ECONOMIC GROWTH CENTER

YALE UNIVERSITY

Box 1987, Yale Station
New Haven, Connecticut

CENTER DISCUSSION PAPER NO. 217

FERTILITY DIFFERENTIALS BETWEEN LESS DEVELOPED AND DEVELOPED REGIONS: COMPONENTS AND IMPLICATIONS

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November 1974

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1. Introduction

The crude birth rates in the economically less developed countries have been over twice those in the developed countries in the recent decades. Such differentials imply differences in age patterns of birth rates through the life cycles of mothers and fathers; differences in age at time of marriage, and between husbands and wives in later life; differences in birth parities; and differences in the size of households, in so far as they reflect the number of children in them. In turn, all these demographic differences have economic and social connotations, and these provide an indispensable framework for interpreting the persistence of the high birth rates in the less developed regions.

The paper presents a brief summary of the easily available recent cross-section data on the demographic components in the international fertility differentials, with emphasis on the comparison of less developed (LDCs) and more developed (DCs) regions among the market economies. This summary, and the accompanying analytical comments, may be familiar to specialists in demography. But the interrelations of these demographic aspects, and their possible connotations, are less familiar to economists; and the recent additions of data on less developed regions, sparsely covered, if at all, in earlier years (most of Africa and much of Asia) make it worthwhile to assemble the summary measures. No effort was made to go back to the original censuses or monographic

studies; and I have relied primarily on the international compilations and special papers of the United Nations. The aim was a broad survey, on the assumption that guidance for a more intensive exploration would be provided by such an approach.

The discussion begins with a review of the age-specific birth rates for women in the successive age classes within the childbearing span; these, together with number of women in these age classes, absolute and in relation to total population, are used to derive the crude birth rates. We can then establish the contribution of each age class of women to the total crude birth rate of a region. The next section reviews marriage proportions among women, derives age-specific marital fertility ratios, and measures the contribution to fertility differences between the LDCs and DCs of the differences in marriage proportions and in intra-marital fertility. The third section compares the distributions of births by age of mother, and an approximation to the distribution of births by age of father, for the LDCs and the DCs. The fourth section summarizes births by birth order or parity, indicating the greater weight of high parity births in the total fertility of the LDCs and establishes the association between the incidence of births to parents at more advanced ages and the contribution of high parity births to higher fertility. The fifth, and last, section devoted to statistical evidence deals with the distribution of population among households of different size, stressing the association between higher fertility and the larger average size of household, or higher proportions of larger households, in the LDCs than in the DCs.

In the concluding section an attempt is made to indicate what the findings contribute to the explanation of persisting high birth rates in the LDCs.

2. Age Specific Birth Rates, Women

We begin with a summary of the birth rates of women in the five-year age classes in the childbearing span from 15 through 49 years of age (Table 1). Since these are annual rates, an entry of 124 in line 1, column 2 means that there were 124 births per year for every 1,000 women 15-49 years old, or 620 births per 1,000 women over the five years covered by that age class.

The regions distinguished are those of most interest in the study of economic growth and levels of living. A more detailed breakdown would, of course, be desirable, but the data and resources are not available. In general, the regional rates are unweighted averages of those for individual countries, the presumption being that each country, large or small, represents an item of significant evidence. But we omitted countries with a population of less than a million, because of the possibility of erratic results. Moreover, when large countries showed distinctive patterns (as was the case with India and Pakistan, compared to other countries in East and Southeast Asia) we took weighted averages for them separately. Finally, we weighted regional rates by population in combining them into aggregates for all LDCs and DCs.

Total fertility is the total of births over the childbearing span to 1,000 women, representative of the population covered in a specific area. Thus, the entry in line 1, column 9, indicates that

Table 1

Annual Births per 1,000 Women, by Age of Women, Less Developed And Developed Regions, Early or Middle 1960s

	Number of Countries (1)	Age of Women 15-19 (2)	20-24 (3)	25-29 (4)	30-34 (5)	35-39 (6)	40-44 (7)	45-49 (8)	Total Fertility (9)
A. Market Economies									
I. Less Developed Regions									
1. East & Southeast Asia	9	124	275	280	223	154	64	22	5,710
1a. India-Pakistan	2	158	277	266	209	140	56	24	5,650
1b. Other countries	7	62	268	305	248	179	78	19	5,795
1c. Hong Kong & Singapore	2	48	247	315	237	148	58	8	5,305
2. Middle East	9	113	305	352	290	199	82	17	6,280
3. Sub-Saharan Africa	16	183	295	268	219	153	77	32	6,135
4. Latin America	16	121	296	308	243	181	74	22	6,225
5. Total, LDCs (lines 1-4, weighted)		131	283	289	231	161	69	23	5,935
II. Developed Regions									
6. Europe	13	32	152	168	106	54	17	1	2,650
7. Overseas Offshoots	4	59	221	208	125	64	19	2	3,490
8. Japan	1	4	109	192	83	22	4	0	2,070
9. Total, DCs (lines 6-8 weighted)		38	171	187	110	53	16	1	2,880
III. Other Market Economies									
10. Europe	4	18	121	186	147	93	36	4	3,025
11. Latin America	3	76	203	185	125	78	31	6	3,520
B. European Communist Economies									
12. Developed	3	49	177	135	78	38	12	2	2,455
13. Less developed	5	52	173	128	69	34	12	2	2,350
14. Albania	1	56	275	305	256	189	117	58	6,280

Table 1 (continued)

Notes:

Entries in columns 2-8 for all countries, except the four listed below, are from United Nations, Interim Report on Conditions and Trends of Fertility in the World, 1960-1965, Population Studies, no. 52 (New York, 1972), various Annex tables. We omitted countries with population below a million. In general, we took means of the values for 1960 and 1965; or the values for one of the two years, if its base was more reliable or its coverage more comprehensive. For the Congo (Leopoldville), 1955-57; Guinea, 1955 India, 1958-59; and the Philippines, 1950-55, data are from United Nations, Population Bulletin no. 7, 1963 (New York, 1965), Table 7.1, pp. 102-103.

Unless otherwise indicated, entries for regions that include more than one country, are unweighted arithmetic means of the values for the several countries. The weights, when used, are population numbers for 1960 given in United Nations, Population Estimates by Regions and Countries, 1950-1960, Working paper ESA/P/WP31, May 1970.

Line 1: Weighted mean of lines 1a and 1b, the relative population weights (in the total comprising other East Asia, excluding North Korea; Middle South Asia, and South-East Asia excluding North Vietnam) being 0.645 for line 1a and 0.355 for line 1b. Line 1c is excluded.

Line 1a: Weighted mean with weights of 0.81 for India and 0.19 for Pakistan.

Line 1b: Includes South Korea, Taiwan, West Malaysia, Thailand, Cambodia, Ceylon, and the Philippines.

Line 2: Represents South West Asia and North Africa, and includes Turkey, Iraq, Jordan, Syria, United Arab Republic, Sudan, Libya, Tunisia and Algeria.

Line 3: Includes Cameroon, Central African Republic, Chad, Congo, Dahomey, Ghana, Guinea, Ivory Coast, Madagascar, Kenya, Mali, Niger, Senegal, Togo, Uganda, and Upper Vol

Line 4: Includes Mexico, Brazil, Colombia, Peru, Venezuela, Ecuador, Guatemala, Honduras, Nicaragua, Dominican Republic, Chile, Paraguay, El Salvador, Costa Rica, Jamaica, and Panama.

Line 5: Weighted averages of lines 1-4. The weights for line 1 as indicated; for line 2--populations of South West Asia and North Africa; for line 3--the sum of

Table 1 (continued)

populations of West, East, and Central Africa; for line 4--population of Latin America, omitting the Temperate Zone--work out to 63 for line 1, 9 for line 2, and 14 each for lines 3 and 4.

Line 6: Includes Belgium, Denmark, Norway, Sweden, Finland, Netherlands, France, Germany FR, Switzerland, Austria, Italy, England and Wales, and Scotland.

Line 7: Includes Canada, United States, Australia, and New Zealand.

Line 9: Weighted averages of lines 6-8. The weights--the population totals for Northern and Western Europe, plus Italy (omitting the rest of Southern Europe); and for the other regions--work out to 46 for Europe, 38 for overseas offshoots, and 16 for Japan.

Line 10: Includes Ireland, Greece, Spain and Portugal.

Line 11: Includes Argentina, Uruguay, and Puerto Rico.

Line 12: Includes U. S. S. R. / Czechoslovakia, and East Germany.

Line 13: Includes Poland, Hungary, Romania, Yugoslavia and Bulgaria. Excludes Albania shown separately in Line 14.

Column 9: Sum of rates for seven age classes, multiplied by five (to allow for the number of years in each class interval). Each entry shows the total number of births over the childbearing span to 1,000 women, aged 15-49, representative of the population reflected in the cross-section.

1,000 women with the fertility patterns of women in ESE Asia in the early 1960s bore 5,710 children through their childbearing span, an average of 5.71 births per woman.

Several findings are suggested. To begin with total fertility, birth rates per 1,000 women of childbearing ages were, among the market economies, over twice as high in the LDCs as in the DCs. The few European and Latin American economies that did not clearly fit into either of these two large groups showed fairly low total fertility, closer to that for the DCs than to that for the LDCs. The distinctive, and less expected, finding was that among the European Communist economies, excluding Albania, fertility was low, even relative to the developed countries of Europe; and just as low, or slightly lower, among the less developed Communist economies than among the more developed. Obviously, some aspects of the social and economic structure of European Communist economies restrict fertility, sharply and effectively.

Second, and more relevant to our specific topic, is the difference between the LDCs and DCs in the pattern of their age specific birth rates over the childbearing span. For the LDCs the rates are fairly high not only during the prime ages, from 20 through 29, and the next higher class from 30 through 34, but also during the younger and older ages. Thus, if we take an age specific birth rate of 100 (500 births in a five-year interval) to be an index of substantial childbearing, we find that such engagement extends over five age classes, or 25 years, in the LDCs, and only over three age classes, or 15 years in the DCs (lines 5 and 9).

Indeed, one could argue that it would be difficult, if not impossible, to attain a total fertility as high as that found for the LDCs, i.e. between 5,700 and 6,800, if births were limited to women 20 through 34 years old. With fecundity proportions rising rapidly from about a third of all women aged 17 to a peak of 93 percent at age 22, and then declining slowly beginning at age 23 and through the early 30s, the average proportions of fecund women are 39 percent from age 15-19, 92 percent for age 20-24, 90 percent for age 25-29, and 85 percent for age 30-34.[1] Given these levels, and observing the record for individual countries, we find that a reasonably high age specific rate would average 350 for the two prime fecundity classes, i.e. 20-24 and 25-29, and about 300 for the 30-34 class--thus yielding total fertility of 5,000, without any births to younger and older women. But this would fall short of the total fertility shown in lines 1-5 by between 12 and 26 percent; yet the assumed total fertility, given an average married proportion below 90 percent (see below) would mean, for the three age classes, an average of almost six births per married woman over the 15 years. It is unrealistic to assume that an average of one birth every two and a half years, over a span of fifteen years, can be maintained for every married woman in the population. The cumulative total for the three age classes would fall short of the 5,000 total fertility level, and the difference, like that between 5,000 and 6,000 or more, would have to be made up by fairly high birth rates for younger and older women.

Third, if there is an element of necessity about the extended pattern of age specific birth rates in the LDCs compared with the more concentrated pattern in the DCs, there is still an element of variance or choice. In some countries the additional contribution to high total fertility occurs largely among women under 20; in others it occurs among those 35 or older. Thus in India and Pakistan (line 1a), and Sub-Saharan Africa (line 3), the rate in the 15-19 class is over 150 per thousand, whereas in the other countries in ESE Asia (line 1b), and to a lesser extent in the Middle East (line 2), the rate for the 15-19 class is relatively low, 62 or 113. And, as one would expect, when the time pattern is extended toward early ages, the specific rates at the later ages tend to be lower than when the time pattern is not extended back of age 20. Thus, for India and Pakistan, and Sub-Saharan Africa, the rates for age 30-34 are 209 and 219 respectively, compared with the much higher rates for other countries in ESE Asia and in the Middle East (248 and 290 respectively). Also, when the birth rates are fairly high in the 15-19 class, the rate tends to be at the peak in the 20-24 class, declining somewhat in the 25-29 class; where as in regions with relatively low rates at the early ages, the peak is reached in the 25-29 class. The differences indicated between the India-Pakistan and Sub-Saharan regions, on the one hand, and the Middle East and other ESE Asia, clearly reflect different institutional conditions governing age of marriage, particularly of women, and suggest the diversity of age patterns that can be associated with a high level of total fertility.[2]

Finally, it follows that the excess of fertility in the LDCs

over that in the DCs may be accounted for by higher birth rates of the former, partly in the young ages (below 20), partly in the prime ages (20-34), and partly in the older ages (35 and over). However, we are interested in a comparison not of total fertility, but of crude birth rates--for it is crude birth rates, in combination with crude death rates, that yield the rate of natural increase, or natural growth of population--with its effects on economic growth and structure. We must, therefore, shift now to the links between total fertility and crude birth rates: the relative size of each age class of women of childbearing ages; and the proportion of all women of childbearing ages to total population. Table 2 summarizes the data on both links, shows the resultant aggregate crude birth rates, and measures the contribution to the differences in the crude birth rates made by women in each age class within the childbearing span.

Panel A reveals that the relative magnitude of the age classes among women in the less developed areas declines significantly as we move from the youngest group, 15-19 years of age, to the oldest 45-49. A simple geometric mean of the relatives of the two youngest and the two oldest classes, for the LDCs as a whole (line 5) yields a rate of rise from the older to the younger groups of 3.3 percent per year (we prefer to think of it as a rise toward the younger, rather than a decline toward the older, age groups). This result is not surprising: the younger groups are larger than the older because they are members of a larger population, i.e. are survivors of a birth cohort that, with population growth, was larger than the one born earlier and now

Table 2

Age Distribution of Women Within the Childbearing Span, and Contribution to Crude Birth Rates, Less Developed and Developed Market Economies, Early or Middle 1960s

A. Number in Successive Age Classes as Relatives of Average Number per Class Within Childbearing Span

		Age Class of Women							Women 15-49 as % of Total Population
		15-19 (1)	20-24 (2)	25-29 (3)	30-34 (4)	35-39 (5)	40-44 (6)	45-49 (7)	(8)
1.	ESE Asia	1.45	1.31	1.19	0.98	0.82	0.68	0.57	23.1
2.	Middle East	1.47	1.32	1.17	0.99	0.80	0.67	0.57	22.5
3.	Sub-Saharan Africa	1.53	1.32	1.13	0.96	0.81	0.68	0.56	23.4
4.	Latin America	1.53	1.30	1.11	0.97	0.82	0.69	0.57	22.8
5.	LDCs	1.48	1.31	1.17	0.98	0.82	0.68	0.57	23.0
6.	Europe	1.02	1.04	0.98	1.02	1.09	0.82	1.02	23.9
7.	Overseas offshoots	1.12	0.94	0.93	1.02	1.07	0.99	0.92	23.1
8.	Japan	1.28	1.16	1.14	1.04	0.91	0.76	0.71	27.0
9.	DCs	1.10	1.03	0.99	1.02	1.05-	0.87	0.93	24.1

B. Age Specific Birth Rates, Weighted by Size Relatives of Age Classes

		Age Class of Women							Total Fer-tility	Implici Crude Birth Rate
		15-19 (1)	20-24 (2)	25-29 (3)	30-34 (4)	35-39 (5)	40-44 (6)	45-49 (7)	(8)	(9)
10.	ESE Asia	180	360	333	219	126	44	13	6,375	42.1
11.	Middle East	166	403	412	287	159	55	10	7,460	47.9
12.	Sub-Saharan Africa	280	389	303	210	124	52	18	6,880	46.0
13.	Latin America	185	385	339	236	150	51	13	6,795	44.3
14.	LDCs	194	371	338	226	132	47	13	6,605	43.4
15.	Europe	33	158	165	108	59	14	1	2,690	18.4

