



Population Council Knowledge Commons

Poverty, Gender, and Youth

Social and Behavioral Science Research (SBSR)

2001

Household size and composition in the developing world

John Bongaarts
Population Council

Follow this and additional works at: https://knowledgecommons.popcouncil.org/departments_sbsr-pgy

 Part of the [Demography, Population, and Ecology Commons](#), [Family, Life Course, and Society Commons](#), and the [International Public Health Commons](#)

Recommended Citation

Bongaarts, John. 2001. "Household size and composition in the developing world," Policy Research Division Working Paper no. 144. New York: Population Council. Version of record: <https://doi.org/10.1080/00324720127697>

This Working Paper is brought to you for free and open access by the Population Council.

Household Size and Composition in the Developing World

John Bongaarts

2001 No. 144

Household Size and Composition in the Developing World

John Bongaarts

John Bongaarts is Vice President, Policy Research Division, Population Council.

The author gratefully acknowledges comments on an earlier draft of this paper from Thomas K. Burch and Cynthia B. Lloyd and assistance from Paul Hewett and Brian Pence in the preparation of the DHS data files.

Abstract

This study uses data from recent household surveys in 43 developing countries to describe the main dimensions of household size and composition in the developing world. Average household size varies only modestly among regions, ranging from 5.6 in the Near East/North Africa to 4.8 in Latin America. These averages are similar to levels observed in the second half of the nineteenth century in Europe and North America. About four out of five members of the household are part of the nuclear family of the head of the household. Household size is found to be positively associated with the level of fertility and the mean age at marriage, and inversely associated with the level of marital disruption. An analysis of trends and differentials in household size suggests that convergence to smaller and predominantly nuclear households is proceeding slowly in contemporary developing countries.

The family and the household are the most fundamental socioeconomic institutions in human society. The principal social function of the family is to bring children into the world and to care for them until they can support themselves. In addition, it is primarily through the family that the ill and the dependent aged are supported. As noted by Ryder (1977): “Every individual life (assuming survival to old age and consequent dependency) is a sequence of net consumption, net production and, again, net consumption. The family is society’s way of coping with this fact; it is the agent for transferring resources across generations. The solution takes the form of implicit contracts built into marriage and parenthood, specifying diffuse and long-standing commitments.... Normative arrangements such as these are the fabric of the social system; they are implanted through socialization and maintained through social control” (p. 45). The role of the household and residential family is also central in economic analyses, because these units are usually the locus of joint decisions regarding consumption, production, labor force participation, savings, and capital formation (Becker 1991; Kuznets 1978).

The social sciences, including sociology, economics, and anthropology, have long recognized the importance of families and households and there are extensive corresponding literatures. In contrast, demographers have neglected the quantitative dimensions of the size composition and change in households and their causes and consequences. According to Burch (1979), “...compared to the subfields of natality or migration, household and family demography is still immature. Documentation of key generalizations is spotty, measurement conventions are not yet firmly established, and theory of determinants and consequences is sketchy and ad hoc” (p. 183). Similarly, Berquó and Xenos (1992) called family demography “a recent and relatively underdeveloped branch of population studies” (p. 8). Despite progress over the past two decades, these observations are still largely valid today.

One of the main reasons for this unsatisfactory state of affairs is the intrinsic complexity of the demographic analysis of households and families. In conventional demography the unit of analysis is the individual, whose characteristics can be described with a limited number of variables such as age and sex. Widely accepted theories and models have been developed to describe how population distributions of these individual characteristics are determined by vital processes. In contrast, the family demographer has to deal with multi-dimensional families, households, and kin groups. Not only does every individual in these units have an age, sex, and marital status, but members are related to one another in a variety of ways. These networks of relationships

make families essential socioeconomic units, but they pose formidable problems to the demographer who tries to identify and quantify the key structural dimensions of these interrelated groups of individuals (Le Bras 1979).¹

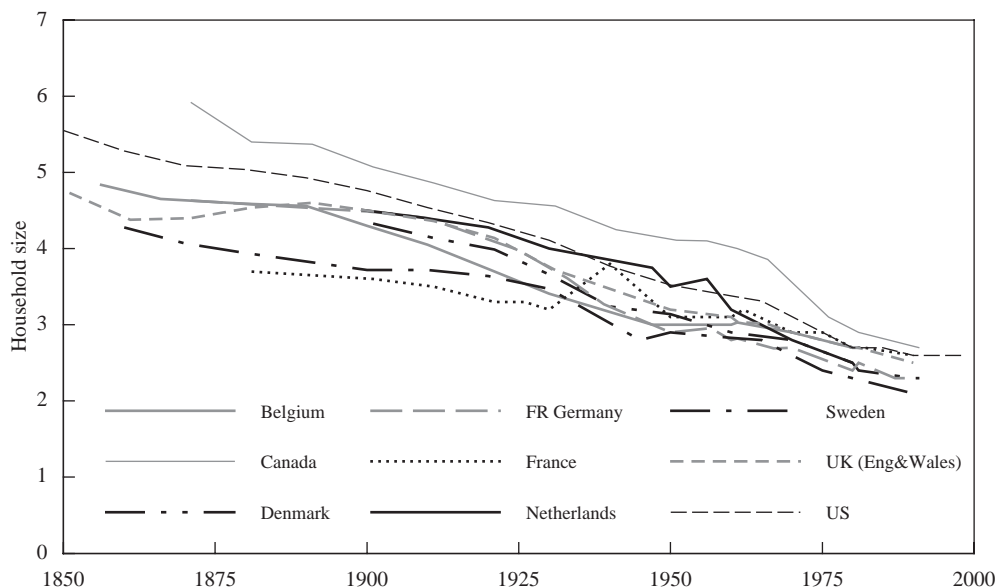
The terms household and family are not always used consistently in the literature. A household is usually defined as a group of persons (or one person) who make common provision for food, shelter, and other essentials for living, but practices vary significantly among countries. As a consequence, measures of household size and composition obtained from censuses or other sources in different countries are sometimes not directly comparable. The term family is used even less consistently. In the social science literature and in common usage “family” refers generally to a group of kin—persons related by blood, marriage, or adoption (Burch 1979). In contrast, demographers and economists usually follow the recommendations of the United Nations (1980) and define a family as the members of a household who are related through marriage, blood, or adoption. That is, they focus on the residential family. A drawback of the latter approach is that related individuals living in other households and the social and economic interactions with such individuals are often ignored (Lloyd 1998).

The present study begins with a description of the main dimensions of household size and composition in the developing world and their variation by region. Since even a moderately complete analysis of this topic would require full-length treatment, only a few key variables are included. Next, the proximate determinants of household size are examined to identify the main demographic factors that account for variation in size. The last section assesses the applicability to the developing world of a common assumption in the field of family sociology, namely that the size and complexity of households decrease over time as a society develops. Before addressing these topics, brief comments will be made on historical trends in household size and on the data base for this analysis.

HISTORICAL TRENDS IN HOUSEHOLD SIZE

In a number of countries long time series available from past censuses are often the main source of descriptive work in household demography. Figure 1 plots average household size for several European countries as well as the United States and Canada over periods that span more than a century. In this group of countries the dominant trend is a steady decline in household size from around 5 members in the middle of the nine-

Figure 1 Trends in average household size in selected countries in Europe and North America, circa 1850–1998



Source: United Nations 1973, 1997; U.S. Census Bureau 1999.

teenth century to between 2 and 3 in 1990. In 1900 France had the smallest household size (3.6) and Canada the largest (5.1), but over the past century these outliers have converged close to the levels observed in other industrialized countries.

The pervasive decline in fertility over the past century in these now-industrialized countries is one of the main driving forces of the secular decline in household size in Europe and North America. Other things being equal, declining fertility reduces the number of children per household. Improvements in child survival offset this trend to some extent, but the net effect has been a reduction in the number of surviving children per woman (as measured by the net reproduction rate). For example, in the US the number of children under age 15 per household declined from 2.3 to 0.6 between 1850 and 1998 (Kuznets 1978; U.S. Census Bureau 1999).²

A second key factor in the secular decline in household size has been a reduction in the number of adults per household. In the US between 1850 and 1998 a substantial

part of the change in average household size from 5.5 to 2.6 resulted from the decline in the number of adults per household from 3.2 to 2.1 (Kuznets 1978; U.S. Census Bureau 1999).³ This decline reflects a trend away from the traditional more complex household structures of the past toward the simpler nuclear households that dominate in contemporary industrialized societies. This trend is attributable to changes in a number of factors other than fertility that affect household size: the age at marriage, adult mortality, the propensity of adult sons/daughters (unmarried or married) to remain in the parental household, the risk of marital disruption and remarriage, the tendency and ability of the elderly to live alone, and the presence of other relatives and nonrelated individuals such as servants or lodgers. The roles these other demographic and residential factors play in shaping the size and composition of households vary among societies and they are in turn affected by numerous cultural and economic conditions. Although some of these factors have offsetting effects (for example, other things being equal, declines in adult mortality raise household size), their net impact over the course of the transition is typically a reduction in the number of adults per household. Since many of the determinants of household size and composition change simultaneously, it is difficult to sort out the specific contribution of each factor to long-range trends.

