassification (3)	Rural out-migration and reclassification as a percentage of natural increase $(4) = \frac{(3)}{(2)} \times 100$
Sweden	1960-1970	− 0.03070	− 0.00071	0.03141	4.423.9
Switzerland	1960-1970	0.00045	0.01605	0.01560	97.2
Oceania					
Australia	1961-1971	− 0.00296	0.02214	0.02509	113.3
New Zealand	1951-1961	0.00118	0.02786	0.02668	95.8
USSR	1959-1970	− 0.00275	0.01599	0.01875	117.3
Mean, last observation					
Developing countries (N = 29)		0.01303	0.02672	0.01369	
Developed countries (N = 20)		− 0.00802	0.01046	0.01848	

ᵃ Including the following countries of Latin America: Dominican Republic; El Salvador; Guatemala; Mexico; Nicaragua; Panama; and Puerto Rico.

conditions are implicated in the global process and account in the main for the movement that has occurred in the past century:

(1) Rising levels of personal income;

(2) Income-inelastic demand for agricultural products: the tendency for increases in income to be disproportionately directed towards expenditure on non-agricultural products;

(3) Greater efficiency of urban as opposed to rural configurations in production and consumption of non-agricultural products. Their efficiency depends in a complex way upon transportation technology, which must be good enough to allow exchange between urban and rural areas but not so good as to make location irrelevant to production and consumption.

These three conditions are by themselves sufficient to account for increasing proportion living and working in dense, urban-type settlements, once a mechanism of factor mobility is introduced to allow workers and firms to locate in areas of higher productivity. There can be no doubt about the empirical validity of each of the three conditions on a global basis.[18] Although these economic transformations and relations can be viewed as the basic engine of urbanization, a wide variety of additional factors will modify the rate at which urbanization proceeds. These factors include: unusually rapid technological change in agriculture; distortions introduced by international economic relations; rapid population growth combined with rapidly diminishing returns to agricultural labour or with exclusionary land tenure systems; urban biases in government investment and services; and government policies on migration.

Bearing in mind those considerations, one should expect migration rates to be higher where economic growth is more rapid. There are certainly instances at the country level

which support such an expectation. Three censuses of relatively high quality conducted in the Republic of Korea during the decade 1960-1970 showed that rural-urban migration was greatly intensified during the period 1966-1970 as the economy of the country grew at an unprecedented rate.[19] Because of the inertia factor and imperfect information, it is unreasonable to expect instantaneous adjustment to economic growth and to accompanying changes in the structure of demand. Therefore, one might also expect migration rates to be higher in countries at higher levels of economic performance, where the accumulated volume of unaccomplished but desirable movement is greater. Another reason for expecting a positive effect of income level on migration rates is that income elasticities of demand for agricultural products typically decline with income level.

Zero-order correlations between rural net out-migration rates and certain other factors in these 29 less developed countries are as follows:

Independent variable	Correlation coefficient
Growth rate, gross domestic product *per capita*	0.356
Initial gross national product *per capita*	0.611
Initial proportion urban	0.576
Rural rate of natural increase	0.085
Growth rate, total agricultural production	− 0.084
Growth rate, agricultural production per rural resident	0.466
Asia, categorical variable	− 0.283
Africa, categorical variable	− 0.204

Source: Data on initial proportion urban and the rate of rural natural increase were produced in the course of the present study. Data on initial gross national product *per capita* were drawn from World Bank, *World Table IV* (Washington, D.C., January 1971), expressed in terms of 1964 dollars and interpolated where necessary. Data on the growth rate of gross domestic product *per capita* and of agricultural production were taken from World Bank, *World Tables 1976* (Baltimore, Maryland, Johns Hopkins Press), "Comparative economic data", table 1. Interpolation was again used where deemed essential. The growth rate of agricultural production per rural resident was derived by subtracting the rural population growth rate from the growth rate in agricultural production. All variables refer to the intercensal period or, where preceded by the word "initial", to the first year of that period.

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[18] For international documentation on income elasticities of demand for food, see Food and Agriculture Organization of the United Nations. *Income Elasticities of Demand for Agricultural Products* (Rome, 1972). in particular, pp. 98-109.

[19] E.-Y. Yu, *loc. cit.*

				Coefficients of:					
Growth rate, gross national product per capita (annual percentage points)	Initial gross national product per capita (1964 dollars)	Initial proportion urban (x 1,000)	Annual rate of rural natural increase (per 1,000)	Growth rate, gross agricultural production (annual percentage points)	Growth rate, agricultural production per rural resident (annual percentage points)	Asia, categorical variable (1 if Asian)	Africa, categorical variable (1 if African)	Constant	R^2
1.576[a]	0.02041[b]	0.01485[c]	0.1448					-5.33	0.494
1.189[b]	0.02351[a]	0.01755[b]	0.2291			3.002	-3.546	-9.02	0.521
1.486[b]	0.03178[c]		0.1408	0.2087				-3.06	0.465
0.948[b]	0.02538[a]	0.00715	0.1182		2.064[a]			-4.71	0.598
0.521	0.02845[c]	0.00620	0.1815		2.226[c]	1.272	-6.046[b]	-5.78	0.636

[a] t-value significant at 5 per cent.
[b] t-value significant at 5 per cent but coefficient larger than its standard error.
[c] t-value significant at 1 per cent.

It is clear that both initial income levels and income growth performance during the period of observation have strong positive associations with the rate of net rural-urban migration. Multiple regression analysis tends to confirm the importance of these variables. Regression results are shown in table 61. Because no one model specification is clearly superior to the others, a wide variety of regressions forms were estimated, not all of which are presented. Results are most efficiently summarized by discussing categories of variables.

National income level and growth

Regression results clearly suggest that income level and income growth have positive effects on rates of rural out-migration. The income-level term is usually highly significant. Its coefficient of around 0.03 suggests that each additional $100 of gross domestic product *per capita* increases rural out-migration rates by about 3 per 1,000. The income growth rate contributes additionally to explaining migration, although its coefficient typically falls slightly short of significance at 5 per cent. Its coefficient of 1-1.5 in the various equations suggests that a gain of 1 percentage point in the economic growth rate in an intercensal period typically increases annual migration by 1-1.5 per 1,000 during the period. It is interesting to observe that income growth is predicted to have only slightly larger effects on migration in the decade in which it occurs than in subsequent decades. That is, a 1 per cent gain compounded over a decade, when applied to the initial average income level of $275 in the sample, should result in about a $30 gain in *per capita* income. When combined with the coefficient of income level, this gain should raise out-migration rates by 1 per 1,000 in subsequent years.

The growth rate of agricultural production minus the growth rate of the rural population is a somewhat round-about measure of agricultural productivity gains. This term is also closely and significantly related to rural out-migration rates; a percentage point increase in "agricultural productivity" increases out-migration by about 2 per 1,000. This result would appear to provide some support for Gaude's conclusion that agricultural productivity gain, the

focus of many rural development programmes, will speed rural-urban migration.[20]

Natural increase

The zero-order correlation between rates of rural natural increase and rates of out-migration is very weak. However, when income factors are controlled, natural increase emerges as a relatively consistent predictor of out-migration, with its coefficient typically falling just short of its standard error. The results suggest that perhaps one fifth of incremental rural natural increase is being "drained off" to urban areas. Such a result should be carefully distinguished from the gross empirical comparison of rural rates of natural increase (averaging 26.8 per 1,000 in the sample) and rates of net out-migration (averaging 13.6). Metaphorically speaking, half of natural increase is being "drained off". But the more interesting question is how much additional migration a unit increment in natural increase would be expected to produce; the equations suggest, albeit in a very preliminary and tentative way, that the answer is on the order of 0.2 unit. Furthermore, it should be remembered that some of the measured influence of natural increase probably reflects reclassification instead of actual movement. Rural places are more likely to be annexed by urban areas, or to pass an urban-defining boundary, when natural increase is high than when it is low.[21]

[20] J. Gaude, "Causes and repercussions of rural migration in developing countries: a critical analysis", World Employment Programme Working Paper WEP/10-6/WP10, Geneva, International Labour Office, October 1976. However, it should be mentioned that there is a possibly serious ratio-correlation problem with the result. Out-migration rates, the dependent variable, also figure into the independent variable because they are a component of rural population change. Errors in measuring rural growth will tend to produce a spurious positive correlation among the variables. It is useful to take note that zero-order correlations between out-migration and the agricultural productivity variable are not unusually large, suggesting that such spuriousness is not an overpowering problem; the importance of the productivity variable emerges primarily in the regression analysis. The simple growth rate of agricultural production, a variable uncontaminated by the ratio-correlation problem, falls far short of achieving statistical or substantive significance.

[21] On the other hand, errors in measuring net migration will bias downward the measured influence of natural increase, which is derived by subtracting net migration from rural growth. The fact that the association is positive is some indication that the migration measurement given here is reasonably reliable. A negative association would also be produced by the tendency for out-migration to hollow out the age structure in rural areas.

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These results therefore appear to support the widespread supposition that high rates of natural increase in rural areas contribute to the flight to cities. At the same time, however, they indicate that demographic solutions to problems of rapid rural-urban migration are partial solutions. According to the equations, a massive reduction of rural natural increase from 30 to 20 per 1,000 would slow migration by only 2 per 1,000, or by some 15 per cent of its average value for the sample as a whole. Obviously, there could be larger effects where diminishing returns to rural labour are unusually strong or where institutional arrangements interfere with rural labour absorption. Furthermore, second-order effects operating through rural income and agricultural productivity are ignored in the calculation.

Initial proportion urban

It is sometimes argued that urbanization is, in effect, a self-perpetuating social diffusion process where "messages" are transmitted from urban to rural residents and where rural residents respond by adopting the innovation described, i.e., an urban residence. The prevalence of urban-rural links within families and neighbourhoods gives some plausibility to this argument. In support of this argument, the simple correlation between proportion urban and the rate of migration is strong and positive. But the influence of the urban proportion largely disappears when the initial income level is controlled. The implication of the partial coefficients is that, when the urban percentage increases by 10 percentage points, the rate of net rural-urban migration increases by from 0.7 to 1.7 per 1,000 rural residents. The results are thus not inconsistent with the notion that rural-urban migration is a cumulative and partially self-perpetuating process. The initial state of the system does appear to influence migration during a period apart from other events of that period. But they do suggest that the initial income level may be a better indicator of the state of the system and the content of urbanizing "messages" than is the initial proportion urban itself.

Major areas

The following major areas are recognized in the analysis: Africa; East Asia; South Asia; and Latin America. So few countries of Africa are represented, however, that no generalizations about that major area should be drawn. The results suggest that countries of Asia have a rural out-migration rate that is slightly higher, by 1-3 per 1,000 than the rate for countries of Latin America, once other measured differences between the regions are accounted for. Regional differences, however, are far from statistical significance.

In Latin America, the countries have higher crude rates of out-migration than those in Asia. But the results suggest that these differences are explicable in terms of other variables, particularly the higher average income levels, income growth rates and rates of rural natural increase in Latin America. The slightly higher out-migration rate in Asia that is implied once these differences are controlled may reflect the activity of such important unmeasured variables as rural density.

Thus, the rate of net flow of migrants from rural to urban areas in developing countries appears to be fairly closely related to a country's level and rate of economic development, contrary to the chaotic and unstructured appearance that is sometimes suggested at a national level. Residential shifts seem to play a highly integrated role in the process of economic and social development. There are also suggestions that higher rates of rural natural increase and of agricultural productivity growth, and a higher initial urban proportion accelerate net migration from rural areas. Urban natural increase has already been identified as the principal source of urban growth in most developing countries; the possibility that rural natural increase speeds rural-urban migration directs additional attention to the importance of natural increase as a factor in urban growth. These results must not be taken to imply that aggregate-level analysis can provide all the answers to questions about determinants of rural-urban migration. Most of the pertinent processes vary considerably from area to area and cannot be accurately identified with international data. However, the fact that rural-urban migration rates vary in a relatively systematic way from population to population helps to identify the major factors that need to be examined in order to understand the process at a lower level of aggregation.

C. FACTORS AFFECTING THE LEVEL AND VARIABILITY OF CITY GROWTH RATES

Workers in extractive or resource-based industries tend to be widely dispersed over the land to take advantage of the dispersion of resources. As economic development proceeds, the dependence of a population upon these industries declines. Correspondingly, workers and industries become increasingly "footloose". Dependence upon raw materials is replaced by dependence upon a vast array of factors, for instance: availability of physical and human capital; availability of the tertiary services of banking, insurance, credit, transportation and distribution; and proximity to consumers. As the human and organizational factors of production become more important to the success of any enterprise, it is not surprising that economic activities become increasingly concentrated in areas where such factors are relatively abundant and diversified.

Although it is not difficult to understand why a population becomes more concentrated, there are no persuasive arguments to predict whether and when the process of concentration should stop. Undoubtedly, the process will vary from country to country because of differences in topography, history, size and involvement in the international economy. Recent cross-sectional studies in Japan, Sweden and the United States suggest that labour productivity increases as the size of city increases.[22] Other factors that vary with

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[22] David Segal, "Are there returns to scale in city size?", *Review of Economics and Statistics*, vol. 58, No. 3 (August 1976), pp. 339-350; Leo Sveikauskas, "The productivity of cities", *Quarterly Journal of Economics*, vol. 89, No. 3 (August 1975), pp. 393-413; Yngve Aberg, "Regional productivity differences in Swedish manufacturing", *Regional and Urban Economies*, vol. III, No. 2 (1973), pp. 131-156; Koichi Mera, "On the urban agglomeration and economic efficiency", *Economic Development and Cultural Change*, vol. 21, No. 2 (January 1973), pp. 309-324.

size, such as capital/labour ratios, apparently do not account for all of the difference in productivity; and the studies conclude that size *per se* contributes to higher productivity.[23] Unfortunately, there is a shortage of studies of city-size effects on productivity in less developed countries, although higher wages in larger cities have sometimes been cited as *prima facie* evidence of higher productivity therein.[24] The productivity advantages of large cities are usually ascribed to "economies of agglomerations": economies of operation that are usually external to the firm but result from the previous presence of other firms and of social infrastructure.[25] These economies include the existence of a skilled labour force, credit facilities, transport and distribution systems and the like.

Others have argued that agglomerative economies are eventually outweighed by diseconomies in the form of air and water pollution, traffic congestion and increasing costs of public services. However, investigations of the relation between public service costs and city size have failed to reveal striking diseconomies of large size. For such services as police, fire-fighting, schools and parks that must be supplied on a small-area basis because they require proximity to users, there tends to be no relation between the size of city and the average cost of services.[26] For the large public utilities, such as sewerage, water-supply and electricity, there tend to be economies of scale which continue to manifest themselves even after population size has reached into the millions.[27] Only with regard to traffic congestion and the length of the journey to work are the disadvantages of large cities readily apparent.[28] Housing presents a mixed picture. Some economies can be effected in high-rise construction, but high-rise construction is feasible only when construction standards are high. For low-income populations, the greater difficulty of creating makeshift, labour-

intensive housing in large cities constitutes a disadvantage of size.[29]

Any decisive advantage or disadvantage of sheer size should reveal itself in systematic differentials in rates of population growth among places of various size. Table 62 shows the growth rate of cities beginning with over 100,000 population between the two most recent censuses (or dates of other concrete estimates). The actual intercensal dates vary from country to country.[30] The table suggests that, for the world as a whole and particularly for less developed regions, the relationship between city size and city growth rates is U-shaped. For the world, the less developed and the more developed regions alike, the fastest growth, on average, has been occurring in the smallest cities, those in the range of 100,000-250,000 inhabitants. The slowest growth in each of the groups occurs among cities in the range of from 1 million to 2 million. The growth tendency of the giant cities, those of 4 million or more inhabitants, is much more mixed. The 10 giants in the more developed regions tend to be growing more slowly than the average city in that group of countries; in less developed regions, the 10 giants exceed the average growth rate and in fact rank second in terms of average growth. It is in this size group where the city growth difference between the more developed and the less developed regions is greatest, with giant cities in the less developed regions growing at more than double the rate of such cities in the more developed regions. These tendencies would appear to confirm suggestions that factors currently operating on urban primacy in the less developed regions are rather different from those operating in the more developed regions. Prominently cited among these factors is a pattern of government expenditures and investments that is disproportionately directed towards one large city; and a history of colonial settlement that encouraged the growth of a particular city, usually a port, at the expense of smaller-city development.[31]

The relatively slow recent growth of very large cities in more developed countries has been observed in Italy, Japan, Norway, Sweden, the United States and elsewhere.[32] Many factors have been invoked to account for this "turnaround". Continued improvements in transportation and

[23] An alternative interpretation of these results is that certain areas enjoy intrinsic natural advantages (e.g., a confluence of rivers), attract thereby a larger population, and retain some wage or productivity advantage rather than have it dissipated by in-migration only because workers require extra compensation for living in large and congested areas. Surveys of consumer preferences in the United States give some support to this latter interpretation by revealing a widespread preference for relatively small places. Larry G. Blackwood and Edwin H. Carpenter, "The importance of anti-urbanism in determining residential preferences and migration patterns", *Rural Sociology*, vol. 45, No. 1 (1978), pp. 31-47.

[24] Koichi Mera, *loc. cit.*, Sally Findley, *Planning for Internal Migration: A Review of Policies and Issues in Developing Countries* (Washington, D.C., Bureau of the Census, 1977), chap. IV.

[25] For an extended discussion, see Niles M. Hansen, "Systems approaches to human settlements", Research memorandum RM-76-3, Laxenburg, Austria, International Institute for Applied Systems Analysis, January 1976; and G. M. Neutze, *Economic Policy and the Size of Cities* (Canberra, Australian National University Press, 1965).

[26] Werner Z. Hirsch, "The supply of urban public services", in Harvey S. Perloff and Lowdon Wingo, Jr., eds., *Issues in Urban Economics* (Baltimore, Maryland, Johns Hopkins Press, for Resources for the Future, 1968), pp. 477-526. Unionization of municipal workers may be more common in larger cities, thereby raising operating expenses, but it is not clear that this factor should be treated as intrinsic to population size.

[27] *Ibid.*; and Roger Revelle and H. Thomas, "Population growth and environmental control", in Economic and Social Commission for Asia and the Pacific, *The Ecological Implications of Rural and Urban Population Growth—Report on a Regional Seminar, 25 August-3 September 1971*, Asian Population Studies Series, No. 10 (E/CN.11/1043) (Bangkok, 1974).

[28] G. M. Neutze, *op. cit.*, chap. II.

[29] Joseph Gugler and William G. Flanagan, *Urbanization and Social Change in West Africa* (Cambridge, Cambridge University Press, 1978).

[30] In rough terms, the average period covered extends from 1962 to 1972. In dealing with a comparison of growth rates by city size, it is obviously desirable to use actually recorded experience rather than data interpolated or extrapolated to a uniform date.

[31] World Bank, "Urbanization", Sector working paper, Washington, D.C., 1972; Janet Abu-Lugnod and Richard Hay, Jr., eds., *Third World Urbanization* (Chicago, Maaroufa Press, 1977); J. Gugler and W. G. Flanagan, *op. cit.*, chap. 2.

[32] Shunichi Inoue, "New stage of economic development and metropolitan growth in Japan"; and Antonio Golini, "Present interrelations between migration and urbanization: the Italian case", papers presented at the Conference of the Committee on Urbanization and Population Redistribution of the International Union for the Scientific Study of Population, Bellagio, Italy, 30 June-4 July 1978; John M. Wardwell, "Metropolitanization in developed countries: have the limits been reached?", paper presented at the Conference on Economic and Population Change: Issues for the 1980s of IUSSP, Helsinki, 28 August-1 September 1979; D. R. Vining and T. Kontuly, "Increasing returns to city size in the face of an impending decline in the sizes of large cities: which is the bogus fact?", *Environment and Planning*, vol. IX, No. 1 (1977), pp. 59-62.

Size class of city (thousands)	World	More developed regions	Less developed regions	Africa	Latin America	Northern America	East Asia	South Asia	Europe	Oceania	USSR
4 000 or more	0.02724	0.01555	0.03893	0.02659	0.04552	0.01700	0.03580	0.02947	0.00970	—	0.00848
Number of cities	20	10	10	1	4	3	5	2	4	—	1
2 000-3 999	0.02355	0.01823	0.03196	—	—	0.01913	0.01731	0.04662	0.01745	0.02356	0.01005
Number of cities	31	19	12	—	—	6	6	6	10	2	1
1 000-1 999	0.02052	0.01178	0.03079	0.02609	0.03731	0.01529	0.02315	0.03550	0.00739	—	0.02138
Number of cities	74	40	34	3	8	9	17	9	22	—	6
500-999	0.02540	0.02127	0.03200	0.03422	0.04382	0.02702	0.02180	0.03798	0.01496	0.02473	0.02405
Number of cities	143	88	55	6	12	24	23	15	37	3	23
250-499	0.02706	0.01814	0.03806	0.04452	0.03902	0.02421	0.03668	0.03396	0.01091	0.03189	0.02394
Number of cities	288	159	129	20	35	48	50	73	2	40	
100-249	0.02902	0.02229	0.03949	0.04701	0.03596	0.02024	0.03607	0.03698	0.01906	0.01415	0.02715
Number of cities	782	476	306	53	66	96	102	134	203	7	121
All cities	0.02759	0.02063	0.03768	0.04448	0.03782	0.02163	0.03293	0.03649	0.01603	0.02029	0.02574
Number of cities	1,338	792	546	83	110	173	201	216	349	14	192

communication may have reduced the economies of agglomerating into very dense aggregate (while the much poorer transport systems of the less developed regions offer continued incentives to agglomerate into areas that facilitate face-to-face interaction); an increase in government transfer payments as a fraction of national product may have allowed larger fractions of the population to locate in smaller areas without economic sacrifice; economic recession may have inhibited the formation of new firms, which tend to locate disproportionately in large cities; high income elasticities of demand for outdoor recreational opportunities may have led increasing fractions to locate outside a metropolis; and governmental deconcentration policies may have had an impact in certain places.[33] Separating out these and other influences will prove very difficult and can scarcely begin until the 1980 round of censuses provides more data on the types of cities involved in the turn-round and on its breadth and continuity.