Table 2 (continued)

Panel B (continued)

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
16.	Overseas offshoots	66	208	193	128	68	19	2	3,420	22.6
17.	Japan	5	126	219	86	20	3	0	2,295	17.7
18.	DCs	42	176	185	112	56	14	1	2,930	20.2

C. Contributions to Crude Birth Rate, by Age of Women

		Age Class of Women							
		15-19	20-24	25-29	30-34	35-39	40-44	45-49	Total
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
19.	ESE Asia	5.9	11.9	11.0	7.2	4.2	1.5	0.4	42.1
20.	Middle East	5.3	12.9	13.2	9.2	5.1	1.8	0.4	47.9
21.	Sub-Saharan Africa	9.5	13.0	10.1	7.0	4.1	1.7	0.6	46.0
22.	Latin America	6.0	12.5	11.1	7.7	4.9	1.7	0.4	44.3
23.	LDCs	6.4	12.2	11.1	7.4	4.4	1.5	0.4	43.4
24.	Europe	1.1	5.4	5.7	3.7	2.0	0.5-	0	18.4
25.	Overseas offshoots	2.2	6.9	6.3	4.2	2.3	0.6	0.1	22.6
26.	Japan	0.1	4.8	8.6	3.3	0.8	0.1	0	17.7
27.	DCs	1.4	6.1	6.4	3.8	1.9	0.5	0.1	20.2
	Contribution to Differences in CBR								
28.	Line 23 minus line 27	5.0	6.1	4.7	3.6	2.5	1.0	0.3	23.2
29.	Line 28 as % of Total	22	26	20	16	11	4	1	100

Table 2 (continued)

Notes:

Panel A: Calculated from the 1960 population data by age and sex given in the United Nations working paper cited in the notes to Table 1. For line 1 we used the sum of Other East Asia, Middle South Asia, and South East Asia: for line 2--the sum of South West Asia and North Africa; for line 3--the sum of Western Eastern, and Middle Africa; for line 4--the total for Latin America, minus the subtotal for the Temperate Zone. Line 5 was derived from summation of the four regions as defined above. For line 6 we used the sum for Northern, Western Europe, and Italy; for line 7--the sum for North America and Australia-New Zealand. Line 9 was derived from summation of the three regions as defined.

Panel B: Columns 1-7 were calculated by applying to the age-specific rates for the regions, the LDCs, and the DCs (in table 1) the relatives shown in the corresponding columns and lines of this table (in Panel A). Column 8 is the sum of rates in columns 1-7, multiplied by five (see notes to column 9 of Table 1). Column 9 is obtained by dividing the entries in column 8 by 35 (the number of years within the 15-49 span), and multiplying the result by the proper fraction that all women aged 15-49 form in total population (see column 8 of Panel A).

Panel C: The shares of the rates of each age class to the total for women 15-49, in columns 1-7 of lines 10-18 were applied to the total crude birth rate shown for each region, for the LDCs, and for the DCs,in column 9 of Panel B.

represented by the older classes. Furthermore, the older groups would have been smaller, even with the same initial birth cohort, because of the longer cumulation of attrition by death. And it is not difficult to derive the 3.3 percent rate as a combination of a past population growth rate of about 2.5 percent (within some range) and age specific death rates over the span from 15-19 to 45-49 of say 5 per 1,000 per year.

Since both past population growth rates, and the death rates within the relevant span, were much lower for the DCs than for the LDCs, one would expect a correspondingly lower rate of rise for the former in the numbers moving from the older to the younger classes among women. And indeed the rate derived from the geometric means of the two classes at each end is 0.7 (see line 9). The rate is clearly too low, for the usual growth rates for population of the developed regions has been well over 1 percent per year, and to this must be added the allowance for the survival rates from ages 15 through 49. Apparently, World War II and the marked fluctuations of birth rates in many developed regions over the last four to five decades have distorted the age pattern, and, in particular, made for somewhat larger relative numbers among the older age groups within the childbearing span. In the sense that the factors involved were transitory, the contrast between the low implicit growth rates within the female population of the DCs and LDCs is exaggerated, although it is in the expected direction.

Obviously, the much greater numbers in the younger groups, with their markedly higher age specific birth rates, yield a weighted total fertility measure appreciably higher than the unweighted. When we apply, in Panel B, the weights derived in Panel A, the weighted total fertility measure for the LDCs is 6,606 (line 14, col. 8), compared with the unweighted 5,935 (in line 5, col. 9 of Table 1)--a rise of eleven percent. The shift for the DCs is from 2,880 in Table 1 to 2,930 in Table 2, a rise of only two percent.

The other link in shifting from the properly weighted total fertility to the crude birth rate is the proportion of all women of childbearing ages to total population (Panel A, col. 8). With higher birth rates and rates of natural increase, and, as before, disregarding the possible effects of international migration, the shares of women aged 15-49 in total population might be somewhat lower for the LDCs than for the DCs. And, indeed, the shares are 23 and 24 percent respectively--but the difference is too slight to offset the differential raising effects on total fertility of the adjustment for the size of the successive age classes within the childbearing span.

With adjusted total fertility, and the share of all women aged 15-49 in total population, we can infer the crude birth rate (Panel B, col. 9). For the LDCs, the crude birth rate works out to 43.4 per 1,000; for the DCs to 20.2--a ratio of 2.15, compared with a ratio of unadjusted total fertility in Table 1 of 2.06. The inferred birth rates compare well with those given directly in the United Nations sources: for 1960-64, the weighted average for the LDCs

is 42.8 per thousand, for the DCs 19.8--both slightly lower than in Table 2, but with the same relative magnitudes.[3] And the regional differentials within the two large groups are about the same, except that here the rate is higher for the Middle East than for Sub-Saharan Africa, and in the United Nations estimates that for Sub-Saharan Africa is higher.

Having the crude birth rates corresponding to the weighted age specific rates for women, we can calculate the absolute contribution of the births credited to a given age class of women to the aggregate crude birth rate for a given region (Panel C). This automatic calculation permits us to observe the age class origin of the differences in the crude birth rates between any two groups of countries. For our purposes the most interesting is the distribution of the differences in crude birth rates between the LDCs and DCs taken as wholes (lines 28-29).

About six-tenths of the total excess of the crude birth rate of the LDCs over those of the DCs was due to the higher age specific birth rates in the three prime age classes--those from 20 through 34. Over a fifth was due to the higher birth rates of the young, below 20. About a sixth, 16 percent, was due to the higher birth rates among the older women. Thus the younger and older women combined accounted for almost four-tenths of the differential in the aggregate crude birth rates. To put it differently, if the fertility of younger and older women were the same in the LDCs and DCs, the ratio of the total birth rate of the former to that of the latter would have been 1.7 to 1, not almost 2.2 to 1 as shown in Table 2.

Applications of the type just made in Table 2, and similar ones measuring the contributions of other characteristics of mothers, fathers, or births to be made in the sections that follow, are obviously not explanations. They do not indicate the causative factors (decisions by would-be parents, and elements underlying these decisions) that may have been involved in producing the birth rates found. They do, however, narrow the locus of the results, and the measures of the different aspects of the parents or of the births may narrow it differently. Hopefully then the causative factors will be more easily perceived, although room will remain for divergent explanatory hypotheses.

3. Married Proportions, Women

A woman, no matter what her marital status, can become a mother: whether single, or divorced, or separated, or widowed, she can, provided she is of childbearing age, have children if she finds a mate. As evidence, in many countries where legal marriage is prevalent, illegitimate births are distinguished. Conversely, a married woman, even if of childbearing age, and not naturally sterile, does not necessarily have children--voluntary control over intra-marital fertility having become increasingly prevalent particularly in modern societies. Furthermore, in many countries, stable, non-legally certified, common law or consensual marriages are widespread; and these have been included here among marriages and the resulting births classified as legitimate.

The fact is that we deal here with a social institution, not a biological process. Consequently, we confront a diversity of meanings

and institutional framework, particularly in international comparisons that span a wide range of societies. Not only is it difficult to establish comparability for analytical relevance, but the data available are subject to greater error reflecting biases in judgment of respondents in terms of preferred marital status. Yet, the institution does have meaning in the fertility process in most societies. The latter involves long-term union between men and women setting up families as lasting units for the major purpose of having children and rearing them toward independence and adequate status in society at their maturity. If we include consensual or common law marriages as stable unions, as we should, the proportions of total births that are recognized as illegitimate are substantial only in Western societies with a strict legal marriage code and concomitant individual permissiveness. Even so, illegitimate births account for a moderate fraction of total births (ranging up to 15 percent in Sweden).[4] Furthermore, many illegitimate births may, in leading to a long-term, legal marriage, become legitimate retroactively, for all intents and purposes.

Marriage, as defined here, implies a long-term commitment to a union, involves family formation, and also, in the dominant proportion of cases, a commitment to children. Therefore, despite statistical difficulties and ambiguities, it must be considered, and its relevant quantitative aspects summarized. Such a summary, for the marriage proportions among women, by age classes, is provided in Table 3.

In general, the proportions of <u>younger</u> women who are married are higher in the LDCs than in the DCs. This is particularly true

Table 3

Proportions of Married (Including Consensual and Polygamous Marriages) Women by Age Classes, Less Developed and Developed Market Economies, 1960s

	Number of Countries	Age Classes						
		15-19	20-24	25-29	30-34	35-39	40-44	45-49
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Less Developed								
1. ESE Asia, weighted	11	53.2	82.7	91.5+	90.9	87.5-	79.4	72.0
1a. India-Pakistan, weighted	2	70.3	91.8	94.1	91.5-	87.1	77.6	69.8
1b. Other Countries	9	22.1	66.0	86.8	89.8	88.1	82.6	75.9
2. Middle East	8	34.9	78.6	89.4	91.4	89.4	84.3	77.2
3. Sub-Saharan Africa	14	54.4	86.8	91.4	91.4	89.3	83.8	75.0
4. Latin America	13	17.5+	55.2	73.5	77.7	78.8	75.0	70.0
5. Total, LDC, weighted		46.7	79.1	88.8	89.2	86.7	79.8	72.7
Developed								
6. Europe	13	5.0	47.7	79.3	85.7	85.8	83.7	80.4
7. Overseas Offshoots	4	9.8	60.1	84.6	88.7	88.6	86.8	83.6
8. Japan	1	1.3	31.4	79.7	88.0	87.5	84.9	79.1
9. Total DCs, Weighted		6.2	49.8	81.4	87.2	87.0	85.1	81.4

Notes

The underlying data are from United Nations, Demographic Yearbook, 1968, and Demographic Yearbook, 1971, New York, 1969 and 1972 respectively.

Throughout, the share of married women, for a given age class, was to a total excluding those whose marital status was unknown.

For the weights underlying lines 1, 1a, 5, and 9, see the notes to Table 1.

Table 3--continued

Notes--continued

The following countries were included, with the year of coverage indicated in parentheses; Line 1a: India (1951), Pakistan (1961); Line 1b: Ceylon (1967), Nepal (1961), Indonesia (1964-65, sample), Khmer (1962), Korea (1966), Taiwan (1956), West Malaysia (1957), Philippines (1960), Thailand (1960); Line 2: Iran (1966), Turkey (1965), Iraq (1965), Jordan (1961), United Arab Republic (1960), Tunisia (1966), Morocco (1960), Algeria (1966); Line 3: Chad (African population 1963-64, sample), Central African Republic (1959-60), Angola (1960), Dahomey (African population, 1961), Congo (Kinshasa) (1955-57), Guinea (1955), Mali (1960-61), Kenya (1962), Liberia (1962), Madagascar (1966, sample), Senegal (African population (1961), Togo (1958-60), Uganda (1963), Zambia (1969); Line 4: Costa Rica (1963), Brazil (1970), Guatemala (1964), Honduras (1961), Ecuador (1962), Mexico (1960), El Salvador (1961), Panama (1960), Chile (1970), Colombia (1964), Paraguay (1962), Peru (1961), Venezuela (1961).

For lines 6-8 the coverage is that given in Table 1.

For a few countries adjustments had to be made to estimate the proportion for the standard age class (when two were combined, or the lower limit of the youngest class was different from 15 years of age). These adjustments were based on neighboring age classes, or on other countries in the region. The possible errors involved were minor, and it seemed best to include at least the larger countries.

of the 15-19 age class: almost half of all women in the LDCs are married, compared with only 6 percent in the DCs. It is also true of the 20-24 age class, in which the proportions are close to 80 percent and about 50 percent, respectively. Only for woman 25 or older are the married proportions in the two groups of countries similarly high. And, in fact, for women 35 or older, the married proportions are larger in the DCs than in the LDCs--largely because the incidence of widowhood is less marked, proportionately, in the former.

In addition to this broad, and expected, finding, there are significant differences in the proportions of married women in the younger classes among the several regions within the less developed group; and a question arises about the statistical limitations of those shown for Latin America. The latter are far below those for any other less developed region; and the higher level of economic development in Latin America would not explain this shortfall, since the proportions are lower even for the older age classes. The possible explanation may be that, with the prevalence of consensual marriages in Latin America, there is a marked tendency (stronger among men, but presumably true also of women) by some partners in consensual marriages to report themselves as single.[5] The married proportions in the 15-19 class are distinctly higher for India-Pakistan and Sub-Saharan Africa than for the other countries in ESE Asia, Middle East, and Latin America (the latter even allowing for some understatement). These differences conform roughly to the differences in the age specific birth rate for the 15-19 class in Table 1--which is higher for India-Pakistan and Sub-Saharan Africa than for the others. Such differences

in marriage proportions persist in the 20-24 class, although they are much narrower than in the 15-19 class; and they are apparently too slight to be reflected in the age specific birth rates for the 20-24 class. (Table 1, column 3, lines 1-4, shows no significant differences in birth rates for this age class among the several regions.)

Since in the comparison of the LDCs with the DCs, the differentials in marriage proportions in the younger classes among women are roughly consonant with differences in fertility levels, we related the age specific birth rates for age classes of all women to the married proportions, deriving age specific marital fertility rates. These are given in Table 4, lines 1 and 2.

Obviously, we introduced an error in relating all births, including illegitimate, in a given age class of women to the married proportions within that age class. The ratios overstate marital fertility, particularly in the ages in which marriage proportions are low and the ratios of all mothers to married mothers are high. But the exaggeration should affect both the LDCs and the DCs, and its impact is reduced by combining the two young classes--15-19 and 20-24--with due allowance, of course, for the difference in size, total and married.