DATA

This study uses data from household surveys conducted in 43 countries that have participated in the Demographic and Health Surveys program between 1990 and 1998.⁴ In countries where multiple surveys were implemented during this period only the latest survey is included. The regional groups of countries are as follows:

Asia: Bangladesh, India, Indonesia, Kazakhstan, Kyrgystan, Nepal, Pakistan, Philippines, Uzbekistan

Latin America: Bolivia, Brazil, Colombia, Dominican Republic, Guatemala, Haiti, Nicaragua, Paraguay, Peru

Near East/North Africa: Egypt, Morocco, Turkey, Yemen

Sub-Saharan Africa: Benin, Burkina Faso, Cameroon, Central African Republic, Comoros, Côte d'Ivoire, Ghana, Kenya, Madagascar, Malawi, Mali, Mozambique, Namibia, Niger, Nigeria, Rwanda, Tanzania, Togo, Uganda, Zambia, Zimbabwe.

The main objective of the DHS household survey is to identify women of reproductive age who are eligible for a subsequent detailed interview covering demographic and health issues. The information collected in the household survey is therefore limited in scope. The household questionnaire obtains from an adult a listing of all usual household members and visitors. For each individual, information is collected on age, sex, relationship to head, education level, and residential status, and, for children, the presence and survival status of their parents. In a limited number of surveys, marital status of members is also collected. In addition, characteristics of the household (e.g., source of drinking water, availability of electricity, type of toilet facilities, household possessions) are recorded. The size of the household sample varies among countries, with the majority ranging between 3,000 and 10,000. These data, available in standardized computer data files, are a unique source for comparative analysis of demographic characteristics of households and their members in the developing world (Ayad et al. 1997).

One problem encountered in the collection of household data is the identification of the head. The head of the household is usually defined as “that person who is acknowledged as such by the other members” (United Nations 1980, p. 70).⁵ The DHS interviewer’s manual gives a more detailed definition: “...the head of the household [is] the person who is considered responsible for the household. This person may be appointed on the basis of age (older), sex (generally, but not necessarily, male), economic status (main provider), or some other reason. It is up to the respondent to define who is the head” (DHS 1990, p. 32). Following standard practice, the DHS interviewers ask an adult respondent in each household to identify the head. This approach (and similar ones used in other surveys and censuses) is not simple and unambiguous, and socio-cultural considerations no doubt lead to variation in interpretation among respondents and countries (Armstrong 1978; De Vos and Holden 1988). In addition, in traditional societies an adult male is often designated as the head even if a female member is the main provider (Ayad et al. 1997; United Nations 1980). These circumstances unavoidably complicate the analysis of household composition.

The results reported in this study are often presented in the form of regional averages. These are unweighted averages of various statistics for the countries with DHS surveys. Since only a small number of the household surveys are available for

each region, these estimates are not necessarily representative of the region as a whole. This approach is taken to obtain an overview of key differences by region and to avoid presenting large numbers of country statistics that can make it difficult to identify broad patterns of interest.

HOUSEHOLD SIZE AND COMPOSITION

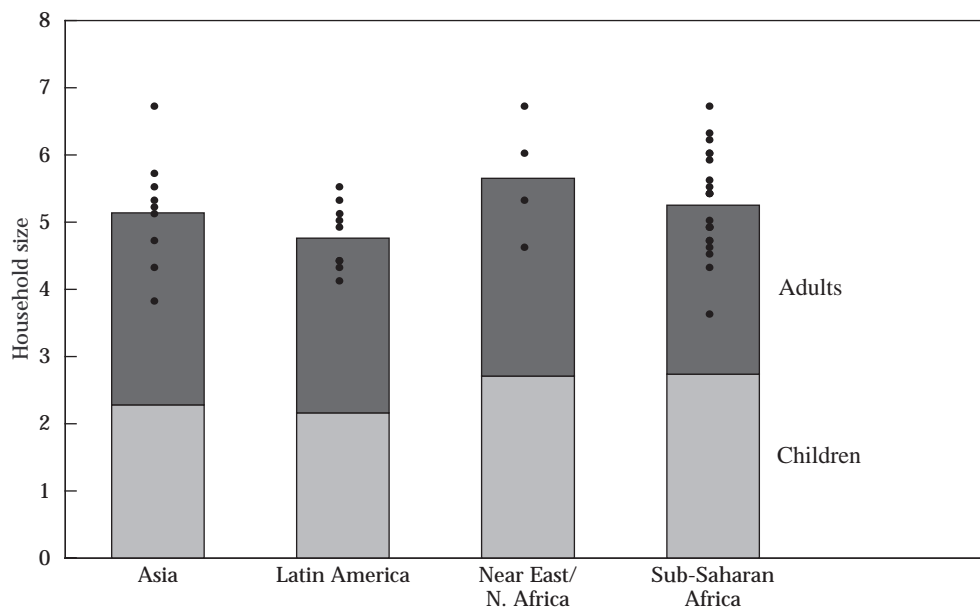
Size

The most basic demographic characteristic of a household is the number of members it contains. Although the determination of membership is not always straightforward, in particular regarding visitors and members who are temporarily absent, these considerations are of minor significance for our purposes. The analysis below is based on the *de jure* population—that is, members who usually reside in the household are included even if they are temporarily absent at the time of the survey, and temporary visitors are excluded. This approach is also used in other recent analyses of household structure in developing countries (Ayad et al. 1997; DeVos 1995).

The average household size measured in countries of the four regions of the developing world is graphed in Figure 2. Differences among regions are relatively small, with the average size ranging from a high of 5.6 in the Near East/North Africa to a low of 4.8 in Latin America, and intermediate values for Asia (5.1) and sub-Saharan Africa (5.3). The finding that household size in the Near East/North Africa exceeds that of sub-Saharan Africa is somewhat surprising since fertility in sub-Saharan Africa is significantly higher than in the Near East/North Africa. A comparison of Figures 1 and 2 indicates that households in contemporary developing countries are broadly similar in size to those in Europe and North America in the middle of the nineteenth century.

The regional averages presented in Figure 2 conceal substantial differences among countries. This is evident from the country-specific point estimates of average household size from the individual surveys that are also plotted in Figure 2. Although variation in household size in this set of countries ranges from 6.7 in Pakistan to 3.6 in Ghana, the regional standard deviations are not particularly large: 0.9 in the Near East/North Africa, 0.8 in Asia, 0.7 in sub-Saharan Africa, and 0.5 in Latin America. In general, then, country-level average household sizes cluster fairly tightly around their regional means near 5 members per household.

Figure 2 Average household size by region and country within region



Source: DHS data files.

Age composition

As a first step toward analyzing the composition of households, we calculate the average number of adults (aged 18+) and children (aged <18) per household (the very small number of individuals under age 18 who are identified as head or spouse are considered to be adults in this analysis). The results are also graphed in Figure 2. The average number of children per household in sub-Saharan Africa (2.8) and the Near East/North Africa (2.7) slightly exceeds those in Asia (2.3) and Latin America (2.2). The number of adults per household is highest in Asia (2.9) and the Near East/North Africa (2.9) and lowest in Latin America (2.6) and sub-Saharan Africa (2.5). The average household population is roughly evenly divided between adults and children in the countries included in this study. It is of interest that the number of children in the average household is well below the country-level total fertility rate. For example, in sub-Saharan Africa the average number of children per household (2.8) is only about half of the total fertility rate. The reasons for this difference are discussed further below.

Members' relationship to head

Adults. Every household has a head and most heads have spouses who reside with them. Since the average number of adults per household exceeds 2 in all but one country included in this study,⁶ it is clear that many households include adults other than a head and his or her spouse. These other adults may be parents or parents-in-law, adult offspring, sons-/daughters-in-law, co-wives, other relatives of the head (e.g., brother or sister), and nonrelatives (e.g., domestic servants). Because the DHS recorded the relationship to the head for every household member, it is possible to examine the frequency of different types of adults residing in households. The upper panel of Table 1 presents the distribution of the average number of adults by relationship to head for the different regions. These results indicate that households predominantly contain three types of adults: the head (one per household), spouse of head, and sons and/or daughters. These three types account for close to 85 percent of adult household membership in all regions. The remaining categories average a few percentage points each. These generalizations hold for all countries and regions, even though the specific composition varies significantly at the country level.

