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CENTER DISCUSSION PAPER NO. 343

INEQUALITY IN THE SIZE DISTRIBUTION OF HOUSEHOLDS: DIFFERENCES AND TRENDS

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Inequality in the Size Distribution of Households: Differences and Trends

Simon Kuznets

This paper deals with the distributions of households by size, i.e., by number of persons, as they are observed in international comparisons; and for fewer countries, over time.[1] Our interest is in the extent of inequality in the size-distribution of households, because earlier explorations indicated that, within countries and within significant sub-national groups, size-differences among households are positively correlated with differences in income per household; but negatively correlated with differences in household income per person.[2] Given this combination, it follows that inequality in the size-distribution of households constitutes a minimum to which the associated inequalities in income per household and in household income per person should add. Hence, differences and changes in inequality in the size distribution of households should result in differences or changes in the associated inequality in income per household or in the associated inequality in household income per person, or in both. These different or changing contributions of inequality in the size distribution of households may affect significantly the total distribution of income by income per household, or by household income per person, or both.

1. International Comparison for Recent Years

We begin with an international comparison of the size distributions of households for a large number of countries in recent years. This comparison is feasible because the United Nations has assembled, in its

Demographic Yearbooks and in some related publications, the distributions of households and of population in households for a large number of countries --in detail that permits us to derive disparity or inequality measures of the simple type used by us. We limited them to the TDMs, the sum, signs disregarded, of the differences between percentage shares of the size classes in total households and in total population, because in past work we found their orders of magnitude so closely related to the slightly more sensitive Gini coefficients as to serve our purpose adequately. The main question that we tried to answer was whether there were systematic differences among countries in the inequality in the distributions of their households by size, systematic in the sense of being associated with average size of household, and thus also with differences among countries in the level of their economic and demographic development.

The definitions of households differ somewhat among countries; the data are incomplete for some, and we had to resort to adjustments (of no great magnitude) to complete them by estimating the difference between total population and population in households, or by deriving distribution of population among size classes of households from the size distributions of households.[3] And, as we shall see, the coverage of the United Nations data is inadequate for some major regions of the world. But the sample is large enough to cover a variety of regions.

A summary of the data on the size of the average household (arithmetic mean number of persons), on the TDM measure of disparities in size, and on related measures, for the countries covered by the data, is provided in Table 1. In view of the bearing of size differentials

among households on the disparities in income per household and per person, our main interest here is in the inequalities in the distributions of households by size for the different groups of countries. A reference to the identity of the countries included, listed in the notes to Table 1, reveals that data are lacking for the populous countries of South and East Asia (Mainland China, India, Indonesia, and a number of others) and for Subsaharan Africa (Nigeria, Ethiopia, and a large number of others). One should also note the omission of such major communist countries as the U.S.S.R., the data for which do not report the one person households. Nevertheless, the coverage is sufficiently varied to suggest some intriguing similarities and differences.

(a) The first finding to be observed in Table 1 is the familiar difference in size of average household between the less developed and more developed market economies, with the former ranging from 4.5 to 5.5 persons and the latter from 3 to somewhat over 3.5. The rather low average of 3.5 persons per household for the Communist group, which includes such less developed countries as Mongolia, Cuba, and Bulgaria, reflects the effects of Communist organization of society in reducing the birth rates and thus the contribution of children to size of household.

(b) A glance at columns 7-8, in conjunction with column 6, reveals that the major source of differences in average size of household is the proportion of children (under 15) in total population and hence within the households. Contrasted with this positive correlation between proportions of children and average size of household, is the negative correlation between the latter and the proportions, among all households, of 1- and 2-person units (columns 4 and 5), the size classes within which the

Table 1. Average Size of Household and Associated Measures, Countries by Economic and Regional Groups, 1960s and 1970s

	Number of Countries	Persons per Household	TDM, Size Distr.	% in all HHs: 1 pers. HH	% in all HHs: 2 pers. HH	% of pop. below 15	Pers. per HH: below 15	Pers. per HH: 15 and over
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Less Developed Market Economies								
1. East and Southeast Asia	8	5.45	37.6	4.1	8.0	43.2	2.35	3.10
2. Middle East	7	5.33	42.2	6.4	10.9	45.6	2.43	2.90
3. Subsaharan Africa	7	4.59	51.4	13.6	15.6	43.0	1.97	2.62
4. Latin America (ex. Caribbean)	12	5.00	43.4	7.4	12.3	42.1	2.10	2.90
5. Caribbean	6	4.46	53.5	16.6	16.1	42.5*	1.90	2.56
Developed Market Economies								
6. Dev. Europe	12	2.96	44.8	20.7	26.8	24.3	0.72	2.24
7. Overseas off-shoots	4	3.22	44.45	15.85	27.45	28.5	0.92	2.30
8. Japan	1	3.45	38.8	13.6	16.8	24.5	0.85	2.60
9. DC (lines 6 & 7 weighted 2 each, line 8 weighted 1)	-	3.16	43.5	17.3	25.1	26.0	0.83	2.33
10. Other Europe	4	3.82	43.7	10.9	20.45	29.4	1.12	2.70
11. Israel	1	3.79	46.4	12.2	22.2	33.1	1.25	2.54
Communist Countries								
12. All covered by avail. data	8	3.49	42.7	15.65	20.2	28.4	0.99	2.50

*Covers 5 countries, excludes British Guiana

Table 1--continued

Notes

Columns 1-5: Except for entries for United States and Taiwan, the underlying data for all countries are either from the United Nations Demographic Yearbooks (for 1962, 1963, 1971, 1973, and 1976) or from UN files for more recent years. The data in the UN Demographic Yearbook for 1955 were not used here, since they related to years well before the 1960s.

The entries for the United States are taken or calculated from US Bureau of the Census, Current Population Reports, Series P-60, no. 104, Washington 1977, Table 3 and 15, pp. 13-20 and 48-57.

The entries for Taiwan are taken or calculated from two sources. One, relating to Taipei City, is by the Bureau of Budget, Accounting, and Statistics, Taipei City Government, Report on the Survey of Family Income and Expenditures... Taipei City 1975, 1976, Table 16, pp. 108-11. The other, relating to Taiwan Province, is by Department of Budget, Accounting, and Statistics, Taiwan Provincial Government, Report on the Survey of Family Income and ..., Taiwan Prov., 1975, 1976, Table 25, pp. 538-48. The total and per household number of persons in the open-end, largest size group was calculated from the other size-groups and the population totals for all households given in the other tables in the Reports.

For two or three countries we had to estimate the difference between total population and population in private households, on the basis of such ratios for neighboring sets of countries. The related adjustment was also made in the population for the upper, open-end size class.

Table 1--continued

Column 6: These are ratios of population under 15 to total population. For recent years, these are available at every 0 and 5 year beginning in 1950 in United Nations, Selected World Demographic Indications by Countries, 1950-2000, Working Paper ESA/P/WP.55, May 1975. The ratio for that 0 or 5 year was taken for each country that was nearest to the date for which the data on size distribution of households were available for columns 1-5.

The entries for subdivisions of the United Kingdom were obtained for late 1960s from UN Demographic Yearbook 1970, New York 1971, Table 6. That for Taiwan was taken from the country's Statistical Yearbook, 1976.

In averaging for regional groupings in columns 2-6, we assigned equal weight for each country.

Cols. 7 and 8: Obtained by multiplying the averages in col. 2 by the percentages in col. 6, used as proper fractions, and by the complement of the latter to 1.000.

The following countries and years were covered in the several groupings:

Line 1: South Korea, 1960; Taiwan, 1975; Philippines, 1970; Thailand, 1970; Federation of Malaya, 1957; Khmer (Cambodia), 1962; Pakistan, 1968; Nepal, 1971.

Line 2: Iran, 1966; Kuwait, 1975; Iraq, 1965; United Arab Republic (Egypt), 1960; Libya, 1964, Tunisia, 1966; Morocco, 1971.

Table 1--continued

Line 3: Lesotho, 1956; Liberia, 1962; Sierra-Leone, 1963; Southern Rhodesia, 1962; Zambia, 1969, Reunion, 1967; Mauritius, 1962.

Line 4: Costa Rica, 1973; Dominican Republic, 1970; Ecuador, 1962; Mexico, 1970; Argentina, 1970; Brazil, 1970: Chile, 1970; Colombia, 1964; Peru, 1972; Uruguay, 1963; Paraguay, 1962; Venezuela, 1961.

Line 5: Barbados, 1960; Bahamas, 1970; Guadeloupe, 1967; Martinique, 1967: Trinidad and Tobago, 1970; British Guiana, 1960.

Line 6: England and Wales, 1971; Scotland, 1971; France, 1968; West Germany, 1970; Italy, 1971; Switzerland, 1970; Austria, 1971; Netherlands, 1960; Denmark, 1965; Norway, 1975; Sweden, 1975; Finland, 1970.

Line 7: United States, 1975; Canada, 1976; Australia, 1971; New Zealand, 1966.

Line 8: Japan, 1975.

Line 10: North Ireland, 1966; Eire, 1971; Spain, 1970; Portugal, 1960.

Line 11: Israel, 1972.

Line 12: Mongolia, 1969; Cuba, 1970; Bulgaria, 1965; Czechoslovakia, 1970; Hungary, 1970; German Democratic Republic, 1971; Poland, 1970; Yugoslavia, 1971.

contribution of children to size is minimal.

(c) The most striking finding in Table 1 is that the average TDM is roughly the same for a number of economic and regional groupings that otherwise differ substantially in their economic development, in the size of their average household, and in their geographical location. A range of TDM from 42 to 45 includes the averages for the 16 countries of Europe (and the two subgroups among them), the 4 overseas offshoots, the 7 countries in the Middle East, the 12 countries of Latin America, and the 8 Communist countries--a total of some 47 countries, market and command economies, economically more and less developed, with average size of household ranging from barely above 3 to well above 5. We shall return to a closer examination of this finding, after considering briefly the three groups in Table 1 for which the level of TDMs differs substantially from that common to most other countries.

(d) For one regional group in Table 1 the average TDM is distinctly below the range of 42 to 45 observed for so many other groups--that for the eight countries in East and Southeast Asia, with an average TDM of 37.6 (line 1); and one could add to it Japan, with its TDM of 38.8 (line 8). One should also note that for the ESE Asia group and Japan the proportions of 1 and 2 person households are distinctly lower than in other countries at similar levels of development and with the same proportions of children under 15 in column 6.

Inspection of the measures for the eight countries included in line 1 reveals that the TDM for all, except Federation of Malaysia, was either 40 (Pakistan and Nepal) or well below it (the other five countries). We did omit Hong Kong and Singapore, the TDMs for which were 48.4 and 49.0 for 1966 and 1971 respectively, on the argument that these city-enclaves were characterized by a structure bound to be different from countries with both urban and rural components. The data thus suggest that the countries in East Asia exhibit a distinctive type of size-distribution of households. If this finding is confirmed by additional data, and is not due to some aspects of the definition followed in statistical practice, one would have to search for the institutional characteristics that account for a size structure among households so different from that in most other regions.

(e) For two regions, Subsaharan Africa and the Caribbean, inequality in the distribution of households by size is unusually wide, with average TDM above 50 (lines 3 and 5). And, significantly, here the proportions of 1 and 2 person households in all households, in columns 4 and 5, are too high,--in comparison with other countries in which the proportions of children under 15 are about the same as in the two regions under discussion.

As already noted, the sample for Subsaharan Africa is poor and all we can say is that for the seven countries covered, the TDM ranged from a low of 44.2 for Mauritius in 1972 to a high of 64.2 for Sierra-Leone in 1963, with 5 out of the seven countries characterized by TDMs of 49 or over. The case is strengthened by the finding that for Kenya's urban households in 1962, the TDM is as high as 54.8; but data for many more countries are needed to provide an adequate coverage of this large region.

The difference between the disparity measures for the Caribbean group and those for Latin America suggests the distinctiveness of the former with 5 out of the 6 countries showing TDMs well over 50. The distinctiveness is emphasized also by comparison with the measure for 5 islands in the Pacific (Solomon Island, 1976; Samoa, 1971; Gilbert Islands 1973; Pacific Islands, 1958; and New Caledonia, 1963), which, with an average household of 5.60 persons show an average TDM of 44.4 Here again, as in the case of East Asia, specific explanations would be required to account for the different size-structure of households.

We return now to the major finding noted above, the narrow range within which disparity or inequality measures vary for a large number of countries, the latter differing widely in size of average household, in level of economic development, and even in the system of economic organization. Of the 70 countries covered in Table 1, 21 are in the three regions in which inequality in the size distribution of households was either unusually moderate (East and Southeast Asia) or unusually wide (Subsaharan Africa and the Caribbean). The remaining 49 countries, comprising all the developed market economies, all the Communist countries for which data are available, and the Middle East and Latin America regions among the less developed market economies, can be examined further to observe some correlates of the relative invariance of the inequality measures (TDMs). We do this by arraying the countries in decreasing size of their average household, the most easily available characteristic of the level of their economic development, and studying the associaton between household size,

disparities in the size distribution of households, and related measures on proportions of population under 15 and the percentage shares in all households of the 1 and 2 person size-classes (Table 2).

