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Age at First Birth

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The World Fertility Survey (WFS) is an international research programme whose purpose is to assess the current state of human fertility throughout the world. This is being done principally through promoting and supporting nationally representative, internationally comparable, and scientifically designed and conducted sample surveys of fertility behaviour in as many countries as possible.

The WFS is being undertaken, with the collaboration of the United Nations, by the International Statistical Institute in co-operation with the International Union for the Scientific Study of Population. Financial support is provided principally by the United Nations Fund for Population Activities and the United States Agency for International Development. Substantial support is also provided by the UK Overseas Development Administration.

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Cross National Summaries

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ERRATA

COMPARATIVE STUDIES NO. 15
Age at First Birth

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p. 10, Section 2, L.H. Column, second para., line 15 should read:
"women, nevertheless, there is a tendency to omit first births"

p. 11, Section 3, L.H. Column, second para., line 10 should read:
".....The trends or lack of trends in fertility"

p. 14, L.H. Column, second para., line 16 should read:
"American and Caribbean countries, Guyana, Mexico and"

p. 17, References - The reference to Coale and Tye has been inadvertently printed in the middle of the reference to Hermalin and Mason.

p. 25, Table 3, footnote a), R.H. Column, line 2 should read:
"the exception of Peru), information on proportions ever"

p. 26, Table 4, heading should read:
"Estimated Percentage[a] of Women Having First Birth". Add footnote a) "Estimated by fitting of model schedule. See text."

pp. 29-34:
Pages are incorrectly numbered and ordered.

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Preface

The first issues of the Cross National Summaries in the Comparative Studies series provide basic information, documentation and results of the World Fertility Survey for the nineteen countries which had their First Country Reports and Standard Recode Tapes available at the beginning of 1980.

Despite the efforts made by WFS to maintain comparability of question wording and content, field procedures and specifications of the tabulations and analysis included in the First Country Reports, it was inevitable that differences would arise as a result of the importance attached to meeting specific requirements of the countries themselves. A major attempt to enhance and facilitate comparability has been the production of Standard Record Tapes for each country, with all the core information coded and stored in a consistent order, together with the dictionaries which provide detailed specifications for all variables.

Several of the Cross National Summaries will be concerned solely with providing detailed and systematized information on the comparability (or lack thereof) of the field procedures, survey characteristics, questionnaire content and wording and content of the First Country Reports. Such detailed appraisals constitute an essential reference base for anyone using WFS data for comparative analysis.

Other volumes of the Cross National Summaries will present comparable results from as many surveys as possible. These volumes will present the basic data from the surveys over a wide range of specific topics. In addition to the tabular material, there will be a brief accompanying text, which will draw attention primarily to any non-comparability of the data and to any obvious interpretational pitfalls to which the tables may be subject: for example many summary indices are subject to compositional differences, which are often reduced by standardisation. Finally, although these volumes are not intended to be analytic in their orientation, some brief highlighting of the major noteworthy differences and similarities is included.

We hope that these Cross National Summaries will be widely used, especially by persons in the international community who are making cross national comparisons. We also hope that the sub-series will help users to avoid assuming too much comparability when this is not the case and to avoid interpretational mistakes which can easily arise when data are presented without qualification.

Sir Maurice Kendall

Acknowlegements

Although authorship is attributed to the person(s) taking primary responsibility for the production of each of the Cross National Summaries, the work has been a co-operative effort involving many staff members of WFS. In particular, the production of the tables would often have been impossible without the substantial assistance of staff in the Data Processing Division.

The overall planning and co-ordination of the Cross National Summaries has been the responsibility of an editorial committee consisting of V. C. Chidambaram, John Cleland, John Hobcraft, Judith Rattenbury, German Rodriguez, Vijay Verma and Waller Wynne.

1 Introduction

The age at which women initiate childbearing influences a variety of demographic and non-demographic phenomena. In the absence of active fertility control, the total number of births women bear through the reproductive period is largely a function of the age at which childbearing begins. In settings in which fertility control is exercised, most ages at first birth are compatible with a wide range of completed fertility levels with the range severely constricted only for those women who begin childbearing quite late. In such settings the age at first birth is nonetheless of interest because of its effect on the timing of childbearing within the reproductive period. With average completed family size held constant, younger childbearing implies higher aggregate rates of fertility and of population growth (Coale and Tye, 1961). In addition, younger ages at first birth are typically associated with younger ages at the achievement of desired family size, and, as a consequence, a longer period of exposure to unwanted births if fertility control is imperfect.