The most important category of adult household member other than the head is the spouse. On average about 76 percent of heads have a spouse present (ranging from 82 percent in the Near East/North Africa to 66 percent in sub-Saharan Africa). For a small proportion of heads the explanation for the absence of a spouse is that they have never married. For the majority who have ever married, the absence of a spouse is the result of death, divorce, or separation.

The next largest group of adult household members consists of sons or daughters—on average, 0.45 per household (0.29 sons and 0.16 daughters). This group varies considerably in size among regions, with the Near East/North Africa having twice the level observed in sub-Saharan Africa (0.68 vs. 0.34). This group consists largely of young, mostly unmarried adults with males outnumbering females. Apparently, substantial proportions of children remain in the household of their parents after they reach their 18th birthday.

The remaining groups of adult household members are small in size. Daughters-/sons-in-law and parents are relatively more numerous in Asia and the Near East/North Africa than in Latin America and sub-Saharan Africa, but in the latter two regions rela-

Table 1 Average number of members per household by relationship to head and region

Relationship to head	Asia	Latin America	Near East/ North Africa	Sub-Saharan Africa
Adults				
Head	1.00	1.00	1.00	1.00
Spouse	0.79	0.69	0.82	0.66
Son/daughter	0.58	0.54	0.68	0.34
Son-/daughter-in-law	0.20	0.05	0.14	0.04
Grandchild	0.02	0.02	0.01	0.03
Parent	0.10	0.04	0.11	0.05
Parent-in-law	0.02	0.02	0.01	0.01
Brother/sister	0.06	0.06	0.08	0.08
Co-spouse	0.00	0.00	0.01	0.10
Other relative	0.06	0.09	0.06	0.13
Adopted/fostered	0.00	0.02	0.00	0.01
Nonrelative	0.03	0.06	0.01	0.05
Total	2.86	2.60	2.93	2.50
Children				
Son/daughter	1.78	1.62	2.28	2.02
Grandchild	0.38	0.32	0.31	0.34
Brother/sister	0.03	0.02	0.04	0.04
Other relative	0.07	0.09	0.08	0.25
Adopted/fostered	0.01	0.06	0.01	0.05
Nonrelative	0.01	0.05	0.01	0.04
Total	2.28	2.16	2.71	2.75
Household size	5.14	4.76	5.65	5.25

Source: Calculated from DHS data files.

tively more other relatives and unrelated persons are present. Few co-spouses are present except in sub-Saharan Africa, where polygamy is most common. To conclude our comments on these findings, we identify the countries that have the highest levels in each of the categories of relationship to head other than spouse and sons/daughters:

- Son-/daughter-in-law: Nepal (0.30), India (0.29), Uzbekistan (0.28)
- Grandchild: Namibia (0.12), Nicaragua (0.05), Dominican Republic (0.04)

- Parent: India (0.19), Pakistan (0.17), Bangladesh (0.16)
- Parent-in-law: Comoros (0.11), Indonesia (0.05), Philippines (0.03)
- Brother/sister: Cameroon (0.13), Pakistan (0.13), Côte d'Ivoire (0.11)
- Co-spouse: Burkina Faso (0.42), Mali (0.25), Niger (0.23)
- Other relative : Côte d'Ivoire (0.39), Namibia (0.33), Comoros (0.11)
- Adopted/fostered: Comoros (0.11), Dominican Republic (0.04), Nicaragua (0.03)
- Nonrelative: Namibia (0.20), Côte d'Ivoire (0.13), Haiti (0.12).

An explanation for these country-specific findings is beyond the scope of this study.

Children. The average number of children (aged <18) by relationship to head in each region is provided in the lower panel of Table 1. As expected, the large majority of children are sons or daughters of the head (75 percent on average). Among the other categories of children, grandchild is the most important, accounting for about half the remainder. Categories other than son/daughter and grandchild each account for only small percentages, except in sub-Saharan Africa where more children are categorized as “other relative” and “adopted/fostered” than in any other region. This is not surprising since child fostering is a well-established custom in sub-Saharan Africa, but even in this region these categories together account for only 12 percent of children.

Household complexity

Household complexity usually refers to the degree to which non-nuclear members are present. A simple nuclear household consists of parents and their children and no other relatives of the head or nonrelatives. More complex households can be created either by vertical extension through the addition of members of more than two generations or by horizontal extension through the addition of siblings and their spouses and offspring. Still more complex households include other more distant relatives or individuals unrelated to the head. To measure complexity, a variety of schemes for classifying households by type have been proposed (UN 1980; Laslett 1972; De Vos 1995), but there is no widely accepted and commonly used approach. The DHS data are not well suited to analyze this issue in detail and only a few key dimensions of family complexity can be examined with these data. The approach used here, similar to the one proposed by Burch (1967), relies on the frequency with which different relationships to head are observed. Members are classified as follows:

- Nuclear family: head, spouse, and their children⁷
- Stem family additions: parents or grandchildren of head
- Other family: any other relatives of head
- Other nonfamily: any individuals not related to head.

Based on members' relationship to head presented in Table 1, individuals can be categorized as one of these four types. From this information we calculate the average size of nuclear, nuclear and stem, and all family units within households. The results by region are presented in Table 2. Membership in nuclear family units predominates in all regions with its average proportion per household ranging from 77 percent in sub-Saharan Africa to 85 percent in the Near East/North Africa. The addition of parents or grandchildren yields the average size of the nuclear/stem family, which only modestly exceeds that of the nuclear unit alone, adding about 0.5 members in Asia and about 0.4 in the other regions. The average size of all residential families regardless of type or complexity is close to the average household size because very few members are not related to the head, especially in the Near East/North Africa and Asia (<1 percent), but also in sub-Saharan Africa (2 percent) and Latin America (2 percent). Clearly, nonfamily household members represent only a tiny minority of household members in these developing countries.

Table 2 Average size of residential family units by region

	Asia	Latin America	Near East/ North Africa	Sub-Saharan Africa
Average size				
Nuclear family	4.15	3.86	4.77	4.03
Nuclear/stem family	4.65	4.25	5.20	4.44
All families	5.10	4.64	5.62	5.16
Household	5.14	4.76	5.65	5.25
Ratio to household size				
Nuclear family	0.81	0.81	0.85	0.77
Nuclear/stem family	0.90	0.89	0.92	0.85
All families	0.99	0.98	1.00	0.98
Household	1.00	1.00	1.00	1.00

Source: Calculated from DHS data files.

The results in Table 2 are derived from characteristics of individuals and thus are not directly comparable with estimates of household complexity obtained with other approaches, especially those that are based on characteristics of households. A simple numerical example illustrates the difference between these two approaches. Assume that in a hypothetical population all households have 5 members; half of these households consist entirely of nuclear families and the other half contain nuclear families with 4 members plus one parent of the head. In this illustration, half of all households would be categorized as nuclear and the other half as stem. However, nine out of ten individuals are members of nuclear families and only one in ten are not (i.e., the one parent in half of the households). The proportion of individuals who are part of a nuclear family unit regardless of household type is clearly higher than the proportion of households that are nuclear. Different approaches to measuring household complexity can therefore lead to quite different results, and comparisons between studies should be done with great care to avoid misleading conclusions.⁸

Gender of head and household structure

In most countries, the majority of household heads are men, but the proportion of households headed by females is substantial in all regions: 13 percent in the Near East/North Africa, 16 percent in Asia, 22 percent in sub-Saharan Africa, and 24 percent in Latin America. In some countries this proportion exceeds one-third (Ghana, Haiti, Kenya, Zimbabwe). Table 3 presents household measures such as average size, number of adults and children, and the like by gender of the head and by region. The average size of male-headed households substantially exceeds that of female-headed ones. The difference is largest in the Near East/North Africa (5.9 vs. 3.8 members) and smallest in Latin America (5.0 vs. 4.1). These differences in overall size are the result of smaller numbers of both adults and children in female-headed households. The main cause of the smaller number of adults is that female heads very rarely co-reside with a spouse, while the large majority of male heads live with their wives. For example, in sub-Saharan Africa 92 percent of male heads co-resided with a spouse, while only 6 percent of female heads lived with a husband. Interestingly, in every region the number of adult sons/daughters is slightly higher in female-headed than in male-headed households.