In the arrays summarized in Table 2, the average household declines from 5.69 persons in group I to 2.75 persons in group VII, and the identity of countries suggested in the regional designations (line 1) indicates that the movement is from less developed to the more developed countries (with some special bias toward lower average size among the Communist countries). But the TDM measures of disparity or inequality remain at levels between 42 and 45½, without systematic movement associated with declining size of households. Within the limits of the universe covered by these 49 countries, the absence of a significant association between size of household and extent of inequality in the size-distribution of households would suggest the absence of trends in inequality in this size distribution over time as the average size of household declines -- if cross-section comparisons can be used as a guide to the trends over time.

The downward movement of the size of average household and the relative constancy of the TDM as gauge of inequality in the size distribution of households are accompanied by a substantial decline of the proportion of children under 15 years of age in total, and hence in household, population (line 4) and an increasing proportion of 1 and 2 person households both in all households and in total household population (line 9 and 12). As usual, the difference in average size of household is due largely to differences in number of children under 15 rather than to those in adult members: the decline in average size from group I to group VII, of 2.94

Table 2. Grouping of 49 Countries in Decreasing Order of Size of Household

		Groups in Decreasing Order of HH Size (7 Countries each)						
		I (1)	II (2)	III (3)	IV (4)	V (5)	VI (6)	VII (7)
1.	Regional affiliation	ME-2 LA-5	ME-4 LA-3	ME-1 LA-2 OD-2 CM-2	LA-2 OD-3 CM-1 DC-1	CM-2 DC-5	CM-2 DC-5	CM-1 DC-6
2.	Persons per household	5.69	5.09	4.43	3.76	3.34	3.01	2.75
3.	TDM, distribution of HHs by size	43.4	42.3	44.3	43.2	42.2	43.8	45.6
	Breakdown by Age							
4.	% of under 15 in total population	46.1	44.0	39.5	29.4	26.9	23.8	23.3
5.	Persons under 15 per HH	2.62	2.24	1.75	1.11	0.90	0.72	0.64
6.	Persons 15 and over per HH	3.07	2.85	2.68	2.65	2.44	2.29	2.11
		Proportions (%) of 1 and 2 Person Households in all households						
7.	1 person HHs	5.9	6.7	9.2	11.3	14.6	19.8	23.8
8.	2 person HHs	9.3	11.4	15.5	20.5	22.5	25.8	28.9
9.	1 & 2 person MMs combined	15.2	18.1	24.7	31.8	37.1	45.6	52.7
		Members of 1 and 2 person HHs in total population in HHs						
10.	1 person HHs	1.1	1.3	2.1	3.0	4.4	6.6	8.7
11.	2 person HHs	3.3	4.5	7.1	11.0	13.5	17.2	21.2
12.	1 and 2 person HHs combined	4.4	5.8	9.2	14.0	17.9	23.8	29.9

Table 2--continued

		Groups in Decreasing Order of Size						
		I (1)	II (2)	III (3)	IV (4)	V (5)	VI (6)	VII (7)
		Excluding the 1 and 2 Person Households						
13.	Persons per HH	6.41	5.86	5.34	4.71	4.36	4.19	4.07
14.	TDM	34.0	32.1	31.6	29.4	24.6	23.7	22.2
	By Age							
15.	% of under 15 in population	48.3	46.7	43.3	34.3	32.9	31.7	33.3
16.	Persons under 15 per household	3.10	2.74	2.31	1.62	1.43	1.33	1.36
17.	% 15 & over per HH	3.31	3.12	3.03	3.09	2.93	2.86	2.71

Notes

The regional affiliation designations in line 1 are as follows (see Table 1): ME- Middle East (7 countries); LA-Latin America (12 countries); OD--other developed countries (5 countries, lines 10 and 11 of Table 1); CM--Communist countries (8 countries); DC--developed countries (17 altogether, see lines 6-8 of Table 1).

For lines 2-12 the individual countries were arrayed in decreasing order of size of average household, and then divided into seven groups of 7 countries each. For each group we calculated unweighted arithmetic means of the measures in lines 2,3,4, 7-9 and 10-12. The sources of these data were indicated in the notes to Table 1.

Table 2--continued

Lines 5 and 6 were derived by multiplying the percentages in line 4, taken as proper fractions, by the average number of persons per household in line 2.

For lines 13-17 the grouping of the countries was identical with that for lines 2-12, i.e. based on decreasing size of the average household for the total size-distribution of households. Then, for each of the 49 countries, we recalculated the distribution of households by size, omitting the 1 and 2 person households; and computed the unweighted arithmetic means of the measures appearing in lines 13, 14, and 15.

Lines 16 and 17 were again derived by multiplying the percentages in line 15, taken as proper fractions, by the average number of persons per household in line 13.

persons is accounted for by a drop in the average of children per household of 1.98 (line 5) and of adults of 0.96 (line 6), with proportion of two-thirds for the former and one-third for the latter. And there is a sharp rise in the share of one and two person households in all households, from 15 percent in group I to over 50 percent in group VII (line 9); the shares in total household population of the members of these two size-classes rise from less than 5 percent to almost 30 (line 12).

We proceed on the hypothesis that the combination of relatively invariant measures of inequality in the size-distribution of households with wide differences in size of average household, of the type shown in lines 2 and 3 of Table 2 (and would be shown for Gini coefficients or other measures of inequality) is due to the associated changes in the proportions of children (below 15 or with other realistic dividing lines) and in the shares of 1 and 2 person households (the ones from which children are almost totally absent); and that these differences in the children proportions and in the shares of 1 and 2 person households are interrelated in that the factors that make for fewer children also make for a much greater "separateness" in the way adults live. We shall try to follow this hypothesis, with whatever scant data are at hand; but one test bearing on it can be made in close connection with Table 2, using the same bodies of data that were used for lines 1-12.

Keeping the composition of Groups I-VII as they were determined by the size of the average household in the total of all households, we can, for each country, exclude the 1 and 2 person households, and recalculate -- securing a new average number of persons per household, a new TDM,

and a new proportion of children under 15 for total and hence household population -- the latter on the realistic assumption that the number of children in the 1 and 2 person households combined is so small proportionately that it can be set at 0. The results of this recalculation, which eliminates the possible influence of differing proportions of 1 and 2 person households on the TDM, are shown in lines 13-17 of Table 2.

Exclusion of the 1 and 2 person households naturally raises the average size of the households, the increase being particularly large proportionately as we move toward the lower end of the range from Group I to Group VII. The decline in average size is reduced; it was from 5.69 to 2.75 in the full distribution, a drop to less than a half (line 2) and it becomes one from 6.41 to 4.07 (line 13), a drop to over six-tenths. Again, the exclusion reduces the TDMs, which now range from 22 to 34, rather than around the levels of 42 to 45½. But the most interesting result is the downward movement of the TDMs, from Group I to Group VII, which is systematic and of significant magnitude, being a reduction from 34 to 22, or over a third. In other words, with a still substantial decline in average size of household in line 13, and also a still substantial decline of the share of children under 15 (from 48 to about 33 percent, see line 15), the omission of the 1 and 2 person household results in a significant decline of the TDMs as we move from the larger to the smaller household countries. The inference is then that the rise in the proportion of these 1 and 2 person households in line is what sustained the TDMs at near constant levels in line 3.

But the rise in the proportion of 1 and 2 person households may be

partly a function of the decline in the proportion of children, rather than an independent trend; and we ought to consider in the next section, the possible contribution of the two variables, proportion of children and shares of 1 and 2 person households, to the total disparity, or inequality, in the size distribution of households.

2. Allocation of Total Inequality in the Size-Distribution of Households

We begin the analysis by using the two bodies of data that distinguish, for the usual size-classes of households by number of persons, the proportions within each size-class of children or minors from those of adults. With this distinction given we can observe separately the inequality in the distribution, among the size-classes, of the two age groups among household members; and derive total inequality in the size distribution of households as a combination of inequalities in the distribution of the two, significantly different, age groups.

Table 3 presents such data for the United States, taken from the Census of 1970, with the line of division between children below 18 years of age and adults aged 18 years and over. The table also includes similar data for Taiwan for end of 1975, with the line of division between minors aged below 21 years of age, and adults aged 21 years and over. Both sets of distributions are used as given, without any interpolation or adjustment. The sample is tiny; Taiwan is atypical with respect to inequality in the size distribution of households; and the division lines between children and adults are not optimal. Yet the data are helpful in suggesting relations between significant age groups and household composition, by size classes of households by number of persons.

Table 3. Allocation of Size-Differentials among Households between those for below 18 or minors and those for over 18 or adults, U.S., March 1976, and Taiwan, end 1975

A. Size Differentials and Related Measures

Classes of Households by Size	% in all HH	Pers. per HH		% Shares in Relevant Totals			Disparities		
		Below 18 or minor	18 and over or adult	Persons	Below 18 and minor	18 and over or adult	Col. 4 minus Col. 1	Col. 5 minus Col. 1	Col. minus Col.
	(1)	(2)	(3)	(4)	(5)			(8)	(9)
United States, March 1970									
1. 1 person	19.6	0	1.00	6.4	0	9.9	-13.2	-19.6	-9.7
2. 2 persons	28.5	0.06	1.94	18.6	1.4	28.1	-9.9	-27.1	-0.4
3. 3 persons	16.7	0.74	2.26	16.3	11.3	19.1	-0.4	-5.4	2.4
4. 4 persons	15.2	1.70	2.30	19.8	23.6	17.8	4.6	8.4	2.6
5. 5 persons	9.7	2.63	2.37	15.8	23.2	11.6	6.1	13.5	2.9
6. 6 persons	5.3	3.52	2.48	10.4	17.2	6.7	5.1	11.9	1.4
7. 7 & over	5.0	5.12	2.72	12.7	23.3	6.8	7.7	18.3	1.8
8. Totals, averages, and TDMS	63.57	1.09	1.98	195.2	69.6	125.6	47.0	104.2	20.2
Taiwan, end of 1975									
9. 1 person	3.1	0	1.00	0.6	0	1.2	-2.5	-3.1	-1.9
10. 2 persons	5.2	0.19	1.81	2.0	0.4	3.6	-3.2	-4.8	-1.6
11. 3 persons	10.3	0.89	2.11	5.9	3.5	8.3	-4.4	-6.8	-2.0
12. 4 persons	16.9	1.75	2.25	12.8	11.2	14.4	-4.1	-5.7	-2.5
13. 5 persons	22.3	2.60	2.40	21.1	21.9	20.3	-1.2	-0.4	-2.0
14. 6 persons	18.9	3.32	2.68	21.6	23.8	19.2	2.7	4.9	0.3
15. 7 persons	11.3	3.95	3.05	14.9	16.9	13.1	3.6	5.6	1.8
16. 8 persons	6.0	4.33	3.67	9.1	9.8	8.4	3.1	3.8	2.4
17. 9 & over	6.0	5.50	5.03	12.0	12.5	11.5	6.0	6.5	5.5
18. Totals, averages, and TDMS	3.01	2.64	2.63	15.88	7.92	7.92	30.8	41.6	20.0

Panel B. Allocations

	TDMs persons below 18 or minor	Weight, Col. 1	Col. 1 X Col. 2	TDM, persons 18 and over adult	Weight, Col. 4	Col. 4 X Col. 5	Cancelation component	Sum Co 3,6,7
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
19. United States, line 8	104.2	0.357	37.2	20.2	0.643	13.0	-3.2	47.0
20. Taiwan, line 18	41.6	0.501	20.8	20.0	0.499	10.0	0	30.8

Table 3--continued

Notes

Panel A

The data for the United States are for the sum of principal individuals (i.e., one-person households) and family households, from the Bureau of the Census, 1970 Census of Population. Subject Report PC(2)4A, Family Composition, Washington May 1973, largely Table 3, pp. 7-8. Data needed on members (persons) in family households are from the same source, Table 7, pp. 138ff.

For the data on Taiwan see my paper, "Size and Structure of Family Households: Exploratory Comparisons," Population and Development Review, vol. 4, no. 2, June 1978, Table 1, pp. 190-1.

Lines 8 and 18: entries in col. 1 are the totals of all households, in million; in cols. 2 and 3--average number of persons in the two age-classes; cols. 4-6--totals of persons in million; cols 7-9--the TDMs for the three distributions.

Panel B

The TDM entries in columns 1 and 4 are from Panel A, columns 8 and 9 lines 8 and 18. The weights, in columns 2 and 5 are calculated from columns 2 and 3, lines 8 and 18.

The cancellation component in col. 7 is due to divergence in the signs of the deviations in columns 8 and 9 of Panel A (e.g., for the 3 person size class in line 3). It is derived here as the difference between the sums of cols. 3 and 6 (Panel B) and the TDM for the distribution by the number of persons (Panel A, col. 7, lines 8 and 18). For discussion see text.