Because of the striking, and suspect, differences in age specific marital fertility in the two young classes taken separately, we combine them. For the two combined, or up to age 25, the age specific fertility adjusted for the difference in married proportions is no higher among the LDCs than among the DCs--if anything, it is significantly lower, although some allowance must be made for differential errors in exaggeration (lines 1 and 2). To put it differently, the age

Table 4

Births per 1,000 Married Women, and Effects of Differences in Marriage Proportions versus Differences in Births per 1,000 Married Women on Differences in Fertility Between Less Developed and Developed Market Economies

	Age Classes of Women								
	15-19	20-24	15-24	25-29	30-34	35-39	40-44	45-49	Total
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Total Births, per 1,000 Married Women									
1. LDCs	281	374	326	325	259	186	86	32	nc
2. DCs	613	344	374	230	126	61	19	1	nc
Effect of Differences in Proportions of Married Women									
3. Assumed identical birth rates per 1,000 married women			350	278	193	124	53	17	nc
4. Married proportions, LDCs (%)			61.9	88.8	89.2	86.7	79.8	72.7	nc
5. Married Proportions, DCs (%)			27.3	81.4	87.2	87.0	85.1	81.4	nc
6. Derived age specific BRs, LDCs			217	247	173	108	42	12	5,080
7. Derived age specific BRs, DCs			96	226	168	108	45	13	3,760
8. Derived BRs, LDCs, weighted by relative size of age class			605	289	170	88	29	7	5,940
9. Derived BRs, DCs, weighted by relative size of age class			204	221	171	113	39	12	3,800
Effect of Differences in Births per 1,000 Married Women									
10. Assumed identical marriage proportions (%)			44.6	85.1	88.2	86.8	82.5	77.0	nc
11. Derived age specific BRs, LDCs			145	277	228	161	71	25	5,310

Table 4 (continued)

12. Derived age specific BRs, DCs	167	196	111	53	16	1	3,555
13. Derived BRs, LDCs, weighted by relative size of age class	395	324	223	132	48	14	5,680
14. Derived BRs, DCs, weighted by relative size of age class	356	194	113	56	14	1	3,670

Allocation of Differences in Total Fertility Between LDCs and DCs

	Aggregate Differences	Effects of Differences in Marriage Proportion	Effects of Differences in Births per Married Woman
	(1)	(2)	(3)
15. Total fertility not weighted	3,055	1,320	1,755
16. Total fertility weighted	3,635	2,140	2,010

nc -- not calculated

Notes:

Lines 1 and 2: For the standard size classes obtained by dividing the age specific birth rates in Table 1 (lines 5 and 9) by the marriage proportions (treated as proper fractions) in Table 3 (lines 5 and 9). For the 15-24 class (column 3), we derived the joint age specific rate (analogous to that in Table 1) by using the weights of the two classes (15-19, and 20-24) as given in the relevant columns and lines of Table 2; calculated the joint marriage proportion by using the weights for the two classes again from Table 2; and then divided the joint age specific birth rate by the joint marriage proportion.

Line 3: **Arithmetic means of the BRs in line 1 and 2.**

Lines 4 and 5: From Table 3, lines 5 and 9, with the calculation for the joint class (15-24) as indicated above.

Table 4 (continued)

Lines 6 and 7: Birth rates in line 3 multiplied by the married proportions in lines 4 and 5 (treated as proper fractions). Total fertility in column 9 is five times the sum of the class fertilities (with that for 19-24 multiplied by two).

Lines 8 and 9: The weights for the relatives of the size classes are from Table 2, lines 5 and 9. These are applied to the derived age specific BRs in lines 6 and 7. Total fertility (column 9) is five times the sum of the entries in columns 3-8.

Line 10: Aritmetic means of the married proportions in lines 4 and 5.

Lines 11 and 12: The BRs given in lines 1 and 2 respectively multiplied by the assumed marriage proportions (treated as proper fractions) in line 10.

Lines 13 and 14: The age specific birth rates, derived for the age classes in lines 11-22, are weighted by the relative size of these classes, given in Table 2, lines 5 and 9.

Lines 15 and 16: Column 1: differences between total fertility of LDCs and DCs, unweighted (from lines 5 and 9, column 9 of Table 1); and weighted (from lines 14 and 18, column 8, Table 2). Column 2: differences between lines 6 and 7, column 9; and lines 8 and 9, column 9. Column 3: differences between lines 11 and 12, and 13 and 14, column 9.

specific fertility in the LDCs up to age 25 (cumulatively) is higher than that in the DCs only in association with the much higher marriage proportions, i.e. the earlier incidence of marriage among the women in the LDCs than in the DCs. Only in the older ages, when the marriage proportions in the LDCs no longer rise, and those in the DCs catch up, do differences in marriage proportions cease to have any effect on the age specific fertility rates for women, or rather on the differentials between these rates for the LDCs and the DCs.

The finding is hardly surprising. Indeed, it is, in a way, a necessary consequence of the difference in marriage incidence at the younger ages between the LDCs and DCs. If in the DCs marriage proportions at the early ages are low--and they were below 50 percent through the ages of 21-23-- those women who did marry were a group with a high propensity toward having children. The much wider groups of younger married women in the LDCs would, therefore, be unlikely to match the marital fertility rates of these rather exceptional early starters among the young women in the DCs. It is the dominant proportion of married women that is the primary cause of the higher marital fertility of the LDCs. And yet the finding is of cardinal importance in interpreting the birth rate differentials between the LDCs and the DCs. To the extent that these differentials in the early ages are so closely associated with differences in marriage proportions, the finding emphasizes the early entry of women into the childbearing family and the early withdrawal of such women for outside activities. Indeed, in many LDCs, a young woman, sheltered in her parental home, moves immediately to marriage, without participating directly in any

non-domestic activity through much of her youth and childbearing span. Thus, some light is shed on the structure of the family, particularly with regard to the ages and experiences of wife and husband. We shall find below that this early entry into marriage is not typical of men in the LDCs; and that the age difference between husbands and wives is significally wider in the LDCs than in the DCs.

Given the age specific birth rates per 1,000 married women, and the proportions which relate married to all women by age classes, the differences in total fertility between the LDCs and the DCs can be decomposed--into those of differences due to marriage proportions (for identical marital fertility ratios) and those due to marital fertility (for identical marriage proportions in the comparable age classes of women). The calculation appears in lines 3-13 of Table 4; and the summary of the two sets of effects on unweighted total fertility, or on total fertility weighted as it was in Table 2, is shown in lines 15 and 16.

The sum of the two sets of effects does not equal the total, particularly in line 16, because of intercorrelation between marriage proportions and age specific marital fertility. And there are, of course, the limitations already noted on the use of total births in relation to married women. But the rough magnitude of the findings would be little affected by refinements. The general suggestion is that between four-tenths and a half of the difference in total fertility between the LDCs and DCs is due to differences in marriage proportions; and the balance to intra-marital fertility differences. These weights

should be taken only as a general indication that differences in marriage proportions, among younger women, play a large part, if we assume that early marriage is a pre-condition of the wide age-specific birth rate differences in the ages below 25 and 30. Indeed, it follows automatically from the two findings already noted: (1) that excess of birth rates for the age group below 30, either in Table 1 or Table 2, would account for about a half of the total fertility differentials; (2) that up to the age between 25 and 30 the higher birth rates of women in the LDCs are completely accounted for by their higher marriage proportions. In this sense, the evidence in the present section is a refinement, a detail in understanding how the much higher age specific birth rates for the younger women in the LDCs are attained.

4. Married Proportions, Men, and Distribution of Births by Age of Father

We are concerned here with two questions. The first relates to the ages of married men compared with those of their wives, for the LDCs and the DCs. We shall find that women who marry at an early age marry much older men in the LDCs, and the excess of a husband's age over that of his wife is far wider than in the DCs. Obviously then the structure within the family household differs in the two groups of countries. The decision activity of a household composed of an older husband and a younger wife must differ from that of a household in which the ages, and implicitly experience in the outside world, of husband and wife do not differ as much. The second question concerns the distribution of births by age of father. If, in general, husbands are older relative to their wives in the LDCs than in the DCs, and if, as already observed, childbearing continues to older women (within their childbearing span) in the LDCs than in the

DCs, the contribution of older fathers to the crude birth rate must be far greater in the LDCs than in the DCs. And we shall find that a substantial proportion of births in the LDCs can be credited to fathers of 40 years or over. This finding sheds further light on the determinants of the higher birth rates in the LDCs.

Unfortunately, the available data do not directly yield the comparisons and distributions which we seek. Some manipulation and restrictive assumptions must be made before even approximate answers can be reached. Yet the statistical difficulties are of interest in themselves because they reflect substantial international differences in the marriage institutions and differences in the degree of connection of children to their fathers compared with that of children to their mothers.

We begin with the marriage proportions of men, that are to be compared with marriage proportions of women, both for comparable age classes. Our intent is to derive, for comparison with the distribution of married women aged 15-49, a distribution of their husbands by age. In this attempt, we immediately run into difficulties. In the first place, for many less developed countries (but for none of the developed), the reported number of married men is significantly short of the reported number of married women despite the inclusion of the consensually married. The remaining categories are single, widowed, and separated. Yet if reporting is accurate, if polygamy is not practiced, and if differential international migration (in which case shortages of husbands in some countries would be offset by excesses in others) is disregarded, the numbers of all married men and women (albeit of dif-

ferent ages) should be identical.

The explanation is, in good part, that polygamy is practiced in many countries. In fact, for several sub-Saharan countries, the United Nations Demographic Yearbooks report numbers of men with two wives, three wives, and so on; and for several Middle-Eastern Moslem countries they report marriages of men already married. The shortage of husbands reported for Latin America, where consensual marriages are common, suggests that some polygamous marriages are also included. The alternative, and contributory assumption, is that even when a consensual marriage is monogamous, there is a greater tendency among men than among women not to report themselves as married.

We must match husbands and wives, for married women in their childbearing ages, and compare the ages of husbands and wives, since they affect decisions regarding children, and in order to derive distributions of births by age of father. For this purpose only monogamous marriages can be handled easily. We have, therefore, excluded from lines 1 and 2 of Table 5 all countries in which number of married men fell short of that of married women by more than a few percentage points (there were no opposite pairings). This meant eliminating all Sub-Saharan African countries (except Madagascar, which would not contribute much); and also many Latin American countries. As already indicated, this problem did not arise in the case of the DCs. Although illegitimate births and informal departures from monogamy do occur, they are not legally recognized, nor are they recorded in any way within the statistically established marital status categories.

Table 5

Married Proportions, and Age Partition Values for Distributions of Married Men and Women and of Births by Age of Mother and Father, Less Developed and Developed Countries, 1960s

A. Married Proportions for Men (and Women, Comparable Coverage)

	Age Classes						
	15-19	20-24	25-29	30-34	35-39	40-44	45-49
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
LDCs							
1. Men	11.2	40.9	69.5-	85.8	89.7	89.7	89.1
2. Women (comparable coverage)	42.6	75.9	87.9	88.7	86.2	79.1	73.7
DCs							
3. Men	1.1	24.6	65.2	82.5	86.6	88.0	88.2
4. Women (comparable coverage, Table 3)	6.2	49.8	81.4	87.2	87.0	85.1	81.4

B. Partition Values for Panel A

	LDCs			DCs		
	1st quart.	Median	3rd quart.	1st quart.	Median	3rd quart.
	(1)	(2)	(3)	(4)	(5)	(6)
5. Wives, 15-49, comparable coverage	23.4	29.7	37.6	28.7	35.4	42.2
6. Corresponding married men (husbands, see text)	28.7	36.6	46.9	31.5	38.3	45.5
Age differentials between LDCs & DCs						
7. Wives (line 5)				-5.3	-5.7	-4.6
8. Husbands (line 6).				-2.8	-1.7	1.4
9. Age excess, husbands' over wives (line 6 minus line 5)	5.3	6.9	9.3	2.8	2.9	3.3

Table 5 (continued)

C. Partition Values, Wives and Mothers (based on Tables 2 and 3)

		LDCs			DCs		
		1st quart.	Median	3rd quart.	1st quart.	Median	3rd quart.
		(1)	(2)	(3)	(4)	(5)	(6)
10.	Wives, 15-49	23.1	29.5	37.4	28.7	35.4	42.2
11.	Mothers, 15-49	21.8	26.4	31.9	23.0	27.0	31.6
	Age differentials between LDCs and DCs						
12.	Wives (line 10)				-5.6	-5.9	-4.8
13.	Mothers (line 11)				-1.2	-0.6	0.3
14.	Lead of age partition values, mothers over wives (line 11 minus line 10)	-1.3	-3.1	-5.5	-5.7	-8.4	-10.6

D. Derivation of Age Partition Values, Distribution of Births by Age of Father

15.	Corrected partition values, married men (line 10 + line 9)	28.4	36.4	46.7	31.5	38.3	45.5
16.	Alternative partition values, married men (using median difference only)	30.0	36.4	44.3	31.6	38.6	45.1
17.	Partition ages, fathers (line 15 + line 14)	27.1	33.3	41.2	25.8	29.9	34.9
18.	Alternative partition ages, fathers (line 16 plus line 14)	28.7	33.3	38.8	25.9	29.9	34.5
	Age differentials between LDCs and DCs						
19.	Line 17				1.3	3.4	6.4
20.	Line 18				2.8	3.4	4.3

Table 5 (continued)

Notes:

Lines 1-2: The sources of data for individual countries are those cited in the notes to Table 3. For reasons given in the text only those countries were used for which the total numbers of married women and men for the given year differed by only a few percent (well below 10). The following countries were included: for ESE Asia (10)--Ceylon, Indonesia, Khmer, S. Korea, Taiwan, India, West Malaysia, Pakistan, Philippines, and Thailand--with the usual weighting within the region; for the Middle East (8)--Iran, Turkey, Iraq, Algeria, Libya, Tunisia, Morocco, and UAR; for Sub-Saharan Africa--none; for Latin America (11)--Brazil, Chile, Mexico, Colombia, Costa Rica, Guatemala, Honduras, Panama, Paraguay, Peru and Venezuela. The usual weighting by total population in 1960 was followed in combining the three major regions covered.

Lines 3-4: Coverage is that given in the notes to Tables 1 and 3, from the same sources.

Line 5: The product of the proportions married within the successive age classes, 15-49 (in lines 2 and 4 above) and the relative weight of each age class (from Table 2, lines 5 and 9) is the distribution of married women, 15-49, by five-year age classes. (The use of class weights for all LDCs, from Table 2, is justified because the relative weights of the age classes in the omitted region (Sub-Saharan Africa) are quite close to those of the LDCs as a whole (see Table 2, lines 3 and 5). From the distributions we derive, by linear interpolation, the three age partition values shown.

Line 6: The basic assumption here is that younger husbands are matched with younger wives. Knowing the distribution of married men and of married women, for the same countries and years, we can then calculate the partition age of husbands corresponding to the partition age of wives. The weights for age classes among men used in the calculation were the same as those for age classes among women. The close

Table 5 (continued)

similarity of the two is shown in the distributions for large regions in the UN Working Paper cited in the notes to Panel A of Table 2.

Line 10: The underlying proportions of married women within each age class are from Table 3, lines 5 and 9. The relative weights are from Table 2, lines 5 and 9; and the procedure is the same as that for line 5 above.

Line 7: Table 2, lines 23 and 27 show the contribution of each age class within the total of all women 15-49 to the crude birth rate (or to total births), for the LDCs and DCs respectively. From these two distributions we derive, again by linear interpolation, the age partition values. Since we are assuming that all births are by married women, the distributions of births by age of mother by age of married mother are identical.

Line 16: Instead of matching the youngest husbands to the youngest wives (as was done for line 6 above), which yields a widening excess of age of husband over age of wife as the age of wives increases, here we assume a constant age differential between husbands and wives and set it at the differential at the median partition value. An element of matching younger husbands to younger wives still remains, but only in the sense that for all wives, 15-49, the younger group of husbands (in equal number) is selected among the total of married men. But there is no selectivity within the age span of wives 15-49.

Obviously, the exclusion of bigamous and polygamous marriages from the LDC estimates probably means an underestimate of the excess of the age of husbands over that of wives. The weighted excess of a husband's age over that of all of his several wives would presumably be greater than the excess in monogamous pairings. A man usually acquires his second or third wife as he grows older and his economic status improves. Moreover, he usually selects much younger second and third mates.

But we have to go beyond the married proportions for men and women separately, toward some approximation to the relative ages of wives and their husbands. For this purpose the age distribution of married men must be linked to that of married women. No problem would arise if data were available on the cross-classification of married couples by ages of husband and wife; or if data on the ages of brides and grooms at time of marriage were available, cross-classified, for an adequate sample of countries. But neither body of data is provided in the international compilations of demographic information; and a search in the records of individual countries was not practicable here. Hence we attempted an approximation by the use of some plausible assumptions (Panel B).