Table 3 Average size of household components by gender of head

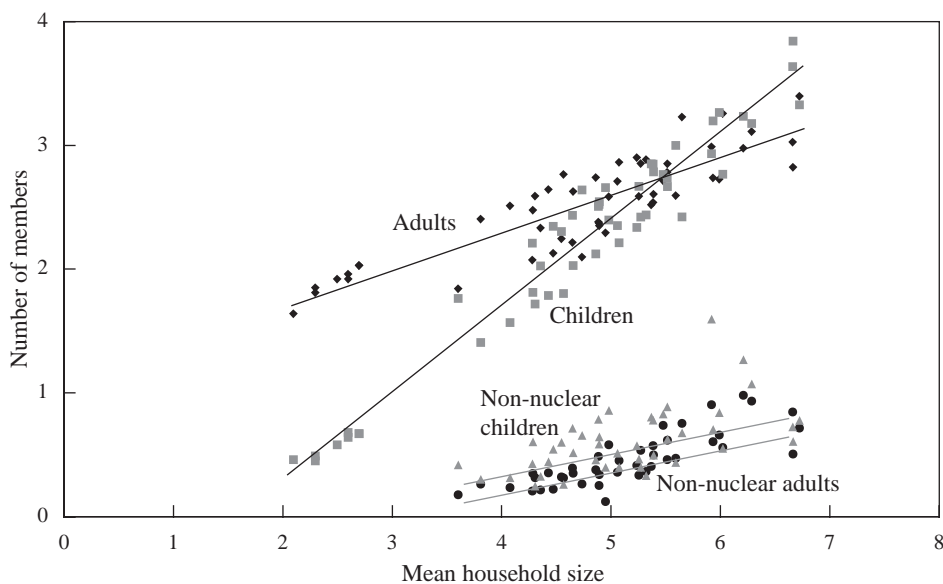
	Male	Female	Total
Household size			
Asia	5.4	3.8	5.1
Latin America	5.0	4.1	4.8
Near East/North Africa	5.9	3.8	5.7
Sub-Saharan Africa	5.5	4.2	5.3
Number of children			
Asia	2.4	1.6	2.3
Latin America	2.3	1.8	2.2
Near East/North Africa	2.9	1.7	2.7
Sub-Saharan Africa	2.9	2.3	2.8
Number of adults			
Asia	3.0	2.2	2.9
Latin America	2.7	2.3	2.6
Near East/North Africa	3.1	2.1	2.9
Sub-Saharan Africa	2.7	1.9	2.5
Number of spouses			
Asia	0.9	0.1	0.8
Latin America	0.9	0.1	0.7
Near East/North Africa	0.9	0.0	0.8
Sub-Saharan Africa	0.8	0.1	0.7
Number of adult sons/daughters			
Asia	0.6	0.7	0.6
Latin America	0.5	0.7	0.5
Near East/North Africa	0.7	0.8	0.7
Sub-Saharan Africa	0.3	0.4	0.3
Number of other adults			
Asia	0.5	0.5	0.5
Latin America	0.3	0.5	0.4
Near East/North Africa	0.5	0.3	0.4
Sub-Saharan Africa	0.5	0.4	0.5

Source: Calculated from DHS data files.

Association between household size and structure

In theory, the structure of households could be similar in countries with different average household sizes. In practice this is not the case, as is evident from the data plotted in Figure 3. Each point in this graph represents one country, and four variables are plotted against the average household size of each country: the number of adults and children per household and the number of non-nuclear adults and children. Figure 3 includes estimates from the 43 DHS countries as well as data circa 1990 from the nine European and North American countries included in Figure 1. As expected, each of these variables declines as household size declines. The number of children per household is higher than the number of adults in countries with the largest households while the reverse is true for countries with smaller household sizes. In the industrialized countries with household sizes between 2 and 3, children average only about one-quarter of the total membership. These trends in household composition as size declines reflect the

Figure 3 Relationship between average number of adults, children, and non-nuclear adults and children per household and mean household size



Source: DHS data files.

older age structure of countries with smaller households. Extrapolation of these trends to still smaller households leads to the logical end point at a household size of one that would consist of one adult and no children.

The proportion of members who are not members of the nuclear family of the head is a simple measure of the complexity of the household. The trends evident in Figure 3 show a clear decline in the number of non-nuclear adults and children as household size declines. The same downward trend applies to the proportion of household members who are not part of the nuclear unit (data not shown). This proportion is around 30 percent in countries with the largest households, but only about 15 percent in countries with around 4 members. This trend reflects a sharp decline in the complexity and extendedness of households as their size declines. Non-nuclear members are rare in countries with moderate or small average household sizes.

PROXIMATE DETERMINANTS OF HOUSEHOLD SIZE

The first section of this study described key demographic dimensions of households. The discussion now turns to a brief examination of the demographic causes of variation in household size and composition among countries. In discussing this topic we distinguish between direct and indirect determinants. Demographic variables such as fertility have a direct impact on household composition. In contrast, socioeconomic variables such as income do not affect household structure directly but instead operate through demographic and residential choice factors. These factors can therefore be considered intermediate or proximate determinants. For example, as a society develops, social and economic changes (indirect factors) bring about reductions in fertility (a proximate determinant), and the decline in fertility, in turn, leads to a change in household structure by reducing the number of children.

Bongaarts (1983) proposed six proximate demographic determinants of the size of nuclear households: nuptiality, fertility, adoption, mortality, migration,⁹ and divorce. These variables identify the ways in which nuclear households can change: individuals enter through marriage, birth, adoption, or immigration and they leave through death, divorce, or out-migration. Nuclear residential families, and individuals who are not members of nuclear units, are the building blocks of households. This process is governed by

a separate set of proximate determinants—describing household formation, transition, and dissolution—that reflect residential choices made by individuals (Ermisch and Overton 1985).

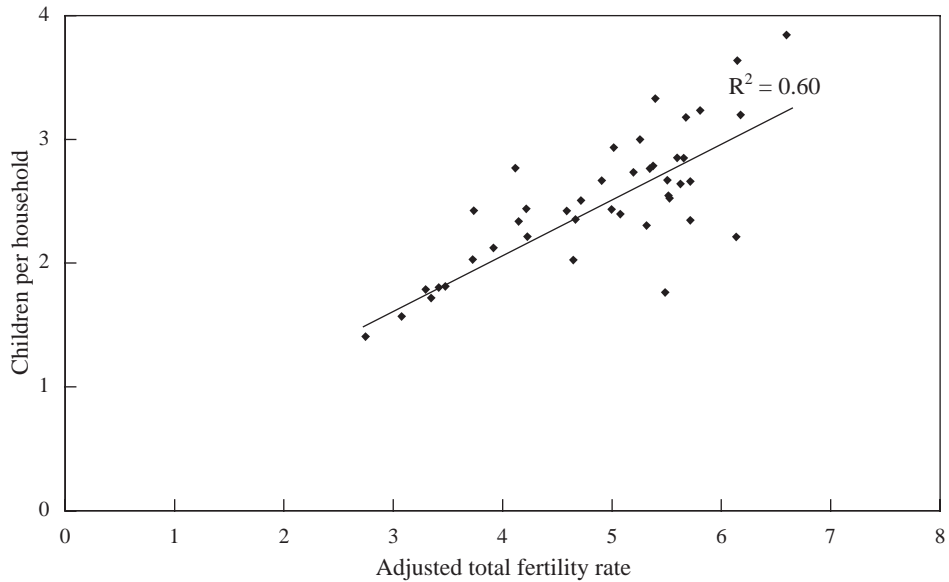
The preceding analysis revealed that households consist primarily of heads and their spouses, adult offspring, and children. Variation in household size is therefore primarily due to variation in the last three of these components because every household has one head. We now examine the key proximate determinants of these components of household size.

Fertility and the number of children per household

As noted, the level of fertility is often seen as the main determinant of the number of children per household. This relationship is not as straightforward as it may appear for several reasons. First, since individuals up to age 18 years are considered children, it is not just current fertility that matters. Instead, the level of fertility over the 18 years before the survey affects the current number of children. Second, since only surviving children are included in household listings, child mortality must be taken into account in assessing this relationship. Third, not all children reside in their mother's household. For the present analysis of aggregate statistics this is not a problem, provided these children are counted in other households where they may be categorized as a relative of the head or as a nonrelative (e.g., servant). However, children who are members of institutions (e.g., boarding schools, the military, or prisons) are missed in household surveys. Fortunately, the proportion of the population not living in households is generally very small (Kuznets 1978).

Figure 4 plots the relationship between average number of children per household (CH) and “adjusted” total fertility rates (ATFR) for each of the 43 developing countries. Adjusted fertility is estimated as the total fertility rate for the 18 years before the survey multiplied by a survival factor which is taken to be the proportion of births that survive to age five.¹⁰ The correlation between these two variables, CH and ATFR, is quite strong ($R^2=0.60$). The number of children per household rises from around 1.5 in countries with ATFR near 3 to more than 3 when the ATFR reaches 6 or more births per women. The number of children per household is only about half the level of the adjusted total fertility rate in most countries. The explanation for this finding is simply that

Figure 4 Relationship between average number of children per household and adjusted total fertility rate, 43 DHS countries



Source: DHS data files.

fertility as measured by the ATFR is a lifecycle measure whereas children per household is a current status indicator. Very few women have all their children living with them. At any point in time many younger women have not yet completed their childbearing, and the number of children in their households will therefore be smaller than the number of surviving children these women will eventually have. In addition, some or all of the children of older women have become adults, thus also contributing to lowering the value of children per household relative to ATFR.