The first observation to be noted is that the inequality in the size distribution of households by number of persons can be viewed as the sum of inequalities in the distribution of children- minors and of adults within the same size classes, weighted by the proportions of the two age groups in total population within households. Thus, the TDM for distribution of Taiwan households by number of persons, 30.8, equals the sum of the TDM for minors (in the same size classes by number of persons) of 41.6 weighted by 0.501 and of the TDM for adults of 20.9 weighted by 0.499 (see line 20).

Second, this identity between the TDM for distribution by the number of persons and the sum of wieghted TDMs for children-minors and adults requires that there be identity of the signs of deviations for the two age groups in cols. 8 and 9 of Panel A. This requirement is fulfilled for Taiwan, but not for the United States (see divergence in signs in cols. 8 and 9, line 3). Yet, in general, there is likely to be agreement in signs, because size classes for which children-minors per household are below (or above) the countrywide average are the size classes in which adults per household are also below (or above) their countrywide average. Thus, the effect of disparity in signs, the cancellation component, tends to be small.

Third, the TDM for the children-minors distribution is much larger than that for the adults distribution, in both the United States and Taiwan (see lines 8 and 18, cols. 8 and 9). This should have been expected, since we know that there are practically no children in the 1- and 2-persons households, and that the rise of the former cumulates rapidly toward

the larger size-classes of households -- whereas the number of adults per household rises slowly beyond the 2-person class.

But the wider amplitude of disparities in the size-distribution of children does not mean that the TDM for that distribution dominates differences among countries (or changes over time) in the TDM for the total distribution of households by number of persons. As the equations represented by lines 19 and 20 indicate, in addition to the minor cancellation component, four variables are involved: the TDM for children-minors; its weight; the TDM for adults; its weight. Differences or changes in the two TDMs can be offset, partly or more than offset, by differences and changes in the weights -- as we shall observe in Table 4. We shift now from the comparison of USA and Taiwan in Table 3, which is too narrow and too limited for our purposes, to a comparison of the groups in Table 2, each of which includes seven countries, and which were derived from an array that ranged the countries in decreasing size of the average household (number of persons per household).

Column 1 in Panel A (excluding the modifications to be discussed later) are the arithmetic mean (unweighted) percentage distributions of households by size classes (number of persons), taken from the data for the individual countries included in the largest size group (I) and the smallest (VII). The identity of the countries is shown in the notes to Table 4. With these at hand, and the average size of household in each of the two groups given in Table 2, we can calculate the percentage shares of persons in the several size-classes (column 4) and the TDMs for the two size-distributions (43.4 and 46.0, respectively, lines 10 and 18, col. 7,

Table 4. Size-Distributions of Households for Largest and Smallest Average Household Groups (I and VII in Table 2), and Illustrative Modifications

A. Size-Distributions and Related Measures

Size of HH Class	% Shares in all HHs (1)	Persons per HH below 15 of age (2)	Persons per HH 15 & over (3)	% Shares in persons all (4)	% Shares in persons below 15 (5)	% Shares in persons 15 & over (6)	Disparities Col. 4 minus col.1 (7)	Disparities Col. 5 minus col.1 (8)	Disparities Col.6 minus col.1 (9)
		Group I							
1. 1 person	5.9	0	1.00	1.0	0	1.9	-4.9	-5.9	-4.0
2. 2 persons	9.3	0	2.00	3.3	0	6.1	-6.0	-9.3	-3.2
3. 3 persons	11.5	0.70	2.30	6.1	3.1	8.6	-5.4	-8.4	-2.9
4. 4 persons	12.7	1.50	2.50	8.9	7.3	10.3	-3.8	-5.4	-2.4
5. 5 persons	12.9	2.30	2.70	11.3	11.3	11.4	-1.6	-1.6	-1.5
6. 6 persons	12.2	3.10	2.90	12.9	14.4	11.5	0.7	2.2	-0.7
7. 7 persons	10.1	3.70	3.30	12.4	14.3	10.9	2.3	4.2	0.8
8. 8 persons	38.3	4.20	3.80	11.7	13.3	10.3	3.4	5.0	2.0
9. 9 & over	17.1	5.57	5.21	32.4	36.3	29.0	15.3	19.2	11.9
7a. 7 & over	5.5	4.72	4.33	56.5	63.9	50.2	21.0	28.4	14.7
10. Averages & TDMs	5.69	2.62	3.07				43.4	61.2	29.4
Modification 1 (see notes)									
11. Averages, TDMs	5.69	2.21	3.48				43.4	60.0	34.0
Modification 2 (see notes)									
12. Averages, TDMs	3.85	1.46	2.39				65.8	112.0	37.4
		Group VII							
13. 1 person	23.8	0	1.00	8.7	0	11.3	-15.1	-23.8	-12.5
14. 2 persons	28.9	0	2.00	21.0	0	27.4	-7.9	-28.9	-1.5
15. 3 persons	18.7	0.60	2.40	20.4	17.5	21.3	1.7	-1.2	2.6
16. 4 persons	15.7	1.30	2.70	22.8	31.9	20.1	7.1	16.2	4.4
17. 5 persons	7.4	2.00	3.00	13.4	23.1	10.5	6.0	15.7	3.1
18. 6 persons	3.2	2.70	3.30	7.0	13.5	5.0	3.8	10.3	1.8
19. 7 persons	2.3	3.90	4.06	6.7	14.0	4.4	4.4	11.7	2.1
20. Averages & TDMs	2.75	0.64	2.11				46.0	107.8	28.0
Modification 1 (see notes)									
21. Averages, TDMs	2.75	0.87	1.88				46.0	105.4	22.2
Modification 2 (see notes)									
22. Averages, TDMs	3.71	1.15	2.56				30.0	62.4	19.3

B. Allocations, Panel A as Given, and as Changed by Illustrative Modifications

	Persons per HH (1)	TDM, under 15 (2)	Weight, Col.2 (3)	Col.2 X Col.3 (4)	TDM, 15 and over (5)	Weight, Col.5 (6)	Col.5 X Col.6 (7)	Cancellation Component (8)	Sum, Cols. 4, 7, 8 (9)
23. Group I	5.69	61.2	0.460	28.2	29.4	0.540	15.9	-0.7	43.4
24. Group VII	2.75	107.8	0.233	25.1	28.0	0.767	21.5	-0.6	46.0
Mod.1-- interchanging Group I and VII averages of persons under 15 per household, by size classes (see col. 2 of Panel A)									
25. Group I	5.69	60.0	0.388	23.3	34.0	0.612	20.8	-0.7	43.4
26. Group VII	2.75	105.4	0.316	33.3	22.2	0.684	15.2	-2.5	46.0
Mod.2-- interchanging Group I and VII percentage proportions of 1-and 2-person households									
27. Group I	3.85	112.0	0.380	42.6	37.4	0.620	23.2	0	65.8
28. Group VII	3.71	62.4	0.309	19.3	15.6	0.691	10.7	0	30.0

Table 4--continued

C. Comparison of Size-Distributions, Groups I and VII as Given, and as Changed by Modification 2

Size-Classes	Group I				Group VII			
	% HH as given (1)	% HH Mod. 2 (2)	Ratio col.2/ col.1 (3)	Ratio col.5/ col.1 (4)	% HH as given (5)	% HH Mod. 2 (6)	Ratio col.6/ col.5 (7)	Ratio col.1/ col.5 (8)
29. 1 person	5.9	23.8	4.03	4.03	23.8	5.9	0.25	0.25
30. 2 person	9.3	28.9	3.11	3.11	28.9	9.3	0.32	0.32
31. 3 person	11.5	6.4	0.56	1.63	18.7	33.5	1.79	0.61
32. 4 person	12.7	7.1	"	1.24	15.7	28.2	"	0.81
33. 5 person	12.9	7.2	"	0.57	7.4	13.3	"	1.74
34. 6 person	12.2	6.8	"	0.26	3.2	5.7	"	3.84
35. 7 & over	35.5	19.8	"	0.06	2.3	4.1	"	15.43

Notes

Panel A

Columns 1 and 4, lines 1-9 and 13-19: Derived from data for the seven countries included in Groups I and Group VII in Table 2. In order of decreasing average of persons per household, they were: for Group I--Kuwait; Colombia; Iraq; Costa Rica; Paraguay; Venezuela; Dominican Republic; for Group VII--Austria; USA; England & Wales; Denmark; West Germany; German Democratic Republic; Sweden (for year of coverage see notes to Table 1). The data for the two groups of seven countries each yielded the unweighted average of shares of the nine or seven size-classes of households. Knowing from Table 2 the average size of households for Groups I and VII (5.69 and 2.75 persons respectively), we could calculate the average share in total number of persons in column 4.

Columns 2 and 3, lines 1-9 and 13-19: The allocation in columns 2 and 3 between household members below 15 years of age, and 15 and over is an approximation using the general pattern in Table 3 above, for Taiwan (Group I) and United States (Group VII). This pattern suggests negligible proportions of children below 15 in the 2 person households, and a rapid rise in the ratios of children to adults in the larger size-classes. The approximations in columns 2 and 3 were also constrained to yield the averages per household under 15 and 15 years of age and over estimated for Groups I and VII in Table 2 (i.e. 2.62 and 3.07 for Group I and

Table 4 continued

0.64 and 2.11 for Group VII). With columns 2 and 3 given, in addition to entries in columns 1 and 4, all other entries in lines 1-9 and 13-19 could be calculated.

Lines 10 and 20: The entries in cols. 1-3 are the averages of persons per household, total and in the two age groups; those in cols. 7-9 are the TDMs for the three distributions.

Lines 11 and 20: Modification (1) involves assigning to Group I the averages of persons under 15 per household of Group VII (i.e. those in col. 2, lines 13-19); and assigning to Group VII the averages of persons under 15 per household of Group I (i.e., those in col. 2, lines 1-6 and 7a). The averages per household of persons 15 years of age and over are then obtained by subtraction from the total number of persons in each of the seven size-classes. The averages in cols 2 and 3, and the TDMs in cols 8 and 9 are then calculated for the new distributions. The averages in col. 1 and the TDMs in col. 7 remain as they were in lines 10 and 20 respectively.

Lines 12 and 21: The modification here involves assigning to Group I the percentage shares of 1- and 2-person households of Group VII (i.e. those in col. 1, lines 13 and 14); and assigning to Group VII the percentage shares of 1- and 2-person households of Group I (i.e. those in col. 1, lines 1 and 2). The new distributions are then adjusted so that the totals of shares in households, and persons (in the two age groups) add out to 100--the adjustments made proportional to the original shares in the remaining size-classes (see Panel C). We calculate the averages in cols 1-3 and the TDMs in cols 7-9 from the new distributions (these size-distributions are shown in Panel C).

Panel B

All entries calculated from Panel A. For brief notes on the procedure see the notes on Panel B of Table 3.

Panel C

Based entirely on Panel A and showing explicitly the new size distributions yielded by Modification 2, and the unrealistic component in them (see discussion in the text).

which agree with the TDMs calculated from averaging the country TDMs in Table 2, of 43.4 and 45.6).

The allocation of the household averages between members under 15 years of age and 15 years old and over (columns 2 and 3, lines 1-9 and 14-19) is an approximation based on applying the pattern for Taiwan to Group I and that for the United States to Group VII -- but constraining the approximations so as to yield the averages of children and adults per households already established in Table 2 (see lines 4-6). The approximations are rough and rounded, but there is no reason for assuming that significant error was introduced into the allocation between the two age groups, within the several size classes of households (the relevant classes range from 3 to 7 and over persons).

We can now observe the allocation of the total TDM for the two size groups between those generated by the size-distributions of children below 15 and of adults of 15 and over (see lines 10 and 20, cols. 8 and 9; and particularly the allocations in lines 23 and 24). The average size of household declines from 5.69 persons in Group I to 2.75 in Group VII; but the inequality in distribution of households by number of persons barely changes, with the TDM moving from 43.4 to 46.0. This relative stability is the result of sizable but compensating movements in the TDMs for persons under 15 and for adults 15 and over, and their respective weights. Thus, with the marked decline in children per households and the sharp rise in proportions of 1- and 2-person, i.e., virtually childless households, the TDM in the distribution of children rises from 61.2 for Group I to 107.8 for Group VII. But this is more than offset by the

decline in the weight of children in total household population, so that the contribution of the children's component to total inequality, which amounts to 28.2 in Group I, declines to 25.1 in Group VII (see lines 23-4, col. 4). In contrast, the TDM for the adult component, 29.4 for Group I, declines somewhat to 28.0 in Group VII -- but the substantial increase in the weight, from 0.540 to 0.767, yields a substantial rise in the weighted contribution to total inequality, from 15.9 in Group I to 21.5 in Group VII. It is the rise in the contribution to inequality of the adults component that more than offsets the decline in the contribution of the children's component -- and results in a minor rise in the TDM for the total size-distribution from 43.4 to 46.0.