Furthermore, there is evidence that the timing of childbearing has an impact on variables other than fertility itself. Infant and child mortality tend to be higher among children born to women under age twenty and over age thirty-five. More generally, due to the usual incompatibility of childbearing with school attendance and, in many societies, with wage-earning employment outside the home, the timing of childbearing can influence the educational and employment experiences of young women. Data from fertility surveys conducted in developed societies indicate that the timing of childbearing also has effects on the economic status of the household, effects which persist throughout its economic career (Coombs and Freedman, 1970). The causal impact of these socio economic variables -- education, employment, economic status -- on age at first birth is frequently emphasized, but without doubt the reverse causation noted here is also present to a greater or lesser extent in most societies.

The relationship between age at first birth and age at first marriage is quite strong and direct, even in societies where fertility control is actively exercised. One of the measures used in this report, in fact, is theoretically linked to this relationship. As a result, the substance of the comparisons presented below would differ only slightly if age at first marriage rather than age at first birth were examined. (For an analysis of age at first marriage using data from the same surveys as this report, see Smith, 1980a). Despite the strong empirical relationship between these two variables, entrance into marriage and entrance into childbearing signify distinct, albeit related, changes in status and role, and for this reason investigation of each one separately is of interest.

In this report, parameters of the age at first birth process, estimated from WFS data, are compared among nineteen countries. The parameters are estimated separately for six five-year age cohorts (ages 20 to 49) for each country. Using these estimates, we examine variation both across countries and across cohorts. Examination of the former yields conclusions concerning the international variability in this aspect of the reproductive process, while examination of the latter provides estimates of secular trends.

2 Data

Age at first birth can be calculated from the information in the maternity history obtained from each woman administered the WFS individual questionnaire. These women were a subset of the women residing in the sampled households at the time of the WFS survey. Only women 15 to 49 years of age and, in most countries, ever-married women were eligible for inclusion in this subsample. The age criterion limits the consideration of cohort trends to cohorts within the reproductive period at the time of the survey, but among the older women interviewed the first birth experiences measured occurred on average as much as thirty years prior to the survey. The limitation to ever-married women means that estimates presented below of the mean and standard deviation of the first birth process (estimated on the basis of a model schedule, as described below) are unbiased population estimates only if childbearing is confined to marriage or if the first birth experience of ever-married women is no different from that of all women. For further details on the comparability of the questions used and universes covered by the nineteen surveys, reference should be made to Singh (1980).

Because these data on age at first birth are based on retrospective reports, they are susceptible to biases resulting from the failure to report first births (omission) and the misreporting of the date of first birth (misplacement) . It is well-recognized that such errors are common in maternity history data (Brass, 1978; Potter 1977). Such errors threaten cross national comparisons if the resulting biases differ in nature and in extent among countries. There has been, as yet, little research on the possible impact of differentials in reporting errors on cross national analyses. The same errors affect the analysis of within-country secular trends in ways which have been more thoroughly investigated. First births in general tend to be more accurately reported than higher-order births. Among older women, nevertheless, there is a tendency to omit firts births (particularly if the child subsequently died) or to place them nearer the survey date in time. Estimates of age at first birth for older cohorts will thus be biased upwards. When presenting the results (that follow), we note evidence suggestive of such upward bias in the median and mean ages at first birth of older cohorts of women in most of the countries examined.

The nineteen countries included in the analysis consist of those for which usable data files were available at the time of the analysis. The nineteen countries are well dispersed through the less developed world, with a slight concentration in Latin America and the Caribbean. The countries, by broad geographical groupings, are:

Asia and Pacific (11):	Bangladesh, Fiji, Indonesia, Jordan, Korea, Malaysia, Nepal, Pakistan, Philippines, Sri Lanka, Thailand.
Latin America and Caribbean (8):	Colombia, Costa Rica, Dominican Republic, Guyana, Jamaica, Mexico, Panama, Peru.

This set of countries was selected on the basis of convenience (i.e. the availability of WFS survey data) and therefore can in no sense be viewed as a proper international sample of countries. Details about the survey in each country (e.g. sample design, response rate) are provided in the First Country Report for the respective country.