Another, less obvious factor confounds the relationship plotted in Figure 4. The number of children per household is affected not only by the rate of childbearing and the survival of children, but also by the propensity of adults to live together as measured by the average number of adults per household (AH). At any given level of fertility the number of children per household will be higher, the lower the number of adults per household, and vice versa. A simple hypothetical example demonstrates this relationship. Assume that all households consist of nuclear families with 6 members: a husband, wife, and 4 children (i.e., AH=2 and CH=4). Assume next that all husbands separate

from their wives and set up new households while holding fertility constant. After the separation there will be twice as many households, and average household size is 3 instead of 6. As a consequence, children per household is reduced from 4 to 2. This decline is the result of a change in the living arrangements of adults and not a change in fertility or in the survival of children. The confounding effect of the number of adults per household weakens the correlation between the ATFR and CH, as can be demonstrated with a simple set of regressions. A least-squares linear regression line fitted to the data in Figure 4 yields the following equation:

$$CH = 0.34 + 0.45 \text{ ATFR} \quad (R^2 = 0.60).$$

Adding AH as an explanatory variable gives

$$CH = -2.15 + 0.49 \text{ ATFR} + 0.87 \text{ AH} \quad (R^2 = 0.92).$$

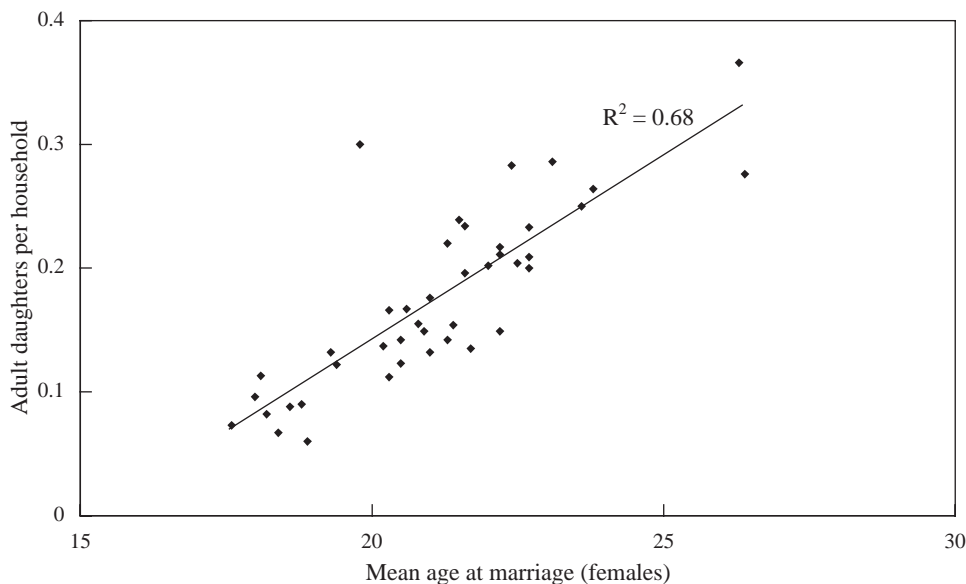
Clearly, the second equation explains a much higher proportion of the variance in the number of children per household than the first. This result confirms that the adjusted TFR and the number of adults per household both have highly significant effects on the number of children per household. Trends in the number of children per household therefore depend not only on the trend in the adjusted total fertility rate but also in the number of adults per household.

Age at marriage and the number of adult sons and daughters per household

The number of adult offspring per household varies widely among countries, from a low of 0.20 in Ghana to high of 0.91 in Morocco. Because departure from home often takes place at or near the time of marriage, one would expect a correlation between mean age at marriage and the presence of adult offspring. This proposition is tested in Figure 5 with data for women from our sample of 43 developing countries. As expected, there is a highly significant correlation between the singulate mean age at marriage of women (SMAM) and the average number of adult daughters per household (AD):

$$AD = -0.46 + 0.030 \text{ SMAM} \quad (R^2 = 0.68).$$

Figure 5 Relationship between average number of adult daughters per household and mean age at marriage



Source: DHS data files; UN 2000.

A similar analysis of the relationship between the mean age at marriage for males and the number of adult sons was not statistically significant.¹¹ It is not entirely clear why this effect is not significant for males, but it is likely that some males leave home well before they marry while others remain in the parental household after marriage. In contrast, the timing of marriage for females apparently coincides more closely with their departure from home.

Marital disruption and the presence of a spouse

The proportion of households in which the head co-resides with his or her spouse ranges from 87 percent in Turkey to 41 percent in Ghana. The main cause of the absence of a spouse of the head is marital disruption as a result of divorce, separation, abandonment, and death, especially in female-headed households (Lloyd and Duffy 1995; Ono-Osaki 1991). Since most DHS household surveys do not collect marital status information it is not possible to measure marital disruption directly. Instead, the proportion of

heads not living with a spouse (NSP) can be used as an indirect indicator of marital disruption.

Combined effects of proximate determinants

The average number of children, adult offspring, and spouses are the three key components of household size examined here. These components are related to a set of three proximate determinants of household size: the adjusted TFR, mean age at marriage, and marital disruption. The combined effect of these determinants on overall average household size is examined with a single regression equation in which average household size of countries (HS) is the dependent variable and ATFR, SMAM, and NSP are the explanatory variables:

$$HS = 0.65 + 0.60 \text{ ATFR} + 0.13 \text{ SMAM} - 4.19 \text{ NSP} \quad (R^2 = 0.59).$$

As expected, household size is positively related to adjusted fertility and the mean age at marriage and negatively related to the proportion of heads not living with a spouse. One reason why 41 percent of the total variation in the average household size of countries is not explained by this regression is that some households contain non-nuclear members. Repeating this regression with the average size of the nuclear family unit (NF) within each household as the dependent variable yields:

$$NF = 1.9 + 0.37 \text{ ATFR} + 0.07 \text{ SMAM} - 4.18 \text{ NSP} \quad (R^2 = 0.81).$$

Each of the three proximate factors included in this regression has a statistically significant effect ($p < 0.01$) on the size of the nuclear family unit within each household, and the proportion of country-level variance explained increases to a more respectable 81 percent.

CONVERGENCE TO THE NUCLEAR HOUSEHOLD?

A long-standing and generally held view among family sociologists is that the size and complexity of households and residential families decrease as a society industrializes and urbanizes (UN 1973; Burch 1967; Goode 1963; McDonald 1992). In largely rural traditional societies residential families are more often extended, either horizon-

tally or vertically, than in modern industrialized societies where the independent nuclear family predominates. As societies develop, extended households tend to be replaced by the nuclear or conjugal households consisting of husband, wife, and children. McDonald (1992) refers to this generalization as the convergence theory of family structure and considers William Goode as its originator. Goode (1963) predicted the convergence of family systems around the world to the conjugal type: “Wherever the economic system expands through industrialization family patterns change, extended kinship ties weaken, lineage patterns dissolve and a trend toward some form of the conjugal system generally begins to appear—that is, the nuclear family becomes a more independent kinship unit” (p. 6). Goode recognized the importance of the ideological dimension of this convergence: “Everywhere the ideology of the conjugal family is spreading. It appeals to the disadvantaged, to the young, to women and to the educated. It promises freedom and new alternatives as against the rigidities and controls of traditional systems” (p. 369). Although Goode’s research has been influential and insightful, it has also been criticized on a variety of grounds.¹²

The focus here is on the demographic dimensions of convergence theory. Despite the notion that households decline in size and complexity as societies develop, households in traditional societies never have been as large as one might expect if vertical and horizontal extension were maximized. If such were the case households containing more than 10 members should be common (Burch 1972). In practice, average household size in preindustrial societies is usually between 4 and 6 members. This is true in the most traditional contemporary developing countries as well as historically in European societies (Laslett 1972). Levy (1965) argued that a variety of economic and demographic constraints, in particular high mortality, prevented the extended family from becoming predominant in practice and that, as a consequence, actual household sizes vary much less than ideal types.

Regardless of the constraints that may have limited households in the past, there is little doubt that the trend in household size and composition in Europe and North America over the past century is consistent with convergence theory. Both size and complexity have declined and the nuclear household is now dominant (see Figure 1 and related discussion). In these developed societies the decline in fertility is the main cause

of the small numbers of children per household, and increasing preferences for privacy and rising incomes are among the key reasons why so many adults are willing and able to live in small households (Burch and Matthews 1987).