It is not easy to judge whether the differentials of the type and combination shown in lines 23-24, are typical and could be expected in other similar comparisons among size-distributions of households, for groups with substantially different average household size. In general, in the movement from larger to smaller households, associated with the decrease in the proportion of children within the household population and rise in the proportions of 1- and 2-person households, we would expect the TDM for the children's component to rise substantially, and for its weight in total population to decline substantially -- but the net effects on the weighted contribution to total inequality can be either to reduce it (as was the case here) or to raise it. The TDM for the adult component is not likely to move as sensitively as that for the children's component, in the shift from larger to smaller households; but its weight will be rising, and a rise in the weighted contribution is not unlikely.

Any generalizations would have to await far more data on composition of households in its distribution between children and adults in the successive size classes by number of persons, data that would provide such information on a much larger number of countries differing substantially in the size of the average household.

Modification 1 is introduced to illustrate cases where the proportions of children in the composition of households is lowered or raised, without affecting the distribution of households by the total number of persons (which means, that the lowering or raising of the children component is offset, within each size-class of households, by the corresponding raising or lowering of the adult component). We did it in Table 4 by replacing the entries in col. 2, lines 1-7a, by the persons below 15 per household in col. 2, lines 13-19 -- thus lowering appreciably the proportion of children in Group I (from an average of 2.62 to one of 2.21, see lines 10 and 11, col. 2). By contrast, the shift of the entries of of Group I to replace those in Group VII, resulted in raising the average number of children under 15 per household from 0.64 to 0.87 (see lines 20 and 21, col. 2). There were complementary changes in the averages of adults of 15 and over per household in the corresponding size classes, and in the averages (the latter rose for Goup I from 3.07 to 3.48, and declined in Group VII from 2.11 to 1.88 -- see lines 10-11 and 20-21, col. 3).

The TDMs for the total distribution of households by number of persons were not affected by modification 1; but it is interesting to observe the large effects on the TDMs for the adult components, the weights, and the weighted contributions (see lines 25-26). While the TDM for the children's

components changed only slightly (from 61.2 to 60.0 in Group I and 107.6 to 105.4 in Group VII), the weights were materially affected, and the net contribution show now a substantial rise as far as the children's component is concerned (from 23.3 to 33.3, lines 25-6, col. 4) instead of the decline shown in lines 23-4. The TDM for the adults component is quite changed by the modification, and shows a marked decline from Group I to Group VII (from 34.0 to 22.2) which is only partly offset by the rise in weights, so that the weighted contribution of the adult component now declines between Groups I and VII, rather than rise as it did for the unmodified distributions in lines 23-4. The sensitivity of the TDMs and weights of the children and adult components, in response to changes that are compatible with maintaining the same size-distribution of households by number of persons suggests that these responses are inter-related so that they can easily offset each other.

Modification 2 assigns the high proportions of 1- and 2-person households, found in Group VII, to Group I; and then adjusts the percentage shares of the size-classes of 3 persons and larger so that the total adds out to 100. The same procedure is then repeated with the shares of 1- and 2-person households in children under 15, in adults of 15 and over, and in total income. In all four adjustments, the shares of the size classes above that of 2 persons are reduced in proportion to the original distribution (see lines 12, 27, and for the resulting distributions of households by number of persons, col. 2 of Panel C). Modification 2 in Group VII assigns to it the low proportions of 1- and 2-person households found in Group I, and then the shares of the remaining size-

classes (3 persons through 7 and over) are adjusted upward, so that the sum of shares for all the size classes equals 100.0. The same procedure is repeated for the distribution by size classes of children under 15, adults 15 and over, and total income (see lines 22, 28, and col. 6 of Panel C).

The effect of modification 2 is to reduce the average household in Group I from 5.69 persons to 3.5; and to raise the average household in Group VII from 2.75 to 3.71. It also serves to reduce the proportion of children under 15 in Group I, from 0.460 to 0.380, with a complementary rise in the proportion of adults 15 years old and over; whereas the effect on Group VII is to raise the proportion of children under 15, from 0.233 to 0.309, with the complementary decline in the proportion of adults 15 years old and over. Such changes in the proportions of children and adults, a decrease of the shares of the former for Group I, was to be expected because of the decline in size of average household; while the rise in the proportion of children in Group VII was associated with a rise in the size of the average household. But the major effect is on the TDMs, for the distributions of children and adults, and also for the total distribution of households by number of persons (see lines 27 and 28, in comparison with lines 23 and 24). The most interesting result is the divergence in the TDMs for the distribution by number of persons (col. 9); for the modified Group I, this TDM is as large as 65.8; for the modified Group VII, it is as small as 30.0. Both values represent substantial deviations from the range of TDMs observed for the seven groups in Table 2, from that for unmodified Group I and Group VII, and that for Group IV

(which is 43.2), a group the average household for which is 3.76 persons, quite close to the averages shown for modification 2 of Groups I and VII (see Tables 2 and 4, lines 2 and 3). Comparison of lines 27 and 28 shows that the wide difference in the TDMs between modified Groups I and VII is accounted for by wide differences in the TDMs for both children under 15 (col. 2) and adults 15 and over (col. 5).

Panel C reveals that the marked effects of modification 2 on the TDMs for the distribution of households by number of persons are due to the procedure by which the modified percentage distributions are adjusted to add out to 100. Thus, for Group I the comparison of cols. 2 and 1, the original distribution of households by size classes and the modified one, shows a uniform reduction of shares in col. 1 beginning with the 3 person class -- by a factor of 0.56 (see col. 3). But it is highly improbable that, with the 1 person and 2 person shares raised by factors of 4.03 and 3.11 respectively, the share of the 3 person class would be reduced as much as that of the higher size classes, say the 6 person and the 7 and over classes. The failure of the procedure to use the reasonable assumption that the increase in the share of the smaller size classes is diffused and shifts gradually to a decline in the shares of the larger size-classes is what yields, in the case of Group I, the impression of more than one peak in the distribution in col. 2, and the large jump in the size of the TDM. This is shown by the ratios in col. 4, which compare the percentage shares of the comparable size classes in the unmodified Group VII with the unmodified Group I, and yield a gradual decline of the ratios from a high of 4.03 for 1 person households to a low of 0.06

for the 7 and over size class.

A similar observation can be made on the effect of modification 2 in lowering so strikingly the TDM for modified Group VII. Here the reduction in the shares of 1- and 2-person households was followed by a uniform proportional rise by a factor of 1.79 of the original share of each size class, from that of 3 persons to that of 7 and over persons (see col. 7 of Panel C). It is highly unrealistic to assume that if there be a tendency for the smaller size-classes of households to diminish in importance, this tendency would be sharply limited to the 1- and 2-person households and be reversed abruptly with the 3-person class -- rather than diffuse gradually and raise more the shares of very large size classes. The procedure that followed yielded an unusual concentration of frequencies in just two size-classes (3- and 4-person, see col. 6) which accounted for over six-tenths of total frequencies. The comparison of the ratios in col. 7 of Panel B with those in col. 8 indicates how, in the comparison of Group VII percentage distribution with that of Group I, the ratios rise gradually from that for the 1- person size class and concentrate the compensating increase in the three top size-classes.

This, of course, is a single illustration. But the conclusion that it yields may have some validity. The suggestion is that the key to stability or narrow range of the TDMs (or other measures of relative disparity) with substantial changes in the size of average household, may lie in the inter-connectedness of the larger and smaller households within a country's (or a region's, or a similar large entity's) size-distribution of households. It is this inter-connectedness that is

fractured by the procedure used in Modification 2. For Group I we assumed an increase in proportions of smaller households and thus reductions in the shares of larger households -- but the procedure drew a sharp line between 1- and 2-person households, and all the size-classes above 2-persons, rather than allow for inter-connectedness among the several size-classes. The latter would imply a gradual diffusion of the process of decline in average size, whether it be associated with reduction of the proportion of children or with the tendency of adults to live separately, or usually both.

This answer or hypothesis is not specific, and is insufficient to explain why for such a large group of countries the TDM in the size-distribution by number of households of persons ranges from 41 to 48, rather than from 43 to 46 or from 38 to 50. Specifying the explanation further would require the additional data on the distributions of households by size, and of the age composition within the size classes, for the larger number of countries that we still lack.

3. Implications and Conjectures

The discussion in the preceding section suggested that for the large group of countries for which the inequality in the distribution of households by number of persons varied within a narrow range (despite substantial differences in size of average household), implications of interest can be drawn from the allocation of total inequality between that contributed by the children and by the adult components. As we move from the larger to the smaller average household countries the TDM for the distribution of the adults (within total person size-classes) tends to

change moderately -- as is indicated by the relevant measures of 29.4 for Group I and 28.0 for Group VII (see Table 4, lines 23-4, col. 5). If this is a general pattern, the rise in the weight of the adults component as we move from larger to smaller household countries, would lead to a substantial rise of the weighted contribution of this component to total inequality in the size distribution of households by number of persons. Since this latter is about the same for the groups of countries ranging from large average household to small, and since the cancellation component may be assumed to be negligible, the weighted contribution of the children's component to total inequality must decline as we move from the larger average household to the smaller average household countries. Since the weights of the children component also decline as we move from the large to the smaller household countries, the TDM for the children component, derived as the ratio of the weighted contribution to the weight, may move either way. As we shall see presently, whether, under the assumptions stated, the TDM for the children component rises or declines as we move from larger to smaller household countries, will depend on the magnitude of the TDM assumed for the adults component, relative to the TDM for the total size-distribution of households by number of persons.

In Table 5 we assume a constant TDM for the size-distribution of households in the seven groups distinguished in Table 2 (for which the average household declines from 5.69 in Group I to 2.75 in Group VII). This average TDM (in line 1 of Table 5) is the arithmetic mean of the slightly divergent TDMs in line 2 of Table 2. We then introduce the changing proportions of children under 15 and of adults 15 and over, using

Table 5 Derived TDM for Distribution of Children under 15 by Household Size-Classes, Groups by Size of Average Household from Table 2

	Groups from Table 2						
	I	II	III	IV	V	VI	VII
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
1. Average TDM, distribution by number of persons	43.74	43.74	43.74	43.75	43.74	43.74	43.74
2. Proportion of children under 15	0.461	0.440	0.395	0.264	0.269	0.238	0.233
3. Proportion of adults, 15 & over	0.539	0.560	0.605	0.706	0.731	0.762	0.767
TDM for Adults Assumed at 20.00							
4. Contribution of adults (20.00 x line 3)	10.78	11.20	12.10	14.12	14.62	15.24	15.34
5. Contribution of children (line 1 - line 4)	32.96	32.54	31.64	29.62	29.12	28.50	28.40
6. Derived TDM, children (line 5/ line 2)	71.50	73.95	80.10	100.75	108.23	119.75	121.89
TDM for Adults Assumed at 30.00							
7. Contribution of adults (30.00 x line 3	16.17	16.80	18.15	21.18	21.93	22.86	23.01
8. Contribution of children (line 1 -line 7)	27.57	26.94	25.59	22.56	21.81	20.88	20.73
9. Derived TDM, children (line 8/ line 2)	59.80	61.23	64.78	76.73	81.08	87.73	88.97
TDM for Adults Assumed at 40.00							
10. Contribution of adults (40.00 x line 3)	21.56	22.40	24.20	28.24	29.24	30.48	30.68
11. Contribution of children (line 1 - line 10)	22.18	21.34	19.54	15.50	14.50	13.26	13.06
12. Derived TDM, children (line 11/ line 2)	48.11	48.50	49.47	52.72	53.90	55.71	56.05
TDM for Adults Assumed at 50.00							
13. Contribution of adults (50.00 x line 3)	26.95	28.00	30.25	35.30	36.55	38.10	38.35
14. Contribution of children (line 1 - line 13)	16.79	15.74	13.49	8.44	7.19	5.64	5.39
15. Derived TDM, children (line 14/ line 2)	36.42	35.77	34.15	28.71	26.73	23.70	23.13

Table 5--continued

Notes

The entry in line 1 is the average TDM for all seven groups in Table 2, line 3--an unweighted arithmetic mean.

Line 2 is taken from Table 2, line 4. Line 3 is the complement to 1, i.e. 1.0 minus the proportion shown in line 2.

The calculations that follow, for the different assumed values of the TDM for adults (held constant for the several groups) assume also that the cancellation component in the allocation identity is 0.

the data in line 3 of Table 2.

The rest of the table demonstrates the differences in the movement of the derived TDMs for the children component as we vary the level of the constant TDM assumed for the adults component, from a low of 20.00 for lines 4-6 to a high of 50.00 for lines 13-15. It can be observed that in the movement from Group I to Group VII, the derived TDMs for the children component will rise as long as the TDM assumed for the adult component is below that level of the TDM for the total size-distribution of households, i.e., below 43.74; that when the TDM of 50.00 is assumed for the adults component, the derived TDMs for the children component decline (see line 15); and that the rises in the derived TDMs for the children component are the greater, the lower the assumed level of the TDM for the adult component. Thus, when the latter is 20.00, the rise of the derived TDMs (in line 6) is from 71.70 to 121.89, or 70 percent; in line 9 it is from 59.80 to 88.97 or about 49 percent; in line 12, it is from 48.11 to 56.05 or 17 percent. And it is clear that, under the assumptions used, the derived TDMs for the children component will be constant over the range of the 7 groups if the assumed TDM for the adults component is set at 43.74, i.e., at the value of the TDM for the total size-distribution of households by number of persons.