The legitimacy of cross national comparison of age at first birth using these data is strengthened by the fact that the essential information was gathered by using very similar instruments and field procedures from country to country. The WFS has striven to achieve the greatest uniformity of data collection across countries feasible. The information on age at first birth analyzed here derives from the maternity history section of the WFS "core questionnaire" which, apart from the obvious necessity of translation into local languages, has been administered in virtually identical form in all countries.

The analysis requires merely estimates of the proportion of women ever married by age and a data matrix obtained from cross-classifying the women interviewed by age at the interview and age at the birth of first child. We examined each of the nineteen data matrices. In a few cases the observed age at first birth appeared implausibly low when compared with the entire distribution; in these cases we assigned the women an older age at first birth. These changes do not affect the parameter estimates. (Details are provided in Appendix A).

3 Method of Estimation

Several strategies might be proposed for analysis of age at first birth using the WFS data. If cohort differences in age at first birth are assumed to be trivial or non-existent,the sample of women aged 15 to 49 can be pooled for the purposes of estimating age at first birth, increasing the precision of the estimates relative to those for separate cohorts. Methods which examine change in status (in this case, the change from null-parity to parity) as a function of age can be employed. For example, a singulate mean following the method of Hajnal (1953) or a mean based on a life table approach can be calculated.

The results presented below suggest that an assumption of no trends across cohorts in age at first birth is not badly violated for most of the nineteen countries in this analysis, with several glaring exceptions. Nevertheless, the assumption is not one which we wish to make *a priori,* since in this analysis the identification of within-country trends is of equal importance with the examination of cross national differences. Indeed, the policy decisions which results such as those presented here might inform are typically made "within-country". The trends or lace of trends in fertility and its parameters which emerge from analysis of age at first birth by cohort thus have a significance which discourages the use of any methods which do not permit explicit consideration of variation across cohorts.

Estimation of trends across cohorts, however, is hampered by a fundamental characteristic of the data: the first birth experience of the younger cohorts is almost certainly not complete as of the survey interview. That is, the data are truncated: some ever-married women in each cohort with no births will have their first births at an older age; some women in each cohort who have never married as of the survey date will subsequently marry and have one or more children. Estimation of cohort trends thus requires measures which are resistant to biases inherent in truncated data. The median age at first birth is such a measure when it is calculated using all women as a base rather than the smaller group of women who will eventually become mothers (or the group who will ever marry). In the case of most of the WFS countries, at least fifty percent of all women are no longer nulliparous among women aged 20-24 and among older cohorts, and consequently the median will not be altered by further cohort fertility experience.

To calculate medians based on all women in a cohort rather than those ever married as of the survey, we have used two separate pieces of information: the cohort age at first birth distribution provided by the maternity history data obtained from ever-married women; and estimates of the proportion ever married by age provided by the listings of household members by age, sex, and marital status, obtained prior to the detailed interviews with ever-married women. (In those surveys where all women were eligible for inclusion in the detailed individual interview -- surveys in Latin America and Caribbean countries, with the exception of Peru -- information on proportions ever married by age is not required). In those instances where the median fell within the current age interval of the cohort under consideration, the median is calculated by a life table procedure (Smith 1980b). Since, with the exception of only a few of the countries examined in this report, the estimated median age at first birth falls above exact age twenty among the younger cohorts, it is not possible to calculate medians for women under age twenty at the survey date.

We have also employed a method for estimating cohort mean ages at first birth. The method relies on an assumed empirical regularity in the functional form of the first birth schedule. The functional form is the same one proposed by Coale and McNeil (1972) as the basis of a model nuptiality schedule (Coale, 1971). This model schedule has been applied to first marriage data from a wide variety of populations, and the empirical evidence to date confirms the universality of this standard form of the first marriage schedule. As noted above, the association between age at first marriage and age at first birth is quite strong, and thus it comes as no surprise that the model nuptiality schedule describes quite satisfactorily the age pattern of first births as well, as initially demonstrated by Trussell (Trussell, Coale, and Menken, 1979) and confirmed in further applications by Bloom (1980) and Rodriguez and Trussell (1979).

The model schedule is adapted to individual populations by retaining the same functional form but adjusting the location (the mean) and the scale (the standard deviation) of the model schedule to fit the observed experience of the population under consideration. The mean and standard deviation which provide the best fit of the model schedule to the observed distribution of ages at first birth must be identified by an estimation procedure. (The estimation procedure selected will possess implicit or explicit criteria for the "best fit"). We use maximum likelihood estimation (MLE) as operationalized in the computer package NUPTIAL, developed at the WFS by Rodriguez and Trussell (1979). Interested readers are referred to their paper for a complete description of the model, the estimation procedure, and the tests of goodness of fit.