In addition to the average growth rates in a class of cities, some interest is attached to the variance in growth rates. High variance implies unpredictability, which entails uncertainty and difficulty in urban planning. It has been suggested that large size imparts a form of inertia to city growth rates.[34] Large cities are typically more diversified industrially, particularly so with respect to the export industries that transmit impulses of change to the local economy. This diversification should serve to cushion large cities against sudden growth or decline associated with the fortunes of a particular industry. The recent growth patterns of the 1,338 cities with more than 100,000 population provide striking confirmation of the above-cited hypothesis:

Size class of city (thousands)	Standard deviation of city growth rates	
	More developed regions	Less developed regions
4 000	0.00996	0.01290
2 000-3 999	0.01583	0.01610
1 000-1 999	0.01160	0.01656
500-999	0.01350	0.02091
250-499	0.01345	0.02344
100-249	0.02041	0.02625

In both groups of countries, the standard deviation of city growth rates is highest for the smallest group of cities and lowest, less than half the size, for the largest. This pattern appears to be the first demonstration on an international level that the variability in city growth rates is systematically associated with city size.

There are compelling reasons to argue that a dominant influence on the level of city growth rates is not city size but rather the population growth rate of the country in which the city is located. This relationship is brought out clearly in table 63. Without exception, cities in a particular size class experience more rapid average growth as the national population growth rate increases in increments of 1 per cent. All the categories in which average city growth rates exceed 4.5 per cent per annum occur among the group of countries in which national growth rates exceed 3 per cent. Undoubtedly, the difference in national growth rates accounts for the bulk of the difference between city growth rates in the less developed and the more developed regions. Within a particular category of national growth rates, the relationship between city size and city growth rates remains relatively flat, with a slight tapering off of city growth as size increases among the slow-growing countries and the emergence of a U-shaped curve as national growth rates increase.

The importance of national growth rates is further confirmed by a correlation and regression analysis of factors associated with city growth rates. Growth rates in 1,322 of the 1,338 cities represented in tables 62 and 63 were compared with a variety of demographic and economic indica-

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[33] The effect of government policies is reviewed in Niles M. Hansen, ed., *Public Policy and Regional Economic Development? The Experience of Nine Western Countries* (Cambridge, Mass., Ballinger Press, 1974). On some of the other influences, see J. Wardwell, *op. cit.*

[34] Wilbur Thompson, "Internal and external factors in the development of urban economies", in Harvey S. Perloff and Lowdon Wingo, Jr., eds., *Issues in Urban Economies*, pp. 43-80.

Size class of city (thousands)	Growth rate of country			
	0-0.0099	0.01-0.0199	0.02-0.0299	0.03+
4 000 or more	0.01228	0.03244	0.04045	0.05775
Number of cities	8	7	4	1
2 000-3 999	0.00923	0.02097	0.04188	—
Number of cities	11	10	10	—
1 000-1 999	0.01117	0.02516	0.03389	0.04123
Number of cities	36	23	11	4
500-999	0.01888	0.02476	0.03766	0.04541
Number of cities	71	38	25	9
250-499	0.01663	0.03117	0.03510	0.05190
Number of cities	130	72	64	22
100-249	0.01916	0.03115	0.03820	0.05323
Number of cities	349	199	176	58
All cities	0.01784	0.02980	0.03746	0.05171
Number of cities	605	349	290	94

tors pertaining to the initial census date or to the intercensal period.[35] By far the strongest correlate of a city's intercensal growth rate is the intercensal population growth rate of the country in which the city is located. The correlation coefficient between the two variables is +0.499. In a regression analysis that attempts to identify factors associated with city growth rates, the coefficient of the national growth rates is associated, on average, with about a 1 per cent gain in city growth rates. As shown in table 64, other variables that are significantly associated with city growth rates in the regression analysis are the national economic level and economic growth rate, both positively associated with city growth; the initial city size and the initial proportion urban, both negatively associated with city growth; and a city location in Latin America, which confers an additional 0.8 per cent to city growth rates in comparison with the combined group of cities in Europe-Northern America-Oceania-USSR. City location in Asia or Africa is not significantly associated with a city's growth rate, once demographic and economic factors are controlled. The importance of economic level and economic growth for large city growth is, of course, congruent with their positive influence on rates of rural out-migration which was suggested above on the basis of a completely different data set. The variance in city growth rates explained by this combined set of factors is 29.1 per cent of the total variance; of this amount, 85 per cent is accounted for by national population growth rates alone. If policy levers for influencing city growth rates are sought, those affecting national rates of population growth are clearly worthy of special consideration.

The large cities given in tables 62 and 63 are growing at about the same rate as the total urban populations in the respective regions. Their average growth rate of 0.0276 in the world as a whole is very close to the world average urban growth rate of 0.0288 between 1960 and 1975. For the more developed regions the equivalent rates are 0.0206

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[35] Cities in countries with fewer than 2 million population were dropped from the data set, as were cities in two countries for which economic information was not available.

TABLE 64. REGRESSION EQUATION PREDICTING MOST RECENT INTERCENSAL GROWTH RATE, PER PERSON, OF 1,322 CITIES WITH OVER 100,000 POPULATION

Variable	Coefficient of variable	F-value of additional explained variance contributed by variable after all other variables are in the equation
National intercensal population growth rate (per person)	0.94093	104.41
Initial national proportion urban	−0.03274	47.43
Intercensal growth rate of gross domestic product per capita (percentage) . .	0.00245	36.54
Initial level of gross national product per capita (thousands of 1964 dollars)	0.00351	11.90
Log, initial city size	−0.00212	5.44
Regional categorical variable for city in:		
Latin America	0.00794	9.50
Asia	−0.00186	1.10
Africa	0.00201	0.45

NOTES: F-value significant at 1 per cent: 6.64; F-value significant at 5 per cent: 3.84; constant term = 0.04408.

and 0.0195; and for the less developed regions, 0.0377 and 0.0394. Despite this near equivalence of large city and urban growth rates, the fraction of the urban population that resides in large cities has been growing. This growth results in the main simply from the continual graduation of cities beyond the boundary that distinguishes small and large cities. The fraction of the urban population that lives in cities larger than a particular minimum size is shown in table 65.

For the world as a whole, the percentage of urban population that lives in cities with more than 250,000 population has grown at a steady rate, from 44.3 per cent in 1950 to 53.7 per cent in 1975. Proportionally, the fraction living in the largest cities of more than 4 million inhabitants has

TABLE 65. POPULATION, NUMBER OF CITIES AND PERCENTAGE OF URBAN POPULATION IN PARTICULAR. SIZE CLASS OR ABOVE, WORLD, MORE DEVELOPED REGIONS AND LESS DEVELOPED REGIONS, 1950-1975

(Population in thousands)

Size class of city (thousands)	1950	1955	1960	1965	1970	1975
			World			
4 000 +						
Population	71 133	89 699	125 380	156 128	189 790	241 809
Number of cities	11	13	18	21	24	30
Percentage urban	9.82	10.56	12.39	13.30	14.01	15.49
2 000 +						
Population	121 710	146 641	198 531	250 568	298 801	375 153
Number of cities	30	33	46	57	63	78
Percentage urban	16.81	17.27	19.62	21.35	22.06	24.04
1 000 +						
Population	186 830	234 529	294 639	360 338	433 100	525 389
Number of cities	77	95	115	138	159	185
Percentage urban	25.80	27.62	29.11	30.70	31.98	33.66
500 +						
Population	254 735	314 634	388 822	470 192	562 713	685 719
Number of cities	176	213	250	297	345	412
Percentage urban	35.18	37.06	38.42	40.06.	41.55	43.93
250 +						
Population	320 823	388 833	480 471	577 150	693 011	837 818
Number of cities	371	431	516	610	726	853
Percentage urban	44.30	45.80	47.47	49.17	51.17	53.68
100 +						
Population	408 004	492 897	597 220	709 438	833 058	971 656[a]
Number of cities	953	1 121	1 277	1 462	1 615	1 655[a]
Percentage urban	56.34	58.05	59.01	60.44	61.51	62.25[a]
		More developed regions				
4 000 +						
Population	55 655	72 175	82 937	100 183	108 250	121 235
Number of cities	8	10	10	12	12	13
Percentage urban	12.40	14.25	14.48	15.66	15.40	15.80
2 000 +						
Population	85 694	98 907	125 588	151 000	168 448	193 721
Number of cities	19	20	26	32	34	39
Percentage urban	19.09	19.53	21.93	23.60	23.97	25.25
1 000 +						
Population	124 485	151 192	181 193	212 368	239 168	271 153
Number of cities	46	56	65	77	85	95
Percentage urban	27.73	29.85	31.64	33.20	34.03	35.34
500 +						
Population	166 599	198 958	237 972	276 775	312 257	351 071
Number of cities	107	127	147	170	188	205
Percentage urban	37.11	39.28	41.55	43.26	44.43	45.75
250 +						
Population	208 471	244 238	290 648	335 400	380 899	432 942
Number of cities	230	259	299	342	392	443
Percentage urban	46.44	48.23	50.75	52.43	54.19	56.42
100 +						
Population	259 628	306 591	360 706	413 228	461 635	510 228[a]
Number of cities	575	678	759	846	904	907[a]
Percentage urban	57.83	60.54	62.98	64.59	65.68	66.50[a]
		Less developed regions				
4 000 +						
Population	15 478	17 524	42 443	55 945	81 540	120 374
Number of cities	3	3	8	9	12	17
Percentage urban	5.62	5.11	9.66	10.48	12.52	15.19
2 000 +						
Population	36 016	47 734	72 943	99 568	130 353	181 432
Number of cities	11	13	20	25	29	39
Percentage urban	13.09	13.93	16.60	18.65	20.01	22.86
1 000 +						
Population	62 345	83 337	113 446	147 970	193 932	254 236
Number of cities	31	39	50	61	74	90
Percentage urban	22.65	24.32	25.82	27.71	29.77	32.04

[a] Not including some cities that graduated into size class 100,000 + between 1970 and 1975.

Size class of city (thousands)	1950	1955	1960	1965	1970	1975
500+						
Population	88 136	115 676	150 850	193 417	250 456	334 648
Number of cities	69	86	103	127	157	207
Percentage urban	32.02	33.76	34.33	36.22	38.44	42.17
250+						
Population	112 352	144 595	189 823	241 750	312 112	404 876
Number of cities	141	172	217	268	334	410
Percentage urban	40.82	42.20	43.21	45.27	47.91	51.02
100+						
Population	148 376	186 306	236 514	296 210	371 423	461 428[a]
Number of cities	378	443	518	616	711	748[a]
Percentage urban	53.91	54.38	53.83	55.47	57.01	58.15[a]

increased even faster, from less than 10 per cent in 1950 to greater than 15 per cent in 1975. These same growth tendencies are apparent within both the less developed and the more developed regions, but the graduation of cities into higher size classes has been more rapid in the less developed regions. As the most extreme example, in the less developed regions, the number of cities larger than 4 million grew from only 3 in 1950 to 17 by 1975; 105 million persons were added to this size class during the interval, a majority of whom (14 × 4 million = 56 million) were added by graduation. Even in the more slowly growing developed regions, however, the number of million-cities doubled from 46 to 95 between 1950 and 1975.

From table 65, it can be inferred that the urban population of the less developed regions tends to reside in somewhat smaller places than the urban population of the more developed regions. As of 1970, 43.0 per cent of the urban population in the less developed regions lived in places smaller than 100,000 in population, compared with 34.3 per cent in the more developed regions. The difference in the proportion in the largest cities, however, is insubstantial. In part, this equality reflects counterbalancing tendencies in Latin America, where the urban fraction living in cities of over 4 million is among the world's highest at 20 per cent; and in Africa, where only 6-7 per cent of the urban population live in such large agglomerations.

Chapter VI

SOME ASPECTS OF POPULATION STRUCTURE*

A. Age distribution

The age structure of a population is a product of its past history of fertility, mortality and migration. Mortality reductions tend to inflate the fraction of the population who are at the ages of childhood and at the very high ages. They tend to have little effect on the mean age of the population, but to increase the variance of ages and the fraction in ages of labour force dependency. Fertility reductions, on the other hand, invariably make a population older and decrease the proportion in the childhood years. A permanent move to a lower fertility régime has the eventual effect of pivoting the age distribution about the mean age of the population: increasing the proportion at all ages below the mean age and decreasing it at all higher ages.

In many developing regions, recent fertility declines have more than offset the effects of mortality declines, with the result that the proportion of the population that is below age 15 has fallen. As shown in table 66, the proportion in this age interval fell between 1970 and 1975 in the less developed regions as a whole; and in the Caribbean, Middle America, Temperate South America, Eastern South Asia and Middle South Asia. The largest decline, more than 1 percentage point, is estimated to have occurred in South America. However, in Eastern, Western and Southern Africa, the fraction at childhood ages is estimated to have risen during that period, reflecting the effects of mortality declines and in some cases of fertility increases. An increase is also suggested to have occurred in Western South Asia. Although the changes in either direction during a short period are necessarily small and are only suggestive of long-term trends, they are especially noteworthy because they reverse a long-standing history of stability or slight increase in the youthful fraction. For example, between 1950 and 1970 the percentage of the population in less developed regions aged 0-14 years grew by 2.2 percentage points.[1]

This recent reversal of long-standing demographic trends is expected to continue and even to accelerate during the remainder of the century. Between 1975 and 2000, the medium variant projection implies a decline of 6.4 percentage

points in the percentage of the population under age 15 in the less developed regions. This decline represents 15 per cent of the total population who would have been in this age range in 2000 had the 1975 age distribution been maintained. Between 1985 and 2000, all major less developed regions, including Africa, are expected to be sharing in the declining youthful fraction. Virtually all of the youthful loss will be absorbed by the working ages of 15-64. The fraction over age 65 is expected to grow by less than 1 percentage point in the last quarter of the twentieth century. The result is that the burden of dependency in developing countries is expected to decline continuously for the remainder of the century. In 1975, a person of labour force age "supported" an average of 0.80 person outside of labour force age; by 2000, the figure is expected to have declined to 0.64, or by 20 per cent. Such a decline in the relative size of the dependent population may facilitate economic growth through faster capital accumulation, both human and physical; on the other hand, the fact that slower growth will occur predominantly at childhood ages indicates that unemployment and job creation problems among the working-age population will not experience a substantial relaxation of demographic pressure during this century.

Among more developed countries the aging of population has been even more rapid and pronounced. Between 1970 and 1975, the percentage of population in the age interval 0-14 declined from 27.1 to 25.3. This decline of 1.8 percentage points was absorbed in equal parts by the working ages and by ages 65 and above. Although all developed regions experienced a rise in the fraction of the aged, the increase was more rapid in Europe than elsewhere. By 1975, the percentage in the retirement years exceeded 13 per cent in Western Europe and Northern Europe, whereas it was still less than 9 per cent in the Soviet Union, Australia and New Zealand, and Japan. By 2000, the percentage over age 65 is expected to be 12.8 per cent in the more developed regions as a whole. The age distribution in developed regions is approaching with considerable speed the age distribution of a stationary population with a life expectancy at birth of 70 years. A typical population with this life expectancy at birth and zero growth has 20.6 per cent of the population under age 15, 64.2 per cent aged 15-64 and 15.2 per cent above age 65.[2] By 2000, the percentage of the population in the

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* Sections A and B prepared by the Population Division of the Department of International Economic and Social Affairs of the United Nations Secretariat. Section C prepared by the Food and Agriculture Organization of the United Nations.

[1] Compiled from "Population by sex and age for regions and countries, 1950-2000, as assessed in 1973: medium variant" (ESA/P/WP.60), p. 3.

[2] Compiled from Ansley Coale and Paul Demeny, *Regional Model Life Tables and Stable Populations* (Princeton, New Jersey, Princeton University Press, 1966), p. 66. Female "West" model life tables are used.

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TABLE 66. AGE DISTRIBUTION, MEDIUM VARIANT, MAJOR AREAS, REGIONS AND COUNTRIES, 1970, 1975, 1985 AND 2000[a]

(Percentage)

Major area, region and country	1970			1975			1985			2000		
	0-14	15-64	65+	0-14	15-64	65+	0-14	15-64	65+	0-14	15-64	65+
World total	36.6	57.9	5.5	36.25	58.08	5.67	34.23	59.99	5.77	31.68	61.93	6.39
More developed regions	27.1	63.4	9.5	25.33	64.30	10.37	23.05	66.01	10.94	22.16	65.09	12.75
Less developed regions	40.7	55.6	3.7	40.54	55.64	3.82	38.03	57.95	4.02	34.31	61.06	4.63
Africa	44.1	53.0	2.9	44.75	52.23	3.02	44.98	51.98	3.04	42.45	54.25	3.29
Eastern Africa	44.4	52.9	2.7	45.41	51.76	2.83	46.16	50.98	2.87	44.27	52.72	3.00
Middle Africa	43.0	54.3	2.8	43.05	53.74	3.22	43.71	53.02	3.28	39.98	56.43	3.59
Northern Africa	44.8	51.9	3.4	44.02	52.56	3.42	42.60	54.04	3.36	38.82	57.35	3.84
Southern Africa	41.0	54.9	4.1	41.90	54.00	4.10	41.99	53.86	4.15	37.67	57.83	4.50
Western Africa	44.4	53.1	2.5	46.03	51.42	2.55	46.81	50.58	2.61	45.11	52.06	2.83
Latin America	42.7	53.5	3.7	41.78	54.30	3.93	40.18	55.69	4.13	37.19	58.20	4.60
Caribbean	41.5	53.5	4.9	40.81	54.12	5.07	35.45	59.11	5.44	32.20	62.05	5.76
Middle America	46.4	50.2	3.4	45.79	50.81	3.40	44.77	51.95	3.28	41.66	54.84	3.51
Temperate South America	31.4	61.9	6.7	30.24	62.44	7.32	28.78	62.96	8.26	25.98	64.53	9.49
Tropical South America	43.9	53.1	3.0	42.65	54.11	3.24	40.86	55.57	3.57	37.26	58.46	4.27
Northern America	28.4	61.9	9.7	25.24	64.46	10.30	22.38	66.15	11.47	22.04	65.95	12.01
East Asia	33.6	60.9	5.4	33.96	60.52	5.52	28.26	65.48	6.26	24.40	67.79	7.81
China	34.5	60.2	5.4	34.87	59.79	5.34	28.64	65.38	5.99	24.56	68.17	7.27
Japan	24.0	68.9	7.1	24.31	67.81	7.88	21.50	68.81	9.69	19.26	66.41	14.33
Other East Asia	42.2	54.4	3.4	38.50	57.78	3.72	34.41	61.28	4.31	29.76	64.67	5.57
South Asia	43.5	53.6	2.9	43.09	53.97	2.94	41.33	55.65	3.02	35.97	60.39	3.64
Eastern South Asia	43.8	53.3	2.9	43.38	53.70	2.92	41.39	55.51	3.11	34.81	61.15	4.05
Middle South Asia	43.3	53.8	2.9	42.85	54.21	2.94	41.12	55.88	3.00	36.06	60.43	3.51
Western South Asia	45.0	51.9	3.1	45.97	50.89	3.14	45.02	52.07	2.90	41.99	54.75	3.26
Europe	26.2	63.0	10.8	25.15	63.12	11.72	22.75	65.55	11.69	21.99	64.78	13.23
Eastern Europe	24.6	65.0	10.4	23.27	65.34	11.39	23.40	65.72	10.88	21.82	65.10	13.08
Northern Europe	24.2	63.2	12.7	23.28	63.01	13.71	19.86	65.53	14.61	21.35	64.38	14.27
Southern Europe	29.9	61.6	8.5	29.02	61.57	9.41	26.89	63.26	9.85	24.89	63.28	11.82
Western Europe	24.2	63.0	12.8	23.30	61.73	14.97	19.28	66.97	13.75	19.55	66.17	14.28
Oceania	32.2	60.6	7.3	31.06	61.43	7.50	28.17	63.67	8.16	26.83	64.45	8.72
Australia-New Zealand	29.4	62.3	8.4	28.03	63.29	8.68	24.19	66.18	9.63	23.17	66.41	10.43
Melanesia	42.4	54.6	3.1	42.47	54.37	3.16	42.40	54.35	3.25	38.70	57.66	3.64
Micronesia-Polynesia	44.6	52.6	2.8	42.48	54.68	2.84	38.53	57.98	3.49	32.48	62.77	4.75
USSR	28.6	63.6	7.8	26.08	65.04	8.88	24.86	65.56	9.58	23.74	64.25	12.01

[a] Provisional data.

more developed regions in these age groups is projected to be 22.2, 65.1 and 12.8. In Western Europe, stationarity will be even closer at hand, with corresponding percentages of 18.2, 66.9 and 14.9. The achievement of stationary age distributions, with their attendant problems of reduced intragenerational mobility and increased fraction of retirement-aged persons, is for all practical purposes less than a generation away in developed regions.

B. URBAN AND RURAL OCCUPATIONAL STRUCTURES

One of the most important sources of internal differentiation within populations is urban versus rural residence. Urban residents typically live in denser surroundings, have access to a wider variety of opportunities and public services and are often the beneficiaries of disproportionate political influence. But probably the most important difference between the two types of areas is their occupational and industrial structures. Rural areas are traditionally identified with agricultural activity and urban areas with non-agricultural pursuits. Indeed, the prevalence of non-agricultural jobs in an area is sometimes an important component of urban definitions. But the correspondence between type of area and type of economic activity is far from perfect, and there are important distinctions among the types of jobs available within the non-agricultural sector. For example, a good deal of concern has been expressed in recent years that urban occupational structures in less developed countries have a deficiency of manufacturing jobs and a surplus of service-type jobs, particularly of the traditional type.