The explanation of these findings, if it be needed, lies in the implication of the procedure in which the movement or changes in the derived TDMs for the children component depends on the ratio of the link-relative of the weighted contribution of the children component (lines 5,8,11, and 14) to the link-relative of the proportion of children under

15 (line 2). Thus, in line 5, the relative (cols. 1 and 2) is that of 32.54 to 32.96, or 0.9873, whereas that in line 2 it is 0.440 to 0.461 or 0.9544. The ratio of 0.9873 to 0.9544 is 1.0345; multiplying by the entry in line 6, col. 1, of 71.50, by 1.0345, we obtain 73.95, or the derived TDM for the children component of Group II. In short, so long as the relative decline in the weighted contribution of the children component is not as great as the relative decline in the weights, the derived TDM for that component will rise. And a shortfall of the assumed TDM for the adult component relative to the total TDM in line 1, will tend to reduce the proportional decline in the weighted contribution of the children component, compared to the proportional decline in the share of children in total population.

Given the values of 29.4 and 28.0 for the TDM of the adult components in Groups I and VII respectively in Table 4 (see lines 23-24, col. 5), we may argue that a reasonable level for an assumed TDM of the adult component is about 30; and that it is likely to vary among the groups within a relatively narrow range, so that the assumption of constancy is not unrealistic. If so, Table 5 implies that in the movement from the larger to the smaller average household countries, the derived TDM for the children component will rise, from roughly 60 in Group I to about 90 in Group VII; and that accordingly, the inequality in the distribution (within size classes by number of persons) of the children under 15 will exceed that in the distribution of adults by an increasing margin. But does this inference bear on the income disparities between children and adults? The conjecture here is that under realistic conditions, the larger TDM

of the children component inferred for the smaller average household countries is also likely to mean an average per person income for children under 15 that is short of the average per person income for the adults -- by a greater margin than would be true for the per person income of children vs. adults in the larger household countries.

Since the conditions for such an inference cannot be made clear without an illustrative demonstration, we use Table 6 which presents it for Groups I and VII identified in Table 4. Almost all the evidence here is taken directly from Table 4. The major new item is in lines 3 and 11, which determine the inequality, the income disparity between the shares of size-classes of households in the total of persons and the shares of these size-classes in the total of income. The data introduced are thus on the component of income inequality in the distribution among persons that is associated with the usual negative relation between size of household and per person income of household. These new data are patterned after the measures observed in our earlier paper (see footnote 2) for Taiwan (for Group I) and for the United States (for Group VII). The illustration is subject to the constraint that the inequality in per person income, associated with the negative correlation between size of household and household income per person, is set at the same magnitude, with a TDM of 22.0, for Group I and Group VII. In the paper referred to above, the corresponding TDMs were 20.6 for Taiwan and 25.2 for the United States (see Table 1).

Since children are more concentrated in the larger size households than adults, and since the per person income in the larger households

tend to be lower than the per person income in the smaller households, the weighted per person income for children is bound to be lower than per person income of the adults. And, indeed, Table 6 shows that for both Groups I and VII the derived income relative for per person income of children, at 0.936 and 0.814 is significantly lower than the derived income relative of per person income for adults (see second entry, col. 8, lines 7-8 and 15-16). What is more significant is that for the small household Group VII, with a lower proportion of children and greater inequality in the distribution of the children component (as inferred from Table 5), the shortfall of the per person income of children, at 0.77 of the income of adults, is significantly greater than the shortfall of per person income of children in Group I, at 0.89 of income of adults. If one may generalize, the finding would mean that, in the smaller household, and thus economically more developed, countries, the relative gap between the weighted per person income of children and adults would be wider than that between the weighted per person income of children and adults in the larger household, and thus economically less developed, countries. The greater shortfall of per person income of children in the more developed countries would, however, apply to a much higher countrywide per capita income.

If this finding is broadly valid, its significance is enhanced by the observation that the procedure used in Tables 5 and 6 <u>understates</u>

Table 6 Illustrative Differentials in Income per Person between Children and Adults, Groups I and VII.

		Size-Classes of Households							
		1 person	2 person	3 persons	4 persons	5 persons	6 persons	7 & Over	Sums, TDVs Avges.
				Group I					
1.	% shares in households	5.9	9.3	11.5	12.7	12.9	12.2	35.5	100.0
2.	% shares in persons	1.0	3.3	6.1	8.9	11.3	12.9	56.5	100.0
3.	Differences, % shares in income minus % shares in persons	1.0	2.0	3.0	3.0	2.0	-0.3	-10.7	22.0
4.	% shares in income (line 2 + line 3)	2.0	5.3	9.1	11.9	13.3	12.6	45.8	100.0
5.	Income relative, per HH (line 4/ line 1)	0.34	0.57	0.79	0.94	1.03	1.03	1.29	22.2
6.	Income relative, per P (line 4/ line 2)	2.00	1.61	1.49	1.34	1.18	0.98	0.81	22.0
7.	% shares of children under 15	0	0	3.1	7.3	11.3	14.4	63.9	(39.8).936
8.	% shares of adults, 15+	1.9	6.1	8.6	10.3	11.4	11.5	50.2	(10.4)1.056
				Group VII					
9.	% shares in households	23.8	28.9	18.7	15.7	7.4	3.2	2.3	100.0
10.	% shares in persons	8.7	21.0	20.4	22.8	13.4	7.0	6.7	100.0
11.	Differences, % shares in income minus % shares in persons	3.0	7.0	1.0	-3.0	-3.0	-2.0	-3.0	22.0
12.	% shares in income (line 10+ line 11)	11.7	28.0	21.4	19.8	10.4]	5.0	3.7	100.0
13.	IR, per HH	0.49	0.97	1.14	1.26	1.41	1.29	2.04	26.0
14.	IR, per P	1.35	1.33	1.05	0.87	0.78	0.71	0.55	22.0
15.	% shares in children under 15	0	0	17.5	31.9	23.1	13.5	14.0	(87.2) .814
16.	% shares in adults, 15 & over	11.3	27.4	21.3	20.1	10.5	5.0	4.4	(2.2)1.057

Table 6--continued

Notes

The entries in column 8, except the sums of percentages (in lines 1,2,4,9,10, and 12) are as follows: Lines 3, 6, 11, and 14--all at 22.0, the TDM for the disparities between shares in total persons and shares in total income; lines 5 and 13--the TDM for the disparities between the shares in households and in total income. Lines 7 and 15: the first entry, in parentheses, is the TDM for the disparities between the shares in total income, while the second entry is the average relative per person income for the children under 15 (obtained by multiplying the % shares in lines 7 and 15 respectively by the relatives of income per person in lines 6 and 14, and dividing the sums of products by 100). Lines 8 and 16: the first entry, in parentheses, is the TDM for the disparities between the shares in adults 15 years old and older and the shares in total income while the second entry is the average relative per person income for adults 15 and over (obtained by multiplying the percentage shares in line 8 and 16 respectively by the income relative per person in lines 6 and 14, and dividing the sums of products by 100).

Lines 1, 2, 7, 8, 9, 10, 15, and 16--columns 1-7 are taken directly from Table 4 above.

The entries in lines 3 and 11, columns 1-7, are illustrative differences between shares in persons and shares in total income following roughly the patterns observed for Taiwan (in 1975) and United States (in 1975), but constrained so as to yield the same TDM of 22.0 for both Group I and Group VII.

the possible income disparity between children and adults, because the distribution yielding the size classes of households is by number of all persons. If the distribution were in size classes by the number of children (or the number of adults, deriving that by the number of children as a residual), the contrast between the weighted per person income of children and that of adults would be greater. This follows from the general principle that variance in a variable is greater when the classification is by the size of that variable, not by any other characteristic. On the other hand, an allowance for lower per unit consumption for children than for adults, and conversion of household classes by number of persons to household classes by number of consuming units, would reduce the gap between children and adults. But the analysis of this particular aspect of size differentials among households and associated income disparities deserves more extended treatment than is feasible here.[4]

Since our main interest in the size-differentials among households is in the contribution of these differentials to inequality in the income distribution among persons, it is only a partial digression to consider the comparison in Table 7. It presents, for each of several groups of households by occupation of employed head for the United States for 1975, and for each of roughly comparable several groups by occupation of head, for Taiwan for 1977, the size-differentials among households (column 3) -- and, particularly important, the contribution of these differentials to inequality in distribution of income among households (column 7) and of household income per person among persons (column 8). The United States data cover money income only, one of the reasons for not including service and farm workers that receive substantial income in kind (lines 9 and 10);

whereas the data for Taiwan include income (and some transfers) in both money and kind. The occupational classifications for the two countries are only roughly comparable. And as in the rest of the paper, no attempt is made to convert household size in terms of numbers of persons to size in terms of consuming units. But the comparison is of value suggesting the kind of findings that are of sufficient interest to warrant exploration with more and better data.

Table 7 Inequality in the Size-Distribution of Households, and Contribution to Disparities in Income per Household and in Household Income per Person, Occupational Groups, United States, 1975, and Taiwan 1977

Panel A. United States (demographic data, March 1976, money income, 1975)

Occupational groups, employed heads	Money income per person, $000s	No of HHs, mill.	Persons per HH	TDM, H-P	Sum, TDM H-Y, P-Y	TDM H-Y	TDM P-Y
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1. Professional, technical	6.99	8.33	3.04	42.6	43.4	14.8	28.6
2. Managers, administrat., ex. farm	6.86	7.34	3.27	38.8	40.4	10.2	30.2
3. Sales workers	6.19	2.92	3.04	39.0	40.8	13.0	27.8
4. Clerical and kindred workers	5.15	4.92	2.59	46.2	49.4	18.2	31.2
5. Craft and kindred workers	4.58	9.20	3.51	37.2	38.0	7.4	30.6
6. Transport equipment operators	4.11	2.50	3.57	38.0	38.0	9.6	28.4
7. Other operatives	4.01	5.27	3.31	42.6	42.6	13.2	29.4
8. Laborers, ex. farm	3.78	2.20	3.27	41.8	41.8	11.6	30.2
9. Service workers	3.87	4.62	2.91	47.0	51.2	22.4	28.8
10. Farm workers	3.39	1.75	3.47	42.0	44.8	15.0	29.8

Panel B. Taiwan, 1977 (demographic data, end of 1977, available income for 1977

Occupation of Head	Income per pers. $NT,000s	No of HH 000s	Persons per HH	TDM H-P	Sum, TDM H-Y, P-Y	TDM H-Y	TDM P-Y
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
11. Professional, technical & related workers	37.7	240	4.53	30.0	30.4	8.2	22.2
12. Managers & administrative workers	33.0	170	5.14	28.2	31.8	11.4	20.4
13. Clerical workers	32.9	441	4.72	28.8	28.8	8.4	20.4
14. Sales workers	27.8	426	5.15	29.2	29.2	14.0	15.2
15. Service workers	25.1	191	4.68	34.0	34.2	15.0	19.2
16. Transport operators	24.1	168	5.17	26.0	27.8	13.0	14.8
17. Laborers	23.1	112	5.18	31.8	33.8	17.6	16.2
18. Other industrial workers	21.4	628	5.25	29.9	31.0	16.0	15.0
19. Farmers (incl. hunters)	17.2	608	5.70	32.2	32.8	19.6	13.2
20. Loggers and fishermen	16.2	87	5.37	29.6	33.6	21.6	12.0

Table 7--continued

Notes

The entries in column 5 are the TDMs, derived from comparing shares within each occupational group, of size classes in the number of households and of the same size classes in the number of persons. The entries in column 6 are the sums of the TDMs, in the relevant line, in columns 7 and 8. The entries in column 7, are the TDMs derived from comparing shares, within each occupational group, of size classes in the number of households and in total income. The entries in col. 8 are the TDMs, derived from comparing shares, within each occupational group , of size classes in total persons and in total income.

Panel A

Taken or calculated from US Bureau of the Census, Current Population Reports, Series P-60, no. 104, "Household Money Income in 1975 and Selected Social and Economic Characteristics of Households," (Washington, 1977), Table 15, pp. 48ff. Occupational groups, lines 1-8 are 1 arrayed in decreasing order of money income per person. The 10 groups covered comprise households with civilian employed heads (49.0 million out of a total of 72.9 million, the latter including households with heads not in labor force, in labor force but unemployed, and employed in military services).

Panel B

Taken or calculated from Directorate General of Budget, Accounting and Statistics, Report on the Survey of Personal Income Distribution in Taiwan Area, Republic of China, 1977 (Taipei, 1978). Table 15, pp. 236ff and Table 59, p. 400ff. The ten occupational group covered exclude two groups shown in

Table 7--continued

the source, service men (military) plus workers not classified, and non-working. These two groups together account for 175 thousand households, out of a total of 3,247 thousands.