In addition to the mean and the standard deviation of the first birth schedule, a third parameter which refers to the proportion of women who will ever have first births can be estimated for countries where the WFS survey collected fertility information from all women rather than ever-married women only. (This parameter corresponds to the parameter in the first marriage model which identifies the proportion of women who will ever marry). We estimate this parameter for seven of the nineteen countries, again using the computer package NUPTIAL to obtain maximum likelihood estimates.

Application of the model schedule provides an acceptable solution to the problems inherent in estimating from truncated data. On the basis of the experience of each cohort as of the survey date, a complete first birth schedule is estimated, characterized by a mean and a standard deviation. The mean and standard deviation can then be employed in comparisons across cohorts and, in this report, across countries. Naturally the estimates are sounder the more complete is the cohort first birth experience. We do not fit the model schedule for the age cohort 15 to 19; unlike the task of calculating median ages at first birth, there is no computational obstacle to doing so, but we judge the experience of this cohort in most countries too incomplete to warrant the fitting of the entire schedule. The estimates for women aged 20 to 24 should also be regarded sceptically, particularly in those cases where the estimated mean exceeds age 24. Even in those cases, however we feel that the model schedule, because of its documented applicability in a wide variety of populations, provides a better means of extrapolating future experience than competing alternatives available to us.

Such extrapolation of the complete cohort experience is an inherent feature of the fitting of the model schedule, and the capacity to do so represents an advantage of this method. The estimates of the model schedule parameters, for example, pertain to that subgroup of the cohort who are expected to have at least one birth. The estimated medians, on the other hand, pertain to all women in the age cohort. The model parameters, thus, are in principle insensitive to changes in the proportion remaining nulliparous; they reflect the age pattern of the initiation of childbearing of those women who actually experience the event of a first birth. The medians are sensitive to changes in the proportion remaining nulliparous: an increase in this proportion in conjunction with no change in the age pattern of first births yields a higher median age of first birth (when all women in a cohort are the base). There are circumstances where one or the other estimate(s) may be preferred. The median ages and the model parameters therefore provide complementary descriptions of the first birth process.

4 Results

The results are presented in Tables 1 through 5 and in Figures 1 through 3.

In Table 1, the median ages at first birth and the number of women interviewed (N) are shown for six five-year cohorts (aged 20-49) for each of the nineteen countries. The sample size refers to the number of women from whom the fertility information was obtained. Except in those cases where women of all marital statuses were eligible for inclusion in the detailed individual survey (the Latin American and Caribbean countries, with the exception of Peru), the implicit base for the median is larger. In four cases the median cannot be calculated for the cohort aged 20-24 at the survey date (Korea, the Philippines, Sri Lanka, and Peru), because the estimated percentage experiencing a first birth by exact age 24.0, calculated by a life table procedure, is less than fifty. (The life table procedure uses information on age at first birth up to the exact age at time of the interview but not including first birth experience during the age at interview. Hence, data are available for women aged 24 up to exact age 24.0).

In Table 2 estimates from fitting the model schedule of the mean age at first birth (μ) and the standard deviation of the first birth schedule (σ) are presented for the six cohorts and nineteen countries. The standard errors of each estimate are shown in parentheses. These enable direct tests of whether the differences across cohorts or across countries are statistically significant. A "p.value" is also shown for each pair of estimated parameters. This value summarizes the goodness of fit test for each fitting of the model schedule: the null hypothesis is that the observed and fitted values do not differ, and thus p.values below .05 (or .10, depending on one's preferred level of significance) indicate a poor fit. Finally, the number of women in each cohort (N) is given; this is the number of women who have experienced a first birth as of the survey date.