The distributions of married women, 15-49, by age class, can be derived from marriage proportions and the data in Table 2 on the relative size of each age class; and the quartiles and medians in line 5 can then be estimated directly. These estimates show that the quartile and median ages of married women (within the childbearing span) in the LDCs are about five years below those in the DCs (line 7). But

we would like a similar set of partition values for the married men, who can be viewed as husbands of the married women aged 15-49, since these men are the most involved in decisions on the production of the next generation. The corresponding partition values for married men (husbands) in line 6 are derived on the assumption that younger married men should be matched with younger married women--perhaps the most plausible of alternative simple assumptions. Using the principle in matching and having the age distribution of married men, we assign a number equal to that of the first quartile of the distribution of married women--to establish the age partition value that separates this number from all other, older married men; and continue up the age scale for married women, and corespondingly, married men.

Three related conclusions emerge. First, whereas married women, age 15-49, were about five years younger in the LDCs than in the DCs, the husbands of these women in the LDCs were only slightly younger at the median than the husbands in the DCs (less than 2 years); and at the third quartile of the distribution they were distinctly older (lines 7 and 8). Second, the age excess of husbands over wives (the latter aged 15-49) was much wider in the LDCs than in the DCs: at the median about 7 years for the former and about 3 years for the latter (line 9). Third, the age excess of husbands over wives in the LDCs rises markedly from the younger to the older ages of wives (still within the 15-49 span)--from 5.3 at the first quartile to 9.3 at the third; whereas the age excess of husbands in the DCs increases only slightly--from 2.8 at the first quartile to 3.3. at the third (line 9).

These conclusions are subject to two qualifications: the limited coverage of the LDCs and, particularly, the assumption underlying the "matching" of husbands and wives. It is this assumption, applied within the age distribution of married women, that produces the steep rise in exesss of age of husband for the LDCs. On the other hand, the omission of Sub-Saharan Africa may have resulted in understating the age excess of husband over wife in the LDCs. Consequently, the general order of magnitudes is likely to stand. To put it briefly, the age excess of husbands over wives is probably significantly wider in the LDCs than in the DCs, particularly at the older age; the average ages of husbands of wives aged 15-49 are not too different in the LDCs and the DCs; and the wives are distinctly younger in the former than in the latter.[6]

The contrast in ages of wives and husbands in the LDCs and those in the DCs, is of interest in itself. It suggests a difference in the structure of the household, at least as far as the parental generation is concerned. But it also is an indirect indication of the distribution of births by age of father, from which we can infer the contribution of older fathers to the difference in crude birth rates between the LDCs and the DCs. Panels C and D of Table 5 show the results of an attempt to link the age distributions of married men and women with the distributions of births by ages of fathers and mothers. The underlying assumption is that births are related to married men and women, and illegitimate births are disregarded. However, the latter are clearly definable, and of some limited importance, only in the DCs.

In Panel C we link the distribution of married women with that

of married mothers (unmarried mothers having been excluded by assumption). For the LDCs the distribution of married women underlying the partition values shown in line 10, columns 1-3, is from Table 2 and 3, and includes all regions--much more complete coverage than that in line 5--which explains the slight difference between the two sets of partition values in lines 5 and 10. This minor discrepancy suggests that the limitation of coverage for the LDCs in Panels A and B was not of great consequence. Panel C indicates, as one would expect, that the population of current mothers is distinctly younger than the population of current wives, aged 15-49, reflecting the higher age specific birth rates for the younger age classes, particularly those under 35 (line 14). Also, since the concentration of childbearing within the prime age classes--20-34--among the married women is greater in the DCs than in the LDCs, and since married women are, on the average, older in the DCs, the lead of age partition values of mothers over wives is far wider in the DCs than in the LDCs--over 8 years compared with 3 years at the median respectively (see line 14 again).

In Panel D we apply the differentials in the age partition values between wives and mothers to the estimated age partition values of husbands, to derive the age partition values for fathers. The assumption underlying this calculation is that the age excess of husband over wife, for a given age class of the latter, is identical with that of father over mother within the given age class of wife. However, if, e.g., wives age 20-24 have husbands who are 25-29 (i.e. five years older), the current mothers among these wives (say a quarter of

them) may have husbands who are more or less than five years older. Unfortunately, we have no basis for adjusting the age differential between husband and wife to that between father and mother. In any case, the adjustment is not likely to be substantial. Moreover, the distribution of births by age of father in lines 17 and 18 will be checked by alternative sets of data in following tables.

Lines 17 allows for internal "matching" whereas for line 18 we assumed a constant excess of age of husband within the range of married women 15-49--an assumption somewhat less realistic than that used in other panels, but one that reduces the effect of the matching assumption. Still, the differences between the two lines are so slight that they suggest the same conclusion.

The conclusion is that fathers of about 40 or over contribute a quarter of all births in the LDCs. Thus, in the latter, with the crude birth rate at 43.4 per 1,000, a component of 10.85 is to be credited to these fathers. In the DCs, the age partition value for fathers at the third quartile is below 35 years; and it seems reasonable in the light of other evidence to suggest that fathers aged 40 and over can be credited with about one-tenth of all births. With a crude birth rate of 20.2, the contribution of the older fathers in the DCs is then 2.02. The difference between the contributions of older fathers in the LDCs and DCs is then 10.85 minus 2.02, or 8.83, out of a total difference in the crude birth rates of 23.2 points, or well over a third. This finding differs markedly from that for mothers. Mothers aged 40 or more account for only 1.3 out of 23.2 points of

total difference; and even women aged 35 and over contribute only a seventh of the total difference in crude birth rates between LDCs and the DCs (see Table 2, line 28).

The contribution of older fathers can be checked with an alternative set of data, also incomplete, but in other ways. For eleven less developed countries we have for recent years distributions of births by age of father, which can be compared with the distributions by age of mother. Similar data are available for all developed countries, but for the 1950s, not the 1960s; and for legitimate births only. The evidence is summarized in Table 6.

Regretably, we have no data for the populous Asian countries, like India and Pakistan, or for Sub-Saharan Africa, both regions with high specific birth rates in the younger age classes of women. We use Middle East and Latin America, weighted equally (since the structure of the former is closer to the missing regions), to represent the LDCs. This approach, while understating the excess of ages of fathers over those of mothers, may nevertheless yield a good approximation of the share of older fathers in total births.

The share of fathers aged 40 and over in the distribution of births by age of fathers for the average of ME and LA, is about a quarter (line 11). This finding checks with that indicated by the age partition values established in Table 5. By contrast, the share of fathers 40 or older in total births in the DCs is about 11 percent, which also checks with the finding based on Table 5 (line 23).

In comparing directly the shares in total births of fathers

Table 6

Distributions of Births by Age of Mother and of Father,

Selected Groups of Countries, Late 1950s and mid 1960s

(percentages)

A. Distribution of Births

	Age Classes of Mothers and Fathers							
	Below 20	20-24	25-29	30-34	35-39	40-44	45 & over	Total
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Less Developed Countries								
Taiwan and Philippines								
1. Mothers	5.8	26.1	29.1	20.7	12.8	4.7	0.8	100
2. Fathers	1.1	14.4	27.0	24.3	17.2	9.8	6.2	100
3. Line 2 - line 1	-4.7	-11.7	-2.1	3.6	4.4	5.1	5.4	37.0
Middle East (3 countries)								
4. Mothers	8.3	21.8	26.0	21.4	14.6	6.1	1.8	100
5. Fathers	0.4	7.1	19.0	22.5+	20.0	13.5	17.5	100
6. Line 5 - line 4	-7.9	-14.7	-7.0	1.1	5.4	7.4	15.7	59.2
Latin America (6 countries)								
7. Mothers	14.3	29.4	24.2	16.6	11.0	3.7	0.8	100
8. Fathers	2.3	18.6	24.6	21.0	15.0	9.3	9.2	100
9. Line 8 - line 7	-12.0	-10.8	0.4	4.4	4.0	5.6	8.4	45.6
10. Average of ME and LA (equal weights)								
10. Mothers	11.3	25.6	25.1	19.0	12.8	4.9	1.3	100
11. Fathers	1.3	12.9	21.8	21.8	17.5	11.4	13.3	100
12. Line 11-line 10	-10.0	-12.7	-3.3	2.8	4.7	6.5	12.0	52.0

Table 6 continued:

Developed Countries							
Europe (10 countries)							
13. Mothers	4.9	26.3	31.3	21.9	11.7	3.5	0.4	100
14. Fathers	0.7	13.8	30.7	26.2	15.9	7.8	4.9	100
15. Line 14-line 13	-4.2	-12.5	-0.6	4.3	4.2	4.3	4.5	34.6
Overseas Offshoots (3 countries)							
16. Mothers	8.9	31.5	29.4	17.8	9.4	2.8	0.2	100
17. Fathers	1.6	18.3	30.5	24.3	14.7	6.9	3.7	100
18. Line 17-line 16	-7.3	-13.2	1.1	6.5	5.3	4.1	3.5	41.0
Japan							
19. Mothers	1.2	27.2	43.3	20.2	6.6	1.4	0.1	100
20. Fathers	0	7.5	39.4	33.1	12.4	5.1	2.5	100
21. Line 20-line 19	-1.2	-19.7	-3.9	12.9	5.8	3.7	2.4	49.6
All Developed (weighted average)							
22. Mothers	5.8	28.4	32.5	20.1	10.0	2.9	0.3	100
23. Fathers	0.9	14.5+	32.0	26.6	14.9	7.0	4.1	100
24. Line 23-line 22	-4.9	-13.9	-0.5	6.5	4.9	4.1	3.8	38.6

B. Age Partition Values in the Distribution of Births, Mothers and Fathers

	Taiwan Philip.	Middle East	Latin Am.	LA & ME	Europe	Ov. Off.	Japan	DCs
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Mothers								
25. 1st quartile	23.7	23.8	21.8	22.7	23.8	22.6	24.3	23.4
26. Median	28.1	28.8	26.3	27.6	28.0	26.6	27.5	27.4
27. 3rd quartile	33.4	34.4	32.1	33.4	32.9	31.5	30.8	32.1

Table 6 continued:

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Fathers								
28. 1st quartile	26.6	29.6	25.8	27.5	26.7	25.8	27.2	26.5
29. Median	31.5	35.2	31.1	33.2	30.9	29.9	30.5	30.5
30. 3rd quartile	37.4	42.2	37.8	39.9	36.1	35.1	34.2	35.3
Excess of Age of Fathers								
31. 1st quartile	2.9	5.8	4.0	4.8	2.9	3.2	2.9	3.1
32. Median	3.4	6.45	4.8	5.6	2.9	3.3	3.0	3.1
33. 3rd quartile	4.0	7.8	5.7	6.5	3.2	3.6	3.4	3.2

Notes:

The distributions of births by age of mothers and of fathers are for identical countries for the same year. Column 8 of lines 3, 6, 9 ... 24, is the sum of columns 1-7, signs disregarded.

The data for the LDCs are largely from United Nations, Demographic Yearbook, 1969 (New York, 1970), Tables 14 and 19. Taiwan is the one country for an earlier year, 1958, from Demographic Yearbook, 1959 (New York, 1959), Tables 11 and 13.

Lines 1-2: Includes the Philippines (1964) and Taiwan (1958).

Lines 4-5: Includes Algeria (1965), Tunisia (1965), and the United Arab Republic (1966).

Lines 7-8: Includes Puerto Rico (1963), Peru (1963), Chile (1963), Guatemala (1963), and Costa Rica and Panama, combined (1963). Many Latin American countries also reporting had to be omitted because in the distribution by age of father, the unallocated births were more than twenty percent of the total.

Table 6 continued:

Lines 13-14: Because of inadequate coverage of Europe in later years, we had to use data on legitimate births for 1957 or 1958, given in the Demographic Yearbook, 1959. The only country included for a recent year (total births, 1963) was England and Wales.

The following countries were included: Austria (1958), Belgium (1958), Denmark (1957), Finland (1958), France (1958), Germany (FR, 1955), Netherlands (1958), Norway (1957), Sweden (1957) and England and Wales (1963).

Lines 16-17: Includes Canada (1958), United States (1955), and Australia (1963).

Lines 19-20: For 1957.

Lines 22-23: The weights used are population for 1960 (see notes to Table 1).

Lines 25-30: Derived by linear interpolation from the percentage distributions in Panel A.

and mothers of identical age classes (lines 3,6, and so on of Panel A), or in comparing the age partition values derived from the distributions of births by ages of fathers and mothers, we are implicitly matching younger fathers and mothers. Since this plausible assumption is used also in connection with Table 5, we can compare the differentials in age-partition values between mothers and fathers, with those obtained in comparing wives and husbands in Table 5. There the age excess of husbands over wives, for the LDCs, was 5.3 years at the first quartile, 6.9 years at the median, and 9.3 years at the third quartile; for the DCs it was 2.8, 2.9, 3.3 years respectively (see Table 5, line 9). In Table 6, the age excess of fathers over mothers, for the average of the Middle East and Latin America, was 4.8 years at the first quartile, 5.6 years at the median, and 6.5 years at the third quartile; while the corresponding differentials for the DCs are 3.1, 3.1, 3.2 years (lines 31-33, columns 4 and 8). For the DCs the differentials between the age partition values of husbands and wives are about the same as between those of fathers and mothers, although the average ages of wives and husbands differ from those of mothers and fathers. For the LDCs the age excess of fathers over mothers in Table 6 is narrower than that of husbands over wives in Table 5, but the difference may be due partially to inadequate coverage in Table 5. Yet Table 6 confirms, for fathers and mothers, the finding for husbands and wives in Table 5: the age excess of men is much wider in the LDCs than in the DCs, and it increases more significantly in the former as the age of wife or mother rises.

On the basis of Table 6, and the assumption that the average for the Middle East and Latin American represents the LDCs, we derive the distributions of births by the quinquennial age classes of fathers, as we did for mothers in Table 2. We then calculate the contributions of each age class to the differences in crude birth rates between the LDCs and DCs (Table 7).

The finding here confirms the inference from Table 5 that the contribution of fathers aged 40 and over is so much greater in the LDCs than in the DCs that it accounts for one-third of the total differences between the crude birth rates of the two groups of countries. In Table 2 we found that young mothers, those below the age of 20, contributed more than a fifth of the total difference between the crude birth rates of the LDCs and the DCs (see Table 2, line 29). Assuming little overlapping between husbands 40 and over and wives below the age of 20, one could say that if the age specific birth rates for women below age 20 and for men 40 or more were the same in the LDCs and the DCs, the difference in the crude birth rates between the two groups of countries would have been cut by more than half; and the crude birth rate for the LDCs would be somewhat over 30 per 1,000 (compared with about 20 for the DCs), instead of over 43 per 1,000 as shown now.

5. Distribution of Births by Parity

Parity refers to the birth order in the childbearing sequence for a given mother--first birth, second, third, and so on. It suggests the number of children presumed to be living when the given birth occurs--although this statistics could be estimated directly if data

Table 7

Distribution of Births by Age of Father, Less Developed and Developed Market Economies, 1950s and 1960s

	Age of Mother or Father							
	Below 20	20-24	25-29	30-34	35-39	40-44	45 & over	Total
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
% Shares of Births by Age of Mother (lines 1-4)								
1. Middle East	11.1	27.0	27.6	19.2	10.7	3.7	0.7	100
2. Latin America	13.6	28.3	25.0	17.4	11.0	3.8	1.0	100
3. ME and LA (equal weights)	12.4	27.6	26.3	18.3	10.8	3.7	0.9	100
4. LDCs	14.6	28.1	25.6	17.1	10.0	3.6	1.0	100
5. Differences in % shares of births, age of father minus age of mother, ME and LA	-10.0	-12.7	-3.3	2.8	4.7	6.5	12.0	0
6. Derived % shares of births by age of father (line 4 + line 5)	4.6	15.4	22.3	19.9	14.7	10.1	13.0	100
7. % shares of births by age of mother, DCs	7.2	30.0	31.6	19.1	9.5	2.4	0.2	100
8. Differences in % shares of births, age of father minus age of mother, DCs	-4.9	-13.9	-0.5	6.5	4.9	4.1	3.9	0
9. Derived % shares of births by age of father, DCs (line 7 plus line 8)	2.3	16.1	31.1	25.6	14.4	6.5	4.0	100

Table 7 continued:

		Age Classes							
		Below 20	20-24	25-29	30-34	35-39	40-44	45+	Total
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Contributions to Differences in Crude Birth Rates, Age Classes of Fathers								
10.	LDCs	2.0	6.7	9.7	8.6	6.4	4.4	5.6	43.4
11.	DCs	0.5	3.2	6.3	5.2	2.9	1.3	0.8	20.2
12.	Contributions to differences	1.5	3.5	3.4	3.4	3.5	3.1	4.8	23.2
13.	% Distribution of Line 12	7	15	15	15	15	13	20	100

Notes:

Lines 1, 2, and 4: Calculated from Table 2, lines 11, 13, and 14.