Available income is defined as distributed factor income, plus current transfer receipts by households, minus current transfer payments by households. Factor incomes and transfers include both money flows and flows in kind.

The eight occupational groups used for the United States were arrayed in declining order of income per person; and so were the ten occupational groups used for Taiwan (col. 1). The reason for such an array, chosen after experimenting with alternative ordering (e.g., by average size of household, or the value of the TDM in col. 5), is that the corrollaries of average household income per person were substantially and interestingly different in the United States and in Taiwan.

For the eight occupational groups in the United States, the size-differentials among households, measured directly by the TDMs in col. 5, lines 1-8, differ, in a range from 37.2 to 46.2; but there appears to be no association with either average size of household in col. 3, or with income per person in the occupation in column 1. The approximations to these size differentials among households in the eight occupational groups, obtained by adding the TDMs in columns 7 and 8, fluctuate in a similar fashion, ranging from 38.0 and 49.4, with no correlation either with size of average household or with occupational income per person.

What we do observe for the United States is that for an occupational group with a large size-differential among households, the contribution to inequality in distribution of income by per household income is also large (compare columns 5 or 6, with column 7). For craft and kindred workers, and transport equipment operators (lines 5 and 6), the groups with the lowest TDMs in columns 5 and 6, the TDMs for the differences in shares of households and shares in total income, in col. 7 are also among the lowest.

By contrast, for the professional-technical group, the clerical group, and other industrial operatives, for which the TDMs for size differentials among households are the highest (lines 1,4, and 7 cols. 5 and 6),the TDMs for the contribution to disparity in income per household, in col. 7, are also among the highest. The result of this strong positive response of the contribution of income disparities among households, the contribution to disparities in household income per person, reflected by TDMs in col. 8, differs relatively little among the eight occupational groups. These TDMs in col. 8 range from 27.8 to 31.2, without obvious correlation either with per person income differences, or with average-size of household differences, or with total size differentials among households (compare entries in col. 8 with those in cols. 1,3,5 or 6). The same finding would remain even if we include the service and farm occupational groups, in lines 9 and 10.

For Taiwan and the ten occupational groups distinguished, the range in per person income from the highest to the lowest, in col. 1, is a great as in the United States; and there is a weak association (negative) with average size of household (in col. 3) which tends to be somewhat higher in lower income ranges. The inequality in the size-distribution within the occupational groups ranges in col. 5 from 26.0 to 34.0, and in col. 6 from 27.8 to 34.2--but there is no apparent association with either size of average household or per person income, in cols. 3 and 1 respectively.

The significant difference emerges in the contribution of the size differentials to the inequality in distribution of households by income per household (see the TDMs in column 7). Here there is a clear tendency for this contribution to inequality in income per household to rise, as we move from higher to lower income per person occupations--even though inequality in distribution households by size, i.e. number of persons does not change with income per person. This rise in the TDM in col. 7 tells us that the positive association of household income with size of household becomes stronger as we move toward the low income occupations: in the latter, unlike the case of the higher income occupations, a larger household means more effectively a larger total household income.

As a consequence of this rise of the TDMs in col. 7, as we move from the higher to the lower income occupations, there is a downward movement of the TDMs in col. 8, i.e. in the contribution of size-differentials among households to inequality in the distribution of household income per person. Thus, in the four higher income occupational groups (lines 11-14), the average TDM for contribution to inequality in income per household, averages (unweighted mean) 10.5; and it then rises, in the four lower income occupational groups (lines 17-20), to a mean of 18.7. By contrast, the TDM in col. 8, measuring contribution of size-differentials in households by number of persons to inequality in distribution of household income per person, averages for the four highest income occupational group 22.05, and then declines to an average for four lowest income occupational groups of 14.1.

This difference between Taiwan and the United States, in the effects of size-differentials among households within different occupational groups on contributions to inequality in per household income and in household income per person, may be due to the differences in per person income levels in the two countries. If so, it might be found in similar comparisons between other pairs of high and moderate income countries: but this is still to be explored. One should also test how much of this difference in response would remain were we to measure size and per unit income not in persons but in consuming units. Yet, given the various qualifications, the results are sufficiently intriguing to be of interest; and they particularly suggest that, at generally lower levels of economic product per capita, pressures of larger numbers in larger households would result in a stronger positive response in greater attempts to raise total household income--than would be the case at higher level of economic product and performance per capita, where a lower response to greater numbers within a larger households might be permitted to result in a somewhat lower, but still adequate, income per person. Another contributory explanation may lie in differences among countries in the availability of ways to raise income in larger households within some occupational groups (e.g., in farm or rural occupations, compared with industrial or urban occupations). But further elaboration and testing of hypotheses requires a wider and richer empirical base.

4. Trends over Time

We turn now to consider changes over time in the inequality in the distribution of households by number of persons; and in particular,

to observe whether the limited range of differences in the inequality in size-distirbutions of households in cross-section comparisons means also a relative stability of such inequality in the temporal changes that usually accompany economic growth--decline in average size of households and the reduction in the proportion in total population of children below a working age. An adequate study of the time trends requires combing through the census volumes for the countries for which an historical series of censuses exists, and through sample studies covering different points of time for countries without a long history of censuses. Such an undertaking is not feasible here; and our exploratory effort is based largely on the data assembled and published by the United Nations, supplemented by data for two or three countries from sources at hand.

We begin with a summary of the evidence for the two and a half to three decades since World War II, for countries for which the coverage permits us to observe changes extending, in most cases over a two decade period and in a few over a decade and a half (Table 8). The table shows the size of the average household for two or more dates since World War II, the TDM for the total size-distribution, and various associated measures that suggest some aspects of the time changes in the structure of household in the country. Despite the substantial number of countries in the table, 25 in all, the coverage is deficient--particularly among the Communist, and the less developed market economies. Of the latter, no countries in Asia except a few in the Southeast, and in Arica, are represented; and the coverage for Latin America omits some of the major

Table 8 Post World War II Changes, Size of Average Household and Associated Characteristics, Selected Developed and Less Developed Market Economies

Country and years of coverage	Persons per HH	% of persons under 15	TDM, size distribution	% in HHs		Excluding 1 Person HHs	
				1 person HHs	2 person HHs	Persons per HH	TDM
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Developed Market Economies							
England and Wales							
1. 1951	3.19	22.1	38.2	10.7	27.6	3.45	33.4
2. 1971	2.86	23.6	43.0	18.2	31.9	3.28	34.4
West Germany							
3. 1950 (ex.Saar and W.Berlin)	3.04	23.3	42.4	18.5	24.8	3.52	34.0
4. 1970	2.74	23.1	46.4	25.1	27.1	3.32	33.8
France							
5. 1946	3.07	21.6	44.6	18.6	26.7	3.54	36.8
6. 1968	3.06	24.8	46.6	20.3	26.9	3.59	37.4
Netherlands							
7. 1947	3.79	29.3	43.2	9.2	22.6	4.07	37.8
8. 1960	3.58	30.0	44.8	11.9	24.3	3.93	37.4
Denmark							
9. 1950	3.15	26.3	40.8	13.8	27.0	3.49	34.4
10. 1965	2.80	23.7	44.0	21.9	27.4	3.31	32.6
Norway							
11. 1950	3.25	24.5	41.4	14.9	22.2	3.64	33.4
12. 1975	2.94	24.1	44.2	21.1	25.4	3.46	33.8
Sweden							
13. 1950	2.90	23.4	42.6	20.7	24.8	3.40	32.8
14. 1975	2.41	21.0	45.6	30.0	30.8	3.02	29.6
Finland							
15. 1950	3.57	30.0	48.2	18.5	18.0	4.15	36.8
16. 1970	2.99	24.6	46.4	23.9	22.1	3.61	34.4
Austria							
17. 1951	3.11	22.8	44.8	17.5	27.2	3.56	37.4
18. 1971	2.90	24.5	48.8	24.6	26.5	3.52	37.4
Eire							
19. 1946	4.16	27.8	45.4	10.4	17.9	4.53	39.6
20. 1971	3.94	31.1	48.8	14.2	20.5	4.43	41.2
United States							
21. 1950	3.37	26.9	43.8	10.9	28.8	3.63	36.4
22. 1977	2.86	25.3	45.6	20.9	30.7	3.35	36.0
Canada							
23. 1956	3.94	32.1	42.4	7.9	21.9	4.24	38.6
24. 1976	3.13	27.2	44.2	16.8	27.8	3.56	35.6

Table 8--continued

Country and years of coverage	Persons per HH	% of persons under 15	TDM, size distribution	% in HHs		Excluding 1 Person HHs	
				1 person HHs	2 person HHs	Persons per HH	TD
	(1)	(2)	(3)	(4)	(5)	(6)	(7
Australia							
25. 1947	3.75	25.1	39.4	8.1	20.3	3.99	33.8
26. 1971	3.31	28.8	43.2	13.5	26.6	3.67	35.6
New Zealand							
27. 1951	3.61	29.1	41.0	9.1	23.4	3.87	35.2
28. 1966	3.56	32.6	45.0	12.5	24.8	3.93	36.8
Japan							
29. 1950	4.97	35.5	38.8	5.4	10.2	5.20	35.6
30. 1975	3.45	24.5	38.8	13.6	16.8	3.84	28.8
Less Developed Market Economies							
Taiwan							
31. 1956	5.60	44.2	41.2	7.7	7.2	5.98	35.0
32. 1966	5.86	43.3	37.4	6.6	5.4	6.21	32.4
33. 1970	5.85	40.5	32.0	2.5	4.8	5.98	29.8
34. 1977	5.06	34.7	30.8	3.4	6.2	5.20	29.0
Philippines							
35. 1957	5.70	44.2	35.2	1.6	6.7	5.78	34.0
36. 1970	5.94	45.5	36.8	2.3	7.2	6.06	35.4
Thailand							
37. 1960	5.64	44.7	37.0	2.5	7.3	5.76	35.2
38. 1970	5.71	46.2	36.8	3.2	6.9	5.88	34.2
Mexico							
39. 1940	4.08	42.4	46.4	12.7	17.4	4.53	39.0
40. 1950	4.47	42.9	47.0	11.5	14.6	4.92	39.0
41. 1970	4.85	46.5	45.2	7.8	14.2	5.18	40.0
Costa Rica							
42. 1950	5.52	44.0	43.0	4.8	10.6	5.75	39.6
43. 1973	5.60	42.2	43.0	4.7	9.6	5.83	39.4
Dominican Republic							
44. 1950	4.93	44.2	48.0	13.7	20.9	5.37	41.8
45. 1970	5.29	48.3	45.8	8.1	11.5	5.67	40.4
Ecuador							
46. 1950	5.12	43.3	43.4	6.8	11.0	5.43	39.0
47. 1962	5.13	45.4	43.8	6.8	11.5	5.43	39.6
Venezuela							
48. 1950	5.34	42.3	44.6	7.0	10.8	5.65	40.0
49. 1961	5.33	46.0	45.6	8.8	10.0	5.74	39.4
Paraguay							
50. 1950	5.32	42.4	41.8	5.0	10.4	5.54	38.8
51. 1962	5.43	45.9	43.2	6.1	9.9	5.72	38.8
Trinidad and Tobago							
52. 1946	4.02	36.8	54.4	16.9	20.8	4.63	45.6
53. 1970	4.78	42.8	52.2	14.6	13.7	5.42	42.6

Table 8--continued

Notes

Columns 1, 3, 4, 5: Except for United States, 1977 (line 22); Taiwan, 1966, 1970, and 1977 (lines 32-34); and Mexico, 1940,1950 (lines 39-40), the entries are from United Nations Demographic Yearbooks cited for the data in Table 1 (including the Demographic Yearbook for 1955 covering the early postwar years).

The US data for 1977 are taken or calculated from Bureau of Census, Current Population Reports, Series P-60, no. 109 (Washington, D.C., 1978) showing data for March 1977, Table 17, pp. 47ff.

The Taiwan data for 1966 and later years are from the usual sources on distribution of income and expenditures of households in Taiwan cited for Tables 1 and 3.

The data for Mexico for 1940 and 1950 are from Julio Duran Ochoa, "XX. La Explosion Demografica," in Fondo de Cultura Economica Mexico: 50 anos de revolucion, vol. II, La Vida Social (Mexico City, 1961). The classification of families by size and the number of single persons not forming families are in Table 9, p. 17. The classification of total population by age, for the two years, is in Table 8, p. 16 (used in col. 2, lines 39-40).

Column 2: Except for Taiwan and Mexico (1940 and 1950), the entries are either from the United Nations working paper cited for the same data (% of population below 15 years of age) used for Table 1; or, for some earlier years, from the early issues (1949-50, 1951 etc. of United Nations Demographic Yearbooks, and B. R. Mitchell, European Historical Statistics 1790-1970, London 1975, Tables B1 and B2, pp. 19ff.

Table 8--continued

For Taiwan we used the Statistical Yearbook, 1976 (see notes to Table 1). The entry for 1977 relates to end of 1976.

For Mexico see the source cited for Columns 1, 3, 4, 5, above.

Columns 6 and 7: Calculated from the distributions underlying the entries in columns 1, 3, 4, and 5.