Examination of the p.values immediately reveals that the model does not fit the observed data in a disturbingly large proportion of the the cases. (Using the .05 level of significance, the model fits poorly in 50 out of 114 fittings). There are, in general, three reasons why the fit might be poor: (1) The model schedule used is based on an inappropriate functional form for the cohort of women under consideration. An alternative functional form of equivalent simplicity might describe the cohort experience much better. (2) The data possess irregularities of enough consequence that neither this model schedule nor alternate models of reasonable simplicity will adequately describe the cohort first birth experience. Such irregularities in the data can be generated by several quite different processes. On the one hand, response errors in the reporting of either or both age of respondent and date of first birth can significantly disturb the extent to which the observed age pattern of first birth validly reflects the true pattern. On the other hand, historical events and other period effects may in fact disrupt the cohort age pattern of first birth assumed by the model schedule. (3) The implicit assumption of homogeneity of experience among the single-year cohorts comprising each five-year cohort does not hold. Heterogeneity among these single-year cohorts will in some circumstances produce age patterns of first birth for the five-year groups which cannot be well described by the model schedule.

In practice, an assessment of the reasons for the poor fit requires careful examination of the data and, usually, some knowledge of the recent demographic history of the country in question as well as the general quality of the reporting in the survey. There are formal statistical tests of (3), one of which is conducted as part of the fitting of the model, and in some cases this test makes plain the source of the poor fit. We have not examined all of the cases of poor fit in detail. Some of the cases we have investigated are noted in the discussion below. In our experience the poor fit more often seems to be due to irregularities in the data, but this assessment is difficult to make with certainty and does not apply to all the cases we examined.

In Tables 3 and 4, the percentages of women having a first birth by exact age twenty are shown. The percentages in Table 3 are the observed sample percentages, with all women in the cohort employed as the base in the calculation of the percentages (similar to the calculation of the medians). The percentages in Table 4 are obtained from the fitting of the model schedule and thus are estimates referring to that group of women which will ever experience a first birth.

Finally, in Table 5 estimates of the eventual proportion of all women in each cohort who are expected to experience a first birth are presented for the seven countries in which fertility information was obtained from ever-married and never-married women. Some of the estimates exceed 1.00, an impossibility, but the standard errors indicate that these estimates are not statistically different from 1.00, or outside the range for other ages. We also note that for all countries, especially if the estimates for the youngest cohort are ignored, the estimated proportion who will ever bear a first birth shows little change over cohorts. (See Figure 1).

In this report we will discuss trends and differentials in the estimated medians and means only. To ease examination of them, the medians and means for each country are plotted in Figure 2. The plots reveal that for the most part the medians and means show levels and trends which are consistent with each other. The means are usually higher than the medians, which follows from the positive skew of the age at first birth distribution in most countries. There are a few cases where the two measures provide markedly different levels. In Asia and the Pacific, the means for the cohorts aged 40-44 in Malaysia, aged 20-29 in the Philippines, and aged 20-24 in Sri Lanka diverge from what would be expected from the levels and trends in the median. Age at first birth in Sri Lanka has been examined in more detail in another report (Trussell, 1980). In that report, it is noted that the Sri Lankan age at first birth distributions show many irregularities, especially the distributions for the younger cohorts, which may account for estimated means inconsistent with the medians, as well as the poor fit of the model schedule for the older cohorts (Table 2).

In Latin America and the Caribbean, the high median age in Peru for women aged 25-29 (and, apparently, women aged 20-24 also) is not consistent with the estimated means. Apart from this case, however the medians and means for this region show considerable agreement.

Since trends across the younger cohorts are of great interest, in comparing the estimated means and medians it is worth noting the extent to which the two are similar in this respect. In general, it is among the younger cohorts that the two measures show the least agreement, which is to be expected since the experience of these women is least complete and thus provides a less sound basis for the estimates. In several cases the median shows a sharper rise among these cohorts: Jordan, the Philippines, Sri Lanka,

Thailand, and Peru. In several other cases the mean shows a non-negligibly steeper rise: Indonesia, Korea, Nepal, and Colombia stand out. In four of these cases, one might draw meaningfully different conclusions about cohort trends from the median and the mean: Jordan, Nepal, the Philippines, and Peru. This is more contradiction than one would like to accept: the difficulties of estimating from incomplete experience are plainly illustrated here. Note that in two of these four cases (Jordan and Nepal are the exceptions) it is not possible to calculate the median for the youngest cohort (but the value must be greater than exact age twenty-four). It should also be recalled that the medians and means pertain to different subgroups of women: if, for example, the proportion of women remaining childless is rising rapidly in these four countries (a trend which will cause the median to rise but not necessarily the mean), the apparently contradictory estimates of the median and mean presented here may both quite validly measure the actual cohort fertility experiences. Until those experiences become more complete, there is no means to resolve the contradictions. We emphasize, however, that the discrepancies occur predominantly among the youngest cohorts (aged 20-24 in Jordan and Nepal; aged 25-29 in Peru and the Philippines) whose first birth experience is not yet complete.