In an attempt to clarify the relation between occupational and residential distributions, the Population Division has undertaken a large-scale comparative analysis of occupational structures in urban and rural areas. Data used in the study were drawn from national census reports or from government questionnaires returned to the United Nations Statistical Office. An attempt was made to ensure broad geographical coverage; this attempt was successful except for sub-Saharan Africa, where only a handful of populations were able to supply data. Data were processed into categories equivalent to those used in the 1968 revision of the International Classification of Occupations. Where data were presented in such a way that comparability to the 1968 classification could not be attained, those data were excluded from the study. The urban definition used also had to be roughly comparable to international norms, as judged on the basis of a scatter-gram relating the urban proportion to the agricultural proportion of the labour force. Although an occupational rather than industrial classification is used in

this section, analysis of 18 countries where data have been processed using both classification systems suggests clearly that the size of the agricultural, manufacturing and service sectors is quite insensitive to choice of classification. The only major difference refers to transportation equipment operators, who are usually grouped with the service sector in an industrial classification but who are included in the manufacturing sector in the present investigation.

Labour force structures of urban and rural areas in relation to developmental level

Table 67 is designed to show the percentage composition of the total labour force at each of five levels of development in both urban and rural areas. In order to have enough observations to form a stable basis of comparison, countries that could supply data at several time points were allowed to be represented in the table more than once. In this sense, the table pools both cross-sectional and time-series data. The index of development will be simply the percentage of the total labour force that is in agriculture. By this definition, the percentage in agriculture necessarily declines as development proceeds. This decline is seen to occur within both rural and urban areas. The decline is especially marked in rural areas, where the percentage in agriculture is reduced from an average of 87 to an average of 27 in the course of development. Obviously, the identification of rural areas with agricultural activities becomes less and less appropriate as countries reach higher levels of economic development. In urban areas, the percentage of agricultural employment at the three lowest levels of development (from 12 to

18 per cent) is reduced to less than 5 per cent at the two highest levels. It is likely that at lower levels of development, many smaller urban places are not highly differentiated from rural areas. This situation is particularly likely in areas where the traditional form of rural settlement has been village clusters rather than dispersed individual landholdings, and where the agricultural labour force commutes to fields in the vicinity. Such clusters may frequently be classified as urban rather than rural because they can attain considerable size. Also, a considerable proportion of the urban labour force in less developed areas may produce a significant amount of food supply in backyards or kitchen gardens. Such labour force may be classified as agricultural if enumerated at a time when they are retired or otherwise unemployed in urban occupations.[3]

In the urban areas, manufacturing remains remarkably constant at a little more than a third of the labour force at all levels of development. Structural differences with regard to manufacturing have been mostly in the rural areas. Whereas manufacturing comprises only about 5 per cent of the rural labour force at the lowest level of development, this proportion is increased at each higher level of development until it reaches 38 per cent at the highest level. It is interesting to note that at this level of development the percentage of manufacturing in the urban labour force is also 38 per cent. Although manufacturing remains a decidedly urban activity in the sense that three quarters of it is contained in urban

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[3] Also, over-bounding of urban areas may result in the classification of some farm land as urban. However, this can happen at any level of development and thus would not necessarily influence the trends shown here.

TABLE 67.   COMPOSITION OF URBAN AND RURAL LABOUR FORCE, BY OCCUPATION AND LEVEL OF DEVELOPMENT
(Percentage points)

Percentage in agriculture in total labour force (1)	Total (sum of cols. 2, 3, 4 and 8) (1)	Agriculture (2)	Industry (3)	Services (sum of cols. 5, 6 and 7) (4)	Professional and administrative services (5)	Clerical and sales services (6)	Traditional services (7)	Unknown (8)	Service-to-industry ratio (9)
Total labour force									
65.0 or more[a]	100.0	77.3	9.7	9.6	2.9	4.0	2.7	3.6	99
50.0-64.9[b]	100.0	55.7	19.5	21.2	5.0	9.0	7.2	3.7	109
35.0-49.9[c]	100.0	42.5	25.7	25.9	5.7	11.6	8.6	5.9	101
15.0-34.9[d]	100.0	23.1	34.7	39.6	11.6	18.4	9.6	2.5	114
15.0 or less[e]	100.0	8.4	38.4	50.1	17.1	22.2	10.8	3.2	130
Urban labour force									
65.0 or more	100.0	18.2	34.2	39.6	10.6	17.3	11.7	8.0	115
50.0-64.9	100.0	10.5	36.3	47.2	10.5	21.2	15.5	6.0	130
35.0-49.9	100.0	12.0	35.6	45.5	10.1	21.0	14.4	6.9	128
15.0-34.9	100.0	4.7	39.6	52.8	15.2	25.3	12.3	2.8	133
15.0 or less	100.0	1.4	38.2	57.2	19.6	26.0	11.6	3.3	150
Rural labour force									
65.0 or more	100.0	87.1	5.4	4.7	1.4	2.0	1.3	2.7	87
50.0-64.9	100.0	74.3	12.1	11.0	2.7	4.4	3.9	2.6	91
35.0-49.9	100.0	65.9	17.7	11.3	2.3	4.7	4.3	5.0	64
15.0-34.9	100.0	49.8	26.8	21.4	6.2	9.3	5.9	2.0	80
15.0 or less	100.0	26.9	38.4	31.6	10.7	12.4	8.5	3.1	82

[a] N = 14: Bolivia, 1963; Central African Empire, 1960; Guinea, 1955; India, 1961; Morocco, 1951; Romania, 1956; Sarawak, 1970; Sudan, 1956; Thailand, 1970, 1954; Turkey, 1970, 1960, 1950; United Republic of Tanzania, 1967.
[b] N = 13: Bulgaria, 1956; Ecuador, 1962; Guatemala, 1973; Greece, 1961; Indonesia, 1971; Iran, 1956; Morocco, 1971, 1960; Nicaragua, 1963; Romania, 1966; Sabah, 1970; Sri Lanka, 1970, 1953.
[c] N = 14: Algeria, 1966; Costa Rica, 1973, 1963; Cyprus, 1960; Ecua-

dor, 1974; Greece, 1972; Libyan Arab Jamahiriya, 1964; Nicaragua, 1971; Peru, 1972, 1961; Portugal, 1960; Spain, 1960; Tunisia, 1966; Peninsular Malaysia, 1970.
[d] N = 9: Chile, 1970; Hungary, 1970; Israel, 1961; Japan, 1970, 1965, 1960; Puerto Rico, 1960; United States of America, 1940; Venezuela, 1961.
[e] N = 9: Canada, 1971, 1961; Puerto Rico, 1970; Scotland, 1961; Sweden, 1970, 1960; United States of America, 1970, 1960, 1950.

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areas at the highest level of development, it is approximately equally prominent in both urban and rural labour forces at this level.

Total services rise progressively with level of development in both urban and rural areas, though they remain considerably more important in urban than in rural areas. Whereas rural services are almost non-existent in the least developed group, standing at only about 5 per cent of the labour force, rural services in the most developed group of countries represent almost a third of the rural labour force. Such a level of service participation is not far below the urban level at the lowest level of development. Thus, with the vast decline of agricultural occupations and the relative increase in manufacturing and services in rural areas, a kind of convergence occurs between the structure of urban employment and the structure of rural employment.

Each of the three categories of services tends to increase in rural areas from virtually zero to roughly 10 per cent of the labour force. In urban areas, sales and service workers tend to increase fairly steadily with development, from 17 per cent at the lowest level of development to 26 per cent at the highest level. The traditional services increase somewhat at the very lowest levels of development but thereafter tend to decline steadily with development until the percentage of traditional services at the highest level of development approximately equals that of the lowest level. Perhaps the increase in these services in the urban areas of countries at intermediate levels of development represents urban residents who are underemployed but who can find at least partial or temporary employment in these occupations. Once the urban economy becomes better organized, much of the labour in traditional services can presumably find more productive employment elsewhere, and the structural importance of the traditional services in the urban labour force recedes to its previous level.

Professional and managerial services do not show any increase in importance in urban areas until a country reaches the two highest levels of development. At this point, these services show considerable change, increasing from 10 to 15 per cent and ultimately to 20 per cent of the total urban labour force.

The main result of table 67 with regard to the structure of urban and rural labour force can be summarized as follows. In populations where a high proportion of the labour force is occupied in agricultural activities, the rural labour force is highly specialized in agricultural pursuits. As development proceeds, however, the rural labour force becomes more diversified until only sbout a quarter is engaged in agriculture. The urban labour force, on the other hand, is predominantly non-agricultural at all developmental levels and undergoes much less structural change. Manufacturing tends to be a stable component of the urban labour force, with declines in urban agriculture offsetting gains in urban services. The index of dissimilarity in rural labour force structures between populations at the highest and lowest development levels in table 67 is 0.597.[4] For the urban

labour force, the coefficient is only 0.217 for these same populations. This difference is a numerical representation of the larger shift in rural than in urban labour force structures. The result is a convergence of the rural labour force to the relatively stable urban form. At the lowest developmental level given in table 67, the index of dissimilarity between rural and urban labour force structures is 0.690, more than two thirds of the numerical ceiling on the index. At the highest developmental level, however, it is only 0.257. Occupational differentiation between urban and rural areas is clearly greatest at the lowest developmental levels.

Relative rise of urban services

The question of the rise of service employment in relation to industrial employment is summarized in the final column of table 67, which shows the number of service workers per 100 industrial workers at each level of development.[5] For the total labour force, the service-to-industry ratio rises from 99 at the lowest level of development to 130 at the highest level. At all levels of development, the urban ratio is considerably above 100—that is to say, the number of service workers exceeds by a generous margin the number of industrial workers. Conversely, at all levels of development, the rural ratio falls below 100. In rural areas, industrial workers outnumber service workers by a large margin. There are at least two types of reasons for this urban/rural disparity. On the one hand, the urban population uses a number of services that are less necessary or more difficult to supply in rural areas—fire and police protection, trash removal etc. On the other hand, the urban areas provide many services, such as medical services and entertainment, that are utilized not only by urban residents but by rural residents in the vicinity.[6] The propensity of service activities to locate in urban areas arises, perhaps, in part from their very intangibility. Whereas tangible agricultural or manufactured goods can usually be shipped anywhere for use, many services, especially personal services, must often be supplied on a face-to-face basis; and thus there is a need for central urban locations with maximum accessibility to

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occupational categories in the two comparison populations). It is computed by the following formula:

$$\text{Index of dissimilarity} = i \sum \frac{\left| 0_{1i} - 0_{2i} \right|}{2}$$

where 0_{1i} and 0_{2i} are the proportions of populations 1 and 2, respectively, who are located in occupation i. The index can take on any value between zero (identical distributions) and 1 (non-overlapping distributions).

[5] A similar, though inverse, ratio of manufacturing to tertiary employment is used by Galenson. Tertiary employment is defined by him to include all sectors of employment outside manufacturing except agriculture, mining; and electricity, gas and water. Walter Galenson, "Economic development and the sectoral expansion of employment", *International Labour Review*, vol. LXXXVII, No. 6 (June 1963), pp. 508-512.

[6] Turnham observes also that service activities tend not to appear in rural employment statistics because they are secondary activities. In urban areas, specialization is more developed and many such "do-it-yourself" services are likely to be purchased from the service "specialists". This point is said to apply particularly, perhaps, to commercial activities. See David Turnham, *The Employment Problem in Less Developed Countries: A Review of Evidence*, Development Centre Studies, Employment Series No. 1 (Paris, Organization for Economic Co-operation and Development, 1971), p. 129.

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[4] The index of dissimilarity is interpretable as the minimum percentage of either population that would have to shift categories in order to equalize the two distributions (that is, to produce identical proportions in the six

consumers.[7] With the increasing development of long-distance communications, some business services can be performed at a distance from the user, though in many there is a continuing need for centralized face-to-face contact.[8]

Not only are urban service-to-industry ratios higher than rural ratios, but urban ratios tend to increase with level of development. At the lowest level of development, the urban ratio of service workers per 100 industrial workers is only 115, while at the highest level it stands at 150. The rural ratios, conversely, show no discernible trend by level of development. The urban increase in the service-industry ratio results from an absolute increase in urban services (except the traditional services), combined with a relatively stable industrial base.

At the early stages of development, services of the traditional type tend to increase by a modest amount in both urban and rural areas. As discussed earlier, this category is believed to include a high proportion of underemployment. As illustrated in table 67, these services tend to decline in urban areas at later stages of development in relation to the other classes of services. In urban areas, the unknown category is also believed to be largely composed of traditional service employments. Moreover, in urban areas, both traditional services and the unknown category show a similar downward trend with level of development. A truly mixed unknown category would probably exhibit no discernible trend, as is the case in the rural areas. If the urban unknown category is added to the urban traditional service category, this combination occupies fully one fifth of the labour force in the three lower categories of development. The volume of traditional service employment in the urban areas of the less developed countries may actually be closer to one quarter of the urban labour force if it is considered that a substantial proportion of the sales workers listed separately in the category of urban clerical and sales workers may be simply street-peddlers with only a marginal, intermittent livelihood rather than modern, literate sales employees with full-time occupations.

Table 67 indicates that clerical and sales services begin to assume an increasing share of the urban labour force structure at an early stage in development. These services are largely brought forth as a by-product of development itself and the concomitant increasing scale of enterprise. Clerical services are record-keeping skills. The need for these multiplies as enterprises increase in size and the limited number of face-to-face relationships based on memory which characterize very small business undertakings are replaced by almost limitless numbers of paper relationships based on written records and files. Selling also emerges as a specialized full-time occupation when the scale of output becomes

too large for workers specialized in production to do the marketing of their own output themselves. Where small-scale handicraft production prevails, inventories are small and selling occupies relatively much less time and effort than production. Even where specialized urban merchants exist, inventory acquisition is problematical, as a single seller must procure inventory from a multiplicity of small-scale producers. With increasing development and automation, the inventory of a single manufacturing enterprise can be considerable, requiring the services of large full-time marketing staffs. Inventory distribution, rather than inventory acquisition, becomes relatively more problematical. The scale of markets must be increased from merely local to regional and national and even international. In such a context, the service of selling assumes increasing importance in relation to production.

As shown in table 67, urban professional and administrative services do not begin to increase in importance as a component of urban labour force structure until relatively high levels of development have been achieved. At low levels of development, administrative expertise is mainly governmental and even this service is loose and limited. Economic activities are, in general, too small scale to require systematic, professional administration. With development and the growth in scale of enterprise, however, the number of employees within an enterprise can exceed the population size of territorial localities, and considerable management and administration are necessary to co-ordinate successfully the productive activities of business organizations. Moreover, the larger scale of extended territorial markets brings with it a need for ever more detailed and comprehensive government administration to ensure orderly and secure conditions for the organization of production and exchange. Furthermore, the complex level of technology in use at high levels of development brings with it an increasing need for professional and technical services. Although certain of these services are rendered to individuals, especially medical and educational services, an increasing proportion are enterprise-oriented, providing not only scientific and engineering services to businesses but legal, accounting, marketing and other services essential to the rationalization of business procedures.

Trends in occupation/residence relations

In this section, a comparison is made between the relations just described (developed from data for 39 countries) and actual time-series data for a more limited sample of 16 countries having multiple observations. Such a comparison indicates whether recent history in selected countries supports the inferences drawn from the pooled cross-sectional and time-series data or whether newly emergent trends can be observed. Countries are ordered in the time-series tables by level of development (i.e., by percentage of total labour force in agriculture) at the most recent date, beginning with the least agricultural country, the United States of America. Countries are also grouped into two discrete categories: the less agricultural, those with less than 35 per cent of total labour force in agriculture; and the more agricultural, which contain more than 35 per cent of total labour force in agri-

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[7] Because of the face-to-face relationship with the consumer in many services, the consumer frequently plays some part in the production of the service, as for example, in the modern supermarket, launderette or bank where the consumer actually works to perform "self-service". Fuchs even refers to the consumer in such cases as a "factor of production". Victor R. Fuchs, *The Service Economy*, General Series, 87 (New York, National Bureau of Economic Research, 1968), pp. 194-195.

[8] Such factors are discussed in Colin Clark, "The economic functions of a city in relation to its size", *Econometrica*, vol. 13, No. 2 (April 1945), p. 98.

Country	Year	Total (sum of cols. 2, 3, 4 and 8) (1)	Agriculture (2)	Industry (3)	Services (sum of cols. 5, 6 and 7) (4)	Professional and administrative services (5)	Clerical and sales services (6)	Traditional services (7)	Unknown (8)	Service-to-industry ratio (9)
Less agricultural countries[a]										
Canada	1961	100.0	1.5	38.3	57.6	20.6	23.5	13.5	2.6	150
	1971	100.0	1.6	28.8	59.4	18.9	28.6	11.9	10.3	206
Japan	1960	100.0	2.4	42.9	53.9	10.9	32.8	10.2	0.7	126
	1965	100.0	2.0	40.9	56.4	11.7	34.6	10.1	0.7	138
	1970	100.0	1.8	39.6	58.1	14.0	34.0	10.1	0.6	147
Puerto Rico	1960	100.0	3.0	37.8	58.2	18.7	25.2	14.3	1.0	154
	1970	100.0	1.3	36.6	59.0	23.8	23.9	11.3	3.1	161
Sweden	1960	100.0	1.9	40.6	56.9	19.6	26.1	11.2	0.6	140
	1970	100.0	1.9	41.0	56.3	23.7	22.3	10.3	0.7	137
United Kingdom England and Wales	1951	100.0	0.8	50.5	47.1	9.5	26.9	10.7	1.6	93
	1961	100.0	0.7	44.7	52.5	11.3	30.3	10.9	2.1	117
United States of America	1940	100.0	0.8	41.5	57.0	14.1	27.7	15.2	0.8	137
	1950	100.0	0.8	41.9	56.2	17.8	26.5	11.9	1.1	134
	1960	100.0	1.1	34.9	58.6	17.6	28.7	12.3	5.4	168
	1970	100.0	0.6	32.6	62.5	24.2	26.9	11.4	4.3	192
More agricultural countries[b]										
Costa Rica	1963	100.0	6.8	31.5	55.6	13.0	25.1	17.5	6.0	177
	1973	100.0	5.1	31.8	57.9	17.2	23.2	17.5	5.2	182
Ecuador	1962	100.0	10.6	37.9	43.3	7.4	21.0	14.9	8.1	114
	1974	100.0	7.5	33.9	48.4	11.9	22.4	14.1	10.1	143
Greece	1961	100.0	8.7	42.6	41.8	8.3	21.6	11.9	6.8	98
	1971	100.0	5.6	44.9	46.1	10.5	25.0	10.6	3.4	103
Morocco	1960	100.0	5.3	36.5	43.5	6.7	19.2	17.6	14.7	119
	1971	100.0	4.7	34.8	43.4	8.4	17.3	17.7	17.2	125
Nicaragua ....:	1963	100.0	16.3	38.9	44.4	6.4	21.4	16.6	0.5	114
	1971	100.0	11.3	36.8	48.9	10.9	20.6	17.4	3.1	133
Peru	1961	100.0	18.1	31.0	43.7	8.3	20.2	15.2	7.3	141
	1972	100.0	15.3	31.2	45.9	11.9	21.6	12.4	7.6	147
Romania	1956	100.0	16.5	41.4	42.0	20.8	12.4	8.8	0.1	101
	1966	100.0	14.6	46.3	39.0	20.5	10.8	7.7	0.1	84
Sri Lanka	1953	100.0	5.9	24.1	66.3	9.7	26.1	30.5	3.7	275
	1970	100.0	8.8	38.2	52.8	12.2	26.5	14.1	0.2	138
Thailand	1954	100.0	12.2	31.3	49.8	9.1	30.5	10.2	6.7	159
	1970	100.0	7.9	31.0	60.6	14.9	30.8	14.9	0.5	196
Turkey	1950	100.0	22.8	38.0	32.9	15.7	10.9	6.3	6.2	87
	1960	100.0	19.0	44.5	36.5	15.8	9.8	20.9	—	82
	1970	100.0	11.3	23.5	36.7	10.2	16.2	10.3	28.6	156

[a] Countries with less than 35 per cent of labour force in agriculture.   [b] Countries with more than 35 per cent of labour force in agriculture.

culture. This cut-off point corresponds to the dividing line between the two highest and the three lowest development categories in the cross-sectional tables. The urban category of England and Wales (United Kingdom) in the time-series tables pertains only to conurbations.[9] It has been included here because the sample of time trends for more developed countries is very small. Service-to-industry ratios are listed in the last column in tables 68 and 69.

[9] England and Wales was not included in the pooled time-series cross-sectional analysis because conurbations are clearly under-bounded in relation to standard urban definitions. However, there is no reason to discard information on trends.