Is convergence to a nuclear household system occurring in the contemporary developing world? Notwithstanding the lack of time-series data on household size and composition, we can shed some light on this issue by examining related hypotheses. Specifically, if convergence were taking place one would expect households to be smaller and less complex in urban than in rural areas and in more-educated than in less-educated groups. In addition one would expect a positive correlation between a country's level of development and the proportion of household members who belong to the nuclear family of the head. Each of these hypotheses is now examined briefly with data from the DHS.

Variation within countries

Table 4 presents household measures such as average size, number of adults and children, and number of spouses' adult offspring for urban and rural areas. On average, urban households are smaller than those in rural areas. The biggest difference is found in the Near East/North Africa (5.4 vs. 6.1) and the smallest in sub-Saharan Africa (5.1 vs. 5.3). Because the number of adults per household is similar in urban and rural areas, this urban-rural difference is mainly the result of a higher number of children per household in rural areas. This finding is consistent with the lower levels of fertility that typically prevail in urban areas. Urban-rural differences in number of spouses, adult children, and other adults are small and show no systematic pattern.

Household measures by level of education of the head are presented in the last three columns of Table 4. Size tends to be similar for heads with no schooling and those with primary education, but heads with secondary education live in somewhat smaller households except in Asia. Higher education of the head is associated with a slightly smaller number of children, again except in Asia, but it has little effect on the number of adults. This last-mentioned pattern is the net result of two offsetting effects: a positive association between education and the presence of a spouse but an inverse association with the presence of adult sons/daughters. Because these findings are based on simple cross-tabulations, further research is required to determine whether these relationships

Table 4 Average size of household components by place of residence and level of education of head

	Place of residence			Head's level of education		
	Urban	Rural	Total	None	Primary	Secondary+
Household size						
Asia	4.9	5.4	5.1	5.2	5.2	5.2
Latin America	4.6	5.0	4.8	4.7	5.0	4.4
Near East/North Africa	5.4	6.1	5.7	5.9	5.7	5.0
Sub-Saharan Africa	5.1	5.3	5.3	5.2	5.3	5.0
Number of children						
Asia	2.0	2.5	2.3	2.2	2.2	2.3
Latin America	1.9	2.5	2.2	2.1	2.3	1.9
Near East/North Africa	2.4	3.0	2.7	2.8	2.8	2.3
Sub-Saharan Africa	2.5	2.9	2.8	2.7	2.8	2.5
Number of adults						
Asia	2.9	2.9	2.9	3.0	3.0	2.9
Latin America	2.7	2.5	2.6	2.6	2.7	2.5
Near East/North Africa	3.0	3.0	2.9	3.1	2.9	2.7
Sub-Saharan Africa	2.6	2.5	2.5	2.5	2.5	2.5
Number of spouses						
Asia	0.8	0.8	0.8	0.6	0.7	0.8
Latin America	0.7	0.7	0.7	0.6	0.7	0.7
Near East/North Africa	0.8	0.8	0.8	0.8	0.9	0.9
Sub-Saharan Africa	0.6	0.7	0.7	0.6	0.7	0.7
Number of adult sons/daughters						
Asia	0.6	0.6	0.6	0.8	0.7	0.5
Latin America	0.6	0.5	0.5	0.7	0.6	0.3
Near East/North Africa	0.8	0.7	0.7	0.9	0.5	0.3
Sub-Saharan Africa	0.4	0.3	0.3	0.4	0.3	0.2
Number of other adults						
Asia	0.5	0.5	0.5	0.6	0.6	0.6
Latin America	0.4	0.3	0.4	0.3	0.3	0.5
Near East/North Africa	0.4	0.5	0.4	0.5	0.5	0.5
Sub-Saharan Africa	0.6	0.5	0.5	0.5	0.5	0.6

Source: Calculated from DHS data files.

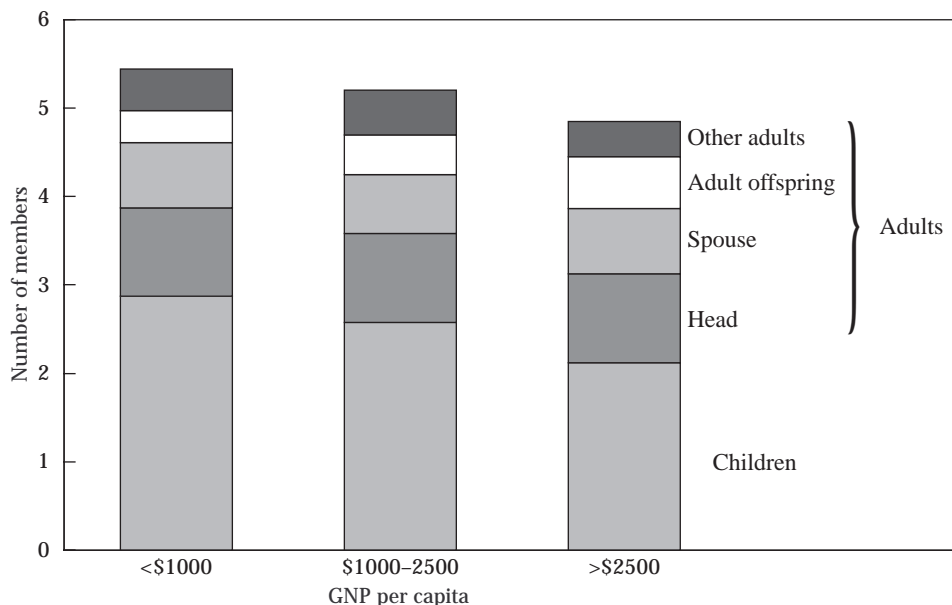
are statistically significant, after controlling for the potential confounding effects of other socioeconomic variables and for the age, sex, and marital status of the head.

Variation among countries at different levels of development

Figure 6 compares average household size and composition in countries with different levels of income as measured by GNP per capita (in purchasing-power-parity dollars). Three income groups are distinguished: low (less than \$1000 per capita), medium (\$1000–\$2500), and high (more than \$2500) based on country estimates from the World Bank (1996). As expected, household size declines with income, but the differences between the lowest and highest income groups are relatively small (5.4 vs. 4.8 members per household, respectively).

An examination of the association between income per capita and adult/child composition revealed an inverse relationship between the number of children and in-

Figure 6 Average household size and household components by GNP per capita



Source: DHS data files; World Bank 1996.

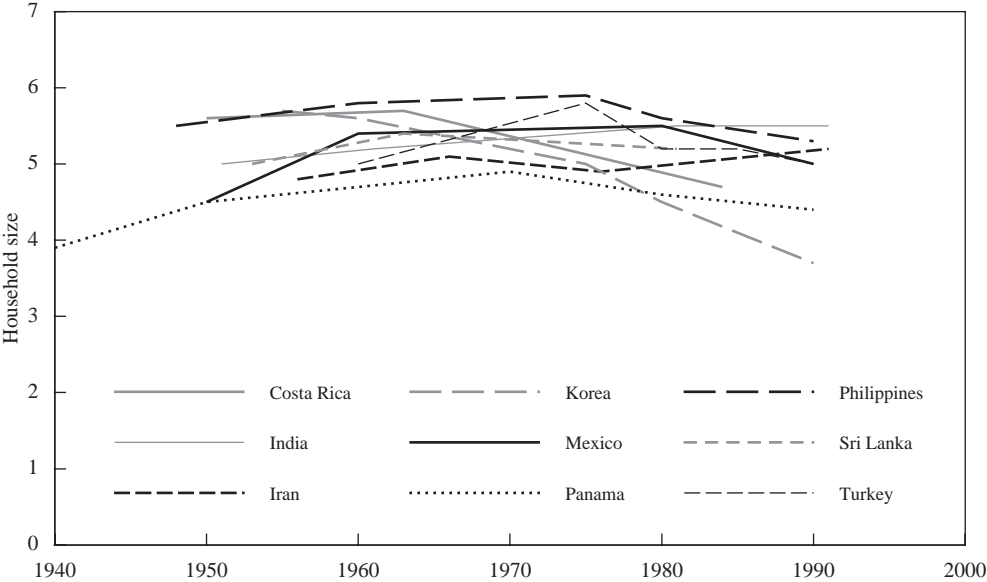
come: the high-income group averaged 2.1 children per household and the lowest income group 2.9 children. This pattern is consistent with the well-established inverse relationship between fertility and GNP per capita. In contrast, the number of adults per household in the high-income group (2.7) exceeded that in the low-income group (2.5). This finding is contrary to the observed downward trend in number of adults as countries developed in the past. To shed some light on this issue, we examined the relationship of adult household members to the head in different income groups. The main factor responsible for the observed pattern was a notable increase in the average number of adult sons/daughters from 0.36 in the low-income group to 0.59 in the countries with the highest GNP per capita. A partial explanation for this difference is that female age at marriage typically rises as countries develop.