Line 5: From Table 5, line 12.

Line 7: From Table 2, line 18.

Line 8: From Table 5, line 24.

Lines 10-13: Shares in lines 6 and 9 applied to total crude birth rates for the LDCs (43.4 per 1,000) and the DCs (20.2). See also Table 2, Panel C.

were available on numbers of surviving children cross-classified with the occurrence of the next birth. Parity data also shed some light on the age of parents, since, obviously, high parities, i.e. high orders of birth, are connected with advanced ages of mother and, particularly, of father. The two connections--between parity and older siblings, and between parity and age of parents--set the lines for the discussion here of the summary data.

In Table 8 we show the distribution of births by birth order for the LDCs and the DCs. The coverage for the LDCs omits Sub-Saharan Africa for which the data are not available, and is quite limited for other regions. But for the three subregions shown, the distributions are quite similar: the share of the high parity births (i.e. the fifth and higher order) is 37 percent of ESE Asia, 33 percent for the Middle East, and 35 percent for Latin America. There is somewhat greater variation among the developed countries: the share of the same high parities is less than 10 percent for Europe, only 2 percent for Japan, and 16 percent for the overseas countries. But each of these, and their average, about 11 percent, are distinctly below the shares of high parities for the LDCs. This finding is not surprising since we found in Table 1 that complete fertility averaged about 6 children for the LDCs and less than 3 children for the DCs--and thus clearly implied much greater proportions of births of high parities in the LDCs than in the DCs.

Table 8

Distribution of Births by Birth Order, Less Developed and Developed Market Economies, Early 1960s

	Number of Countries	Shares of Births in Increasing Order (Parity)							
		1	2	3	4	5	6&7	8+	Total
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Less Developed									
1. ESE Asia	4	18.4	16.9	14.9	13.0	10.9	14.9	11.0	100
2. Middle East	2	17.2	19.7	16.1	13.9	11.0	14.0	8.1	100
3. Latin America	12	21.6	16.7	14.5	12.0	9.6	13.2	12.4	100
4. Total LDCs, weighted		18.8	17.1	15.0	12.9	10.7	14.6	10.9	100
Developed									
5. Europe	13	36.5	29.4	16.4	8.3	4.2	3.5	1.7	100
6. Overseas offshoots	4	28.9	24.8	18.5-	11.7	6.6	6.0	3.5	100
7. Japan	1	47.5	35.7	11.8	3.0	1.1	0.7	0.2	100
8. Total DCs, weighted		35.4	28.7	16.5-	8.7	4.6	4.0	2.1	100
Contributions to Crude Birth Rates									
9. LDCs		8.2	7.4	6.5	5.6	4.7	6.3	4.7	43.4
10. DCs		7.2	5.8	3.3	1.7	0.9	0.9	0.4	20.2
11. Line 9 minus line 10		1.0	1.6	3.2	3.9	3.8	5.4	4.3	23.2
12. %Distribution of line 11		4	7	14	17	16	23	19	100

Table 8 continued:

Notes:

Lines 1-3 and 5-7: The underlying data are from United Nations, Demographic Yearbook, 1969 (New York 1970), Table 17, supplemented for one or two countries by the Demographic Yearbook, 1965 (New York 1966), Table 16.

The data refer primarily to 1963, but another year was taken if data for 1963 were missing or their coverage was incomplete. No adequate data were available for Sub-Saharan Africa.

Percentages were taken to totals excluding the unallocated, except for Mexico where the unallocated were combined in the source with the top parity group (but the effect on column 8 is negligible). For Sweden, the shares of the two top parity groups had to be estimated from the averages for the other twelve countries in the region.

Line 1: Includes Pakistan, West Malaysia, Philippines, and Thailand. The data for India, relating to a limited sample of urban communities, could not be used; therefore, we took an unweighted mean of entries for the four countries.

Line 2: Includes Tunisia and the United Arab Republic.

Line 3: Includes Costa Rica, Dominican Republic, El Salvador, Guatemala, Jamaica, Mexico, Panama, Chile, Colombia, Ecuador, Peru and Venezuela.

Lines 4 and 8: The weighting was the same as that in Tables 1 and 2.

Lines 5-6: The coverage is the same as that in Table 1.

Lines 9-10: The percentage shares in lines 4 and 8 were applied to the crude birth rates for the LDCs and DCs (43.4 and 20.2 respectively, see Table 2).

Lines 11-12: Calculated similarly to lines 28-29 of Table 2.

Nor is it surprising that the high parity births account for much of the excess of the crude birth rate in the LDCs over that in the DCs. Births of the fifth and higher orders contribute close to six-tenths of the total difference in the crude birth rates between the LDCs and the DCs (line 12). Thus, if the proportions of high parity births to total population were the same for the LDCs as for the DCs the crude birth rates would differ by only four-tenths, i.e. would be somewhat below 30 per 1,000 in the LDCs, instead of the 43.4 per 1,000 for the late 1960s.

But we are more concerned here with the connection between births of high parity and the presumed number of older surviving siblings. For the latter we require data on mortality for the younger ages, which are even scarcer for the LDCs than those on births by parity. But we can approximate the necessary coefficients for Latin America, the only subregion among the LDCs for which the coverage in Table 8 is adequate.

Estimates of survival of children to age 5 are available for a number of Latin American countries.[7] For 1955-59 (the latest quinquennium shown), the number of survivors at age 5 (from an initial cohort of 1,000) varies from a high of 929 for Argentina to a low of 787 for Guatemala. The arithmetic mean number of survivors for 11 countries (excluding Argentina, but comprising Chile, Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Panama, Peru, and Venezuela) is 849. But we also need estimates of survivors to ages from 10 to 20. We know from the standard sources that age specific

death rates between age 5 and the late teens are extremely low. We have, therefore, assumed relevant survivor estimate to high parity ages of 800 to 825 for Latin America or a cumulative mortality of 175 to 200 per 1,000. For the DCs we have assumed 925 to 940 survivors, or a cumulative mortality of 60 to 75 per 1,000 (a sizable error in this estimate will have little effect on our comparison).

The comparison of the birth parity grouping for Latin America, with that for all the DCs is given in the following tabulation.

	Contribution to CBR, Low Parities (1-4)			Contribution to CBR High Parities, 5+		
	Total (1)	Survival rate (2)	Adjusted (1+2) (3)	Total (4)	Survival rate (5)	Adjusted (4+5) (6)
1. Latin America	28.7	0.825	23.68	15.6	0.80	12.48
2. DCs	18.0	0.940	16.92	2.2	0.925	2.04
3. Excess, LA over DCS	10.7		6.76	13.4		10.44

Note: The contribution for Latin America was calculated by multiplying the shares of parity groups in total births (line 3, Table 8) by the total crude birth rate of 44.3 per 1,000 (for the latter see Table 2, line 13).

The rough comparison shows that by the time the average mother in Latin America gives birth to her fifth child, she must have over three surviving children. Moreover, the contribution even of mothers with birth parity below 5, in terms of surviving children, 23.7 per 1,000, exceeds not only the total surviving birth rate (18.96) but also the total crude birth rate (20.2) for the DCs. Yet the con-

tributions to the crude birth rate in Latin America continued beyond the fourth birth order--with the survivors of these high births exceeding those in the DCs by over 10 points and accounting for about six-tenths of the total difference in the proportion of surviving births (to about age 20) between Latin America and the DCs. In short, in the LDCs, the high fertility and high birth parities persist <u>despite</u> the substantial number of surviving children within the families that continue to grow. The mortality rates may be somewhat higher in the other LDC regions than in Latin America, but the conclusion is likely to stand.

We turn now to the connection between high parities and the advanced age of parents. The relevant data provide cross-classifications of births by parity and age of mother alone, and for only a few countries, particularly among the less developed. Hence we present the data for a few individual countries, and do not attempt to derive meaningful averages (Table 9). However, the general order of magnitudes suggested would probably be confirmed by more abundant data if they were available.

Needless to say, the role of the older mothers in high parity births in substantial. Thus the average for the five selected less developed countries shows that of 31.5 percent, the share of high parity births in the total, over four-tenths was contributed by mothers 35 years of age or older. Interestingly, in the DCs also, the contribution of mothers that old to the high parity births was also about four-tenths, although the latter accounted for only about 10 percent of total births. Given the excess in the age of father over mother, discussed in the preceding section, we may assume that mothers 35 years old or more are to be matched with fathers well over 40; and

Table 9

Shares in Total Births of High Parity Births to Older Mothers, Selected LDCs and DCs; and Contribution to Differences in Birth Rates, Selected Countries

A. Shares in Total Births of High Parity Births (5th and over) to Older Mothers (%)

	Age of Mothers				
	30-34 (1)	35-39 (2)	40 and over (3)	30 and over (4)	All ages (5)
Less Developed					
1. Philippines 1963	10.7	9.0	3.7	23.4	35.4
2. Thailand 1964	11.0	10.3	5.5	21.8	32.9
3. UAR, 1966	7.2	9.4	5.7	22.3	25.9
4. Guatemala 1963	10.3	8.5	3.8	22.6	33.1
5. Colombia 1964	11.0	9.6	3.9	24.5	30.3
6. Average Lines 1-5	10.0	9.4	4.5	23.9	31.5
Developed					
7. France, 1963	7.0	4.4	1.9	13.3	14.2
8. Germany, FR. 1964	2.3	2.1	1.1	5.5	6.6
9. USA, 1964	5.7	4.0	1.3	11.0	17.4
10. Japan, 1963	0.7	0.8	0.3	1.8	2.4
11. Average Lines 7-10	3.9	2.8	1.2	7.9	10.15

Table 9 continued:

B. Contribution to Differences in Birth Rates

		Shares of High Parity Births (%)		Contributions to CBR	
		Mothers, Aged 30+ (1)	Mothers, Aged 35+ (2)	Mothers, Aged 30+ (3)	Mothers, Aged 35+ (4)
12.	LDCs	25.7	15.9	11.2	6.90
13.	DCs	8.2	4.2	1.7	0.85-

Notes

Panel A: The data are from United Nations, Demographic Yearbook, 1969, (New York, 1970), Table 17. We chose the major countries in the regions for which data were available, to secure a rough approximation. Because of the limited coverage of the less developed regions, other than Latin America, even inclusion of all reporting countries could not yield adequate representation.

Panel B, columns 1 and 2: First we derived the ratios of the shares of high parity births for the older mothers to the shares of high parity births for mothers of all ages (i.e. the ratio of column 4 to column 5, in lines 6 and 10 for column 1 or of the sums of columns 2 and 3 to column 5 in lines 6 and 10, for column 2). These worked out to 0.71 and 0.44 for the LDCs and 0.77 and 0.39 for the DCs. We then applied these to the total shares of higher parities in Table 7 (i.e. 36.2 percent for LDCs and 10.7 percent for the DCs), to secure the entries in lines 12 and 13.

Panel B, columns 3 and 4: The shares in column 1-2 were multiplied by the total CBR for the LDCs (43.4) and for the DCs (20.2) respectively. The

Table 9 continued:

calculation thus parallels that in Panel C of Table 2, except that here it is limited to a comparison of higher parity births to older mothers, not to all births to all mothers.

mothers 30 years old or more imply fathers 35 or more.

Panel B of Table 9 provides an illustrative calculation of the contribution of high parity births to older parents to the total differential (23.2 points) in the crude birth rates between the LDCs and DCs. The high parity births to mothers aged 35 or more (and implicitly to fathers well over 40) account for over 6 points, or over a quarter of the total difference in the CBRs between the LDCs and the DCs. The high parity births to mothers aged 30 and over (and implicitly to fathers 35 and older) account for 9.5 points, or almost half of the differential in the crude birth rates.

We have emphasized the large contribution of high parities, associated with sizable numbers of surviving siblings and with the advanced age of parents, to the excess of crude birth rates in the LDCs over the DCs. The reason for this is that these findings must be recognized in dealing with the persistence of the high birth rates in the LDCs. We must, in analysing the latter, explain not only the connection between the higher fertility and the earlier marriage and younger parents, i.e. at the low parities, but also the relation of high parities to older parents. Why does a family with a mother whose fecundity is declining, and with the father who approaches or passes beyond the age of forty, continue to have high parity births? Why do such families contribute between a quarter and a half of the total birth rate differential between the LDCs and the DCs?

6. Distribution by Size of Household

The family, a group related by blood-ties and usually residing together, is the unit in society primarily responsible for rearing children to the age of maturity, when they can leave the parental home and assume the responsibilities of adult life. Given the higher fertility, predominantly intra-marital, in the LDCs, the average family should be larger in these countries than in the DCs, if only because more surviving children are brought up within the family fold.

But the family is a complex concept that does not lend itself easily to statistical observation; in the larger meaning, relevant to pooling of economic assets and income for coverage of consumer expenditures and accumulation, a family should include not only the nuclear unit of parents and their children residing together but also others. The available statistics do not refer to the family but to the household--a group of individuals sharing quarters (including single-person households) "who make common provision for food and other essentials of living. The persons in the group may pool their incomes and have a common budget to a greater or lesser extent; they may be related or unrelated persons, or a combination of both."[8] A household can then be wider than a family, since it may include members not related by blood-ties, or narrower since it may exclude closely related members living elsewhere. Still, it is a fairly useful approximation to what may be called the co-habiting family unit, in that households with members not related by blood-ties (e.g. domestic servants, hired workers for a family business, boarders, and the like) constitute limited proportions of all households.

Being largely family households, they are relevant to tracing the effects of differential fertility on the number of children within the unit. More important for our purpose--consideration of the possible effects of numbers of children on the economic position of the closely relevant family unit--the household is the unit most often employed in studies of the distribution of income by size.

Table 10 summarizes the data on distribution of households and population by size of household, with emphasis on comparison between the LDCs and DCs. The difficulties with the definition of a household, particularly in cases of unrelated individuals living communally in lodging houses, dormitories, and the like--in addition to those involved in establishing fully the sharing of quarters by a family household with non-related members--yield statistical divergences from the true situation (illustrations can be found in the source in footnote 8). In Table 10 these difficulties appear to affect particularly the averages for Sub-Saharan Africa, which suffers also from inadequate country coverage. For these reasons, we excluded Sub-Saharan Africa from the averages for all LDCs--although the broad differences between the LDCs and the DCs would not have been much affected by its inclusion.