Agriculture

Tables 68 and 69 show that virtually all the countries with trend data are becoming less agricultural in both rural and urban areas. These trends clearly support the pooled analysis. Urban areas of the more developed countries are already so low in agricultural employment (less than 3 per cent of the urban labour force) that only limited further declines can be achieved per decade. More substantial decadal declines of 2-5 percentage points are still being achieved in the urban areas of the less developed countries, where the percentage of agricultural employment in individual countries can still be as high as 15 per cent. In the rural areas, substantial declines in percentage of agricultural employment are oc-

TABLE 69. COMPOSITION OF RURAL LABOUR FORCE, BY SECTOR OF ECONOMIC ACTIVITY,
COUNTRIES WITH AT LEAST TWO OBSERVATIONS
(Percentage points)

Country	Year	Total (sum of cols. 2, 3, 4 and 8) (1)	Agriculture (2)	Industry (3)	Services (sum of cols. 5, 6 and 7) (4)	Professional and administrative services (5)	Clerical and sales services (6)	Traditional services (7)	Unknown (8)	Service-to-industry ratio (9)
Less agricultural countries[a]										
Canada	1961	100.0	40.5	29.8	27.3	11.0	7.3	9.0	2.5	92
	1971	100.0	27.5	29.2	32.1	9.9	13.4	8.8	11.1	110
Japan	1960	100.0	54.2	25.4	20.1	4.6	12.6	2.9	0.4	79
	1965	100.0	45.0	29.5	25.2	5.8	15.7	3.7	0.3	85
	1970	100.0	38.0	33.3	28.4	6.8	17.3	4.3	0.4	85
Puerto Rico	1960	100.0	43.9	32.5	22.0	5.4	8.7	7.9	1.7	68
	1970	100.0	19.2	49.0	29.6	8.8	10.3	10.5	2.1	60
Sweden	1960	100.0	27.3	41.6	30.4	10.1	12.5	7.8	0.7	73
	1970	100.0	38.0	38.9	22.7	9.1	7.5	6.1	0.4	58
United Kingdom England and Wales	1951	100.0	8.4	48.6	38.4	8.3	20.0	10.1	4.7	79
	1961	100.0	5.9	45.5	44.9	11.0	23.8	10.0	3.7	99
	1971	100.0	27.5	29.2	32.1	9.9	13.4	8.8	11.1	110
United States	1940	100.0	45.6	28.1	25.5	7.6	10.1	7.8	0.8	91
	1950	100.0	35.9	35.1	27.3	9.5	11.5	6.3	1.7	78
	1960	100.0	21.9	37.5	36.9	11.2	16.5	9.2	3.6	98
	1970	100.0	10.8	42.5	43.8	17.5	16.6	9.7	2.9	103
More agricultural countries[b]										
Costa Rica	1963	100.0	70.9	11.6	13.2	2.7	5.6	4.9	4.3	114
	1973	100.0	58.8	18.2	16.9	3.4	6.4	7.1	6.0	93
Ecuador	1962	100.0	80.7	11.7	6.4	1.2	2.7	2.5	1.1	55
	1974	100.0	73.6	14.2	7.8	2.1	3.8	1.9	4.4	55
Greece	1961	100.0	80.2	10.1	9.6	1.8	3.3	2.6	1.9	95
	1971	100.0	72.5	15.2	11.3	2.5	5.2	3.6	1.0	74
Morocco	1960	100.0	79.9	6.5	7.1	2.1	2.7	2.3	6.5	109
	1971	100.0	76.9	10.7	8.5	2.6	2.8	3.1	4.0	79
Nicaragua	1963	100.0	87.2	5.7	7.1	0.5	2.2	4.4	0.1	125
	1971	100.0	80.0	8.5	9.0	1.3	2.7	5.0	2.4	106
Peru	1961	100.0	79.9	10.9	6.8	1.2	2.9	2.7	2.4	62
	1972	100.0	81.2	9.8	5.5	1.6	2.3	1.6	3.5	56
Romania	1956	100.0	87.0	7.5	5.4	2.7	1.6	1.1	—	72
	1966	100.0	77.4	14.8	7.7	3.5	2.1	2.1	—	52
Sri Lanka	1953	100.0	59.6	14.9	23.8	3.9	8.1	11.8	1.6	160
	1970	100.0	58.7	21.9	19.2	4.8	8.3	6.1	0.2	88
Thailand	1954	100.0	92.6	2.6	4.5	1.1	2.8	0.6	0.4	173
	1970	100.0	89.4	5.1	5.5	1.2	3.1	1.2	0.1	108
Turkey	1950	100.0	92.6	4.0	2.5	1.4	0.8	0.3	0.9	63
	1960	100.0	91.6	5.0	3.4	1.5	0.9	1.0	0.0	68
	1970	100.0	86.0	4.0	5.2	2.2	1.6	1.4	4.7	130

[a] Countries with less than 35 per cent of labour force in agriculture.　　[b] Countries with more than 35 per cent of labour force in agriculture.

curring in both more developed and less developed countries. Time-series data from the United States, spanning the longest period, indicate that the floor which can be reached in rural agricultural employment may be much lower than one fourth. During the three decades shown here, agricultural employment declined in the United States from almost one half to about 10 per cent of the rural labour force. Such limited rural agricultural employment is all the more noteworthy in light of the fact that the United States is a major food exporter.

Industry and services

The cross-sectional table shows that the average percen-tage of industrial employment in urban areas is remarkably similar at slightly more than one third of the urban labour force. However, the time trends reveal that in the urban areas of the less agricultural countries there has been an almost universal downward trend in percentage of industrial employment, except in Sweden, which changed very little. The relative declines in industrial employment in the urban areas of less agricultural countries has been accompanied by relative increases in service employments. As shown in the last column of table 69, the urban service-to-industry ratio among the more developed countries has risen in every country except Sweden. As observed earlier, the rise of service employment in relation to industrial employments has long been anticipated in the more developed countries.

The direction of change in percentage of industrial employment in the urban areas of more agricultural countries is less consistent. Of the 10 countries, three increased (Greece, Romania and Sri Lanka), four decreased (Ecuador, Morocco, Nicaragua and Turkey), and three remained about constant (Costa Rica, Peru and Thailand). Thus, the pooled-data results, suggesting little systematic change in urban industrial employment with changes in development level, are supported by these countries. Meanwhile, urban service employment has increased in a clear majority of these 10 countries, decreasing in only two (Romania and Sri Lanka) and remaining virtually unchanged in one (Morocco). The net effect of these various directions of change in the less developed countries is to increase the service-to-industry ratio in every country but two (Romania and Sri Lanka). The rising trend in urban service-to-industry ratio in both less developed and more developed countries tends to confirm the tendency described in the pooled-data analysis. Also from the cross-sectional analysis, it was observed that the level of urban traditional services in the next to lowest category was conspicuously higher than the level at the lowest level of development. This finding was interpreted as evidence that urban migrants were finding employment in marginal traditional services because of a lack of more productive urban employments at initial stages of development. At each successively higher level of development thereafter, the percentage of traditional services in urban areas was lower, until at the highest level of development the level of traditional urban services was again approximately equal to that of the lowest level. The time-series data tend to confirm what has been concluded from the cross-section. It is fortunate that the time-series sample contains at least two countries (Thailand and Turkey) in the highest agricultural category since many such countries are new in census taking. As would have been predicted from the cross-sectional analysis, these are the only two countries in the time-series sample that showed increases in urban traditional services. At other levels of development, all countries showed downward movement in urban traditional services or little change.

The situation with regard to industry in the rural areas of the less agricultural countries is mixed. Substantial increases in percentage of industrial employment were registered in three countries (Japan, Puerto Rico and the United States); comparatively modest declines occurred in two countries (England and Wales, and Sweden); and one country changed very little (Canada). Meanwhile, rural services increased in all of the less agricultural countries except Sweden (which was similarly an exception in urban areas), and service-to-industry ratios increased in all but two of the more developed countries (Puerto Rico and Sweden).

The percentage of both industry and services in the rural labour force rose in a majority of the more agricultural countries. This is the pattern of change that would have been anticipated on the basis of the pooled-data analysis, which revealed systematically higher percentages of both industry and services in rural areas at each higher level of development. The direction of the service-to-industry ratio in rural areas of most of the less developed countries is clearly downward. The downward trend in rural service-to-

industry ratios in the less developed countries, and the upward trend in the more developed, suggests a U-shaped relationship, which is supported by the pooled analysis presented previously in table 67.

Urban growth and urban labour force change

Ideally, the occupational trend data could be used to make some judgement about the role of urban population growth in the changing structure of the urban labour force. It is often argued that the urban service sector in developing countries is inflated because of large increases in labour supply resulting from urban population growth. Because entry requirements in service jobs are typically less stringent than in industrial jobs, it is alleged that the increment in labour supply will tend to be absorbed disproportionately into the service sector. These arguments are reviewed[10] and found unconvincing on theoretical grounds. Furthermore, the author examines a "natural experiment" in Colombia, where rural disturbances led to a rapid labour flow to Bogotá. The influx of workers, however, did not appear to depress the relative size of the manufacturing sector nor to inflate that of services. Instead, it is argued that the distribution of workers among sectors is determined primarily by demand factors related to income growth and government policy. Another source[11] also questions the prevailing model, particularly the assumption that the service sector plays a predominant role as a point of entry into the labour force for migrants to urban areas.

An inference about the relation between urban growth and service employment based on the present data is hazardous. Few trend observations are available and occupational changes tend to be small and hence could easily be produced by a change in classification systems or in their application. Furthermore, the range of urban growth rates among the less developed countries providing trend data is very narrow. Of the nine countries from Africa, Asia (excluding Japan) and Latin America given in table 71, seven have average annual urban intercensal growth rates in the range of 0.0410-0.0453. Only Thailand (0.0393) and Turkey (0.0555) lie outside this narrow range. Interestingly, despite its slower urban growth, Thailand exhibits the largest gain in the relative size of the urban service sector of any developing country. In Turkey, the service sector is virtually stationary. Perhaps more pertinent than the absence of a relationship between urban growth and labour force change among these populations is the general absence of relative growth in the urban service sector (net of professional and managerial services) in the less developed countries during these intercensal periods when urban populations typically grew by a factor of 50-60 per cent. If urban growth were a powerful factor in increasing the size of the service sector, such large amounts of growth should have left a visible imprint on the occupational structure. These

[10] Alan T. Udall, "The effect of rapid increase in labor supply on service employment in developing countries", *Economic Development and Cultural Change*, vol. 24, No. 4 (July 1976), pp. 765-785.

[11] Dipak Mazumdar, "The urban informal sector", *World Development* (August 1976), pp. 655-679.

results thus support the positions discussed above[12] and fail to buttress what appears to be the conventional position.

C. AGRICULTURAL POPULATION AND LABOUR FORCE

Concepts, definitions and sources of data

Estimates of population of countries and areas, prepared by the Population Division of the United Nations Secretariat; and estimates of the labour force, prepared by the International Labour Organisation, are available for every five years between 1950 and 1975. Estimates of the agricultural and non-agricultural labour force for every five years between 1950 and 1970 have been prepared by the ILO. The Food and Agriculture Organization of the United Nations has prepared by extrapolation estimates of the agricultural labour force for 1975 by countries and areas and for 1977 by areas only. Additionally, FAO has prepared estimates of the agricultural population for every five years between 1950 and 1975 by countries and areas and for 1977 by areas only.[13]

The population and labour force data generally refer to current in-area (*de facto*) population within the current geographical boundaries of countries. The agricultural population is defined as all persons depending upon agriculture (including forestry, fishery and hunting) for their livelihood. It comprises all persons engaged or seeking work in agriculture and their non-working dependants. The non-agricultural population is usually obtained by subtraction from the total population.

The labour force has been adjusted by the ILO to conform to a standard concept of labour force which is defined to comprise all employed and unemployed persons (including those seeking work for the first time). It covers employers, persons working on their own account, salaried employees, wage earners, unpaid family workers, members of producers' co-operatives and members of the armed forces. The agricultural labour force is that part of the labour force which is engaged or seeking work in agriculture, hunting, fishery or forestry; the non-agricultural labour force is obtained as the residual from the total labour force.

The estimates are largely based on the results of the 1950, 1960 and 1970 rounds of population censuses or surveys. Labour force surveys have also been used by the ILO as a source of information on the labour force and activity rates. Data on the agricultural population are lacking for the majority of countries; therefore, estimates are derived indirectly on the basis of the agricultural labour force.

Agricultural labour force

The world agricultural labour force is estimated to have been 795 million in 1977 (see table 66 and figure XI). This absolute increase of 26 million persons since 1970 represents an annual growth rate of 0.5 per cent during this time period. In contrast, during the period 1970-1977, the total world labour force grew at 1.7 per cent per annum; thus, the agricultural labour force, although growing at a moderate rate, is expanding at a significantly slower pace than the total labour force. Consequently, it is estimated that the proportion of the total world labour force employed in agriculture has declined from 51.0 per cent in 1970 to 46.7 per cent in 1977 (see table 67). Of course, this world trend is a composite which masks widely differing situations, especially between more developed and less developed countries.

Figure XI. Total population and labour force and agricultural population and labour force, the world, 1950-1977.
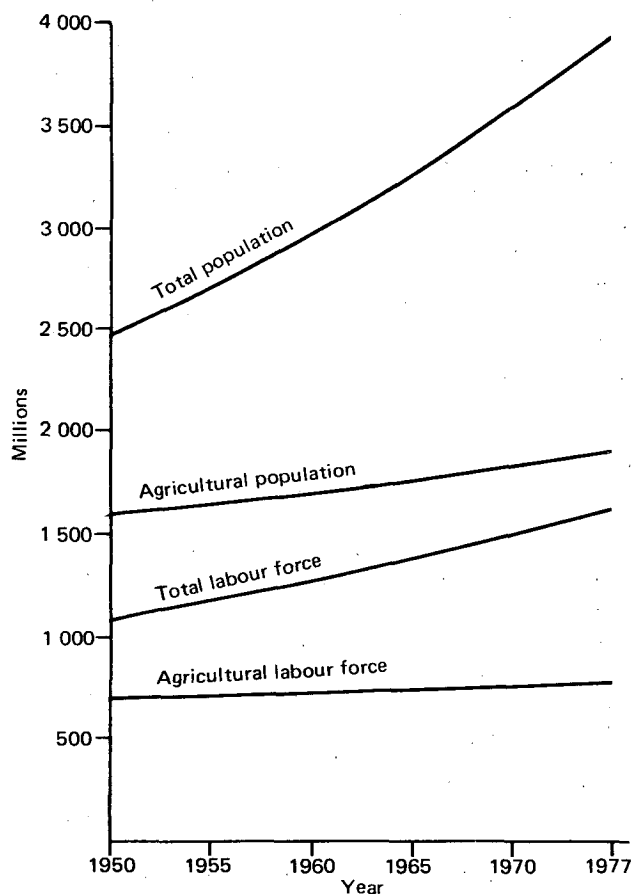
In the more developed regions, the agricultural labour force continued to exhibit the same pattern as for the preceding 20 years, that is, a decline in both absolute numbers and as a proportion of the total labour force (see figure XII). The absolute numbers in the agricultural labour force showed a decrease of 15 million persons from 1970 to 1977, which represents a decline in the proportion employed in agriculture from 18.3 per cent to 13.9 per cent. The rate of

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[12] *Ibid.*; and A. T. Udall, *loc. cit.*

[13] For details regarding the methodology and assumptions underlying the estimates and projections of the agricultural and non-agricultural population and labour force, see Food and Agriculture Organization of the United Nations, Statistics Division, Economic and Social Policy Department, *Estimates and Projections of Agricultural and Non-Agricultural Population and Labour Force, 1950-2000* (ESS/MISC/78/3) (Rome, 1978).

Figure XII. Total population and labour force and agricultural population and labour force, more developed regions, 1950-1977
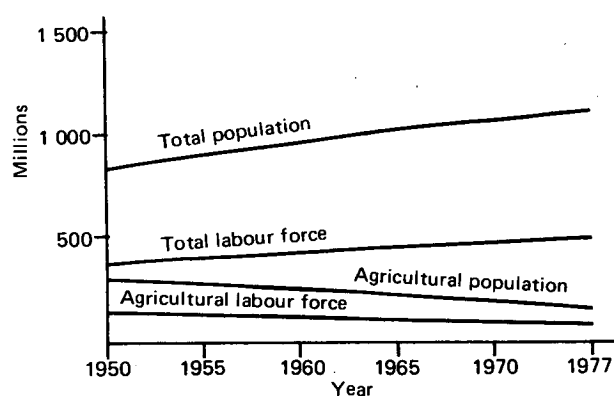
decline in the agricultural labour force, which had been accelerating to a high of −3.8 per cent for the period 1965-1970, showed sharp signs of moderation during the period 1970-1977, slowing to an annual rate of −2.6 per cent.

Within the more developed regions, the rate of decline of the agricultural labour force as well as the proportion employed in agriculture varied considerably by region (see tables 70 and 71). Northern America, the region with the lowest proportion employed in agriculture, showed a drop in this proportion from 4.1 per cent in 1970 to 2.8 per cent in 1977. This represents a rate of decline of 3.7 per cent for the period 1970-1977, which represents a slackening from the preceding five-year period. In Europe, the agricultural labour force declined more slowly than in Northern America, with a rate of decline of 2.2 per cent for 1970-1977. The proportion employed in agriculture in Europe declined from 20.7 per cent in 1970 to 16.7 per cent in 1977. This figure, of course, represents averages; and Western and Northern Europe had fewer employed in agriculture while Eastern and Southern Europe had more. The rate of decline was less rapid in Eastern Europe. The proportion employed in agriculture in the Soviet Union showed a pattern similar to that of Europe, with 25.7 per cent employed in agriculture in 1970 and declining to 18.9 per cent in 1977. This represents a more rapid decline than that for

Europe with a drop of 2.8 per cent for 1970-1977. Temperate South America experienced a decline in the proportion in agriculture from 17.9 per cent in 1970 to 15.2 per cent in 1977. This drop represents an annual decline of 0.8 per cent for 1970-77, which is a much slower decline than the average for the more developed regions.

In the less developed regions, the agricultural labour force continued to exhibit the same pattern as for the preceding 20 years, that is, an increase in the size of the agricultural labour force but a decrease in it as a proportion of the total labour force (see figure XIII). In 1977, the agricultural labour force was estimated to be 722 million, showing an increase of 43 million from 1970. Despite this large absolute increase in number, the proportion employed in agriculture declined from 66.6 per cent in 1970 to 61.6 per cent in 1977. The annual growth rate of the agricultural labour force appears to have peaked during the period 1965-1970 and now the growth rate of 0.9 per cent for 1970-1977 represents a slight declining trend.

Within the less developed regions, there are widely differing regional situations, particularly with respect to the proportion of the labour force employed in agriculture (see table 71). In Africa, the proportion of persons employed in agriculture declined from 71.5 per cent in 1970 to 67.3 per cent in 1977. This drop represents a slightly increasing annual growth rate until 1970, which is now estimated to have stayed at 1.3 per cent per annum during the period 1970-1977. On the other hand, Latin America has a much smaller proportion of its labour force active in agriculture than either Africa or the average for the less developed regions. In 1970, 40.8 per cent were engaged in agriculture; whereas by 1977 the proportion had declined to 35.9 per cent, which represents an annual growth rate of approximately 0.9 per cent. In East Asia, agriculture provided 61.0 per cent of employment in 1970; however, this section had declined to 55.3 per cent by 1977. The size of the agricultural labour force has been expanding at a very low annual growth rate in recent years; and for the period 1970-1977, it is estimated that growth has fallen to 0.1 per cent. South Asia has experienced a similar decline in the proportion of its labour force engaged in agriculture, from 68.6 per cent in 1970 to 64.4 per cent by 1977. The agricultural labour force grew at an annual rate of 1.2 per cent during the
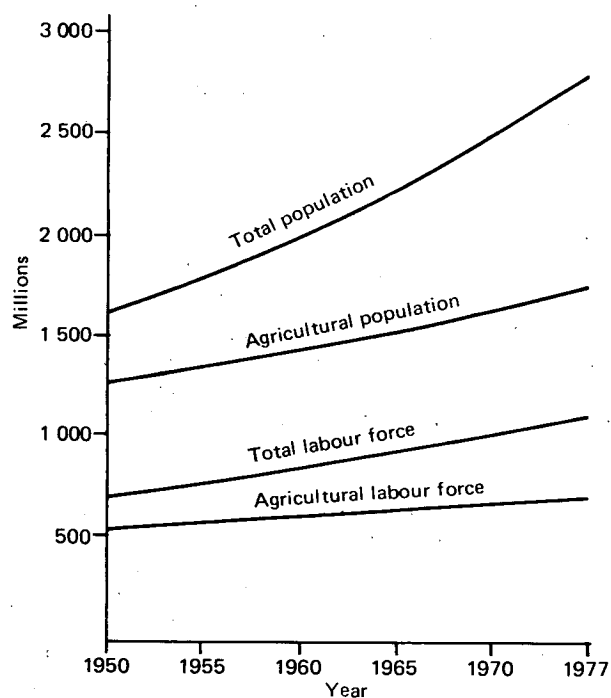
TABLE 70. ESTIMATED AGRICULTURAL LABOUR FORCE WITH ANNUAL GROWTH RATES, BY LEVEL OF DEVELOPMENT AND FOR MAJOR AREAS OF THE WORLD, 1950-1977

| | Agricultural labour force (millions) | | | | | | | Annual growth rates | | | | |
	1950	1955	1960	1965	1970	1975	1977	1950-1955	1955-1960	1960-1965	1965-1970	1970-1977
World	708	727	748	756	769	788	795	0.5	0.6	0.2	0.3	0.5
More developed regions	149	139	124	108	89	78	74	−1.4	−2.3	−2.8	−3.8	−2.6
Less developed regions	558	587	624	648	679	710	722	1.0	1.2	0.7	1.0	0.9
Africa	77	80	85	91	98	104	107	1.0	1.2	1.3	1.4	1.3
Latin America	31	32	34	35	36	38	39	1.0	1.0	0.7	0.7	0.9
Northern America	9	7	6	5	4	3	3	−3.9	−5.3	−3.3	−4.3	−3.7
East Asia	234	245	260	263	267	269	269	0.9	1.2	0.2	0.3	0.1
South Asia	237	248	261	273	290	307	315	0.9	1.0	0.9	1.2	1.2
Europe	67	61	55	49	42	37	36	−1.7	−2.2	−2.4	−3.0	−2.2
Oceania	2	2	2	2	2	2	2	0.3	0.4	0.7	0.8	0.9
USSR	52	51	46	39	30	26	25	−0.6	−1.9	−3.5	−4.9	−2.8

(Percentage)

	1950	1955	1960	1965	1970	1975	1977
World	64.3	60.9	57.7	54.2	51.0	48.0	46.7
More developed regions	37.6	33.0	28.1	23.2	18.3	15.0	13.9
Less developed regions	79.5	76.1	72.9	69.7	66.6	63.1	61.6
Africa	80.8	78.7	76.7	74.1	71.5	68.6	67.3
Latin America	53.3	50.5	47.7	44.2	40.8	37.3	35.9
Northern America	12.8	10.0	7.2	5.6	4.1	3.1	2.8
East Asia	79.8	74.3	69.3	65.1	61.0	57.0	55.3
South Asia	78.2	76.1	73.9	71.3	68.6	65.7	64.4
Europe	36.6	32.7	28.7	24.6	20.7	17.8	16.7
Oceania	31.9	29.9	27.8	25.6	23.7	22.3	21.8
USSR	55.8	48.9	41.9	33.8	25.7	20.5	18.9

period 1970-1977, which is very slightly lower than that for Africa, the region with the highest agricultural labour-force growth rate; however, the number of people in the agricultural labour force in South Asia is approximately three times as many as in Africa. Less developed countries in Oceania show a similar pattern to the over-all average for less developed regions.

In summary, for the period 1970-1977 the world agricultural labour force continued to expand in absolute numbers while at the same time decreasing as a proportion of the total labour force.