The proportion of household members who are nuclear (head, spouse, children) rose slightly from 79 percent to 81 percent between the lowest and the highest GNP group. This difference is not statistically significant, but it is consistent with the view that households become less complex as societies develop.

Trends over time

Although the DHS surveys do not provide long time series of household data, such data are available from the UN *Demographic Yearbooks* for a few developing countries. Figure 7 plots trends in average household size for nine developing countries for which time series are available from around 1950. In these countries no clear secular decline is evident, except in Korea. In fact, modest increases in household size are observed in the 1950s and in some cases even in the 1960s. This rise is probably the result of substantial declines in mortality that occurred during these decades while fertility remained high and largely unchanged. With the onset of the fertility transition in the 1970s and 1980s declines in household size become evident. However, these reductions are modest despite the substantial fertility declines most of these countries have experienced. The largest reduction in household size occurred in Korea, where fertility decline started in the 1960s and since then has fallen more rapidly and further than in the other countries included in Figure 7.

Figure 7 Trends in average household size in selected developing countries



Source: United Nations 1956, 1964, 1973, 1974, 1989, 1997.

Further insight into these trends can be obtained by examining household composition in terms of adults and children. Table 5 presents estimates of the household size and the number of children and adults for the period from around 1960 to the latest date available from the UN *Demographic Yearbooks* (usually 1990 or 1991). The last three columns of the table summarize the general trends in these variables. As noted, household size declined between 1960 and 1990 in most of these countries, but did not change in Turkey and actually rose slightly in India and Iran. The principal reason for the declines was the reduction in the number of children per household in all countries except Iran. In contrast, in all countries except Korea and the Philippines, the number of adults per household rose. This trend is unexpected since it does not follow the pattern of decline typically found in the past in the industrialized world. The proximate factors driving up the number of adults per household over time probably include a rising age at marriage and higher child survival rates. A growing shortage of housing may also be contributing to the rising propensity of adults to live together in these countries.

Table 5 Trends in average household size and number of children and adults in selected developing countries

	Members per household				Trend circa 1960–90		
	Year	Children	Adults	Total	Household size	Children	Adults
Costa Rica	1963	3.05	2.65	5.70	–	–	+
	1984	2.04	2.66	4.70			
India	1961	2.37	2.83	5.20	+	–	+
	1991	2.34	3.16	5.50			
Iran	1966	2.64	2.46	5.10	+	+	+
	1990	2.68	2.52	5.20			
Korea	1960	2.72	2.99	5.71	–	–	–
	1990	1.18	2.52	3.70			
Mexico	1960	2.75	2.65	5.40	–	–	+
	1990	2.29	2.71	5.00			
Panama	1960	2.30	2.40	4.70	–	–	+
	1990	1.84	2.56	4.40			
Philippines	1960	2.95	2.85	5.80	–	–	–
	1990	2.47	2.83	5.30			
Sri Lanka	1963	2.57	2.83	5.40	–	–	+
	1981	2.17	3.03	5.20			
Turkey	1960	2.31	2.69	5.00		–	+
	1990	2.08	2.92	5.00			

Source: Calculated from DHS data files.

CONCLUSION

In the 43 developing countries included in this study the average household contains around 5 members. Average household size varied only modestly among regions, despite substantial differences among them in demographic conditions (e.g., fertility and mortality), levels of socioeconomic development, and cultural customs. Countries in the least-developed region, sub-Saharan Africa, averaged 5.3 members per house-

hold, slightly less than in the Near East/North Africa (5.6), but similar to Asia (5.1) and higher than in Latin America (4.8). These averages are similar to levels observed in the second half of the nineteenth century in Europe and North America.

Regional differences in the composition of households were also not large. Typically, household membership was more or less evenly divided between adults and children. Around 4 out of 5 members of the average household were members of the nuclear family of the head, and nearly all other members were related to the head. Only a tiny percentage of household members had no familial relation to the head. The large majority of households were headed by men and these households were systematically larger than female-headed households. The main reason for this difference is that female heads rarely live with a spouse while the large majority of male heads reside with their wives.

An examination of the substantial variation in size and composition at the country level found a systematic association between average household size and composition. In general, the larger a country's average household size the higher the ratio of children to adults and the higher the proportion of non-nuclear members. Household size was also found to be positively associated with the level of fertility (adjusted for child survival) and the mean age at marriage, and inversely associated with the level of marital disruption (as measured indirectly by the proportion of household heads who do not co-reside with a spouse). None of the effects of these proximate determinants of household size is surprising: higher fertility results in more surviving children; a later average age at marriage provides adult offspring with an opportunity to stay longer in the parental home; and marital disruption splits up households. Together these three proximate determinants explained 59 percent of the country variation in household size and 81 percent of variation in the size of nuclear residential family units.

According to convergence theory, households become less extended, more nuclear, and smaller as societies industrialize and urbanize. These trends have indeed been observed in European and North American societies, where over the past 150 years household size has declined from between 4 and 6 in the mid-nineteenth century to between 2 and 3 today, with the nuclear household now being dominant. In the contemporary developing world the data are insufficient to test whether and to what extent convergence is taking place. An examination of direct and indirect evidence on this issue found only

limited support for convergence. Differentials in household characteristics between urban and rural areas and education groups were in the expected direction, but on the whole were small. A country-level analysis of the association between household characteristics and GNP per capita found the expected decline in size, but no significant difference in the complexity of households as measured by the proportion of non-nuclear members. Most importantly, trends over the period 1960–90 in nine countries showed only minor declines in household size. These declines were mostly the result of reductions in the number of children per family—as expected from fertility declines. In contrast, in seven of these nine countries the number of adults per household rose slightly over these three decades. Possible explanations for this trend are a rise in age at marriage resulting in a higher prevalence of adult offspring and higher probabilities of survival among newborns. Together this evidence suggests that convergence to smaller and predominantly nuclear households is proceeding slowly in contemporary developing countries.

Notes

- 1 Further discussion of research on the methods and models in household and family demography is provided in Bongaarts et al. (1987), De Vos and Palloni (1989), Keilman et al. (1988), van Imhoff et al. (1995), and Zeng et al. (1998).
- 2 The 1998 estimate for the US is obtained by applying the proportion of the total population aged 0–14 years to the average household size.
- 3 Kuznets considers all individuals over age 14 years to be adults. In our subsequent analysis of DHS data adults are defined as individuals aged 18 and older.
- 4 In general, surveys are nationally representative, but in 12 countries certain parts of the country were excluded for various practical considerations. In these cases coverage ranged from 90 to 99 percent. For details see Ayad et al. (1997).
- 5 The United Nations (1980, p. 70) also notes that “Although...a more desirable definition for purposes of dependency statistics would be the person who bears the chief responsibility for the economic maintenance of the household or fam-

ily, it is not recommended that this definition be applied because of the difficulty of collecting information to determine economic responsibility.”

- 6 The exception is Ghana.
- 7 Individuals living alone are included in this category.
- 8 For further discussion of this issue see King and Preston (1990).
- 9 The term migration refers to movement in and out of the household. This movement may be in the same community.
- 10 The TFR for 1977–95 and the survival probability to age five for 1990–95 were taken from UN (1999).
- 11 Data on the singulate mean age at marriage for males were not available for a number of countries.
- 12 See McDonald (1992) for an overview of these controversies.

References

- Armstrong, W.A. 1978. “The census enumerators’ books: A commentary,” in Richard Lawton (ed.), *The Census and Social Structure: An Interpretative Guide to Nineteenth Century Censuses for England and Wales*. London: Frank Cass.
- Ayad, Mohamed, Bernard Barrere, and James Otto. 1997. *Demographic and Socioeconomic Characteristics of Households*. DHS Comparative Studies No. 26. Calverton, Maryland: Macro International Inc.
- Becker, Gary S. 1991. *A Treatise on the Family*. Enlarged edition. Cambridge, MA: Harvard University Press.
- Berquó, Elza and Peter Xenos. 1992. “Editors’ introduction,” in E. Berquó and P. Xenos (eds.), *Family Systems and Cultural Change*, pp. 8–12. New York: Oxford University Press.
- Bongaarts, John. 1983. “The formal demography of families and households: An overview,” *IUSSP Newsletter* no. 17 (January–April): 27–42.