For a few entries approximations had to be made to the average of persons per household in the upper, open-end, size class (with the number of private households given, and a full distribuiton of households by the adequate range of size classes). We used inthese few cases approximations for the same country for another year, or of neighboring countries. Since this usually involved a classs of 10 persons and over, with small shares in the totals, the relative resulting error could be assumed to be moderate.

units in the South. Even for the developed market economies, with a much better coverage, major countries, particularly in Southern Europe, are missing. Still, the recurrence of similar findings for a number of countries yields results that are of some interest and generality; and they can be listed briefly.

(a) In all fifteen developed countries, excepting France, size of the average household declined, in several cases quite strikingly considering the brevity if the period. Thus, in Finland the decline was close to a fifth (lines 15-16, col. 1); in Canada about the same (lines 23-24, col. 1), and in Japan the drop was by almost a third (lines 29-30). In contrast, for the ten less developed market economies, with the exception of Taiwan for the period 1970-77, the size of the average household was either relatively constant or tended to rise (lines 31-3, 35-531, col. 1). It is likely that this contrast between the changes over the last two to three decades, the decline of the size of average household in the developed countries and the stability or rise in the less developed countries, would be confirmed by a larger and more adequate sample.

(b) One would expect the downward trend in the size of average household in the developed countries to be associated with decline in the proportion of children under 15 years of age, in column 2. But this is not generally true, even disregarding France (in which the average household changed little in size). The proportion of children under 15 rose in Netherlands, Austria, Eire, Australia, and New Zealand; and barely changed in West Germany and in Norway. With seven exceptions out of the 14 countries that showed a significant decline in average size of house-

hold, one may argue that this decline is only partly explained by reduction in proportions of children. As we shall see presently, it was due more to a rising proportion of one-person households in the distribution of households by si

In contrast, there was greater uniformity among the ten less developed countries in the tendency of the proportion of children under 15 years of age to rise. The exceptions were Taiwan, which proved to be an exceptional case in other respects; and Costa Rica. It is of some interest that this rise in the proportion of children was observed even in countries in which the average size of household barely changed, e.g., in Ecuador and Venezuela (lines 46-49, cols. 1 and 2).

(c) Except for Finland and Japan, the inequality in the size-distribution of households in the other thirteen developed economies widened perceptibly over the last one and a half to three decades (col. 3). The rises were moderate, but it is their prevalence in so many countries that is significant. No such common tendency toward a rise is observed among the less developed countries. In Taiwan the finding is of a sharp reduction in the inequality, the TDM declining from 41.2 in 1956 to 32.0 in 1970 and hovering around 31 by 1977 (col. 3, lines 32-34), a trend not found in any of the other less developed countries. Some of these show moderate rises (Philippines, Venezuela, and Paraguay); others show stability or moderate declines. There is, thus, a contrast for the post World War II decades between the widening inequality in the size distribution of households in almost all developed countries; and the absence of a common tendency in the TDM for the size distribution to change in the same direction, with the exception of the significant decline for Taiwan.

(d) The almost general widening of the inequality in the size-distributions of households in the more devleoped economies appears to be associated with the rise in the proportions of one-person households (column 3), which was far greater than the rise in the proportions of two-person households in a number of countries (1 compare the changes in col. 4 with those in col. 5 for England and Wales, West Germany, Denmark, Norway, Sweden, Austria, and the United States). It is also interesting to note that this rise in the proportion of one-person households occurred even in Japan, in which the TDM for the size distribution of households in col. 3 was stable over the period.[5]

Such rises in proportions of one-person households can be found in some of the less developed countries in Table 8 (e.g., Philippines, Thailand, Paraguay), but they are absolutely small; while in a number of other less developed countries, even excluding the unique case of Taiwan, the shares of the one-person households in the total were either constant or declined. There is thus conformity between the prevalence of rises in the TDMs in col. 3 and the rises in proportions of one-person households in column 4 for the developed countries; and between the absence of consistent movements in the TDMs in col. 3 and in the movements of the proportions of one-person households in col. 4 for the less developed countries.

(e) The contribution of the rise in the shares of one-person households to the widening in the inequality in the size-distribution of households in the developed countries is demonstrated when we exclude these households and deal with the distributions of households of two persons and more (columns 6 and 7). In all countries except France, this

exclusion of one-person households still leaves a downward trend in the size of average household, but naturally a more moderate trend in column 6 than in column 1. But the significant change is in the TDMs, the measures of inequality in the size-distribution of households. In column 7, which should be compared with col. 3, the TDMs are naturally lower; but the more important change is the disappearence of the tendency in the TDMs, observed in col. 3, to rise. Of the fifteen developed countries in Table 8, we still find some rises in the TDMs in col. 7, in England and Wales, France, Eire, Australia, and New Zealand; for the remaining ten countries we find either stability (Austria) or declines, some quite substantial. The broad conclusion is that the prevalence of some widening in inequality in the size-distributions of households among the developed economies in the post World War II period was due largely to the rise in proportions of one-person households--so that the exclusion of the latter removes any significant trend, with some weight of evidence towards narrower inequality in the size distributions of what might be called family households.

With the shares of one-person households in the less developed countries generally low, and the trends in these shares over the post World War II decades rather diverse, the exclusion of these one-person households does not change much the conclusions established on the basis of the rather small sample for the distributions of all households. This conclusion relates to the absence of movements in the same direction, either of the TDMs in col. 3 or of those in column 7. Perhaps with a

wider sample, a more perceptible order in the post World-War II changes in the size-distributions of households in the less developed economies might be observed.

In Table 9 we summarize measures of size-distributions of households for four countries for which the data at hand extended over a long span back of the 1950s. Two countries are in Southeast Asia, Japan and Taiwan, and for both one finds a downward trend in the TDM for the size-distribution of all households, or of households excluding the one-person class--with the indication that for the 1920s and the 1930s the inequality in the size distribution in these two countries was not narrow compared with the ranges above 40 that were found in so many countries in the post World War II decades. Whether such long-term declines in the inequality measures for the size-distributions of households, striking for Taiwan, but substantial even for Japan, particularly when we exclude the one-person households, are due to some specific aspects of the changing statistical definition of households, or represents a really greater clustering of the distribution around its mean, is a question that could be answered only with a detailed examination of the underlying basic census and other data.

No such downward trend in the inequality in the size-distribution of households is found for Sweden and United States with the exception of the more recent decades (covered in Table 8 above) for the distribution of households excluding the one-person size class. With this exclusion the TDMs for Sweden of 32.8 in 1950 and of 29.6 for 1975 are

Table 9 Long-Term Trends to 1950, Measures of Size-Distributions of Households, Four Countries

Country and year	Persons per HH	% of population below 15	TDM, 1 size distribution	% in HHS: 1 person HH	% in HHS: 2 person HH	Ex. 1-person HHs: Persons per HH	Ex. 1-person HHs: TDM
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Sweden							
1. 1860	4.28	33.5	49.8	15.5	14.4	4.88	39.6
2. 1870	4.07	34.1	49.6	17.9	14.5	4.74	38.4
3. 1880	3.94	32.6	51.6	20.0	15.1	4.67	39.8
4. 1900	3.72	32.4	54.6	23.6	15.8	4.56	40.2
5. 1910	3.72	31.7	53.4	22.6	15.7	4.51	39.8
6. 1920	3.64	29.3	52.2	21.9	16.0	4.38	39.0
7. 1930	3.46	24.8	48.8	20.0	18.0	4.07	36.6
8. 1950	2.90	23.4	42.6	20.7	24.8	3.40	32.8
United States							
9. 1790	5.79	49.9	40.0	3.7	7.8	5.98	37.0
10. 1900	4.76	34.4	43.8	5.1	15.0	4.96	40.2
11. 1930	4.11	29.2	48.2	7.9	23.4	4.38	45.2
12. 1940	3.67	24.9	41.0	7.1	24.8	3.87	36.6
13. 1950	3.37	26.9	43.8	10.9	28.8	3.63	36.4
Japan							
14. 1920	4.99	36.5	41.2			n.a.	n.a.
15. 1930	5.00	36.6	40.4			n.a.	n.a.
16. 1950	4.97	35.4	38.8	5.4	10.2	5.20	35.6
Taiwan							
17. 1930	5.82	41.0	46.4	7.6	7.5	6.22	41.8
18. 1956	5.60	44.2	41.2	7.7	7.2	5.98	35.0

Table 9--continued

Notes

Entries in lines 8, 13, 16, and 18 are from Table 8 above.

Sweden

Taken or calculated from Central Bureau of Statistics of Sweden, Historical Statistics of Sweden, I. Population, Stockholm, 1955. Distribution of households by size for the years shown from 1860 through 1930 is from Table A-24, p. 34, which also showns population not included in households; and indicates that there is no full comparability in the size-distribution of households before 1920, and for 1920 and later dates. The data on total population, and by age, in Table 16, p. 22, when combined with the data in Table A-24, permit calculation of population of each size-of-household class, the proportions of population aged under 15, and all the entries in lines 1-7.

United States

Taken or calculated from Bureau of the Census, Historical Statistics of the United States, Colonial Times to 1970, Bicentennial Edition, Part I (Washington, D.C., 1976). We used Series A335-349, p. 42, showing distribution of households by size classes; Series A288-319, p. 41, showing average size of household; and Series A119-134, pp. 15ff, showing distribution of total population by age, with a special estimate for 1790. The data for this early year, referring to free population alone, are not fully comparable with those for later years.

Japan

Lines 14-15 taken or calculated from Irene B. Taeuber, The Population of Japan (Princeton, N.J., 1958), Table 35, p. 108 for distribution of

Table 9--continued

Notes--continued

private households by size classes (with 1 and 2 person classes combined); and Table 21, p. 73, for the age distribution of total population.

Taiwan

Derived from George W. Barclay, Colonial Development and Population in Taiwan (Princeton, N.J. 1954). Table 45, p. 178 on average size of households (Taiwanese population alone) and Figure 30, p. 179, for distribution of households by size classes (Taiwanese population); and Table 18, p. 99, showing the age distribution of the Taiwanese about 1930.

distinctly lower than the comparable TDMs for 1860-1930 in column 7 of Table 9. Likewise for the United States, the TDM for 1950 of 36.4 and for 1977 of 36.0 are lower than those for 1900 and 1930 in col. 7 of Table 9. But the trends in the complete distribution show for Sweden a long swing, with the TDM measures of inequality in the size distribution first rising from about 50 in 1860 and 1870 to a peak of almost 55 in 1900, and then declining to 42.6 in 1950, to rise to 45.6 in 1975. The significant finding suggested here is that despite the marked decline in the size of the average household, from 4.3 in 1860 to 2.4 in 1975, the underlying long-term trend in the inequality in the size distribution from 1860 to 1930 has been constant. In the United States, if we disregard the entry for the earliest year, 1790, the measure of inequality in the size distribution in col. 3 fluctuates, but again the underlying trend from about 44 in 1900 to about 46 in 1977 is one of long-term stability, despite the marked decline in the size of the average household from about 4.8 persons in 1900 to 2.9 in 1977.

One should also note that for both Sweden and the United States, the long-term stability of the inequality measures of the size-distribution of all households was accompanied by both a substantial decline in the proportion in total population of children under 15, and a substantial rise in the proportions of one-person households. Including the most recent year from Table 8, the decline in the proportion of children aged below 15 in Sweden was from 34 percent in 1860 and 1870 to 21 percent in 1975; in the United States from 34 percent in 1900 to 24 percent in

1977. The rises in the share of one-person households were from 15.5 to 30.0 percent in Sweden, and from 5.1 to 20.9 percent in the United States.

The general bearing of the findings in Table 9 is to confirm the exceptional character of the inequality measures and trends for the two countries in Southeast Asia; and the broad conformity of the long-term trends in inequality in the size-distribution of all households in Sweden and in the United States to what we would expect from the cross-section data for the post-World War II years.

5. Summary

Our interest in the size distribution of households by number of persons stems from earlier findings, which indicate that size differentials among households contributed to inequality in the distribution of income among household by income per household; or to inequality in distribution of household income among persons (or consuming units); or to both. The positive association between per household income and household size means that in the conventional income distribution among households, there is a substantial component due merely to differences in size among small and large households. The negative association between household size and household income per person (or per consuming unit) means that in the distribution of household income among persons or consuming units, there is a substantial component due merely to effect of household size on per person income.

Given the associations noted above, it follows that the inequality in the size distribution of households is the minimum to which the associated inequalities in the distribution of income among households by per household income and in the distribution of household income among persons (or consuming units) should add. It also follows that, other conditions being equal, a wider inequality in the size distribution of households must mean wider inequality in the associated distributions of income among households by income per household; or a wider inequality in the associated distributions of household income among persons; or both. Thus, differences or changes in size distributions of households may spell differences in the associated distributions of income per household, or in the associated distributions of household income per person, or in both.

With these connections in mind, we may now summarize the findings of our exploratory survey of international differences and of trends over time in the size-differentials among households by number of persons. The survey was exploratory because we had to rely largely on the assembly of data by the United Nations, rather than search for the relevant data through the country censuses and sample studies.