The larger size of household, and particularly the larger proportion of households and population in the larger units in the LDCs than in the DCs, is clear. Households of seven persons or more are 28 percent of all households in the LDCs (line 5) and they account for close to a half of total population (line 14), whereas

Table 10 Distribution of Households and Population by Size of Household, LDCs and DCs, Early and Late 1960s (percentages)

	Size of Household Groups					
	1 (1)	2 (2)	3-4 (3)	5-6 (4)	7-8 (5)	9+ (6)
A.			Distribution of Households			
1. ESE Asia (8)	5.7	8.8	29.7	28.2	17.8	9.8
2. Middle East (9)	6.0	10.8	28.6	29.3	15.7	9.6
3. Sub-Saharan Afr. (8)	11.4	48.1		20.1	20.4	
4. Latin America (15)	7.4	10.5	27.1	24.9	16.5	13.6
5. LDCs (ex. line 3)	6.0	9.3	29.1	27.8	17.4	10.4
6. Europe (13)	16.9	26.1	37.9	14.5	4.6	
7. Overseas offshoots (4)	10.9	24.7	37.1	19.8	7.5	
8. Japan (1970)	13.1	15.0	44.0	22.3	5.6	
9. DCs	14.0	23.8	38.6	17.8	5.8	
B.			Distribution of Population (Same Countries as in Panel A)			
10. ESE Asia	1.1	3.6	20.6	29.7	25.6	19.4
11. Middle East	1.2	4.2	19.7	31.4	23.9	19.6
12. Sub-Saharan Afr.	2.7	31.7		24.2	41.4	
13. Latin America	1.5	4.1	19.0	26.0	23.0	26.4
14. LDCs (ex. line 12)	1.2	3.7	20.3	29.3	25.0	20.5
15. Europe	5.4	16.8	41.9	24.4	11.5	
16. Overseas offshoots	3.1	13.9	36.5	29.7	16.8	
17. Japan	3.6	8.3	43.4	33.1	11.6	
18. DCs	4.2	14.3	40.1	27.8	13.6	

Table 10--continued

Notes:

The major source is the United Nations, Methods of Projecting Households and Families, Manual VIII in the series of annuals on methods of estimating population (New York, 1973), Table 3, pp. 12-15, which distinguishes the following size classes of households: 1, 2-4, 5-6, 7 and over. To obtain greater detail, we used data from somewhat fewer countries for each region (except Sub-Saharan Africa) taken from the Demographic Yearbooks (particularly those for 1962 and 1963, and 1971), from these we derived allocation ratios for the 2-4 and 7+ groups; and applied them to the total shares for these two size groups.

Lines 1 and 8: Include Cambodia, Ceylon, South Korea, Federation of Malaya, Philippines, Thailand, India (allocated with the wider size groups by ratios for Ceylon), and Pakistan. The usual weighting was employed for this region.

Lines 2 and 9: Include Turkey, Iran, Iraq, Syria, Jordan, Libya, Tunisia, Morocco, and the UAR.

Lines 3 and 10: Include several smaller countries for better coverage: Lesotho, Dahomey, Gabon, Kenya, Mali, Sierra Leone, Liberia, and Zambia. Cameroon was excluded because of the exceptional showing for the 1-person group.

Lines 4 and 11: Include Costa Rica, Dominican Republic, El Salvador, Honduras, Jamaica, Mexico, Nicaragua, Panama, Brazil, Colombia, Chile, Ecuador, Paraguay, Peru, and Venezuela.

Lines 6-8 and 15-17: Coverage is as complete as in Table 1. We took the 1970 data for Japan (rather than those for earlier years) to give greater weight to the recent experience (with the rapid changes in Japan's birth rate and family structure).

the corresponding proportions in the DCs are less than 6 and less than 14 percent respectively (lines 9 and 18). By contrast, one person households in the LDCs are only 6 percent of the total and they account for about 1 percent of total population, while the corresponding proportions for the DCs are 14 and 4 percent respectively.

The arithmetic mean size of household is clearly greater in the LDCs than in the DCs. This mean is easily calculated by dividing the percentage shares of one person households in the total of households by the share of one-person households in total population (or, with the necessary adjustment, by relating the proportions of two-person households in households and in population). The resultant averages are 5.0 persons per household in the LDCs and 3.33 persons per household in the DCs. This difference, while substantial, may appear to be too narrow, considering that total fertility in the LDCs is over twice as high as that in the DCs (see Table 1). However, the average size of household is a weighted arithmetic mean, in which the younger (and smaller) households have a greater weight in the LDCs than in the DCs (see Table 2 for relative weights of women in the successive age groups within the childbearing span). If we use the weights in Table 2 for women aged 15 to 49 and assume that the size of household corresponding to these ages, grows in the LDCs from 3 for the 15-19 age group of women by one person for each successive quninquennium reaching 9 persons in the age group 45-49, the weighted average size of household works out to somewhat over 5.5. The addition of single-person households (6 percent of households, but only 1,2

percent of population) would reduce the arithmetic mean to 5.3; and if we reasonably assume that households with women aged 50 years and over are, on the whole, smaller, the average of 5.0 obtained from Table 10 is consistent with the assumption that during the childbearing cycle the average woman in the LDCs may have over 7 births (accounting for the top size of 9 persons). A similar calculation for the DCs, using a progression in size of household from 2 persons for women 15-19 years old, to 3 for the 20-24 age bracket, to 4 for the 25-29 age bracket, and to 4.5 for the remaining age brackets through 45-49, would yield a weighted arithmetic mean of 3.8, which with inclusion of one person households (14 percent of households and 4.2 percent of population), would be reduced to 3.4--and be consistent with the 3.33 mean derived from Table 10, with allowance for the remaining households with women aged 50 years and over. The consistency then is with the assumption that women in the DCs bear 2.5 children (or somewhat more)--less than half of the number assumed in the calculation for the LDCs.

The interest in the conjectural calculations just presented is less in the consistency between the difference in mean size of households in the LDCs and the DCs and the difference in their fertility, than in the emphasis on the fact that the range in the size of households within each group of countries is a reflection of the stages in the life cycle of a family. A new family begins with two members, grows as children are born and have to be maintained within the family for a prolonged period to maturity; then contracts as the parents and

children grow older and the children leave to form a new and separate household. The average size of the household is a somewhat artifical measure that is a weighted combination of units of widely divergent magnitudes. It must therefore be remembered that differences in size of household reflect, in large part, differences in the stage in the life cycle of growth and contraction of the various family units.

Two further observations are relevant to the findings in Table 10. First, it can be demonstrated that much of the difference between the 5.0 person average household in the LDCs and the 3.33 person average household in the DCs is due to the different proportions of children in total population. In 1960 in the LDCs (excluding Sub-Saharan Africa) the proportion of children under 15 to total population was 42.8 percent; of persons under 20 years of age--52.5 percent.[9] The similar proportions for the DCs (Western and Northern Europe and Italy, North America, Australia and New Zealand and Japan) were 27.8 and 33.3 percent respectively. If we apply these percentages to the mean size of household we find that of the total discrepancy of 1.67 persons, children under 15 accounted for 1.22 persons (or over three quarters of the difference) and those under 20 years of age accounted for 1.44 persons (or 86 percent of the difference). The calculation implies, realistically, that few children under 15 or persons under 20 live outside the family unit.

The second observation involves data relating size of household and income per person; and is associated with the finding (still to be tested) that if we group households by size, and then divide house-

hold income by number of persons, per person income declines fairly consistently as we move up the scale in size of household.[10] If this negative association, however mitigated by reduction of number of persons to equivalent consuming units, is accepted, the significantly wider range in size of households in the LDCs than in the DCs is of further interest. Thus if we assume that the smaller the household, the higher the per person income, and array population in descending order of per person income, using the data in Table 10 for all LDCs and DCs, we can interpolate the shares of the top 20 and lowest 50 percent of population. We find that the average size of households for these two partition groups are 2.17 and 7.90 in the LDCs, and 1.70 and 5.38 for the DCs--the ratios being 3.64 and 3.15, respectively. Again, if the relation between per person income and size of household is negative, the figures suggest that per person income differentials due to differences in size of household tend to be greater in the LDCs than in the DCs.

Of course, the relation just suggested may not be that simple; and the function connecting size of household and income per person may not be the same for the LDCs and the DCs. But we make the observation here to point up the line of connection between higher fertility in the LDCs, larger average household, wider range of size of household, and hence possible greater effects on differences in per person income associated with households of differing size. Thus, the higher levels of fertility in the LDCs may affect not only over-all levels and growth rates in per capital product, compared

with the DCs, but also the internal distribution of income by size within the LDCs, compared with the DCs, associated with the wider differentials in size of household in the former.

This last observation is also relevant to much of the writing on size distribution of income in recent years. It is almost entirely based on data on household income, with some information on size of household, but with classifications of households by per household rather than per person (or per consuming unit) income. Needless to say, cross-section differences in distributions of households by size, and changes in these distributions over time, would affect these customary measures; and the latter alone could easily be misleading if we are concerned with income per person (or per consuming unit) rather than with income per household. One should also note that the emphasis on effects of fertility on size of household during the successive phases of the life-cycle of the household only strengthens the conviction that adequate analysis of income inequalities within a country must take account of the demographic components that affect the size of household, and determine the life cycle a household--with its parameters different for the LDCs and the DCs, and its possible changes over time within each.

7. Concluding Comments

In concluding this paper, it may be useful to list the findings bearing on the demographic corollaries of the much higher birth rates (over 43 per 1,000) in the less developed market economies (LDCs), compared with those (about 20 per 1,000) in the developed (DCs).

These findings are based largely on international comparisons for the 1960s.

(a) The age-specific fertility rates for women are, for each age group within the childbearing span, consistently and significantly higher in the LDCs than in the DCs. Women in the LDCs begin bearing children at earlier ages, and continue to bear them through later ages, than women in the DCs. Also, the proportions of younger women within the childbearing span is somewhat higher in the LDCs than in the DCs--a factor only partly offset by the lower proportion of all women of childbearing ages within the total population of the LDCs. The higher fertility of the very young women (under 20 years of age) and of the older women (35 years or more) in the LDCs accounts for almost four-tenths of the total difference in the crude birth rates between the two groups of countries.

(b) The higher age specific fertility rates of women below age 25 in the LDCs is associated with a significantly higher proportion married in these young age classes--both as compared with the DCs. Indeed, intra-marital fertility rates for women 15-24 are somewhat lower for the LDCs than for the DCs. The early marriages of women in some of the major LDC regions (particularly the populous countries in Asia, and in Sub-Saharan Africa, excluding the Communist) suggest a direct transition of a young woman from the parental household to the household of her husband. In the DCs, on the other hand, young women spend several years on education and work outside the parental household before marriage.

(c) The differential in the age of married men in the LDCs and the DCs is far narrower. This is true both at time of marriage and within the married state. The bridegroom or husband is between 5 and 8 or 9 years older than the bride or wife in the LDCs, as compared with 2 to 3 years older in the DCs. The composition of the parental couple (even setting aside some incidence of polygamy in the LDCs), with regard to the disparity in age and experience between husband and wife, is clearly different in the LDCs from that in the DCs--with implications for decisions concerning births and children.

(d) Given the extension of childbearing to the more advanced ages of women, and the substantial age excess of husbands over wives in the LDCs, it follows that older fathers account for a larger proportion of births in the LDCs than in the DCs. The estimates suggest that fathers 40 years or older account for almost a quarter of all births in the LDCs, but for only about a tenth in the DCs; and that a third of the total excess of crude birth rates of the LDCs over those of the DCs is due to births associated with older fathers. Thus, much of the difference in birth rates between the two groups of countries is due to higher fertility of younger women and to the excess of births associated with older men in the LDCs, the greater motherhood of younger women, and the greater fatherhood of older men.

(e) The higher parity births (fifth or higher order) account for almost four-tenths of all births in the LDCs, for less than one-tenth in the DCs. This difference in the contribution of higher parity births accounts for almost six-tenths of the total difference in crude birth rates between the LDCs and the DCs; and a substantial

proportion is due to high parity births to older parents (women 35 years or older; men 40 years or older). Thus much of the higher fertility in the LDCs is due to high parity births, incurred despite the presence within the household of well over three children, on the average, and despite the more advanced age of parents, particularly the father.

(f) Given the larger number of children within the household in the LDCs--and they can be only within the family household one of whose main functions is to raise children to maturity and independence--one would expect that in the LDCs the average household would be substantially larger and the proportion of the total population within fairly large households much greater. And, indeed, the household in the LDCs averages about 5 persons, compared with 3.3 in the DCs; and the proportion of population in households of 7 or more persons is close to one-half of the total population in the LDCs, and less than a seventh in the DCs. These results, which are consistent with the assumption that fertility rates in the LDCs are over twice as high as those in the DCs, raise intriguing questions concerning the impact of differences in size of households on the measures of inequality in the size distribution of income among households or among persons.

Before we turn to the possible implications of these demographic corollaries of birth rates for the factors that might explain the persistence of the high birth rates in the LDCs, one other finding, not explicitly considered so far, ought to be noted. The high fertility rates in the LDCs observed for the 1960s and persisting into the early

1970s, have been maintained despite the fact that in most of the less developed regions, death rates, in general, and infant mortality rates, in particular, have declined substantially over the last three to four decades. Given the assumption that the desired number of children was limited and below total capacity, fewer births should have been needed to achieve a limited total surviving children target. Also, in many of these regions other processes of modernization have spread, either since the 1920s or 1930s, or at least since shortly after World War II. Such modernization should have brought about a modernization of the demographic patterns, particularly lower birth rates and smaller family units.

It would take us too far afield to document this observation in detail. But in view of the relevance of the death rates, and their sharp decline in recent decades in the LDCs, we present a brief summary of the worldwide data easily available, and we supplement it with data for individual countries in Latin America, a less developed region the records for which are relatively good, and the political independence of which goes back a century and a half so that recent decades are not disturbed by major political changes like those that have affected most other less developed countries World War II (Table 11).

We eliminated Mainland China from the aggregates for the LDCs because it is difficult to establish the basis of the China estimates for recent years. Three findings can be briefly stated. First, for all LDCs except China with the sharp decline in the crude death rates of almost a half (from 30.8 to 16.4), the crude birth rate rose slightly.

Table 11

Trends in Brith Rates and Death Rates,
Less Developed Regions and Countries

A. Crude Vital Rates (per 1,000), LDCs and DCs, About 1937 and 1965-70

	DCs	LDCs	China	Other LDCs
	(1)	(2)	(3)	(4)
About 1937				
1. Birth rates	24.1	42.5	42.5	42.5
2. Death rates	15.5	31.6	32.5	30.8
3. Infant mortality rates	106	230	na	na
1965-70				
4. Birth rates	18.6	40.6	33.1	44.0
5. Death rates	9.1	16.1	15.3	16.4
6. Infant mortality rates	27	140	na	na
Change, 1937 to 1965-70				
7. Birth rates	-5.5	-1.9	-9.4	1.5
8. Death rates	-6.4	-15.5	-17.2	-14.4
9. Infant mortality rates	-79	-90	na	na

B. Vital Rates (per 1,000), 10 Countries in Latin America, 1920-29 (I) and 1950-59 (II)

	Cumulative death rates to age 5		Crude death rates		Crude birth rates		Standardized birth rates	
	I	II	I	II	I	II	I	II
10. Chile	338.0	145.0	28.85	13.10	43.0	37.3	40.65	37.15
11. Colombia	256.5	192.5	23.05	17.20	44.75	44.55	42.6	44.8
12. Costa Rica	184.5	115.5	23.4	9.9	45.55	45.15	46.0	47.45
13. Ecuador	295.0	197.5	28.55	16.65	48.4	46.45	na	na
14. El Salvador	340.5	197.5	33.45	18.85	46.85	47.9	44.6*	48.35
15. Guatemala	278.5	224.0	33.15	21.7	48.75	49.95	na	na
16. Honduras	210.0	131.5	23.1	13.7	44.2	46.0	43.6*	49.2

Table 11: continued

Panel B: concluded

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
17.	Mexico	291.0	147.0	27.55	13.05	44.8	45.4	40.45	47.6
18.	Panama	172.5	88.0	16.95	9.1	39.5	39.5	37.7*	42.1
19.	Venezuela	242.5	121.0	25.3	11.55	42.15	44.25	na	na
	Averages (Unweighted Arithmetic Means)								
20.	7 countries (except lines 13, 15 & 19)	256.0	145.3	25.3	13.7	44.1	43.7	42.2	45.2
21.	All 10 countries	260.8	156.0	26.4	14.6	44.8	44.6	na	na

C. Crude Vital Rates, Latin America (ex. Temperate Zone), 1950-55 to 1965-70

		Death Rates				Birth Rates			
		1950-1955	1955-1960	1960-1965	1965-1970	1950-1955	1955-1960	1960-1965	1965-1970
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
22.	Caribbean	15	13	12	11	38	38	37	35
23.	Middle America	16	13	11	10	46	45	44	43
24.	Tropical South America	15	13	11	10	45	43	40	39
25.	Total weighted	15.2	13.1	11.1	10.0	44.4	42.9	40.7	39.5

na--not available

*-- the standard birth rate was calculated from the crude for 1920-29, using ratios of crude to standardized for 1930-39 or 1925-29.