Agricultural population

During the period 1970-1977, the agricultural population followed a general pattern similar to that for the agricultural labour force as, in fact, it had been doing for several years prior to 1970. There was an over-all increase in the agricultural population for the world whereby the increase in the agricultural population in the less developed regions more than offset the decrease in the more developed regions. The world agricultural population continued to increase in absolute numbers, from 1,845 million in 1970 to 1,955 million in 1977, reflecting an annual rate of growth of 0.8 per cent for the period in question (see table 72). This over-all in-

Figure XIII. Total population and labour force and agricultural population and labour force, less developed regions, 1950-1977

Table 72. Estimated agricultural population with annual growth rates, by level of development and for major areas of the world, 1950-1977

	Agricultural population (millions)							Annual growth rates				
	1950	1955	1960	1965	1970	1975	1977	1950-1955	1955-1960	1960-1965	1965-1970	1970-1977
World	1 607	1 649	1 708	1 776	1 845	1 923	1 955	0.5	0.7	0.8	0.8	0.8
More developed regions	312	291	264	231	192	164	155	-1.4	-1.9	-2.6	-3.7	-3.0
Less developed regions	1 294	1 359	1 444	1 544	1 653	1 758	1 800	1.0	1.2	1.3	1.4	1.2
Africa	175	189	205	223	244	267	277	1.5	1.6	1.7	1.8	1.8
Latin America	88	98	104	111	116	122	124	1.6	1.6	1.2	1.0	0.9
North America	21	18	14	12	9	7	7	-3.3	-4.8	-3.4	-5.1	-4.4
East Asia	538	540	544	556	568	576	578	0.1	0.1	0.4	0.4	0.3
South Asia	538	575	627	685	748	812	839	1.3	1.7	1.8	1.8	1.6
Europe	141	132	120	108	92	81	77	-1.4	-1.8	-2.3	-3.0	-2.6
Oceania	4	4	4	4	4	5	5	0.7	0.7	0.8	0.8	0.9
USSR	100	96	90	78	62	52	49	-0.9	-1.3	-2.8	-4.5	-3.4

crease was composed of a rather rapid rate of decline in the more developed regions and a moderate rate of increase in the less developed regions. The agricultural population grew at a slightly faster pace than the agricultural labour force, corresponding to the fact that the total population expanded more rapidly than the total labour force in most countries (see figure XI).

In the more developed regions, the agricultural population declined from 192 million in 1970 to 155 million in 1977, representing an annual decline of 3.1 per cent for this period. This net decline of 37 million in the agricultural population contrasts sharply with a net increase of 517 million in the total population; thus, the agricultural population declined as a proportion of the total population as well as decreasing in absolute numbers (see figure XII).

In contrast, the agricultural population in the less developed regions showed an increase from 1,653 million in 1970 to 1,800 million in 1977, representing an annual increase of 1.2 per cent. This increase of the agricultural population in less developed regions was much slower than the corresponding rate of increase of 2.3 per cent for the total population during the same period (see figure XVI). Thus, although the agricultural population grew by some 147 million from 1970 to 1977, it increased at a much slower rate than the total population so that the actual proportion of the agricultural population declined.

Part Two

POPULATION AND DEVELOPMENT
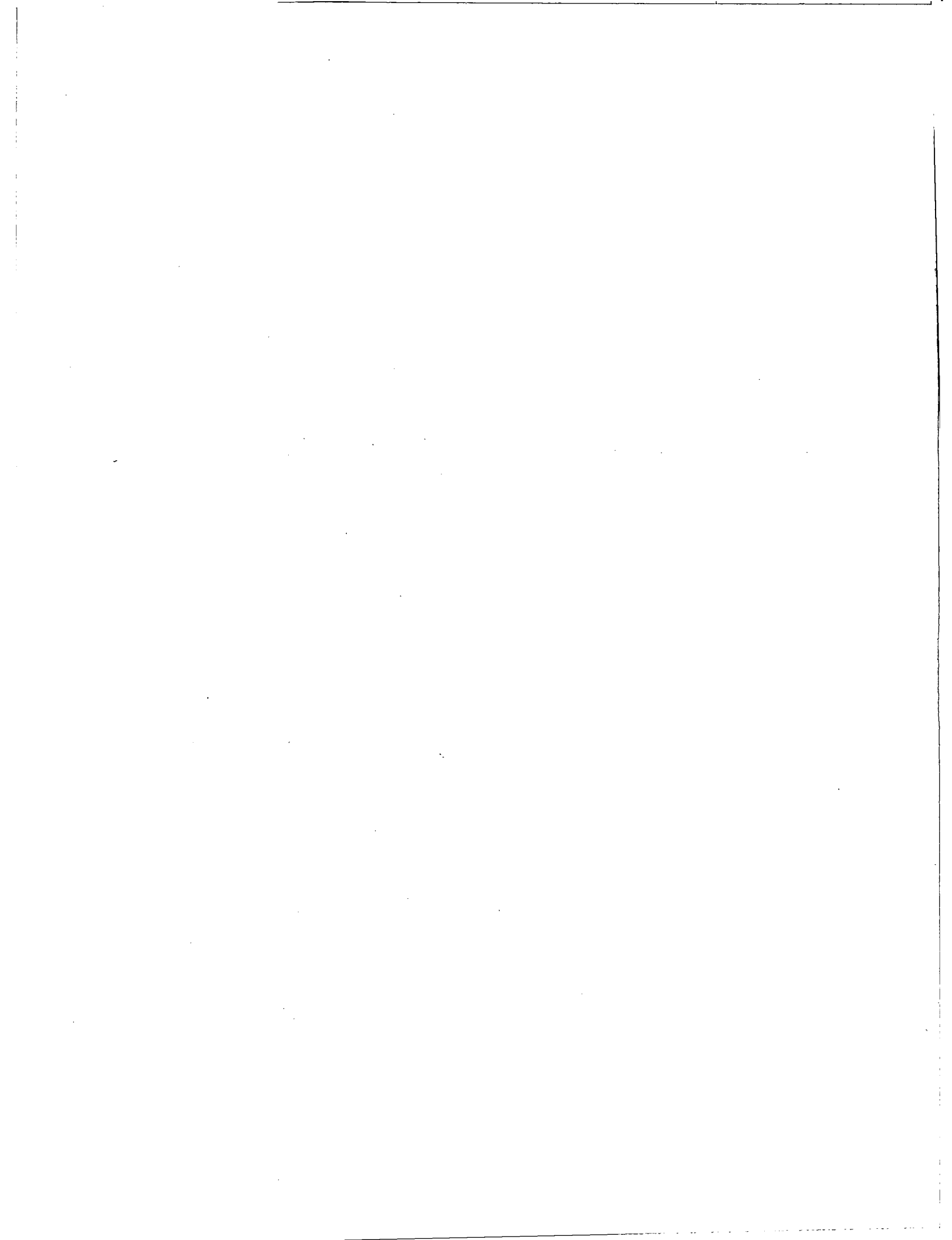
INTRODUCTION

Trends in population and development in the past decade and a half exhibited a mixed pattern of change. The period between 1960 and 1975 was marked by rapid and substantial progress in some areas and stagnation, even deterioration, in others. Differences in the pace of economic growth and in efforts to improve the quality of life, combined with new and emerging patterns in international trade and relations, were some of the forces on the economic and social side which accounted for the disparities in performance between countries. Uneven economic and social progress was matched by significant differences in population trends. Rapid population growth, which continued to dominate demographic trends in the less developed regions as a whole, was accompanied by indications of a slow-down of growth in a number of individual developing countries. At the same time, in the more developed regions, population growth decreased further and even came to a standstill in some cases. Rapid urbanization and its range of economic and social implications remained one of the dominant factors in the social and economic consequences of recent population trends.

For the developing regions as a whole, economic growth in the period between 1960 and 1975 continued to be high by historical standards. Gross domestic product in a group of the developing countries (excluding China) sustained an average annual rate of increase of the order of 5.5 per cent. The average *per capita* gross domestic product, measured at constant 1970 prices, increased from somewhat less than $170 in 1960 to $260 in 1975. Nevertheless, despite the over-all rapid economic expansion, the growth rate of *per capita* income remained substantially below that of the developed market economies and the income gap between the two increased correspondingly. The ratio of *per capita* product in developed and developing countries rose slightly to close to 13 to 1 by 1975. In absolute terms this change signified a steep rise in the income differential *per capita*, from about $1,800 to over $2,800. Similar findings are discussed in chapter VII, although the magnitude of individual data may vary as a result of a different coverage of countries.[1]

Moreover, during the period under observation, income differentials within the group of developing countries, which were already pronounced, increased further. Developing countries with a *per capita* gross domestic product of $200 or less in 1970 experienced in the period 1960-1975 substantially lower growth in total and *per capita* product (about 4.0 and 1.5 per cent per annum, respectively) than

those with higher levels of income. In countries with *per capita* products between $200 and $400, total product increased at an average annual rate of the order of 5.4 per cent and *per capita* product at a rate of 3.3 per cent. Economic growth in the latter group in turn remained below that of the group of developing countries which in 1970 had a *per capita* product of $400 or more. In this group, average annual growth rates for total and *per capita* product for 1960-1975 were about 6.7 and 3.8 per cent, respectively. The same conclusions, arrived at on the basis of a somewhat different data base, were obtained for the analysis in chapter VII, which confirms in particular the high growth of *per capita* income in the group of developing countries with intermediate incomes between $350 and $749.

Similar patterns of relatively favourable changes in combination with other less positive aspects are also found in demographic trends when they are compared with economic changes. There are indications, as stated before, of fertility declines during the 1960-1975 interval, especially in the latter years of this period, in a growing number of developing countries. However, these, or earlier, declines have been concentrated mostly in developing countries in the higher ranges of economic development. Only in the group of countries with a *per capita* gross domestic product in 1970 of $400 or more are current crude birth rates in the lower thirties per 1,000. In the next lower group (with *per capita* product between $200 and $400) the average birth rate is still of the order of 40 per 1,000, whereas in the lowest income group (*per capita* product under $200 in 1970) it is still well above 40 per 1,000. The comparative analysis of income levels and demographic variables provides additional evidence of such differentials. Only in the group of developing countries with a *per capita* income of $750 or more in 1975 is average fertility well below the traditional levels of developing countries. Around 1975, fertility in this group of countries was somewhat over 3,450 children per 1,000 women in childbearing ages, compared with averages of 5,400 or more children per 1,000 women in childbearing ages in groups with lower incomes. What emerges from these data in particular is the suggestion of a threshold level of income, at about $750 in 1975 at 1970 prices, below which fertility on the whole remains high. This statement holds despite the fact that in a number of individual countries with incomes under this level fertility has declined in the past and in some cases has dropped in recent years to moderate or low levels.

A more detailed analysis of the possible associations between fertility and social and economic factors sheds some more light on these issues. When one compares levels and changes in fertility and a selected number of social and economic indicators in a group of 49 developing countries, the findings point to the conclusion that changes in fertility

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[1] The group of countries for which data are analysed in chapter VII includes China, but excludes a number of other developing countries, most of which fall in the low-income category.

appear to have occurred independently of changes in the selected socio-economic variables. By the same token, only a weak relationship would appear to exist between fertility changes and levels of socio-economic variables. However, confirmation was found of a comparatively stronger association between levels of fertility and levels of the majority of social and economic indicators. To the extent that these observations permit a generalization, they suggest that achievement of a given level of socio-economic development—in addition to the pace of development—remains the most important factor in bringing about fertility transition.

Recent trends, as noted before, suggest the possibility of a slow-down in the decline of mortality in recent years. Although gains in longevity over the past quarter of a century in the developing countries have been spectacular, on the whole life expectancy at birth in these countries, if not crude death rates, are still substantially below the average of the more developed countries. An important part of the present perspective are the considerable longevity differentials within the group of developing countries. Although the improvements in mortality conditions in these countries are attributed mainly to factors other than economic growth, the traditional association between levels of mortality and *per capita* income still prevails. Data for 1975 confirm that a *per capita* income of $750 at 1970 prices also constitutes a level separating groups with lower from those with higher life expectancy at birth, even though the delimitation is not as sharp as in the case of fertility. In addition, the data suggest that below that level longevity also appears to vary with *per capita* income. For the groups of countries with *per capita* income in 1975 between $175 and $349, and between $350 and $749, average life expectancies at birth were 57.7 and 60.4 years, respectively. In contrast, countries with income below $175 (excluding China) had significantly higher mortality, with an average life expectancy at birth of 49.9 years.

Both these economic and demographic characteristics not only confirm the continuing gap between more developed and less developed countries but also draw attention to the special problems confronting the poorer countries. These countries besides having experienced—in the past 15 years or so and presumably before that—a lower income growth, also have the highest long-term population growth potential. Their mortality still being high, population growth could accelerate rapidly once sustained improvements in mortality conditions take place. On the other hand, to the extent that a *per capita* income of $750 is a demarcation line between high and low fertility, prospects for fertility decline in this group as a whole are doubtful for some time to come. To a lesser extent, the same statement holds for the group of countries with *per capita* incomes immediately above that of the lowest income group.

However, the above-mentioned findings need to be qualified. Based principally on averages for different income groups, the results conceal substantial within-group variations and deviations from observed group patterns. For several income groups, levels of fertility, mortality and population growth in a number of countries, mostly petroleum-exporting countries which experienced rapid increases in income, are well above typical values for the group. In virtually all income groups, a number of countries exhibit fertility, mortality and population growth levels significantly lower than group averages. A major question which must remain unanswered is to what extent such cases justify a presumption of future changes in demographic patterns in other countries either in response to progress in other-factors than income or, conceivably, as a result of a shift over time in the relationship between income and demographic variables.

Rapid gains in some respects, together with a lack of change in others, are also found in the case of female participation in the labour force and its demographic characteristics. According to estimates prepared by the ILO, female labour participation has been one of the most dynamic factors in labour force trends in recent decades. Outpacing the growth of the male labour force by a considerable margin, the proportion of females in the labour force has increased significantly. The more rapid growth of the female labour force, common to both more developed and less developed countries, was associated with changes towards more "modern" patterns of female employment, manifest both in age structure and industrial composition of the female working population. In many countries, however, either levels or characteristics of women's employment still retain much of the features of more backward conditions. Female participation in the production process in many instances still remains low or unacknowledged or is limited to traditional activities or occupations.

Trends that involve both progress and set-backs are also evident as concerns sectoral trends, such as food and education. Recovery in food production and slow improvements in *per capita* calorie supplies in developing countries in recent years have not improved the food situation nor reduced the gap between requirements and supply significantly. In fact, declines in *per capita* food production in recent years were widespread, with a further deterioration especially in Africa where *per capita* food production has been declining for a considerable period. In general, the number of developing countries in which growth rates of food production remained below those of population increased from 56 in the 1960s to 69 in the first half of the 1970s. In education, substantial progress was made in school enrolment, with, for instance, an increase in enrolment of children aged 6-11 years, from 46 to 62 per cent between 1960 and 1975; but at the same time the number of those out of school in developing countries rose between those dates by 10 per cent. Rapid progress in school enrolment was, moreover, associated with a steep increase in developing countries in the educational dependency ratio, in terms of pupils per working person. This ratio for the developing countries, which was 281 per 1,000 in 1965, similar to the figure of 295 pupils per 1,000 working persons in developed countries, increased to 338 per 1,000 by 1975, as the ratio for developed countries fell to 258 per 1,000.

Chapter VII

DEMOGRAPHIC ASPECTS OF INTERCOUNTRY INCOME DISTRIBUTION*

The objective of this study is twofold: to review, on the basis of 1975 data and their comparison with conditions in 1960, intercountry income disparities; and to investigate the possible over-all relationships between population and economic growth globally and across countries. Although economic and demographic changes have been found to be closely related,[1] such changes are not merely the result of a simple cause-and-effect mechanism between the two. They are also directly and indirectly governed by a complex of social, cultural, political and institutional factors. The nature and mechanisms of such interrelationships and possible deviations from general patterns need to be investigated through sets of criteria relating to socio-cultural characteristics and levels of development. Within this broad framework levels of national income, as well as disparities in intercountry income distribution, are affected, by and large, not only by production structure and technology but by demographic factors. Knowledge of such general associations as they exist and have existed will enhance better understanding of the underlying relationships, also shedding some light on development strategies.

Both cross-country and interperiod data are used in the following discussion. In addition to national income,[2] a number of demographic indicators are used in this study, including rates of natural increase and annual growth rates of population, total fertility rates, life expectancy, adult population ratios, urban population proportions, adult consumer equivalents and labour force. The analysis excludes, however, the considerations of other socio-economic aspects, such as employment, education and health, which have been increasingly recognized as being directly related to economic-demographic factors and trends, and some of which are dealt with in subsequent chapters.

Data and variables included refer to 82 developing countries, 27 developed market countries and 7 centrally planned economies of Eastern Europe and the USSR, a total of 116 countries (broadly defined, including such entities as Puerto Rico).[3] Together they comprise a total population of 3,846 million, or about 97 per cent of the world population in mid-1975. For the comparative analysis, data are divided into various types of classifications: countries grouped by levels of *per capita* income; by types of economy, including developed market economies, developing economies and centrally planned economies of Eastern Europe and the USSR (where developed market economies and centrally planned economies of Eastern Europe and the USSR are referred to as economically more developed economies); and by petroleum-exporting *versus* other countries. By examining these groupings, some of the social, cultural or institutional factors that might be obscured in economic-demographic interrelationships could possibly be discerned.

First to be examined in this chapter are the inequality of intercountry income distribution in the world, as a whole and within each type of economy, and the changes in this inequality over time. Secondly, the relationships between these income disparities and selected demographic variables are highlighted for each demographic variable. In the final section, major findings are summarized.

[1] Several studies undertaken on the subject of demographic transition, as well as on intercountry income disparities, have repeatedly confirmed the existence of relationships between demographic variables and economic development, such as measured in terms of *per capita* income, although not all of the reported correlation coefficients are statistically significant. See, for instance, Ranjan K. Som, "Effects of economic, social and demographic factors on fertility and mortality levels: intercountry studies", *Population Bulletin of the United Nations, No. 9—1977* (United Nations publication, Sales No. E.77.XIII.3), pp. 12-20; Samuel H. Preston, "The changing relation between mortality and level of economic development", *Population Studies*, vol. XXIX, No. 2 (1975), pp. 231-248; Frank Wm. Oechsli and Dudley Kirk, "Modernization and the demographic transition in Latin America and the Caribbean", *Economic Development and Cultural Change*, vol. 23, No. 3 (April 1975), pp. 391-419; George J. Stolnitz, "Recent mortality trends in Latin America, Asia and Africa, review and reinterpretation, *Population Studies*, vol. XIX, part 2 (November 1965), pp. 117-137; and Pan A. Yotopoulos, "The population problem and the development solution", *Food Research Institute Studies* (Stanford University), vol. XVI, No. 1 (1977), pp. 13-22.

[2] A complete discussion of data sources used in this study will be given in a separate report. All figures on demographic indicators are taken from "Selected world demographic indicators by countries, 1950-2000" (ESA/P/WP.55). Some of the reported figures are currently being revised, but

not all of them were available at the time this study was being prepared. Excluding the centrally planned economies of Eastern Europe, the USSR and China, national income figures are from *Yearbook of National Accounts Statistics* (United Nations publication, Sales No. E.77.XVII.2). Some data not reported in the *Yearbook* were made available by the United Nations Statistical Office. For the centrally planned economies of Eastern Europe and the USSR, the national accounting concept of net material product is not directly comparable with gross domestic product, thus requiring adjustments for the purpose of international comparison. To arrive at the present estimates of 1960 and 1975 gross domestic product and national income at 1970 prices for these countries, the data used are based on estimates made by the Economic Commission for Europe, in which all allowances for depreciation and non-materials services are added to the reported data of net material product. See *Economic Survey of Europe in 1969, Part I. Structural Trends and Prospects in the European Economy* (United Nations publication, Sales No. E.70.II.E.1). Data for China are directly adopted from the estimates by Lawrence J. Lau and others, "An econometric model of China", working paper, Department of Economics of Stanford University, January 1978.

[3] These country groupings are in accordance with the United Nations classification. The centrally planned economies defined in this chapter, however, only include Eastern European countries and the USSR. All the developed and developing countries are market economies, excluding China and Viet Nam, which are grouped with the developing economies simply because their income levels fall into that category.

A. Intercountry income disparities

World-wide disparities, 1975

When the 116 countries are ranked in ascending order of *per capita* income and grouped into quintiles it can be seen that in 1975 the poorest 20 per cent of the population of the world, which lived in 12 countries, received only 2 per cent of the income generated in all countries, while a share of 69 per cent accrued to the richest 20 per cent, who lived in 34 countries (see table 73).[4] The share of the population in the highest quintile was more than twice the combined shares of the preceding two intermediate quintiles (26 per cent) and 35 times larger than that of the lowest quintile. This inequality can also be depicted in another way: the poorest 40 per cent of population, which lived in 22 countries (having a weighted average of *per capita* income of about $117) received only some 5 per cent of world income. In contrast, the richest 10 per cent of the population, which lived in 10 countries (having a weighted average of *per capita* income of $3,909), accounted for some 46 per cent of that total. India, with 16 per cent of the world population, weighted very heavily among the countries in the lowest quintile; and China, with 22 per cent of the world population, weighted very heavily among the countries in the second lowest quintile. The United States of America, with the highest total and highest *per capita* income, accounted for about 6 per cent of the world population and 30 per cent of world income in 1975.

The large inequality in the distribution of world income and population between the economically more developed and less developed countries is, as might be anticipated, confirmed by the data. The developing economies, with about 71 per cent of the total population, obtained only 18 per cent of world income in 1975 (see table 74). The developed market economies, with 20 per cent of the total population, accounted for 66 per cent and the centrally planned economies of Eastern Europe and the USSR, with 9 per cent of total population, for 16 per cent of the world income. The weighted average of *per capita* income of the developed market economies was about 13 times and that of the centrally planned economies about seven times that of the developing countries.