(i) The international comparison for recent years covered data from seventy countries, developed and less developed market economies, and a few Communist countries. Excepting a few special regions--Eastern Asia with quite low disparity measures, and Subsaharan Africa (small sample) and the Caribbean, with high disparity measures, the measures of disparity in the size distribution of households tend to vary within a

fairly narrow range (TDMs from about 40 to 48). What is even more significant, for the group of forty-nine countries for which inequality in the size distribution of households varies within a narrow range, there is no correlation between the inequality measures and the size of the average household--which ranges from well over 5 persons to well below 3 persons per household; yet the group includes not only developed and less developed market economies but also eight communist countries. This means that the inequality in size distribution of households is about the same for developed and less developed market economies, and for more and less developed Communist countries. The exceptions being largely in circumscribed regions may, unless they are results of statistical different treatment of the data, be due to some specific insitutional characteristics of household structure in the limited groups of countries involved.

(ii) The relative invariance of inequality measures for the size distribution of households by number of persons is strikingly clear when we array the forty nine countries into seven groups in declining order of size of average household, and then average the TDM measures. In the same grouping, as we move from the largest household group I (5.69 persons per household) to the smallest household group VII (2.75 persons per household), there is a systematic decline in the proportion in total population of children under 15 years of age, and a systematic rise in the percentage in total households of one- and two-person households, the two size classes in which the share of children in minuscule. The stability of the TDM measures is thus maintained not only with a marked decline in average household size, but also with a marked shift in the age structure within the households.

(iii) Total disparity or inequality in the size distribution of households can be allocated between the disparity within the size classes by the number of persons of children under 15 (TDMc), weighted by their proportion in household population (Wc), the disparity within the same size classes of adults aged 15 and over (TDMa), weighted by the proportion of adults in total household population (Wa), the sum of (TDMc.Wc) + (TDMa.Wa) reduced by a possible cancellation component due to disagreement in the disparity signs for the children and adults respectively. Since the size classes where children and adults are above (or below) their average size for the country tend to be the same, the cancellation component is small and can be disregarded. The allocation of total disparity in the size distribution of households thus contains two components: the weighted disparity for the distribution of children under 15, and the weighted disparity for the distribution of adults 15 years of age and over--both disparities being for size classes by number of persons.

(iv) TDMc, the disparity for the children's distribution, is greater than TDMa, that for the adults' distribution, even in the larger household group of countries, in which the weight, Wc, is well over 0.4. As we move, in the cross-section, from the larger to the smaller household countries, TDMc rises, largely because the proportion of one- and two-person households rises; but the drop in the weight, Wc, may largely offset or more than offset the rise in TDMc, so that the product, the weighted contribution to total inequality may remain constant or even decline slightly. In absence of a marked shift toward smaller size households, of a diffused movement that would raise the proportions of

one-and two-person households substantially, those of three-and four person households less markedly, and reduce the proportions of the larger size households substantially, the change in size of average household and proportions of children under 5 might yield either a marked rise or a marked decline in total inequality in the size distribution, the TDM. Experimental modifications, which show the alternative results as we make different assumptions concerning the concentrated (rather than diffused) changes in the shares of the one-and two-person, illustrate the point. The suggestion is that it is the inter-connectedness within the structure of household distribution by size that makes for controlled variations in the weighted contributions of the children and adults components. Of course, no complete stability can be assumed; but it is true that while average size of households vary by a factor of 2 or 2.5 to 1, and proportions of children can decline from over 0.4 to barely over 0.2, the TDM for the size distribution varies within a range of about a tenth about a mean of about 44 (corresponding to a Gini coefficient of about 0.3).

(v) It was noted above that TDM (H-P), the disparity in the size distribution of households by number of persons is the <u>minimum</u> to which TDM (H-Y), disparity in distribution of income by income per household, and TDM (P-Y), disparity in the distribution of household income per person, should add. It is a minimum since TDM (H-Y) + TDM (P-Y) can be larger than TDM (H-P) because there may be some special factors, unrelated to size, that affect the income disparities among size classes.

If we assume that no such unrelated-to-size factors affect the disparity among size classes, two sets of inferences can be suggested.

(vi) The first emerges if we hold TDM (H-P) constant for the several groups of countries in descending order of size of average household, assume relative constancy in the TDMa, the disparity for the adult component at plausible levels; and, then, knowing the changing weights Wc and Wa, derive the TDMc as a residual. This derived TDMc will show a marked rise, as we move from the larger to the smaller average household groups in the array. In other words, the disparity in the distribution of children will widen as we move from countries with large families, many children, and few one-and two-person households, to countries with small families, few children, and large proportions of one-and two-person families. If we then assume that TDM (P-Y), the disparity in distribution of household income per person (associated with size distribution of households) is about the same in the large and small household countries, the higher TDMc in the smaller households countries will be translated into wider difference between the weighted per person income for children and weighted per person income of adults, a <u>wider</u> shortfall of per person income of children relative to that of adults. In other words, under the assumptions stated, and they are plausible, the relative shortfall in the per person income of children in the more developed countries (with overall higher per person income) will be greater than that in per person income of children in the less developed, larger household countries (with overall lower per person income).

(vii) The second conjecture is suggested by a comparison of the relation between disparities in the size distributions of households and the associated disparities in income per household and in household income per person, for groups of households distinguished by occupation of head, in the United States (in 1975) and in Taiwan (in 1977). The eight occupational groups in the United States excluded service and farm occupations, because the US data exclude income in kind (likely to be large in these two occupations), and covered employed civilian workers alone. The ten group in Taiwan, exclude armed services, unclassified, and retired, and the data covered all income, money and kind. The TDM (H-P) varied among occupational groups somewhat more than they would differ among countries, but the variance was not large and not associated either with size of average household or with occupational income per person. The significant finding was in the difference in the responses of TDM (H-Y) and TDM (P-Y) to the level of per person income of the occupational groups among households in the United States and in Taiwan. For the United States, variation in TDM (H-P) among occupations, uncorrelated with income levels, were reflected in similar variations in TDM (H-Y), so that wide disparity in size of households resulted in wide disparities in associated distributions of per household income. Consequently, the variation in TDM (P-Y), in disparities in the associated distributions of household income per person, was negligible, the relevant measures being almost the same in all occupational group, high income and low income. In Taiwan, the array of occupational groups by declining level of per person income yielded a definite trend in the TDM (H-Y), a

rise in the level of this disparity in income per household. Since TDM (H-P), the disparity in size distribution of households, was not varying with the per person income level of the occupational groups, the TDM (P-Y), the disparities in the associated distribution of household income per person, showed a marked decline as we moved from the higher to the lower income occupations. In other words, in Taiwan, the lower the per person income of the occupational group, the greater was the positive response of per household income to household size, and the weaker was the negative response of per person income to household size. The economic rationale of the lower income country response of the type shown in Taiwan is clear, although the explanatory factors may also lie in the greater ease of augmenting income in households in rural or small town occupations in a country like Taiwan than in a more urbanized country like the United States.

(viii) The data base for the study of trends over time in the size distribution of households was far narrower here than that for international comparisons for recent years. Even the evidence on trends in the two to three decades span following World War II was limited to twenty five countries, of which as many as fifteen were developed market economies and only ten were less developed market economies. A wider coverage would have required search in the censuses and sample studies of single countries, a task not feasible in the exploratory comparisons here.

(ix) The general finding of the post World War II decades was a prevalent decline in the size of average household in the developed

market economies, accompanied by significant rises in the proportions of one-person households; but not as generally by a decline in the proportions of population under 15 years of age. There was also a fairly prevalent rise, if moderate, in the TDM for the size distributions, due largely to the increase in the proportions of one-person households. Exclusion of the latter and recalculation of the measures indicate that the prevalent, if limited rise in the TDMs for the size-distribution, disappears.

In the few less developed market economies, no such general trends can be observed in the post World War II. Excepting the marked decline in the TDM (H-P) for Taiwan, there were no major movements in the inequality in the size distribution of households for the less developed countries; nor was there much movement in the average size of households. The low size-disparity which we observed in Table 1 for the distinct group of countries in East-Southeast Asia (Japan, Korea, Taiwan, Philippines, Thailand) appeared to be true not only for recent years, but also in the 1960s.

(x) For periods further back, stretching into the past prior to World War II, we had adequate evidence for only two countries, Sweden and the United States. For Sweden, the complete distribution, including one-person households, shows a long swing in inequality of the size distribution, rising from 1860 to a peak by 1900, and then declining to 1950 to rise slightly again by 1975. But if we exclude the one-person households, the TDM for the size distribution of households in Sweden appears to be constant over the period, and then declines after 1950.

For the United States, the record back to 1900 suggests relative constancy of the TDM for the total size distribution, and a recent decline if we exclude the one-person households. Since the decline in the size of the average household in both Sweden and United States was quite marked over the period, for either the total distribution or excluding the one-person household, the absence of any distinct trends over the long-term, in the TDM for the size distributions in the two countries, is in conformity to what we should have expected from the cross-section comparison for recent years.

(xi) The limited range of differences in inequality in size-distributions of households in cross-section comparisons, and the relative stability of such inequality over long periods, mean invariance and stability in the sum of effects of size differences among households (size-effects) on disparities in income per household (such income positively correlated with size) and on disparities in income per person or per consuming unit (such income negatively associated with household size). Hence, the greater the size-effects on disparities in income per household, the smaller would be the size-effects on disparities in income per person or per consuming unit; and vice versa. If we have grounds to assume that the size-effects on disparities in income per household are greater in the less developed than in the developed countries and were greater in the earlier than in the later stages of economic growth in the developed countries, it would follow that the size-effects on disparities on income per person or per consuming unit would be smaller among the LDCs than among the DCs; and would rise from the earlier to the later stages of economic growth. An opposite assumption would

yield an inference of greater contribution of the size-effects to disparities in income per person or per consuming unit among the LDCs than among the DCs and a decline in these size-effects in the course of long-term growth. It is thus important to view the invariance of constancy over time in the inequality in the size distributions of households as compatible with marked differences and significant trends in the size effects on the income disparities of most interest to us, those by income per person or per consuming unit.

There is no need to extend the discussion here by emphasizing the limitations of the findings, and of the suggested conjectures, due to the narrowness of the empirical base; and to the failure to pursue a variety of alternative measures, having to do with conversion to consuming units, alternative measures of disparity, and the like.

The main aim of the analysis and discussion was to illustrate the otherwise obvious point that differences in size differentials and structure of households have important effects on inequality in the income distributions among the most relevant receipient units, persons or consumer equivalents. Whatever findings were suggested in the tables and discussion are details on the theme just indicated; and one that so far has not been considered adequately in the conventional income distributions among households by income per household.

Footnotes

[1]The data at hand are all on size of household as measured by number of persons. For analytical purposes the conversion of persons to equivalent consuming units is desirable but difficult, with the needed data scarce. However, the findings here are relevant also to comparisons with household size reduced to consuming units, although the magnitudes of the size differentials would be narrower.

[2]See my recent paper, Size of Households and Income Disparities, (to be published).

[3]For definitional problems see United Nations, Methods of Projecting Households and Families, Manual VIII, New York 1973, Chapter I, pp. 5-11; and also the technical notes on Table 42, pp. 51-3, in UN Demographic Yearbook, 1976, New York 1976. We could not use the summary Table 3, pp. 12-15 in the earlier source because the detail by size-class of households was insufficient to allow measuring the full range of inequality in size. I am indebted to the Statistical Office of United Nations for providing me with data on the subject received after the last publication in the Demographic Yearbook for 1976.

[4]For earlier discussion see my paper on "Income-Related Differences in Natural 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 and London, 1974, pp. 127-146.

Footnote 4-continued

Table 2, p. 133, of this paper shows differences in per person incomes (expressed as relatives of countrywide average) of children and adults, for 1971, of 0.75 to 1.13 for white families a ratio of 0.67; and of 0.77 and 1.25 for black families, a ratio of 0.61. Similar relatives to countrywide income per consuming unit (allowing 0.5 weight to a child under 18 and 1.0 to an adult 18 and over) are 0.83 and 1.04 for white families, a ratio of 0.80; and 0.79 and 1.11 for black families, a ratio of 0.71

These income relatives were derived for groups of families (2 persons and over) classified by number of children, not by the number of persons. But the results may overstate the gap, because the data used did not permit a proper estimate of the distribution of adults by size classes of families by number of children -- so that an almost equal number of adults per household had to be assumed for the several size-classes. Further work may result in an improvement of these earlier estimates, but the expected narrowing in the gap is not likely to be large.

[5]The trend toward living alone was commented upon in the United States, in reference to the evidence for that country (see Frances E. Kobrin, "The Fall of Household Size and the Rise of the Primary Individual in the United States," Demography, vo. 13, no. 1, February 1976; and Robert T. Michael, Victor R. Fuchs, and Sharon R. Scott, "Changes in the Propensity to Live Alone," Demography, February 1980 (forthcoming).