- Bongaarts, John, Thomas K. Burch, and Kenneth W. Wachter (eds.). 1987. *Family Demography: Methods and Their Application*. Oxford: Clarendon Press.
- Burch, Thomas K. 1967. "The size and structure of families: A comparative analysis of census data," *American Sociological Review* 32 (3): 347–363.
- Burch, Thomas K. 1972. "Some demographic determinants of average household size: An analytic approach," in P. Laslett, (ed.), *Household and Family in Past Time*, pp. 91–102. New York: Cambridge University Press.
- Burch, Thomas K. 1979. "Household and family demography: A bibliographic essay," *Population Index* 45 (2): 173–195.
- Burch, Thomas K. and Beverly J. Matthews. 1987. "Household formation in developed societies," *Population and Development Review* 13 (3): 495–511.
- Demographic and Health Surveys. 1990. *Interviewer's Manual for Use with Model "A" Questionnaire for High Contraceptive Prevalence Countries*. DHS-II Basic Documentation Number 3. Institute for Resource Development/Macro International, Inc., Columbia Maryland.
- De Vos, Susan. 1995. *Household Composition in Latin America*. New York: Plenum Press.
- De Vos, Susan and Karen C. Holden. 1988. "On measuring living arrangements of older individuals in comparative studies," *CDE Working Paper 88-09*. University of Wisconsin-Madison, Center for Demography and Ecology.
- De Vos, Susan and Alberto Palloni. 1989. "Formal models and methods for the analysis of kinship and household organization," *Population Index* 55 (2): 174–198.
- Ermish, J.F. and Elizabeth Overton. 1985. "Minimal household units: A new approach to the analysis of household formation," *Population Studies* 39 (1): 33–54.
- Goode, William J. 1963. *World Revolution and Family Patterns*. London: Free Press of Glencoe.
- Keilman, Nico, Anton Kuijsten, and Ad Vossen (eds.). 1988. *Modeling Household Formation and Dissolution*. Oxford: Clarendon Press.
- King, Miriam and Samuel H. Preston. 1990. "Who lives with whom? Individual versus household measures," *Journal of Family History* 15 (2): 117–132.

- Kuznets, Simon. 1978. "Size and age structure of family households: Exploratory comparisons," *Population and Development Review* 4 (2): 187–223.
- Laslett, Peter. 1972. "Introduction: The history of the family," in P. Laslett (ed.), *Household and Family in Past Time*. Cambridge: Cambridge University Press.
- Le Bras, Hervé. 1979. *Child and Family: Demographic Developments in the OECD Countries*. Paris: OECD.
- Levy, Marion. 1965. "Aspects of the analysis of family structure," in A.J. Coale and M. J. Levy (eds.), *Aspects of the Analysis of Family Structure*. Princeton: Princeton University Press.
- Lloyd, Cynthia B. 1998. "Household structure and poverty: What are the connections?" in M. Livi-Bacci and G. De Santis (eds.), *Population and Poverty in the Developing World*, pp. 84–102. Oxford: Clarendon Press.
- Lloyd, Cynthia B. and Niev Duffy. 1995. "Families in transition," in J. Bruce, C.B. Lloyd, and A. Leonard (eds.), *Families in Focus: New Perspectives on Mothers, Fathers, and Children*, pp. 5–23. New York: Population Council.
- McDonald, Peter. 1992. "Convergence or compromise in historical change?" in E. Berquó and P. Xenos (eds.), *Family Systems and Cultural Change*, pp. 15–30. New York: Oxford University Press.
- Ono-Osaki, Keiko. 1991. "Female headed households in developing countries: By choice or by circumstances?" in *Demographic and Health Surveys World Conference, August 5–7, 1991, Proceedings*, Vol. III. Columbia, Maryland: IRD/Macro International.
- Ryder, Norman, B. 1977. "Models of family demography," *Population Bulletin of the United Nations*, No. 9, pp. 43–46.
- Shryock, Henry S., Jacob S. Siegel, and Associates. 1973. *The Methods and Materials of Demography*. Washington, DC: US Department of Commerce, Bureau of the Census, vols. 1 and 2.
- United Nations. 1956. *Demographic Yearbook 1955*. New York.
- United Nations. 1964. *Demographic Yearbook 1963*. New York.

- United Nations. 1973. *The Determinants and Consequences of Population Trends: New Summary of Findings on Interaction of Demographic, Economic and Social Factors*. New York.
- United Nations. 1974. *Demographic Yearbook 1973*. New York.
- United Nations. 1980. "Principles and recommendations for population and housing censuses," *Statistical Papers, Series M. No. 67*. New York.
- United Nations. 1989. *Demographic Yearbook 1987*. New York.
- United Nations. 1997. *Demographic Yearbook 1995*. New York.
- United Nations. 1999. *World Population Prospects: The 1998 Revision. Volume I: Comprehensive Tables*. New York.
- United Nations. 2000. *World Marriage Patterns 2000*. New York.
- U.S. Census Bureau. 1999. *Statistical Abstract of the United States: 1999*. Washington, DC.
- van Imhoff, E. et al. (eds.). 1995. *Household Demography and Household Modeling*. New York: Plenum Press.
- World Bank. 1996. *From Plan to Market: World Development Report 1996*. New York: Oxford University Press.
- Zeng, Yi, James W. Vaupel, and Wang Zhenglian. 1998. "Household projection using conventional demographic data," in *Frontiers of Population Forecasting*, Supplement to *Population and Development Review* 24: 59–87. New York: Population Council.

POLICY RESEARCH DIVISION WORKING PAPERS

Recent Back Issues

1999

- *120 John Bongaarts, "The fertility impact of changes in the timing of childbearing in the developing world."
- *121 James F. Phillips, Wendy L. Greene, and Elizabeth F. Jackson, "Lessons from community-based distribution of family planning in Africa."
- 122 Mark R. Montgomery, "Mortality decline and the demographic response: Toward a new agenda."
- *123 Mark R. Montgomery, Mary Arends-Kuenning, and Cem Mete, "The quantity-quality transition in Asia."
- 124 Barbara S. Mensch, Wesley H. Clark, Cynthia B. Lloyd, and Annabel S. Erulkar, "Premarital sex and school dropout in Kenya: Can schools make a difference?"
- 125 John Bongaarts and Rodolfo A. Bulatao, "Completing the demographic transition."
- 126 Geoffrey McNicoll, "Population weights in the international order."
- 127 Cynthia B. Lloyd, Carol E. Kaufman, and Paul Hewett, "The spread of primary schooling in sub-Saharan Africa: Implications for fertility change."
- 128 John B. Casterline, "The onset and pace of fertility transition: National patterns in the second half of the twentieth century."
- 129 Mark R. Montgomery, Michele Gragnolati, Kathleen Burke, and Edmundo Paredes, "Measuring living standards with proxy variables."
- 130 Bamikale Feyisetan and John B. Casterline, "Fertility preferences and contraceptive change in developing countries."
- 131 Martin Brouckerhoff, "Urban growth in developing countries: A review of projections and predictions."
- 132 Omaima El-Gibaly, Barbara Ibrahim, Barbara S. Mensch, and Wesley H. Clark, "The decline of female circumcision in Egypt: Evidence and interpretation."

* No longer available

2000

- 133 Mary Arends-Kuenning and Sajeda Amin, "The effects of schooling incentive programs on household resource allocation in Bangladesh."
- 134 John Bongaarts and Charles F. Westoff, "The potential role of contraception in reducing abortion."
- 135 John B. Casterline and Steven W. Sinding, "Unmet need for family planning in developing countries and implications for population policy."
- *136 Carol E. Kaufman, Thea de Wet, and Jonathan Stadler, "Adolescent pregnancy and parenthood in South Africa."
- 137 Valerie L. Durrant and Zeba A. Sathar, "Greater investments in children through women's empowerment: A key to demographic change in Pakistan?"
- 138 Sajeda Amin, Alaka Malwade Basu, and Rob Stephenson, "Spatial variation in contraceptive use in Bangladesh: Looking beyond the borders."
- 139 Geoffrey McNicoll, "Managing population–environment systems: Problems of institutional design."
- 140 Barbara S. Mensch, Barbara L. Ibrahim, Susan M. Lee, and Omaima El-Gibaly, "Socialization to gender roles and marriage among Egyptian adolescents."
- 141 John Bongaarts and Elof Johansson, "Future trends in contraception in the developing world: Prevalence and method mix."
- 142 Alaka Malwade Basu and Sajeda Amin, "Some preconditions for fertility decline in Bengal: History, language identity, and an openness to innovations."
- 143 Zeba Sathar, Cynthia B. Lloyd, Cem Mete, and Minhaj ul Haque, "Schooling opportunities for girls as a stimulus for fertility change in rural Pakistan."

2001

- 144 John Bongaarts, "Household size and composition in the developing world."