Inequality in the world distribution of income is not confined to differences in income between the richest and poorest countries or between the more developed and less developed regions, but is found among all levels of the world population. The conventional Gini coefficient, as a measure of the concentration ratio of income with respect to all groups of the population, which has a value of zero if income is equally distributed and of one if income is concentrated in only one population group, may be used to illustrate these differences. Applied to all countries included, the Gini coefficient was in 1975 as high as 0.658, indicating a high degree of concentration of income in a small number of countries with high *per capita* income.[5] Inequality in the distribution of income among countries existed also within each of the country groupings. Within the developing countries, developed market economies and the centrally planned economies of Eastern Europe and the USSR, the respective coefficients were 0.421, 0.254 and 0.053, which indicate that within the group of the developing economies intercountry income distribution was most

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[4] Income data presented in this chapter are expressed in dollars at 1970 prices.

[5] If China and the United States of America, which had, respectively, the comparatively largest share in world population and income in 1975, are excluded, the Gini coefficient decreases slightly to 0.613.

Table 73. Quintile distribution of income by type of economy, 116 countries, 1975

Population quintile (percentage)	World		Developed market economies (percentage)	Developing economies[b] (percentage)	Centrally planned economies: Eastern European countries and USSR (percentage)
	Number of countries[a]	Percentage			
Total	116	100	100	100	100
I 0-20	12	2	8	7	17
II 20-40	10	3	14	9	19
III 40-60	25	5	19	14	20
IV 60-80	35	21	26	21	21
V 80-100	34	69	33	49	24
Lowest 40	22	5	22	16	36
Upper 10	10	46	17	33	12
Estimated Gini coefficient		0.658	0.254	0.421	0.053
Average income *per capita*, 1975 (dollars at 1970 prices)					
Weighted		856	2 885	218	1 417
Unweighted		917	2 355	398	1 455

[a] When the country falls between two quintiles, it is assigned to the quintile to which corresponds the higher share of its population.

[b] Including developing centrally planned economies of China and Viet Nam.

| | | Population | | | National income | | | Per capita income | | |
Regions	Number of countries	Population in 1975 (millions)	Percentage distribution	Annual growth rate 1960-1975 (percentage)	National income in 1975 (billions of dollars at 1970 prices)	Percentage distribution	Annual growth rate 1960-1975 (percentage)	Weighted average income per capita in 1975 (dollars at 1970 prices)	Annual growth rate 1960-1975 (percentage)	Annual average increment 1960-1975 (dollars at 1970 prices)
World	116	3 846	100	1.9	3 291	100	4.7	856	2.8	19
Developed market economies	27	757	20	1.0	2 184	66	4.2	2 885	3.1	72
Developing economies[a]	82	2 728	71	2.3	595	18	5.3	218	2.9	5
Centrally planned economies: Eastern Europe and USSR	7	361	9	1.0	512	16	6.6	1 417	5.5	52

[a] Including developing centrally planned economies of China and Viet Nam.

skewed, an aspect to be elaborated later. Among the centrally planned economies, the country with the highest income has 1.7 times the per capita income of that with the lowest, compared with the considerably higher ratio of 6.2: 1 in developed market economies and a very high ratio of 34.1 : 1 in the developing economies.

The developing countries had in 1975 a weighted (unweighted) average annual income per capita of only $218 ($398) at 1970 prices. It is also in this group of countries that, as already suggested, intercountry income disparities were particularly pronounced. Within the developing economies, the population in the highest quintile received 49 per cent of the income of the country group, which was seven times the share of the lowest quintile, compared with a ratio of about 4:1 in the developed market economies and only 1:4:1 in the centrally planned economies of Eastern Europe and in the USSR. In some countries, such as Bangladesh, Ethiopia, Rwanda and the Upper Volta, per capita income in 1975 was only in the range of $50-70. To throw further light on income disparities within the developing countries, data were tabulated on the distribution of population and income for the 82 developing countries by five income groups, according to levels of per capita income achieved in 1975. The first group of 24 countries, with a per capita income of less than $175, had a weighted (unweighted) average of per capita income of only $101 ($103). It accounted for 44 per cent of population but only for 20 per cent of income, compared with the group of 10 countries with the highest per capita income, which accounted for only 2 per cent of 1975 population but for 10 per cent of income in the developing economies, with a weighted (unweighted) average per capita income in 1975 of as high as $1,127 ($1,208).

Further contrasts within the developing countries exist between the petroleum-exporting countries and the others. The 12 developing countries that are petroleum exporters accounted in 1975 for 11 per cent of population, but for 13 per cent of income of the developing countries. On the average, their per capita income based on weighted (unweighted) average in 1975 was 18 per cent (51 per cent) higher than that of non-petroleum exporters.

Interperiod changes, 1960 and 1975

Over the past decade and a half the disparity between the poor and rich countries has persisted and even widened. The ratio of per capita income between the economically more developed and the developing regions was about 11:1 in 1975, in contrast with about 10:1 in 1960, signifying a slightly widening disparity between the two groups of countries during the period between those two years. The absolute gap in per capita income between these two groups of countries widened substantially, with a $1,288 difference in 1960 compared with $2,193 in 1975. Based on the trend towards widening disparities in absolute or even ratio terms in per capita income, the gap between these two groups of countries would be expected at least to persist or even to widen further in the foreseeable future.[6]

In terms of Gini coefficients, the distribution of income among countries for the world as a whole remained virtually unchanged as the coefficient fell slightly by 0.006 during the period 1960-1975, which appears to be an indication of more equality in income distribution for the whole of world population. However, the relative position of the less developed countries worsened slightly: the income share of the poorest countries, which represented 40 per cent of world population, decreased from 6 per cent in 1960 to 5 per cent in 1975.[7]

Within the group of the developing economies, the above-mentioned tendency of widening intercountry income disparities between 1960 and 1975 repeated itself. During the two periods under examination, the increment of weighted (unweighted) per capita income in absolute terms was only $20 ($21) at 1970 prices for countries with the

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[6] See also "Development trends since 1960 and their implications for a new international development strategy" (E/AC.54/L.98), p. 8.

[7] When data on the distribution of world income and population in 1949 and 1957 were used, its movement was found to be similar to the pattern found between 1960 and 1975. See Suphan Andic and Alan T. Peacock, "The International Distribution of Income, 1949 and 1957", Journal of the Royal Statistical Society, vol. CXXIV, part 2 (1961), pp. 206-218.

lowest *per capita* income of up to $175. This increment increased further for each successive income group until it reached the highest increment of $400 ($269) for developing countries with the highest *per capita* income, $750-1,999. This divergence can in part be attributed to the relative gains made by petroleum-exporting countries in the 1970s, especially those in the middle and higher income groups of developing countries.

Qualifications of world-wide disparities

In connexion with the foregoing discussion of world-wide disparities of intercountry income distribution, it should be stated that they must be qualified for at least two reasons. One reason is the limitation of the use of official exchange rates for conversion into a common currency (usually dollars) as a proxy of the level of living of a country; and the other is the choice of deflator of the income by population, adult consumer equivalents or income recipients. First, the statistics presented above are only a crude measure of the economic distance between the economically more developed regions and the less developed regions or between all levels of world population. Alternative methods of comparing income levels across countries, for instance, based on purchasing power parities of country currency, would suggest that the real distance is probably

much less.[8] Nevertheless, even if these purchasing power parities were taken into consideration, the world-wide disparities would still exist, as the mass of people in the developing countries are still living under subsistence levels of food intake, housing and other conditions.

Secondly, the findings with respect to the international distribution of income are not significantly different if the effects of the demographic composition (specifically the sex and age structure and labour force participation rates) are taken into account. The beneficiaries of income are consumers, and consumption needs vary according to sex and age. Also, the immediate recipients of income are principally the individual members of the labour force, rather than all members of the population. Inequality in size distribution of income by country could thus be exaggerated by differences among countries in total consumption needs (due to different sex and age composition) and in production arising from the relative size of the labour force (due to differences in sex-age composition and participation rates). To make allowance for these two factors, population size was weighted by consumption requirements by sex and age and by labour force participation rates, and the correspond-

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[8] See Irving B. Kravis, Alan W. Heston and Robert Summers, "Real GDP *per capita* for more than one hundred countries", *The Economic Journal*, vol. 88 (June 1978), pp. 215-242.

TABLE 75. *Per capita* INCOME, ANNUAL RATE OF POPULATION GROWTH, RATE OF NATURAL INCREASE, TOTAL FERTILITY RATE, LIFE EXPECTANCY AT BIRTH, ADULT POPULATION RATIO AND URBAN POPULATION PROPORTION, BY COUNTRY GROUP ACCORDING TO LEVEL OF *per capita* INCOME, 116 COUNTRIES, 1975

Per capita income, 1975 (dollars at 1970 prices)	Number of countries	Share of world population (percentage)	Average 1975 per capita income (dollars at 1970 prices)		Average annual rates of population growth (percentage)		Average natural population increase rates (per 1,000 population)	
			Unweighted	Weighted	Unweighted	Weighted[a]	Unweighted	Weighted[a]
World	116	100	917	856	2.1	1.9	21.1	19.0
Less than 175[b]	24	31	103	101	2.5	2.5	25.0	25.1
China	1	22	173	173	1.7	1.7	16.6	16.6
175-349	22	7	256	235	2.7	2.9	27.2	29.3
350-749	23	10	500	554	2.6	2.8	26.2	27.7
750-1 999	24	14	1 285	1 377	1.3	0.9	12.4	9.2
2 000 and over[c]	18	10	2 760	2 591	0.9	0.9	8.1	8.9
United States of America	1	6	4 601	4 601	0.9	0.9	6.8	6.8

Per capita income, 1975 (dollars at 1970 prices)	Average total fertility rates (children per 1,000 women of childbearing age)		Average life expectancy at birth (years)		Adult population ratio (percentage)		Average urban population proportion (percentage)	
	Unweighted	Weighted[d]	Unweighted	Weighted[a]	Unweighted	Weighted[a]	Unweighted	Weighted[a]
World	4 649	4 151	60.4	61.0	56.6	58.4	44.5	39.8
Less than 175[b]	6 293	5 919	46.7	49.9	53.1	53.9	13.7	18.9
China	3 772	3 772	61.6	61.6	61.0	61.0	23.5	23.5
175-349	5 833	5 772	54.8	57.7	52.5	52.2	33.9	36.5
350-749	5 415	5 426	60.7	60.4	53.1	53.6	46.0	52.2
750-1 999	3 033	2 476	69.0	70.8	62.0	64.3	60.0	61.1
2 000 and over[c]	2 275	2 196	72.9	73.1	63.5	64.5	75.4	78.7
United States of America	2 186	2 186	71.3	71.3	64.3	64.3	76.3	76.3

[a] Weighted by size of population of each country in the same income group.
[b] Excluding China.
[c] Excluding United States of America.
[d] Weighted by number of women of childbearing age in the same income group.

ing Gini coefficients were computed in terms of income per adult consumer equivalent and income per worker. The values for the latter are 0.650 and 0.655, respectively, which are very close to 0.658, previously reported in terms of income *per capita*.

B. Demographic factors and intercountry income disparities: their interrelationships

Having reviewed the background of world-wide intercountry income disparities in 1975 and in 1960, their possible interrelationships with selected demographic variables are now explored. To make allowances for the variations of these economic-demographic relationships accounted for by economic factors, such as in the case of the present study in terms of income, countries are further grouped into seven income strata according to levels of *per capita* income achieved in 1975[9] (see, for instance, table 75). Findings based on 1975 data are considered first, followed by the discussion of 1960 data and the interperiod changes between 1960 and 1975.

Growth and levels of income and growth of population, 1975

Growth of income and of population

The observed trends in growth of population and in levels and growth of total and *per capita* income in the economically more developed and less developed countries suggest a number of possible associations and interrelationships. Among the most evident of these is that the widening disparities of intercountry income distribution are associated with unprecedented rapid population growth in the developing economies and that there exists an inverse relationship between growth of population and levels of *per capita* income.

First, indications as to whether substantial population growth may have facilitated the growth of output were found to be inconclusive in past studies. On the one hand, the supply of labour being abundant as a result of rapid population growth in the developing countries is not considered to be the principal constraint to economic growth, as may be the case in the economically more developed economies, although there has been evidence of shortages of skilled labour in some developing countries. On the other hand, the productive capacity, given the existing economic structure, resources and level of technology in some developing economies, may be limited and give rise to labour surplus. Moreover, potentials for capital formation may have been constrained by rapid increase of consumption,

although consumption *per capita* still remains very low, as a result of rapid population growth.

The present study confirms the conclusion derived in past studies, in that although unprecedented and still accelerating population growth has not prevented economic advance and modernization, it has been associated with a lower increase of *per capita* income.[10] Despite a more rapid growth of total income in the developing countries than in the developed market economies—although not with respect to the group of centrally planned economies—*per capita* income growth in the developing countries remained behind that in the other two groups. During the period 1960-1975, the growth of national income of the developing economies as a whole was 5.3 per cent per annum, being 1.1 percentage points higher than that of the developed market economies but 1.3 percentage points lower than that of the centrally planned economies of Eastern Europe and the USSR (see table 74). At the same time, the population in the developing economies grew at 2.3 per cent per annum, which was more than double the rates of the developed market economies and the centrally planned economies of Eastern Europe and the USSR. Consequently, the rate of growth of income *per capita* in the developing countries was 2.9 per cent, compared with 3.1 per cent in the developed market economies and 5.5 per cent in the centrally planned economies of Eastern Europe and the USSR. Differentials in income levels in absolute terms widened further as annual absolute increments corresponding to these rates were, on average, $5, $72 and $52 *per capita*, respectively.

On the whole, the lower growth rate and increment of *per capita* income in the developing countries, and the consequent widening disparities in income levels with the economically more developed countries over the past decade and a half, have been linked to the more rapid expansion of population in the developing countries. However, this conclusion is based on the observation drawn from the performance in the broad groups of countries considered. In fact, a number of studies dealing with the relationship of growth of *per capita* income and of population based on data of individual countries have failed to reveal such an association.[11] In addition, the broad association found by no means suggests that a reduction of population growth in developing countries will by itself raise total output. It only implies that *per capita* income would have increased more rapidly if population growth had been lower, on the assumption that the growth of total output would be independent from the rate of population growth.

In fact, for all 116 countries considered, no relation appears to exist between growth of population and growth of

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[9] These groupings of countries, however, are not merely based on income level *per se*, but also on other considerations, such that China and the United States, simply because of their relatively large size in terms of population and income, respectively, are separated into their own income group and that all of the centrally planned economies of Eastern Europe and the USSR, with a similar socio-economic structure, are part of the *per capita* income strata $750-1,999.

[10] See, for instance, *The Determinants and Consequences of Population Trends*, vol. 1 (United Nations publication, Sales No. E.71.XIII.5), pp. 505-556.

[11] Among others, see Richard A. Easterlin, "Effects of population growth on the economic development of developing countries", *Annals of the American Academy of Political and Social Sciences*, vol. 369 (January 1967), pp. 98-108; Simon Kuznets, "Population and economic growth", *Proceedings of the American Philosophical Society*, vol. III, No. 3 (June 1967), pp. 170-192; and J. C. Chesnais and A. Sauvy, "Progrès économique et accroissement de la population, une expérience commentée", *Population* (Paris), vol. 28 (July-October 1973), pp. 843-857.

total output, judged by results from estimates for two different periods, 1960-1975 and 1970-1975. The correlation coefficient between rate of population growth and rate of total income for all 116 countries is positive but low, 0.03, based on 1960-1975 data, but is negative and low, −0.04, based on 1970-1975 data. This lack of relationships between the two in alternative periods is confirmed by additional evidence when countries are grouped by types of economies. The correlation coefficients between growth of total population and of income are negative and low for developing countries based on either 1960-1975 or 1970-1975 data, the coefficients being −0.01 and −0.14, respectively. However, correlation coefficients are high for the centrally planned economies of Eastern Europe and the USSR, being 0.71 based on 1960-1975 data and 0.54 based on 1970-1975 data, suggesting the possibility that population and especially labour force growth may have been constraints on economic growth in these countries.

Levels of income and growth of population

The relationships between levels of income *per capita* and selected demographic indicators have also been analysed through correlation coefficients. As expected, the correlation coefficients obtained between income levels *per capita* and population growth rates (and rates of natural increase) are negative, but surprisingly high: −0.60 (and −0.73) in 1975 for all 116 countries considered. This high order of correlation may in part be due to the contrast between, on the one hand, the economically less developed economies with higher levels of income *per capita* associated with a slower increase in population, and on the other hand, the economically more developed countries, with comparatively low income levels *per capita* coupled with rapid population growth. However, when the countries are grouped according to types of economies the correlations obtained are considerably lower, especially in the case of developed market economies and developing countries, although for the centrally planned economies the levels of association are close to but not as high as those for the world as a whole. The correlation coefficients between *per capita* income and population growth rates (and rates of natural increase) are −0.13 (−0.37) for the developed market economies, −0.08 (−0.24) for the developing economies and −0.66 (−0.57) for the centrally planned economies of Eastern Europe and the USSR, respectively.

Thus, and in particular within developing countries, the relationship between the two is less clear. The correlation coefficient of −0.08 between *per capita* income and rates of population growth, for instance, is extremely low, implying that these two variables do not vary systematically and suggesting, in fact, that some countries with low *per capita* income have achieved an advanced stage of demographic transition characterized by low population growth and vice versa. Data for 1975 reveal that there exist different combinations and wide variations between levels of *per capita* income and population growth in this group. On the one hand, developing economies with comparatively high levels of *per capita* income include a number of countries with slow population growth, such as Puerto Rico and Trinidad and Tobago, both with 1.1 per cent; but also some countries

with rapid population growth, such as Kuwait and the Libyan Arab Jamahiriya, with population growth rates of 7.1 and 3.0 per cent, respectively. On the other hand, among countries with low levels of *per capita* income, most have rapid population growth, but here too there are some exceptions (such as China and Haiti). In other words, the pattern of countries according to levels of *per capita* income *versus* population growth within the developing economies was not sharply defined in the 1975 data.

Relationships by income strata

When countries are grouped according to levels of *per capita* income, sharp differences in population growth patterns between the income class immediately below and above $750 (at 1970 prices) are revealed (see table 75). The income groups below $750 have weighted (unweighted) annual average rates of population growth in the range of 2.5-2.9 (2.5-2.7) per cent (except for China at 1.7 per cent), whereas rates are equal to or below 0.9 (1.3) per cent for the country groups above *per capita* income of $750. Likewise, the weighted (unweighted) average of rates of natural increase are in the range of 25.1-29.3 (25.0-27.2) per 1,000 for the groups with *per capita* income under $750 (again except for China with a rate of 16.6 persons per 1,000), compared with the range of 8.9-9.2 (8.1-12.4) per 1,000 for the groups with *per capita* income of $750 or more.

When examining the relationship between levels of *per capita* income and population growth by individual income groups, differences in population growth conform, in general, to what might be expected under the theory of demographic transition. Excluding China, population growth rises with *per capita* income for groups of countries with income below $750. The weighted average natural rate of population growth begins from 25.1 per 1,000 population for countries with *per capita* income less than $175 and then increases to 29.3 and 27.7 per 1,000 population, respectively, for the country groups with *per capita* income of $175-349 and $350-749. After the sharp decrease to 9.2 per 1,000 population for the group of countries with *per capita* income of $750-1,999, the rate further falls to 8.9 per 1,000 for countries with income of $2,000 or more, even though for the United States the rate again is somewhat higher, 6.8 per 1,000. These growth patterns are in accordance with demographic transition theory, according to which population growth will accelerate at first with development and then decrease to low levels once certain levels of development have been achieved. However, comparatively speaking, changes in population growth rates between these different income groups were small, as the averages for income groups reflect either conditions at the early or late stages of transition. The notably predominant difference in population growth rates is that between country groups with *per capita* income below or over $750.

Fertility, mortality and levels of income, 1975

It has been generally recognized that a clear dichotomy of fertility differentials between economically more developed countries and less developed countries has existed both in

the past and more recently. With respect to mortality differentials, a dichotomy still persists between the two groups of countries; but the conventional explanation for this close association in terms of levels of *per capita* income is currently much weaker than it used to be, and other variables, such as disease control and advanced medical techniques, are also important factors contributing to mortality declines.

These associations are supported by correlation coefficients obtained in this study. As expected, *per capita* income is negatively related with total fertility rates, but positively related with life expectancy at birth. These correlation coefficients are at least 0.70 in absolute terms for all 116 countries considered together. As in the case discussed above, however, the association does not appear to be as strong in the case when correlation coefficients are calculated separately for the developed market economies, the centrally planned economies of Eastern Europe and the USSR, and the developing economies. All coefficients for these groupings are lower than those for the world as a whole. These results, in turn, suggest—as earlier findings also indicated—that the world-wide broad association between economic (income) variables and demographic indicators exists, but that the association reflects the continued bi-modal distribution of the world population according to demographically developing and developed countries.

The above-mentioned economic-demographic interrelationships in terms of correlation coefficients show virtually no changes if the effects of the demographic composition (specifically sex and age structure and labour force participation rates) are taken into account. Correlation coefficients between total fertility rates, on the one hand, and income per adult equivalent and/or income per worker, on the other, for 1975 are -0.74 and -0.68, compared with -0.74 for that between total fertility rates and income *per capita*. Likewise, correlation coefficients between life expectancy, on the one hand, and income per adult equivalent, income per worker and income *per capita*, on the other, are all the same, with a value of 0.70. Therefore, analysis of these economic-demographic interrelations based on income per adult equivalent or income per worker would not significantly differ from that based on income *per capita*.

Fertility rates

Excluding China, weighted and unweighted average total fertility rates for successive income groups vary systematically, although not in a uniform degree, with levels of *per capita* income. As *per capita* income rises from less than $175 to over $2,000, total fertility rate declines from 5,919 to 2,186 children per 1,000 women of childbearing ages, a ratio of about 3:1 (see table 75). In the case of China, total fertility rate of 3,772 children per 1,000 women of childbearing ages is only somewhat more than half the average rate of the country group with the same levels of *per capita* income (under $175) and slightly more than that for the country group with *per capita* incomes between $750 and $1,999. On the whole, however, there are two distinct groups of countries, one with low levels of *per capita* income associated with a high level of total fertility rates and the other group of countries where the opposite is the case. Few countries exhibit a combination of high fertility asso-

ciated with high *per capita* income or low fertility associated with low *per capita* income, although some exceptions do exist.