Table 11: continued

Notes

Lines 1-2: Data from United Nations, World Population Trends, 20-1947 New York, December 1949), Table 2, p. 10. We took the mid-value of the range shown. DCs here comprise North America, Japan, Europe, and Oceania (but exclude Temperate South America, a minor omission here and minor inclusion under the LDCs as compared with line 3 or lines 4-6). All other countries are included in the LDCs. China is identified with the region in the source designated "Remaining Far East" (after exclusion of Japan). The population weights used to combine the rates are from Table 1, p. 3 of the source.

Lines 3 and 6: From the UN Background paper prepared for the 1974 World Population Conference, entitled Demographic Trends in the World and Its Major Regions, 1950-1970 (New York, April 16, 1974), Table 6, p. 15.

Lines 4 and 5: From United Nations, The World Population Situation in 1970 (New York, 1971), Table 11, p. 18 (birth rates), Table 12, p. 32 (death rates), and Table 15, p. 46 (population totals, used as weights in distinguishing between China and other LDCs).

Lines 10 to 21: Calculated from the successive country tables in O. Andrew Collver, Birth Rates in Latin America: New Estimates of Historical Trends and Fluctuations, no. 7 in Research Series of Institute of International Studies, University of California, Berkeley, 1965. The source shows quinquennial averages, which we converted to initial and terminal decadal averages. The standardization of birth rates in columns 7 and 8 is for the ages of women within the child-bearing span (see pp. 42-47 of source for the weighting).

Table 11: continued

Lines 22 to 25: Calculated from the source cited for lines 3 and 6 above. The death rates are derived by subtracting rates of natural increase (Table 7, p. 17) from birth rates (Table 5, p. 13). The weighting in line 25 is by population in 1950 for the first quinquennium, average of 1950 and 1960 for the second quinquennium; 1960 population for the third; and the average of 1960 and 1970 for the fourth quinquennium. The population totals are given in Table 2, p. 2, of the source.

Infant mortality also declined, perhaps as much as four-tenths. Second, for the ten Latin American countries in Panel B, both the cumulative death rates to age 5 and crude death rates for total population declined sharply from 1920-29 to 1950-59 (and could be shown to have declined more from 1920-24 to 1954-59)--the average decline in the former being about four-tenths and that in the latter somewhat greater proportionately (lines 20 and 21, columns 1-4). Over the same period, crude birth rates barely changed; and when standardized for age structure of women within child-bearing ages actually rose (line 20-21, columns 5-8). Finally Panel C shows that the decline in the death rates in Latin America continued in the recent two decades, and the crude birth rates too began to decline, but slowly. In fact, the total absolute drop in birth rates over the last 15 years was somewhat less than that in death rates (leading to a slight rise in the rate of natural increase). For many of the populous less developed countries in Asia and North Africa (less so for Sub-Saharan Africa) similar rapidly declining death rates and constant or slightly rising birth rates could be found--although for a somewhat shorter period than that covered for Latin America.

There have been other important modernization trends in the LDCs over the recent decades when the high birth rates persisted. We cite the evidence for Latin America to illustrate rather than claim thorough confirmation. The proportion of population in "urban agglomerations"--urban communities larger than small towns of up to 20,000 inhabitants--in the three subregions of Latin America (excluding the Temperate Zone) rose from 10.8 percent in 1920, to 20.9 percent in 1950, and to 29.2 percent in 1960.[11] This trend must have continued

through the 1960s. With urban defined differently (and using the national definitions) the percentage of urban to total population for all of Latin America rose from 40.9 in 1950 to 56.7 in 1970.[12] Also, per capita gross domestic product (in constant prices) must have been rising at a significant rate since the mid-1920s. Approximate estimates indicate an average rise between 1925 and 1950 of about 1.7 percent per year; between 1950 and 1970 of close to 2.6 percent per year; and for the full 45 year period from 1925 to 1970, 2.1 percent per year--suggesting that the level in 1970 was over 2.5 times that in the initial year.[13] One may assume that other aspects of the social structure were also modernized in Latin America (e.g. higher literacy and level of education, improved health, greater levels of consumption). However, the fact that birth rates failed to decline means that modernization was partial, and may have failed to affect some other aspects of the social and economic structure. Finally, one should note that in two other less developed regions the rough indexes of aggregate product per capita rose substantially: from 1950 to 1970 in East and Southeast Asia (excluding Japan) and from 1960 to 1970 in Africa (excluding South Africa).[14]

We come now to the question: why have the much higher birth rates in the LDCs persisted through decades of declining death rates and rising urbanization and per capita income? Only conjectures are possible. The summary findings above, relating to the demographic components of these high fertility levels are only suggestive of a deliberate process. And the extensive literature, bearing largely on fertility differentials and trends in the economically developed

countries, is also only suggestive, particularly with respect to the transition theory. The latter outlines a paradigm of a shift from the traditional or pre-industrial to the modern demographic patterns; and thus implicitly indicates the factors underlying the "traditionally" high fertility rates in the current LDCs.[15] But, as has been indicated, one must allow for the different fertility and mortality levels, and the different historical conditions of the current LDCs compared with the vital rates and historical conditions of the presently developed countries in their pre-industrial periods in the eighteenth or nineteenth centuries. The literature on demographic experience of the LDCs is quite limited, if only because statistical data have become available only recently (and are still deficient) and the accumulation of analytical results has just begun.[16] Nor is it feasible here to comb the limited but still vast literature. The attempt is rather to present a few broad reflections, induced partly by the evidence summarized, partly by the readily available literature on demographic and economic patterns. These, we hope, will be of interest as at least indications of possible directions of further research.

It might help to group the factors that could serve to explain the higher fertility rates in the LDCs under three broad heads: the technology of birth control; the possibly lower costs of larger numbers of children in the LDCs; the possibly higher returns from larger numbers of children in the LDCs. These three groups are not mutually exclusive, and each comprises a wide range of subvariables. But one can secure at least an impression of the relative magnitudes of their contributions to the demographic pattern to be explained, and a notion

of the identity of some of the subvariables.

As the quotation in footnote 16 indicates, even in the LDCs fertility is controlled. In all of them some institutions and customs keep fertility below the biological potential. This is a matter of some importance, since it suggests that modernization may destroy or weaken these institutions and customs before the new restraining factors associated with modernization become fully operative. But the technology of birth control referred to above is clearly the modern technology, that is far more readily available in the economically developed countries. In the DCs generally the population is richer and more literate, the transport and communication systems are better, and government has a more permissive or favorable attitude. The implication is that the modern, effective, technology of birth control is not available to the population of the LDCs, because of high economic costs of delivery, or the indifferent or negative attitude of the government, or both; and that much of the high birth rate is due to unwanted births, unwanted by the parents who could have avoided them, given more effective control technology.

There is little question that some group in every large population, whether in a developed or less developed country, would have, with better application of better birth control technology, avoided some births that were unwanted. However, "unwanted" is a term subject to many ambiguities in application in quantitative research (unwanted as to timing, or forever, unwanted under what conditions, and the like). Nevertheless, more effective technology and at a lower costs would have, in any population,

some net curbing effect on births--almost be definition of effectiveness and cost. But how significant is such a factor, in explaining the vast differentials in fertility between the LDCs and the DCs?

Several weighty arguments can be adduced to suggest that it is of limited importance. To begin with, age at time of marriage, particularly of women, is clearly an important variable which can be modified, as it has been in the past history of several European and related societies, and thereby affect fertility significantly. This, however, is a change in human and institutional practices, and is little influenced by birth control technology more directly relevant to intra-marital fertility. Furthermore, intra-marital fertility has varied markedly among the current DCs in their pre-industrial phase, when birth control was far less advanced that it is today. These variations find some parallels today among the less developed countries. The two factors just mentioned yielded crude birth rates in the late eighteenth century that ranged from 31 per 1,000 in Norway and Denmark to 38 per 1,000 in Finland, to 55 per 1,000 in the United States.[17]

If the spread of crude birth rates could be so wide with late eighteenth century birth control technology, one wonders why the current technology within the LDCs has been so inadequate. More important, one may ask why, if more children were seen to lead to economic misery, have the families in the LDCs not manifested a sufficiently strong demand for effective birth control means, a demand that would overcome the indifference of government and the obstacles connected with high costs. After all, other products

and aspects of modern technology--ranging from those that reduced death rates so rapidly to the minor palatable products like radio sets and Coca Cola--have spread widely and been accepted. If the argument is that established views and ideas, which persist despite changing events, did not encompass the need for modern birth control technology, then the identifiable factor is not the absence of such technology, but the lack of demand for it. Why, then, have the high fertility levels continued to be wanted--presumably by dominant proportions of the population, if not by the small group who really desired fewer children but were inhibited by difficulties in securing effective tools?

In turning now to costs of, and returns from, children, we note first that these costs and returns can be economic, social, or psychological. Then we may also ask what units weigh these costs and returns--giving not only explicit, overt consideration to these minuses and pluses, but also intutitive responses that nevertheless reflect real balances. Is it the parental pair, the larger family of which the pair is a member, the larger blood-related collective (tribe, caste, etc.), or even a still larger aggregate that sets the norms to which parental pair may refer? In the discussion here, we emphasize the economic and related social costs; and given the structure of LDCs, one must bear in mind the possible reference of decisions regarding the number of children to norms established by a much wider, if still blood-related, group than the nuclear, or even the extended family.

Under the largely rural, family business, conditions in the LDCs, direct and indirect costs of a child are far lower than for the competitive, nuclear family of an economically developed country. In the latter much reliance is placed on the individual earning (or social) power of the father, which would be adversely affected by the economic and other burdens of many children. In a developed economy also the high earning and other power of the wife and would-be mother would be foregone, if her time and energy were absorbed in childbearing and child-rearing. Furthermore, in the developed societies a much greater investment must be made in the rearing of children, so that the direct inputs (as distinct from indirect costs) per child are much higher than in the LDCs. In the latter, only a small investment is needed to rear a child to maturity as an effective economic agent under the conditions of the country and the family.

There is little question that the absolute costs of children, direct or indirect, are far lower in the LDCs than in the DCs. One related point may be added. Because of the closer ties of family in a less developed country to a larger, blood-related aggregate, any unusual costs of the specific family, particularly in connection with

children, may be covered, partly at least, by its associates within the tribe, caste, or similar type of group.

Yet one must consider absolute costs in relation to the total income of the family unit involved. Are the direct and indirect costs of a child in the family of a less developed country clearly lower relative to the total income of the family than the greater costs of a child in a family in developed country relative to its larger income? If the potential income of the latter is X dollars, and it is reduced to X-C by the direct and indirect costs of a prospective child, and if the potential income of the former is X/K dollars and it is reduced to (X/K) - (C/L), is L necessarily less than K (K and L being larger than one)? Even if the proportional burden of the monetary magnitude of the costs of a child are the same in the LDCs and DCs, with the generally lower income in the former, the welfare burden would still be greater.

But costs are not independent of returns. They would be independent only if we fixed the latter by assumption. And one may argue that returns are a major factor in any explanation of the persistence of high fertility rates in the LDCs. This judgment reflects the general notion that societies, and groups within them, are responsive to differential cost and return opportunities. Although a long persisting framework of such opportunities clothes the largely rational responses in social norms and ideological garments, once the framework of costs and returns has changed for families or for groups of families, the adjustment should be relatively rapid. If the response, in fact,

deviates significantly from the rational content, and if the lag, in fact, is long, one must attempt to establish, in a testable fashion, both the factors that underly the deviation and the mechanism that generates the lag. Broad references to peculiarities of human nature, or to the existence of a lag, are merely descriptions of the puzzle, rather than explanations.[18]

If then we consider the returns from children, the implication is that the families in the LDCs view children as a source of wealth, the latter defined broadly as economic or social power. Either in weighting costs against returns, or in adherence to social norms still justified in their eyes, the families invest in children because they view them as a source of economic or social gain. This view may be held also by the blood-related collectives larger than the family household or extended family, even reaching into the large politically sovereign aggregates. But in our discussion we shall be concerned primarily with the family.

Three aspects of the investment in children may be distinguished. One is the economic, labor-pool aspect, the desire for more children because under the rural or small family business conditions of the LDCs they provide a supply of labor at the disposal of the family that, after some years, provides economic savings and advance far greater than any that could be generated by the same family unit with fewer offspring. A crude calculation, based on reasonably low mortality rates and economical ways of raising the younger generation, might show that the net contribution of an additional child starting work in his teens and continuing to the early or mid-twenties would be quite sub-

stantial--if the child is male, and even if he leaves his family upon marriage.[19] Nor should one overlook the possible contribution of an additional daughter, not only from work within the family, but also in many countries from the bride price or the benefit from the connections with the husband's family.

The second aspect of investment in children might be designated the genetic pool aspect. It is relevant to those less developed countries in which, because of the inequality within the economic and social structure, investment in greater personal equipment and further education of few children is no assurance of upward social mobility. In these societies mobility is blocked by monopolization of economic and social power by a limited number of families. Under such conditions, advance for the offspring of the lowly is a matter of success based on personal characteristics and endowments, on a kind of genetic lottery that may turn up a dictatorial corporal or general, or a successful athlete (or their female consorts) so prevalent in many LDCs. A rational calculation would encourage a family in such circumstances to have as many children as can survive in passable health to maturity--on the chance that one may be so endowed genetically as to raise not only himself or herself, but also the family, above the low initial level. One should note that both the genetic pool and the labor pool aspects of returns from children apply also to the lower economic groups within the developed countries--particularly if these groups are socially discriminated against.

The third, and widest reaching aspect, of the investment in children is that of security. The latter involves not merely, and not foremost, economic security of parents who, in their old age, have to rely on the help of children, reliance needed in absence of social provisions for such security in most LDCs.[20] The scope of the security aspect is much broader, encompassing the protection against natural and social calamities, which is not provided by government or other organs of society (not blood-related)--and must be supplied by the family, or larger, blood-related collectives. The pressure toward large families has been associated with the weakness and unreliability of governmental structure in many pre-industrial societies, and the need to rely on the family in a weakly organized community that fails to provide adequate protection to the individual member as an individual. Even today, in many LDCs, the need to rely heavily on the family, the tribe, or some blood-tie subgroup different from the national community as a whole, is fairly apparent. So long as the conditions persist, an adequate increase in numbers of those related by protective blood-ties will be a goal, justified even despite possible short-term disadvantages.[21]

To digress from discussion of the family, one should note the decentralization of authority and the intensification of nationalist ties in the world in recent decades; and the prevalence within many national states, particularly LDCs, of regional and ethnic divergences, only exacerbated by uneven pressures of modern economic growth. In these conditions, despite the Malthus argument that the quality of

population is important, the quantity of population has become charged with political significance, and has turned into a tool in international and intra-national contests and potential conflicts. The continuing controversy in Nigeria concerning reliability of the regional population totals in the several censuses is one illustration of the value ascribed to numbers. And the recent stand by Brazil (at the 1974 Bucharest World Population Conference) on its own population-growth aims is another illustration that, in the international power game, numbers are not a sign of weakness but of strength. This is not to deny the desire of Brazil to spread a larger population over its wide open spaces; but it does reflect a viewpoint, shared by the governments of many other LDCs, large and small, that see advantages in larger numbers. These advantages may be envisioned as wider domestic markets and a larger labor force for exploiting unutilized resources, or as a larger protective reserve in a world still beset by international tensions, armed conflicts, and possibly enormous dangers associated with some aspects of modern technology. In any case, the LDCs, in particular, tend to see in larger population a source strength that they may lack, relative to the DCs, in technology and material capital.