On the basis of the magnitude of the changes in total fertility rates, it may be said that a 1975 *per capita* income of $750 at 1970 prices constitutes a dividing line between countries with comparatively higher and lower total fertility rates.[12] In the group of countries with *per capita* income under $750, excluding China, the range of weighted (unweighted) average of total fertility rates is quite close, varying between 5,426 and 5,919 (5,415 and 6,293) children per 1,000 women in childbearing ages. In contrast, in the group of countries with *per capita* income higher than the $750 level, the weighted (unweighted) average of total fertility rates is equal or less than 2,476 (3,033) children per 1,000 women in childbearing ages. That is, the weighted (unweighted) average of total fertility rates of the countries with *per capita* income below $750 is more than twice that of the countries with *per capita* income above that level.

This observation of a dichotomy is consistent with the patterns expected in the theory of demographic transition, according to which fertility is little affected in the process of social and economic development until a certain level of development has been reached. By that time, the factors resistent to fertility decline disappear, resulting in a significant reduction of fertility. The findings summarized above are generally consistent with this hypothesis and a *per capita* income of $750 would appear to be the bench-mark level for significant fertility reduction. However, even if the data tend to be in conformity with the theory of demographic transition, they only represent the initial and final stages of transition, and they do not shed much additional light on the critical phase of accelerated fertility decline. In fact, the two adjoining groups with income *per capita* from $350 to $749 and from $750 to $1,999, with total fertility rates of 5,426 and 2,476, respectively, have average levels of fertility representative, respectively, of situations prior to or in early stages of fertility decline and of situations where the fertility transition has been virtually completed. Between these two groups, fertility declines by 54 per cent.

Although, in general, the groups and most countries within each of those groups conform to the patterns described above, a number of countries deviate from them, revealing levels of fertility rates different from the typical rates observed and confirming that levels of *per capita* income cannot by themselves explain differences in demographic behaviour among countries. The most important case in this respect is China, which has low levels of fertility and mortality compared with other countries in the same income brackets. Estimated fertility in China, with 3,772 children per 1,000 women of childbearing age, is very close

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[12] The relationships between levels of fertility and several indicators of economic and social development, including levels of *per capita* income are also analysed in *Population Bulletin of the United Nations, No. 7— 1963, with special reference to conditions and trends of fertility in the world* (United Nations publication, Sales No. 64.XIII.2), pp. 134-151. The other economic and social indicators selected were: energy consumption *per capita*; proportion of labour force in non-agricultural industries; degree of urbanization; female literacy rate; number of hospital beds; newspaper circulation; cinema attendance; number of radio receivers per 1,000 population; life expectancy at birth; and infant mortality.

to the level typical of countries which are nearing the completion of their transition, with *per capita* income of $750-1,999. Other exceptions exist, including Cyprus, Fiji, Mauritius and Sri Lanka, among others, with comparatively low fertility rates, suggesting that they are already at a more advanced stage of fertility transition than other countries in the same income groups. In contrast, countries such as Gabon, Iran, Kuwait, the Libyan Arab Jamahiriya, Saudi Arabia and Venezuela, all of them petroleum-exporting countries, as well as Israel, had comparatively high fertility rates in relation to other countries in their income groups. It should also be noted that within the median income group with *per capita* income between $350 and $749 in 1975, fertility rates vary over a wide range, although not systematically with levels of *per capita* income. Total fertility rates in this group range from 2,500 to 2,999 children in such countries as Cyprus and Fiji, to 6,500 children and over per 1,000 women of childbearing age for such countries as Iran. This pattern, although less pronounced, is also found in groups with incomes *per capita* of $175-349 and $750-1,999.

Life expectancy at birth

As large and rapid gains in longevity in many countries, especially in the developing countries in the post-war period, have occurred even in the absence of significant economic progress, it has been suggested that, to a significant degree, the role of income was not predominant in the substantial mortality changes in those countries. Despite the fact that the possible explanation for changes of mortality and life expectancy may not lie only in levels of *per capita* income, the association between the two still prevails. Data for all 116 countries for 1975 confirm a strong positive association between life expectancy at birth and levels of *per capita* income with a correlation coefficient of 0.70.[13] Yet within each group of countries classified according to types of economies, this association, as in the case of previous discussions on the association between levels of *per capita* income and population growth and total fertility rates, is less clear. Even so, these correlation coefficients are all with expected signs ranging from 0.44 for the developed market economies to 0.61 for the developing economies and for the centrally planned economies of Eastern Europe and the USSR.

In line with this positive association, table 75 confirms that longevity in low-income countries is still considerably lower than in high-income countries. Excluding China and the United States of America, which are treated as separate groups, average life expectancy at birth for each group is positively and systematically, although not uniformly, correlated with average group income. Between the country group with lowest *per capita* income (less than $175) and

the next (with *per capita* income of $175-349) expectation of life at birth increases from 49.9 to 57.7 years and a further increase to 60.4 years is found for the $350-749 income group. In the group of countries with *per capita* income of $750-1,999, a life expectancy of 70.8 years is achieved; and mortality, although already low, shows a further moderate decline, resulting in a life expectancy of 73.1 years, for the next higher income group. A *per capita* income of $750 (at 1970 prices) again appears to emerge as a dividing line as concerns mortality, with the largest increase in life expectancy, over 10 years, between the income group immediately below and over this level. Even so, in contrast with the case of fertility, the dividing line of mortality constituted by the $750 *per capita* income level is less marked. Especially at lower income levels substantial gains in life expectancy are found, implying the significant improvements of mortality conditions in these groups. Consequently, the increase in life expectancy between the groups immediately below and above $750 is less pronounced than in the case of fertility.

The broad positive association outlined above has a much less than universal applicability when individual countries are examined. There are several exceptional cases of countries deviating from this general pattern. China is the most exceptional case. With a *per capita* income below $175, it achieved a life expectancy of 61.6 years, being higher than the average for countries with incomes between $350 and $749. The United States, with the highest *per capita* income, had a life expectancy slightly lower than the countries with the second highest *per capita* income. When compared with other countries in their own income groups, mostly for the low and medium income strata, a substantial number of countries characterized by comparatively lower *per capita* income had comparatively higher life expectancies. These include Colombia, Costa Rica, Cyprus, Ecuador, El Salvador, Fiji, Jamaica, Mauritius, Paraguay, the Philippines, Sri Lanka and Thailand, all with life expectancies at birth of over 60 years in 1975, while their levels of *per capita* income were less than $350 at 1970 prices. One interpretation relating to underlying factors of lower mortality in these countries is that they have been more successful than others in developing means and facilities for improving health conditions or in achieving more rapid progress in social and economic conditions, other than income levels, conducive to mortality decline. In contrast, some countries with comparatively higher income had, compared with their own income group, lower life expectancies. These countries include Gabon, Iran, the Ivory Coast, the Libyan Arab Jamahiriya, Saudi Arabia, Senegal, South Africa, the United Republic of Cameroon and Zambia, some of which are petroleum-exporting countries where socio-economic development in general may not have kept pace with rapid economic growth.

Income and demographic characteristics of the developing countries

When the developing countries are studied separately, also grouped according to *per capita* income, obviously, patterns in lower income groups are the same as those ob-

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[13] Another study, using the logistic curve, obtained results indicating a close association between *per capita* income and mortality rates during the twentieth century. The simple correlation coefficient between life expectancy and the logarithm of *per capita* income obtained was 0.885 for the 1930s and 0.88 for the 1960s. In spite of these high correlation coefficients, economic advancement was not claimed to be a prerequisite of rapid increase in life expectancy. See S. H. Preston, *loc. cit.*

served above. But even inclusion of developing countries with higher income, which were subsumed into one income group with more developed countries in the preceding sections, shows the same basic patterns found for all countries considered together. Life expectancy at birth rises from 49.9 years for the lowest income countries with *per capita* income less than $175 (again excluding China) to 68.3 years for the country group with the highest *per capita* incomes among the developing economies, $750-1,999, confirming consistent increases in life expectancy associated with *per capita* income. Fertility rates decrease in each of the successive income groups of developing countries, but up to the $750 income level, changes are small. Total fertility rates decline slightly from 5,919 to 5,772, or about 2 per cent, between the lowest income groups (under $175) and the next group ($175-349); and somewhat more from 5,772 to 5,415 children per 1,000 women of childbearing age, or 6 per cent, between the next two groups. However, a sharp fall in fertility to 3,463 children per 1,000 women of childbearing age is found for the economically most advanced developing countries, where *per capita* income reaches levels between $750 and $1,999.

As in the case of all countries considered together with respect to population growth, the $750 income level *per capita* is also a dividing line between high and low growth rates for the developing countries. The rates of natural increase of population amongst the developing countries rise from 26.1 per 1,000 for countries with *per capita* income below $175 to 29.3 per 1,000 in the next income group ($175-349). A moderate decline in the natural rates of increase to 28.7 per 1,000 takes place between the latter and the group of countries with *per capita* income of $350-749. The sharpest decrease, however, is found with respect to the next income group, with *per capita* income of $750-1,999. The average rate of natural increase in this group of countries was 17.8 per 1,000 in 1975, a fall of about 38 per cent with respect to the preceding income group. Although these changing patterns in population increase conform to those expected in the process of demographic transition, the outstanding feature is the emergence of the $750 income (at 1970 prices) level *per capita* as a dividing line between high and moderate growth countries within the group of developing countries.[14]

The contrast of demographic characteristics by income groups also exists between the petroleum-exporting countries and others within the developing economies. Average values of weighted income *per capita* as well as the major demographic variables are as follows: .

Weighted average	Petroleum-exporting countries (12 countries)	Non-petroleum-exporting countries (70 countries)
Income *per capita* (dollars at 1970 prices)	260	213
Annual rates of population growth (percentage)	2.8	2.3
Natural rates of increase (per 1,000)	28.3	22.8
Total fertility rates (children per 1,000 women of childbearing age)	5 976	4 846
Life expectancy at birth (years)	50.6	57.5

These results indicate that although the average income *per capita* for petroleum-exporting countries was 18 per cent higher than that of other countries, total fertility rates in the former group were higher by 23 per cent and life expectancy was lower by 12 per cent. Consequently, population growth was higher in the petroleum-exporting countries than in the others, by about 22 per cent for both annual rates of population growth and natural rates of increase. .

Urbanization, adult population ratio and income, 1975

In the process of development, economic growth, industrialization and urbanization are linked in a number of ways, but the focus in this section is confined to relationships between the proportion of urban population and *per capita* income. The findings based on 1975 data support the hypothesis of the continued existence of a positive association between urban population as a proportion of total population and levels of *per capita* income. The correlation coefficient between the two was 0.72 when all 116 countries were considered together, and was on the order of 0.66, 0.52 and 0.89 within the developing economies, the developed market economies and the centrally planned economies of Eastern Europe and the USSR.

Unlike the preceding pattern of demographic variables associated with levels of *per capita* income, the urban population proportion is the only indicator that does not reveal a sharp dividing line at the $750 income level. This proportion rises fairly consistently, although not uniformly, for successive income groups; and although it increases between the two groups immediately below and over $750 income *per capita*, the rise is not exceptionally high. In effect, the major increases (excluding the groups which exist of a single country, i.e., China and the United States) did not occur between the two groups adjacent to the $750 income level *per capita*, but between groups below and above these, that is, between income groups with less than $175 and from $175 to $349 and between the groups with from $750 to $1,999 and $2,000 and over. The proportion increases from 18.9 to 36.5 per cent in the first case and from 61.1 to 78.7 per cent in the second, with a gain of 17.6 percentage points in both cases. These results suggest that urbanization levels increase, in relative terms, most at the early and later stages of economic development; and that these substantial increases in urban proportion were not associated with any pronounced change in fertility, mortality and related demographic variables.

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[14] It may be stated that fertility, mortality and rates of natural increase in the group of developing countries with *per capita* income of $750-1,999 are still significantly higher than in the group of all countries, including the more developed, which fall into this income class. However, weighted average income *per capita* (at 1970 prices) for the developing countries in this income group ($1,127) is also lower than that for all countries in this group ($1,377). The extent to which the higher income in the group as a whole may explain the more advanced stage in demographic evolution is not easy to determine.

The adult population ratio, defined as the number of population aged 15-64 years as a percentage of total population, shows a comparatively high correlation with income for the world as a whole, the correlation coefficient being 0.71. However, there is no consistent pattern in terms of the signs of correlation when the data are partitioned into the developed market economies, the developing economies and the centrally planned economies of Eastern Europe and the USSR, the coefficients being positive for the first two groups but negative for the last. From table 75 it can be seen that, as expected, a *per capita* income of $750 at 1970 prices can be assumed to be the dividing line of lower and higher adult population ratios when countries are grouped by *per capita* income. This ratio reached over 64 per cent for all the three income groups with average *per capita* incomes of $750 or more. In contrast, the ratio was only about 52-53 per cent for the country groups with the average income *per capita* under $750. This low adult population ratio is largely a reflection of high dependency ratio for the ages below 15 years, attributed especially to high fertility and population growth in the developing economies. China was again the exceptional case, with less than $175 income *per capita* but with a ratio of 61.0 per cent, a level slightly less than that achieved by the income groups above $750.

C. Interperiod changes of income-demographic interrelationships between 1960 and 1975

The preceding findings on the relationship between demographic variables and *per capita* income in the mid-1970s pose the question as to the existence of similar associations, and their possible shifts, over time. The following discussion is concerned with the relationship between income and selected demographic indicators in 1960 and changes between 1960 and 1975. The demographic indicators considered include annual rate of population growth and rate of natural increase, crude birth and death rates, life expectancy and proportion of urban population. The lack of data on total fertility rates for 1960 makes it impossible to evaluate the income-fertility relationship for that year and possible changes in it between 1960 and 1975. However, the examination of crude birth rates, considered a proxy for fertility, may provide some indications in this respect.

Grouping countries both for 1960 and 1975 by their level of *per capita* income achieved in 1975 confirms the earlier finding, based on a different grouping of countries, that differential changes in *per capita* income were pronounced. From statistics based on weighted averages, the rise in *per capita* income between 1960 and 1975 in countries that in the latter year had income *per capita* under $175 (excluding China), was, on the annual average, only $20. Somewhat higher increases, $56 and $61, respectively, were achieved by China and countries with a 1975 *per capita* income between $175 and $349. A substantial increase in *per capita* income of $242 was found among the group, still mostly developing countries, with *per capita* incomes in 1975 between $350 and $749. Even so, this increase was only one third of that for countries which in 1975 had a *per capita* income between $750 and $1,999 (with an increment of $720) and one fifth of that of countries with incomes of $2,000 and over (with an increment of $1,139).

The resulting comparative deterioration of relative income against poorer countries was associated to some extent with changes in demographic growth patterns. Although the rate of population growth for all countries together did not change between 1960 and 1975, this situation was the result of opposed tendencies: the decrease of population growth experienced mostly within the developed countries was offset by the increase of growth mostly in the economically less developed countries. Moreover, the tendency towards higher population growth in developing countries, admittedly slight, was concentrated mostly in the poorer of the developing countries (with China being treated as a separate group). The increment of weighted average annual rate of population growth between 1960 and 1975 was 0.3 percentage point for countries with a *per capita* income less than $175 and 0.2 percentage point for those with incomes between $175 and $349; it remained unchanged for those countries which in 1975 had a *per capita* income between $350 and $749.

Demographic changes and levels of income

Comparison of 1960 data with 1975 data suggests two immediate observations. First, an interperiod comparison of levels of income *per capita* and demographic changes, not reported in the tables, shows that while a great majority of the countries with life expectancy at birth of 60 years in 1960 had a *per capita* income above $350 (Fiji, Guyana, Mauritius and Sri Lanka being the exceptions), in 1975 many countries with *per capita* income as low as $200 had achieved the same life expectancy at birth, including China, the Philippines, Sri Lanka and Thailand. In other words, the data suggest that in order to attain a particular value for life expectancy—say that of 60 years, the value of life expectancy that has been achieved by all economically developed economies and some developing economies—a country did not require as high a level of *per capita* income in 1975 as it did in 1960. This shift could possibly be explained, as already suggested, by the importance of factors other than income, particularly progress in and greater effectiveness of programmes in public health and disease control, as mortality determinants. Moreover, the exact value of the income differentials between the two years associated with the same value of life expectancy have not been statistically validated in this study. A related finding is that apparently a lower level of *per capita* income in 1975 than in 1960 would be generally needed in order to achieve the same birth rates. This finding by no means suggests that income variable exerts a greater impact on fertility reduction in 1975 than in 1960. Rather, it indicates that greater fertility reduction has been achieved, even in the current lower income countries, than in the past; and that individual responses and possibly public measures towards fertility reduction have been wider and deeper.

Secondly, as stated previously, despite the close relation between levels of income *per capita* and levels of demographic indicators based on cross-sectional data in a given period, such as for the year 1975, no relationship appears to exist between change of demographic indicators and growth of product as the low correlation coefficients discussed be-

fore indicate. Based on the weighted average for the 116 countries, *per capita* income at 1970 prices increased during the period 1960-1975 by about 50 per cent. However, changes were almost negligible for most demographic indicators, including rate of population growth, rate of natural increase and adult population ratio. Life expectancy increased by about 9 per cent and the proportion of urban population by 14 per cent during the 15-year period.

When, as in the case of 1975 cross-sectional data, changes in demographic indicators between 1960 and 1975 are compared for groups below and above the $750 income level *per capita*, results are, on the whole, consistent with the assumption of a dividing line at this level of income. A 1975 *per capita* income level of $750 appears to be the dividing line with respect to the signs and extent of changes as far as most demographic indicators are concerned. However, differences in the magnitudes and, in some cases, signs of changes in the demographic variables for the two broad income groups are not as distinct as in the case of levels of variables and not such as to lend full support to the hypothesis that a threshold as existed for levels is also found for changes. The weighted averages of changes in these variables during the period 1960-1975 for groups of countries (excluding China), but not for individual countries, may be illustrative in this respect:

| | Range of weighted average increment of indicators, 1960-1975, for country groups with per capita income | |
	Under $750	$750 and over
Rate of population growth (percentage)	0 - 0.3	−0.1 - −0.8
Rate of natural increase (per 1,000) ...	0.3 - 1.8	−1.8 - −5.7
Crude birth rate (per 1,000)	−3.5 - −4.4	−1.9 - −5.4
Crude death rate (per 1,000)..........	−3.8 - −5.7	−0.1 - 0.7
Life expectancy at birth (years)	6.6 - 7.5	1.6 - 2.7
Adult population ratio (percentage)	−1.3 - 0.5	0.4 - 4.6

As previously stated, either no increments or no significant increments in the annual rates of growth of population were predominant in the groups with *per capita* income under $750; on the contrary, decreases in population growth rates were found for the groups of countries with *per capita* income above that level. Similar but somewhat more pronounced differences were found for rates of natural increase of population. Also, with respect to crude death rates and life expectancy, the range of variation in changes between 1960 and 1975 for income groups below and over $750 is different. Crude death rates declined in all groups with incomes below $750 income *per capita*, but remained virtually unchanged or increased for the groups with higher levels of income. Changes in life expectancy were, as expected, of the same sign; but for the groups with income *per capita* of $750 or more the highest average increase was 2.7 years, whereas for groups with lower income the lowest gain was 6.6 years. The difference, however, is not so clear for average group changes as far as declines of crude birth rates are concerned in which the ranges of change were similar. Average changes varied from −3.5 to −4.4 per 1,000 in the low-income groups, compared with from −1.9 to −5.4 per 1,000 for the high-income group. However, if the United States, which as stated previously is treated as a separate group and which experienced the highest negative

change of any group in the birth rate (−5.4 per 1,000), is excluded, the range for the remaining two high income groups is from −1.9 to −3.0 per 1,000. Lastly, changes in the ratio of adult population in the groups below and above a *per capita* income of $750 also show fairly clear differences, with declines or a moderate increase in the proportion for the low-income countries in contrast to from moderate to significant increases for the high-income countries.

The only indicator that does not follow the same pattern is the proportion of urban population. The weighted average of increments between the period 1960-1975 was 3.2 percentage points for the country group with *per capita* income under $175, and this increment was higher for the successive income groups (including China) but not uniformly so, until it reached at the level of *per capita* income between $350 and $749, with this increment of 12.9 percentage points. Increments, however, were lower for each successive income group and declined ultimately to 6.3 percentage points for the United States.

Group averages, however, may conceal substantial differences for individual countries within each of them, which in turn may weaken considerably the significance to be attached to such averages. One of the most obvious exceptions in this context is China, which was treated, for reasons mentioned above, as a separate group. For China, which with respect to *per capita* income falls within the lowest range of income, life expectancy at birth rose by 8.1 years from 1960 to 1975, the highest increment of any country group. Changes in rates of population growth and rates of natural increase in China approached the values found in country groups with *per capita* income of $750 or more. A more detailed analysis of changing demographic patterns, beyond the scope of the present report, would be required to substantiate or validate the tentative conclusions drawn from group averages.

An additional factor determining changes in demographic indicators in the 15-year period may have been the asymptotic nature of demographic behaviour. Generally speaking, high rates of population growth leave less potential for further increases; and to a lesser extent, with low population growth rates the possibilities of further declines are limited. This factor may have been significant for the groups of developing countries with *per capita* incomes between $175 and $349 and between $350 and $749, in which the average rates of natural increase in 1960 (28.5 and 28.4 per 1,000, respectively) were the highest and in which the increases in growth rates between 1960 and 1975 were also the smallest among the country groups (increments of 0.8 and 0.3 per 1,000, respectively). The situation at the opposite side of the spectrum may have existed for countries with *per capita* income of $2,000 or over, whose average natural increase was the lowest among all groups in 1960 (8.7 per 1,000) and whose negative change natural growth rates was, excluding the United States, the lowest of all groups (−1.8 per 1,000). Similar asymptotic behaviour may exist with respect to life expectancy, for instance, the weighted average of the gain in life expectancy of 2.7 years for the country group with *per capita* income of $2,000 and over (excluding the United States) compared with a gain of 6.9 years for the lowest income group.

Interperiod changes within the developing countries

In order to further explore the interperiod changes of demographic trends between 1960 and 1975 with special reference to developing economies, the countries were classified into five groups according to levels of *per capita* income achieved in 1975, with a further distinction within each group of petroleum-exporting countries *versus* non-petroleum-exporting countries. The changing pattern of demographic indicators within the developing countries is quite similar to the preceding case when all 116 countries are considered together. Changes in demographic indicators also exhibit asymptotic behaviour.

The changes in rates of natural increase are largely dominated by crude death rates. All the country groups experienced decreases both in crude birth rates and in crude death rates during the period 1960-1975. The declines of the former rates were quite similar for all income groups, in the range of 3.8 and 4.4 per 1,000. Crude death rates also declined consistently, but at a decreasing rate with each successive income group (excluding China): beginning from a fall of 5.7 per 1,000 for the country group with *per capita* incomes under $175 to 0.8 per 1,000 for the country group with *per capita* incomes of $750-1,999. As a result, rates of natural increase change consistently with each successive income group (again excluding China). Beginning with an increment of 1.8 per 1,000 for the country group with *per capita* incomes under $175, changes in rate decline to 0.1 per 1,000 for the country group with *per capita* incomes of $350-749, and then drop further to −3.4 per 1,000 for the highest *per capita* income group of $750-1,999 in the developing countries.

Concerning the contrast of population growth between petroleum-exporting countries and others, on average, the increment of rates of natural increase of 2.0 for the former is higher than that of 0.8 per 1,000 for the latter. This higher rate of population growth in petroleum-exporting countries is, on average, largely due to their more rapid reduction of crude death rates (a decline of 6.0 per 1,000 compared with 4.4 per 1,000 for others), while the corresponding reduction of birth rates was similar in both groups (4.0 and 3.6 per 1,000, correspondingly). This contrast of demographic changes between the two groups of countries also exists when examining increments in life expectancy and proportion of urban population. On average, the gains of life expectancy at birth and urban population proportion are 7.6 years and 7.8 percentage points, respectively, for the petroleum-exporting countries, compared with 7.0 years and 5.7 percentage points for the others. This contrast is particularly significant for the higher income countries with *per capita* incomes of $750-1,999, as the gains of life expectancy at birth and urban population proportion for the petroleum-exporting countries are 6.6 years and 12.7 percentage points, compared with 3.5 years and 8.1 percentage points for the others.

SUMMARY AND CONCLUSIONS

The cross-country analysis based on 1975 data and the interperiod comparisons on the basis of data for 1960 and 1975 generally confirm the findings of earlier studies. The major conclusions are given below.

Wide disparities in the international income distribution continued to exist in 1975 and comparisons between that year and 1960 indicate that over time those disparities, instead of being reduced, have even slightly increased, implying a deterioration in relative terms and a widening absolute gap in income against the developing countries. The disparities are particularly skewed within the developing countries, and among them the poorer countries had also a somewhat rapid growth of population. From the demographic point of view, this finding implies that if population in these countries had grown at a lower rate, given the growth of production, their *per capita* income would have increased more rapidly and income disparities in relation to the economically more advanced countries would be narrower than those currently existing.

The results also indicate that within the group of developing countries income disparities are wide and have tended to increase in both absolute and relative terms. Gini coefficients calculated for the three types of economies (developed market economies, centrally planned economies of Eastern Europe and the USSR, and developing countries) show that *per capita* income differences within the last group of countries are far greater than those of the other two. Furthermore, high rates of population growth may especially hamper the reduction of the income gap between richer and poorer developing countries, in part because the rapid growth of population for the latter group is higher than for those developing countries with higher *per capita* incomes.

The findings support earlier conclusions that whereas on a world-wide basis a fairly close association exists between levels of *per capita* income and levels, and, to a lesser extent, of demographic variables, no relationship appears to exist between changes in income, either total or *per capita*, and changes in demographic factors. The association between levels of income and demographic indicators, however, is not as strong when correlation coefficients are calculated separately for developed market economies, centrally planned economies and developing economies, which may be mainly owing to the continued importance, despite a growing number of developing countries that have entered the stage of rapid fertility transition, of the distribution of the world population into demographically developing and developed countries. Based on cross-country data in 1975, and to a lesser degree on interperiod changes between 1960 and 1975, a *per capita* income level at $750 (at 1970 prices) in 1975 appears to be the dividing line between countries with high and low growth fertility and, to a somewhat lesser extent, in the case of mortality.

Whereas interperiod changes were not fully analysed, one finding was that apparently a lower level of fertility and mortality rates could be achieved in 1975 by a given lower *per capita* income than in 1960. This finding does not necessarily mean that the impact of income on demographic behavior was stronger in 1975 than in 1960. Rather, it suggests possible shifts in the relationship between income and demographic factors due to changes in underlying variables other than income. Although the results, on the whole, suggest that the role of income and economic growth in demographic change cannot be ignored, this finding and others lend support to the view that income levels and

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changes cannot explain sufficiently by themselves differences in demographic behaviour and development among countries. Income possibly can be seen as an intermediate variable reflecting changes in average levels of living, thus exerting an influence on demographic changes, but not as being adequate enough to depict the demographic transition in depth.

This conclusion would appear to be even more warranted in light of the substantial number of countries that, despite the over-all conformity to the patterns described above, deviate from these patterns, revealing levels of demographic variables different from the typical levels observed in their respective country or income groups. Institutional, cultural and socio-economic settings and changes, and public programmes, policies and measures in such fields as health, disease control, public sanitation and family planning, obviously have exerted an impact on demographic behaviour, levels and changes in mortality and fertility.

From a broad policy point of view, the finding that a *per capita* income level of $750 in 1975 constitutes an apparent clear dividing line between countries at quite different stages of demographic transition appears to be especially relevant. Basically, it raises the issue of the relationship between the "threshold" theory and demographic transition.

The "threshold" hypothesis may be seen as linked with the demographic transition theory in that declines in mortality precede declines in fertility and that both are related to changes in social values and norms and socio-economic institutions. But they differ from each other in several aspects such that the former theory does not formulate a rigid causal chain in a continuous form between fertility and concomitant variables as is assumed in the latter. The threshold hypothesis also emphasizes the possible variation of patterns from region to region, depending upon cultural and social institutions.

On the basis of this hypothesis, data for 1975 suggest that an income level *per capita* of $750, at 1970 constant prices, emerges as a dividing line as far as most demographic indicators, excluding the proportion of urban population, are concerned.[15] Average values of these demographic variables for countries in the income groups immediately under and over $750 are illustrative in this respect:

	Weighted average of indicators for groups with per capita income level of:	
	$350-749	$750-1,999
Rate of population growth (percentage)	2.8	0.9
Rate of natural increase (per 1,000) ...	27.7	9.2
Total fertility rate (number of children per 1,000 women of childbearing age)	5 426	2 476
Life expectancy at birth (years)	60.4	70.8
Adult population ratio (percentage)	53.6	64.3

Furthermore, the weighted average values of these variables for groups under or over this income level vary comparatively little, the exception being the group constituted by China. Excluding China, the range of variations of the indicators is:

	Range of weighted average values of indicators for all groups with per capita income levels of:	
	Under $750	$750 or more
Rate of population growth (percentage)	2.5-2.9	0.9
Rate of natural increase (per 1,000) ...	25.1-29.3	6.8-9.2
Total fertility rate (number of children per 1,000 women of childbearing age)	5 426-5 919	2 186-2 476
Life expectancy at birth (years)	49.9-60.4	70.8-73.1
Adult population ratio (percentage)	52.2-53.9	64.3-64.5

The tentative nature of this conclusion should be stressed and it should not be interpreted for predictive purposes. As Kirk has pointed out "Efforts to identify "thresholds" for the initiation of fertility reduction are at a preliminary stage and their predictive capacity . . . remains to be tested."[16] Furthermore, in the attempt at deriving comprehensive interpretation, it must be recognized that the transition to low fertility and mortality, as part of the process of demographic development, interacts with economic, social and cultural conditions, and that, therefore, the threshold and demographic transitions hypotheses should be treated within the framework of interdependence, where socio-economic and cultural factors affect and are affected by demographic ones. Such feedbacks as exist between demographic change in either demographic transition or threshold hypothesis and cultural and socio-economic development should be considered further within the context of the broad framework suggested.

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[15] Other studies venture to suggest quantitative "threshold" values that trigger fertility declines; these values are summarized by Mauldin and Berelson, based on the findings by the United Nations, Kirk and Srikantan. See W. Parker Mauldin and Bernard Berelson, "Conditions of fertility decline in developing countries, 1965-75", *Studies in Family Planning*, vol. 9, No. 5 (May 1978), p. 92; *Population Bulletin of the United Nations, No. 7—1963;* Dudley Kirk, "A new demographic transition?", in National Academy of Sciences, *Rapid Population Growth: Consequences and Policy Implications* (Baltimore and London, Johns Hopkins Press, 1971); pp. 138-145; K. S. Srikantan, *The Family Planning Program in the Socioeconomic Context* (New York, The Population Council, 1977).

The thresholds in these studies are not defined identically and the sample periods and countries covered are not the same. Still, there are some similarities on these threshold values. Of the 10 factors selected for study, there is reasonable agreement on all but three (income *per capita*, energy consumption *per capita* and radio distribution). Income *per capita* related to threshold values for fertility decline, for instance, was $230-339 for the

period 1957-1959 according to the previous United Nations study; gross domestic product *per capita* was $704-1,056 in 1970 according to Srikantan, both expressed in current prices. These values are different from that in the present study, $750 in 1975 at 1970 prices, which can be attributed to differences in sample countries and periods covered, and differences of measurement in current or constant prices. For the other seven socio-economic factors, based on those studies, the approximate range of thresholds for fertility declines, on average, appear to be as follows:

Variables	Threshold range
Population in cities of 20,000 or more (percentage)	16-50
Non-agricultural labour force (percentage)	50-65
Life expectancy (years)	60-70
Female marriage before age 20 (percentage)	10-20
Female literacy (percentage)	60-75
Hospital beds per 1,000 population	5
Newspaper circulation per 1,000 population	70-100

[16] D. Kirk, *loc. cit.*, pp. 145-146.

Chapter VIII

ASSOCIATIONS BETWEEN LEVELS AND TRENDS IN FERTILITY AND SOCIO-ECONOMIC VARIABLES*

In the *1977 Monitoring Report,* fertility differentials were analysed for a number of countries. These differentials indicated how, in each country, fertility varied according to educational levels and to urban-rural residence.[1] The aim of this chapter is to review for developing countries the association between the levels and trends in fertility from 1960 to 1975 and the level and trends during the same period of 12 social and economic variables grouped into five broad categories:

(1) *Mortality indicators:* life expectancy at birth; infant mortality rates;

(2) *Education indicators:* proportion literate among the population aged 15 and over; school enrolment ratio, first plus second levels, both sexes;

(3) *Status of women indicators:* ratio of the proportion of females literate to the proportion of males literate aged 15 years and over; ratio of the female school enrolment ratio to the male school enrolment ratio; proportion of women aged 15-19 ever married; proportion of women in the non-agricultural active population;

(4) *Income indicators:* gross domestic product *per capita;* share of the poorer 40 per cent;

(5) *Structure indicators:* proportion of the total population urban; proportion of economically active males in non-agricultural activities.

These variables have been selected on the basis of the fertility study in *Population Bulletin, No. 7*[2] and the recommendations of the World Population Plan of Action.

Information on fertility for the period 1960-1975 was available for 87 less developed countries, but 38 among these countries had only one observation, which did not allow the computation of a fertility trend; therefore, they were not retained. The analysis thus includes the 49 remaining countries, with the gross reproduction rate being the fertility variable. For all countries and all variables, when only one observation is available, information may relate to any date between 1960 and 1975, and in a few cases as far back as 1957. When two or more observations are available, the two that are closest to 1960 and 1975 are used to

compute the average annual change, and the second is used for the analysis of levels.

Before proceeding to the analysis it is useful to consider, in order to ascertain the representativeness of the countries studied, the characteristics of those 38 countries which had only one fertility observation and how they compare with the 49 included in the analysis. Of the 38 countries, 34 had a crude birth rate equal to or higher than 40 per 1,000, and among these countries, 27 had birth rates equal to or higher than 45, the average being 46.1. The gross reproduction rate was known for 34 of these countries and its average was 3.06. This compares with average gross reproduction and crude birth rates of 2.69 and 38.2 per 1,000, respectively, for the 49 countries at the most recent date when such data were available. Similar comparisons can be made for all the other variables on the basis of table 76.

It is clear from this table that the existence of data (having had two or more fertility observations during the period instead of only one) is a significant indicator of development. With one exception, all variables show values associated with a higher level of development in the group of 49 countries. The only exception is the proportion of economically active males in non-agricultural activities, and even this may be due to the fact that there were data for only seven countries in the group of 38 countries. Moreover, the differences are, for most variables, substantial. Inferences based on the analysis of the 49 countries, therefore, cannot be generalized without qualifications to all 87 countries or to the developing countries as a whole.[3]

Because this chapter places special emphasis on the analysis of changes in variables, an effort was made to use only data based on actual observations, excluding data that are the output of projections or models. This explains why the number of countries varied for each variable and why the

[3] Although it appears evident that the values of the indicators reflect a higher level of development in the group of 49 countries than in the group of 38 countries, it is possible that this finding might be the result of different dates of observations. In fact, on average, the latest observations for the group of 49 countries are more recent than those for the group with only one observation. For the former group, it is possible to compute the average date for the observations and, by interpolation, the estimated value of the variable at that point of time. The results show that although part of the observed differences in levels of development is attributable to differences in dates, in most cases the largest part reflects a genuine difference in the level of development. The only notable exception is the gross reproduction rate, in which an average difference in dates of 8.6 years accounts, according to this estimation procedure, for 70 per cent of the differences in that rate. On the other hand, with respect to infant mortality, for example, an average difference in dates of 7.1 years accounts for only 18 per cent of the difference in infant mortality rates.

	Countries with one fertility observation[a]		Countries with two fertility observations[b]		
	Number of countries	Average	Number of countries	Average	Difference (percentage)
0. Crude birth rate (per 1,000)	38	46.1	49	38.2	−17
1. Gross reproduction rate	34	3.06	49	2.69	−12
2. Life expectancy (years)	24	42.0	34	58.4	+39
3. Infant mortality rate (per 1,000)	19	146.0	24	83.4	−43
4. Proportion literate (percentage)	10	35.9	37	56.0	+56
5. School enrolment ratio (percentage)	33	46.8	49	61.6	+32
6. Female/male literate ratio (percentage)	10	52.7	37	68.0	+29
7. Female/male school enrolment ratio (percentage)	31	65.5	46	80.8	+23
8. Females aged 15-19 ever married (percentage)	22	43.6	42	23.8	−45
9. Females in non-agricultural labour (percentage)	7	21.3	38	25.6	+20
10. Gross domestic product per capita (dollars)	28(27)[c]	219.0(174)[c]	42	431.9	+97(+148)[c]
11. Share of the poorer 40 per cent (per 1,000)	10	120.0	30	122.6	+2
12. Proportion urban (percentage)	23	23.5	49	39.0	+66
13. Males in non-agricultural activities (percentage)	7	51.5	38	47.4	−8

[a] Thirty-eight countries.
[b] Forty-nine countries.
[c] If Gabon is not included, the average is only $174 for the 27 remaining countries.

analysis could only be done for 49 countries, while there exist published data for more countries for most variables.[4] The number of countries was further reduced by the restriction of the use of data mainly to those appearing in United Nations publications. Even so, the quality and reliability of the data are still very uneven and this uncertainty must be taken into consideration in the present analysis. One other consequence of the fact that the number of countries for which data exist is not the same for each variable is that it precludes the normal use of multiple regression analysis and also requires more circumspection in the analysis of the relations between the variables. Given this situation, the analysis uses only the techniques of cross-tabulations and simple correlations.

A. DESCRIPTIVE ANALYSIS OF LEVELS AND CHANGES

Gross reproduction rates: levels and changes

Levels of the gross reproduction rate for the most recent date range from 1.03 through 3.82. The countries are classified in three classes of levels: low is 2.0 and less; medium is from 2.0 to 3.0; high is higher than 3.0. The results are shown in table 77. Although countries of Latin America and Asia are evenly divided between the three classes, and the averages are 2.52 and 2.51, two thirds of the countries of

Africa are in the high class, only one country is in the low and the average gross reproduction rate is 3.14.

TABLE 77. LEVEL OF GROSS REPRODUCTION RATE, NUMBER OF COUNTRIES CLASSIFIED BY REGION

Gross reproduction rate	Africa	Latin America	Asia	Total
Total	14	20	15	49
High	9	7	5	21
Medium	4	7	6	17
Low	1	6	4	11

Average annual changes in the gross reproduction rate range from +0.094 down to −0.133 with an average of −.026. They also are divided into three classes. The first class corresponds to countries that show very little decrease or even apparent increase in total of 16 countries—seven in Africa, five in Latin America and four in Asia—had an apparent increase in gross reproduction rate; and this class of "low" decrease was defined as countries with changes of −0.01 or above (which includes positive changes). Changes between −0.01 and −0.065 were defined as medium and changes below −0.065 as high. The results given in table 78 show patterns very similar to the distribution of levels. The countries of Latin America and Asia are evenly distributed with averages of −0.035 and −0.042, while two thirds of the countries of Africa are in low level and only one country is in the high class. The average percentage change in gross reproduction rate for the 14 countries is negligible; +0.005.

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[4] See, for example, World Development Report, 1978 (Washington, D.C., World Bank, 1978).

TABLE 78. CHANGE IN GROSS REPRODUCTION RATE, NUMBER OF COUNTRIES CLASSIFIED BY REGION

Change in gross reproduction rate	Africa	Latin America	Asia	Total
Total	14	20	15	49
Low	10	8	5	23
Medium	3	6	6	15
High	1	6	4	11

This consistency in the distribution of countries according to levels and changes was to be expected since in 1960 there were very few developing countries where fertility had already declined; and, consequently, countries that have a low recent level must have had a high decrease in the intervening years.

Selectivity effect within the 49 countries

Although data are available for all 49 countries with respect to changes in gross reproduction rates, not all countries have data for levels and changes for the social and economic variables. Table 79 lists for each variable the number of countries that have information on levels and changes of the variable. In addition, it provides for the countries concerned information on the average level of the variable, average level of gross reproduction rate, average annual change in gross reproduction rate; and, in addition, for countries with data on changes, the average annual change in the variable concerned. In the case of information on levels the number of countries with data on a given variable range from 24 to 49, while for changes the numbers of countries vary from 10 to 48. Table 79 also shows that there is only a limited selectivity effect with regard to socio-

economic variables in the case of levels. The average levels of and changes in the gross reproduction rate of countries that had data on a given socio-economic variable were between 2.52 and 2.72, and the corresponding averages of annual gross reproduction rate changes ranged from −0.025 to −0.035. The selectivity effect is, however, much larger in the case of countries with data on changes in socio-economic variables. Average gross reproduction rate values varied from a low of 1.85 to a high of 2.72, and average annual gross reproduction rate changes from −0.023 to −0.066. Furthermore, large differentials in average gross reproduction rate levels and changes are also associated with large differentials in the average value of the socio-economic variables themselves.

It is therefore evident that whatever conclusions can be drawn from the analysis of comparative changes of gross reproduction rates and socio-economic variables, these conclusions cannot be generalized for all developing countries because they are for subgroups of countries selected on the basis of existence of information, which implies a considerable selectivity effect.

It can be seen from table 80, as already stated, that the average gross reproduction rate is much higher for Africa (3.14) than for either Asia or Latin America (2.51 and 2.52). Furthermore, Africa has average values that correspond to the lowest development level for all variables, often by large margins. Only in the case of two variables has Africa values similar to one other continent: Asia for the ratio of female to male literacy; and Latin America for income distribution. Asia and Latin America, on the other hand, have the same average fertility, and are also at the same level of life expectancy and proportion of active males in non-agricultural activities. Latin America is, however, ahead of Asia for all other variables, except income distri-

TABLE 79. DIFFERENTIALS IN VALUES OF GROSS REPRODUCTION RATE AND OTHER VARIABLES ACCORDING TO NUMBER OF COUNTRIES HAVING INFORMATION ON CHANGES

	All countries				Countries with data on changes				
	Number of countries	Average level of variable	Average level of gross reproduction rate	Average annual change of gross reproduction rate	Number of countries	Average level of variable	Average annual change of variable	Average change of gross reproduction rate	Average level of gross reproduction rate
1. Gross reproduction rate	49	2.69	2.69	−0.026	49	2.69	−2.69	−0.026	2.69
2. Life expectancy (years)	34	58.4	2.52	−0.033	13	62.2	0.58	−0.057	2.12
3. Infant mortality rate (per 1,000)	24	83.4	2.54	−0.032	11	40.0	−1.61	−0.066	1.85
4. Proportion literate (percentage)	37	56.0	2.60	−0.035	16	59.4	0.95	−0.037	2.51
5. School enrolment ratio (percentage)	49	61.6	2.69	−0.026	48	61.8	1.21	−0.027	2.69
6. Female/male literate ratio (percentage)	37	68.0	2.60	−0.035	15	66.3	0.90	−0.037	2.48
7. Female/male school enrolment ratio (percentage)	46	80.8	2.72	−0.026	45	82.2	0.73	−0.023	2.72
8. Females aged 15-19 ever married (percentage)	42	23.8	2.63	−0.031	29	23.2	−0.72	−0.042	2.58
9. Females in non-agricultural labour (percentage)	38	25.6	2.57	−0.034	11	26.9	0.18	−0.043	2.23
10. Gross domestic product per capita (dollars)	42	431.9	2.69	−0.025	42	431.9	10.8	−0.025	2.69
11. Share of the poorer 40 per cent (per 1,000)	30	122.6	2.62	−0.026	15	134.9	0.81	−0.041	2.55
12. Proportion urban (percentage)	49	39.0	2.69	−0.026	41	40.7	0.63	−0.025	2.69
13. Males in non-agricultural activities (percentage)	38	47.4	2.57	−0.034	10	59.6	0.58	−0.048	2.12