In short, while there may be some validity to the statement that LDCs are poor because they are prolific, it may be said that they are prolific because they are poor. To put it more precisely, they are prolific because under their economic and social conditions large proportions of the population see their economic and social interests in more children as a supply of family labor, as a pool for a genetic lottery, and as a matter of economic and social security in a weakly

organized, non-protecting, society. Furthermore, while the private interests of the parental generation may be in conflict with the long-term economic interests of the national community, there is some agreement between the two when we relate families to larger blood-tie groups within the nation and consider the family and the nation in terms of external security interests in a divided and dangerously tense world.

It is hardly necessary to emphasize the speculative character of the comments just made. Yet they are suggested by, and are consistent with, the implications of much of the statistical evidence summarized.[22] The conjectures would be more useful if some attention were given to components of change within countries. Thus, it may be that the declining death rates and rising income per capita had different impacts on different groups within the LDCs. It may be that the fertility for some modernizing groups declined, but that of other groups increased, with greater health and nutrition and relaxation of traditional restraints. In that case, the persistence of high aggregate fertility rates would be the result of a balance of conflicting trends within the population, promising a decline as the relative weights of the groups shift. But it was not feasible to pursue these hints here; and in any case, there would be serious data problems in the way.

Nor is it feasible here to discuss the policy implications of the situation suggested by the double statement that LDCs are poor because they are prolific and prolific because they are poor--except to indicate that in many similar situations in the past innovative breakthroughs brought about changes in economic and social institutions

and led to the emergence and spread of groups pioneering in new and modern directions.

Finally, one must stress that the above comments constitute judgments on the importance of various groups of factors that might explain the persisting high birth rates in the LDCs--for which I have no quantitative weights derived from tested evidence. They should, therefore, be viewed as tentative and rough, although plausibly inferred from the demographic patterns summarized.

Footnotes

[1]See Frank Lorimer and others, Culture and Human Fertility (Paris, UNESCO, 1954), pp. 52-53; quoted in United Nations, Population Bulletin, no. 7, 1963 (New York, 1965), p. 101. Section VII of this Bulletin, pp. 10121, has extensive discussion of age patterns of fertility.

Fecundity is the physiological capacity of woman for procreation, and is characterized by a rather narrowly defined span with greatly varying levels within the span.

[2]High total fertility, even higher than that for the less developed countries today, was shown in the past in some of the currently more developed countries--but always with a low birth rate for the younger age class. Thus, in European Russia in 1897, total fertility was as high as 7,060, but the rate for the 15-19 class was only 30; similar rates for Bulgaria for 1901-05 were 6,570 and 23; for Serbia and Croatia-Slavonia combined in 1910, 5,595 and 44 (see Robert R. Kuczynski, The Balance of Births and Deaths, Vol. II, various tables, The Institute of Economics of the Brookings Institution, New York, 1931). In the successor states--USSR, Bulgaria, and Yugoslavia--total fertility rates for the mid-1960s, according to United Nations sources, ranged from 2,075 for Bulgaria to 2,695 for Yugoslavia.

If we group the 52 countries covered in lines 1-5 of Table 1, i.e., all the less developed, including Hong Kong and Singapore, in descending order of the birth rate for the younger age group, 15-19, and strike group averages, the following associations are revealed:

Footnote 2 (continued):

Averages of Age Specific Birth Rates, Countries Grouped in Declining Order of the Rate for the 15-19 Class

Groups (Number of countries in parentheses)	15-19 (1)	20-24 (2)	25-29 (3)	Changes (1-2) (4)	Changes (2-3) (5)	Total Fertility (6)
1. Top (6)	239	309	289	70	-20	6,665
2. II (6)	173	305	285	132	-20	6,455
3. III (7)	147	310	294	163	-16	6,155
4. IV (7)	136	288	298	152	10	6,030
5. V (7)	124	308	339	184	31	6,745
6. VI (7)	105	299	322	194	23	6,435
7. VII (6)	75	265	291	190	26	5,885
8. VII (6)	45	244	299	191	55	5,250

As the rate for the youngest class declines, the change in the rate from the 20-24 to the 25-29 class shifts from a minus to a plus, thus indicating the movement of the peak toward later ages. Even more interesting is the fact that through the sixth of the eight groups, total fertility shows no decline. This is because the decline of more than 100 points in the age specific rate for the 15-19 class is offset by the rise in the rates at the later ages.

[3]The underlying population data here are from the Demographic Yearbook, 1965 (New York, 1966). The total for the LDCs is the weighted average for the four regions; and the rate for each region is the weighted average of the subregions (Other Asia, Middle South Asia, and South East Asia for ESE Asia; Southwest Asia and North Africa for the Middle East; the rest of Africa, except South Africa for the Sub-Saharan region; and Latin America, excluding

Footnote 3 (continued):

the Temperate Zone, for Latin America). For the DCs I took Northern and Western Europe, and Italy to represent Europe; North America, Australia and New Zealand for the overseas offshoots; and Japan. The crude birth rates for 1960-64 are given in the sources for Table 1; and we used the sum of populations in 1960 and 1964 as weights.

[4]See e.g. Table 21 of United Nations, Demographic Yearbook, 1969 (New York, 1960), the latest volume emphasizing data on natality. The high proportions of illegitimate births shown for many Latin American countries (and some in Asia) reflect the prevalence of consensual marriages. Since we include consensual with legal marriages, such births must be treated as legitimate.

[5]See discussion of table on marital status (Table 7) in United Nations Demographic Yearbook, 1968 (New York 1969), pp. 21-22.

[6]Some confirmation of the findings is suggested by the rather meager data on age distributions of brides and grooms in the LDCs (compared with the DCs). For five countries in the Middle East and six countries in Latin America we have the median ages of brides and grooms and those of married men and women (consensual marriages excluded)--both groups covered only through age classes 15-49. In the tabulation below we compare these with similar data for twelve countries in the DC group.

Footnote 6 (continued):

Median Ages of Brides and Married Women, and of Bridegrooms and Married Men, LDCs and DCs, 1960s

(for brides and wives below 50)

	Median age, Bride (1)	Corresponding age, groom (2)	Difference (2-1) (3)	Median age, wife (4)	Corresponding age, husband (5)	Difference (5-4) (6)
1. Middle East, 5 countries	20.3	26.3	6.0	31.1	39.2	8.1
2. Latin America, 6 countries	22.0	26.2	4.2	32.1	37.2	5.1
3. ME and LA	21.2	26.2	5.1	31.6	38.2	6.6
4. Developed Countries	22.7	25.4	2.7	35.3	38.2	2.9

Notes:

Underlying data are from United Nations, Demographic Yearbook 1968 (New York, 1969), Table 27 (for age at marriage) and Table 7 (for distribution by age and marital status).

In general, the year of marriage was assumed to lie between 3 and 5 years before the year for which marital status was reported.

Countries covered in the Middle East are Iraq, Jordan, UAR, Tunisia, and Algeria; for Latin America--Mexico, Colombia, Peru, Guatemala, Chile, and Venezuela. The consensual category was omitted and the two regions were weighted equally.

The DCs covered are the eight largest countries in Europe, all overseas offshoots except New Zealand, and Japan. The weights for the three regions were those used in the text tables. In deriving the age partition values for men corresponding to the median age of bride (wife), we matched younger groups (husbands)

Footnote 6 (continued):

with younger brides (wives). For medians this implies no internal matching within the age distribution, since the full range of the younger groups (husbands) is assumed to correspond to the total 15-49 range of brides (wives).

Both the excess of age of husband over wife and the excess of age of group over that of bride are wider in the LDCs than in the DCs. Moreover, the spread is somewhat wider for ages of wives and husbands than for ages of brides and grooms in the LDCs (from 5.1 to 6.6 years), not true of DCs (where it changes from 2.7 to 2.9 years). The wife-husband population is, of course, older than the bride-groom--and the widening of the excess of ages of husband over wife, compared with groom over bride, suggests the tendency observed in Table 5, for the excess of the age of husband over wife to rise as the wife grows older--particularly notable in the LDCs, but rather minor in the DCs.

Needless to say, because countries in ESE Asia (particularly India, Pakistan, and Indonesia) and in Sub-Saharan Africa are omitted, the median age for the bride among the LDCs in the tabulation just shown is too high. Hence, the difference between the LDCs and the DCs in the median age of brides in lines 3 and 4, col. 2 is underestimated.

[7]See O. Andrew Collver, Birth Rates in Latin America: New Estimates of Historical Trends and Fluctuations. Research Series no. 7, Institute of Studies, University of California, Berkeley, 1965. The estimates are taken from Tables 11, 16, 19, 22, 28, 31, 34, 37, 40, 44, 47, and 50, pp. 66, 81, 89, 99, 116, 121, 127, 135, 144, 154, 160, and 169.

[8]The quotation is from p. 6 of the United Nations manual on Methods of Projecting Households and Families, referred to as the main source for Table 10 below. A useful, if summary, discussion of the concepts of family and hold is found on pp. 5-12.

[9]The data are from the United Nations working paper, Population Estimates by Regions and Countries, 1950-1960, ESA/P/WP. 31, May 1970.

[10]For illustrative data for the United States see my paper, "Income-Related Differences in National Increase: Bearing on Growth and Distribution of Income," in Paul A. David and Melvin W. Reder, eds., Nations and Households in Economic Growth, Essays in Honor of Moses Abramovitz, New York, 1974, Tables 1 and 2, pp. 130 and 133. Evidence for Taiwan and the Philippines indicates that this negative association between size of household and income per person is found also in the LDCs.

[11]See United Nations, Growth of the World's Urban and Rural Population, 1920-2000 (New York, 1969), Table 47, p. 115, and Table 48, p. 116.

[12]See the United Nations background paper prepared for the 1974 World Population Conference, cited for Table 11, lines 3 and 6, Table 14, p. 30.

[13]The estimates for 1925-1950 are from Alexander Ganz, "Problems and Uses of National Wealth Estimates in Latin America," in Raymond Goldsmith and Christopher Saunders, eds., Income and Wealth Series No. VIII (Bowes and Bowes, London, 1969), Table III, p. 226. The estimates for 1950-60 and 1960-70 are from Table 6B of United Nations, Yearbook of National Accounts Statistics, 1969: vol. II, International Tables (New York, 1970), and Yearbook of National Accounts Statistics, 1972, vol. III, International Tables, (New York, 1974).

[14]The source for 1950-60 is the United Nations Yearbook, 1969 and for 1960-70, the Yearbook, 1972, both cited in footnote 13. For East and Southeast Asia the annual growth rate for 1950-70 in gross domestic product per capita was somewhat over 2 percent, yielding a cumulative rise of 50 percent over the two decades; that for Africa for 1960-70 was only slightly lower. It must be noted, however, that these are aggregates, and make no allowance for divergences among countries or for income inequalities within countries.

[15]For an illuminating summary of the transition theory and the modifications in it in the light of current research see A. J. Coale, "The Demographic Transition Reconsidered," a paper presented at the Liege 1973 International Population Conference of the International Union for Scientific Study of Population, pp. 53-72.

[16]In the 1953 United Nations volume, The Determinants and Consequences of Population Trends (New York, 1953), which was a valuable compilation of findings of studies on the relations between population changes and economic and social conditions, the summary of Chapter V noted that statistical data on fertility are lacking, particularly for "most under-developed countries" (p. 96. par. 141) and in referring to factors that account for high fertility ("in the neighborhood of 40 per thousand" p. 97, par. 145) notes "factors such as the nearly universal marriage of women at young ages and the absence of the use of birth control measures." But the summary also notes that even these LDCs have "institutions and customs which reduce fertility substantially below the biological potential."

Footnote 16 (continued)

The revised edition of the volume, United Nations, The Determinants and Consequences of Population Trends: New Summary of Findings on Interaction of Demographic, Economic and Social Factors, Vol. I (New York, 1973), contains in Chapter IV a much richer discussion of fertility levels and trends in the high fertility (i. e. LDC) countries; and a wider exploration of the cultural, economic and social factors behind them. But the discussion comments on the difficulties of applying the past experience of the presently developed countries to the current LDCs (see paragraph 134, p. 96); and, in trying to explain why there has been little response of the birth rates in the LDCs to much higher levels of income and lower levels of death rates, still emphasizes the "threshold" hypothesis. The latter assumes that the modernization and economic growth levels must reach some relatively high level before effects on birth rates may be expected. But as I suggested in another connection, the hypothesis is but another name for the puzzle--rather than a substantive explanation, that would specify the factors that prevent sizable rises in income and declines in death rates from having an effect (see the comments in my paper, "Economic Aspects of Fertility Trends in the Less-Developed Countries," in S. J. Behrman, Leslie Corsa Jr., and Ronald Freedman, eds., Fertility and Family Planning: A World View (Ann Arbor, 1969), pp. 157-159).

[17]For a convenient summary of these vital rates see Simon Kuznets, Modern Economic Growth (Yale University Press, New Haven, 1966), Table 2.3, pp. 42-44.

[18]This applies also to the "threshold" hypothesis referred to in footnote 16, and criticized in my earlier paper cited in that footnote.

In that paper, I argued that in explaining the high birth rates in the LDCs a rather limited weight should be assigned to the "purely econoic social institutions and life patterns" (p. 101). The seeming inconsistency between the position taken then and the discussion here is due largely to the narrow definition of the term "economic variables" in the earlier paper.

[19]See the discussion in Mahmood Mamdani, The Myth of Population Control: Family, Caste, and Class in an Indian Village, Monthly Review Press, New York, 1972. This short book is based largely on interviews with members of different castes in a Punjab village that was the focus of an earlier long-term study and prolonged field effort at education in family planning and birth control. One cannot judge the validity of the results even in terms of the given village, let alone their relevance to a wider field of population experience and motivation among the LDCs. But the book is useful in quoting the reasons adduced by various occupational groups for having more children, particularly sons.

[20]See the analysis in papers by David M. Heer and Dean O. Smith which uses simulation techniques to derive the number of births required if, given the mortality levels prevailing in the LDCs, a parental couple wishes to assure a high probability that at least one son will survive to father's old age. The papers are "Mortality Level, Desired Family Size, and Population Increase," Demography, vol. 5, no. 1, 1968, pp. 104-121, and "Mortality Level, Desired Family Size and Population Increase: Further Variations on a Basic Model," Demography, vol. 6, no. 2, May 1969, pp. 141-150.

[21]This argument applies, in particular, in cases of natural calamities and breakdowns of civil authority in internal conflicts. The vulnerability of LDCs to such disasters, combined with the weakness of central authority, is obvious. While natural and social calamities may raise the death rate temporarily, the sustaining long-term effects making for higher birth rates probably more than compensate in the aftermath.

For a suggestive analysis of the key role of the family as a major resource in a recent calamity see Robert W. Kates and others, "The Human Impact of the Managua Earthquake," Science, vol. 182, December 7, 1973 pp. 981-990.

[22]Many of the arguments are identical with those used in the transition theory to explain "traditional" high birth rates (see the long summary quotation from Notestein in the Coale paper cited, in footnote 15.