Given substantial agreement between the medians and means, what do the figures in Tables 1 and 2 (plotted in Figure 1) indicate about levels and trends in the age at first birth? The estimates reveal little change in the average age between the older and younger cohorts in most of the countries. There are several important exceptions to this generalization. In particular, the medians and means estimated for Korea show a spectacular rise across the six cohorts, the median increasing from 19.9 years for the cohort aged 45-49 to 23.9 years for the cohort aged 25-29, and the mean increasing from 20.7 years for the cohort aged 45-49 to 27.1 for the cohort aged 20-24. Smaller rises over the younger cohorts are also observed in other countries: specifically, the two South American countries examined, Columbia and Peru; several of the Central American and Caribbean countreis, Guyana, Mexico, and Panama; in Asia, Indonesia, Malaysia, and Nepal and, for the median alone, Jordan, Pakistan, the Philippines, Sri Lanka, and Thailand. Only one of the countries examined, Jamaica, shows a significant and essentially monotonic decline across cohorts.

With the exception of Jordan, Korea, Malaysia, Sri Lanka, and Thailand, the average ages estimated for women aged 45-49 exceed those for women aged 40-44. In fact, the medians for the nineteen countries are 20.5 and 20.2 for women aged 45-49 and 40.44, respectively, and the means are 21.3 and 21.1 for the same two cohorts. (Furthermore, in many cases the average age for women aged 35-39 is lower than the average age for women aged 40-44). It is possible that these estimated declines reflect valid trends across cohorts. It is more plausible, however, that the medians and means for ages 45-49 (and perhaps 40-44 also) are inflated due to the omission of first births and/or the misplacement in time of first births in the maternity histories reported by the older cohorts of women. If this is the proper explanation for the estimated decline across these cohorts, its general applicability among the countries examined is indeed striking.

We observe a general pattern, then, of little change in most countries in the mean age at first birth across the six cohorts examined. In approximately one-half to two-thirds of the countries the estimates indicate a rise, in most cases small, among the more recent cohorts. These changes do not appear, however, to disrupt the essential stability of the average age among cohorts within countries and a consequent stability of the differences across countries. The extent to which this statement accurately describes the distribution of the estimates can be investigated quantitatively by a straightforward decomposition of the variation in the medians and means. The medians and means can be thought to vary between countries and within countries (that is, among cohorts within countries). Proceeding as in the first step of an analysis of variance (Blalock, 1972), we calculate a total sum of squares (TSS) of differences among the medians and and among the means and decompose this total sum into the sum of squares between countries (between-group sum of squares, BSS) and the sum of squares within countries (within-group sum of squares, WSS). The figures are:

	Medians		Means
BSS	179.58	BSS	247.34
WSS	59.39	WSS	93.06
TSS	238.97	TSS	340.40

N = 114 (19 x 6)

Clearly most of the variation is between countries rather than across cohorts within countries. (For the median, BSS/TSS = 179.58/238.97 = 0.75; for the mean, BSS/TSS = 237.34/340.40 = 0.73). This decomposition is not the sole one appropriate in this instance. We may also ask what proportion of the total variation occurs between cohorts and within cohorts (across countries within cohorts). The figures are:

	Medians		Means
BSS	11.26	BSS	30.22
WSS	227.71	WSS	310.18
TSS	238.97	TSS	340.40

N = 114 (6 x 19)

Once again the decomposition reveals that differences in means across countries are much larger than changes in the mean across cohorts. (For the median, BSS/TSS = 0.05; BSS/TSS = 0.09).

Although this set of countries cannot be regarded as a representative sample of all countries, nevertheless it is of interest to note the nature of the differences among countries. We note the following patterns:

(1) There is a tendency for the South and Central American countries and the East Asian countries to show higher average ages at first birth and the South Asian countries to show lower ages. In the latter regions, the average ages between 17 and 18 years estimated for Bangladesh stand out, since they fall well below those estimated for any of the other eighteen countries.

(2) We hesitate to make any generalization concerning a regional pattern for the changes observed among recent cohorts. The estimates do indicate that the average age is rising in most of the Central and South American countries examined and perhaps in one-half of the South and East Asian countries examined, but there are several violations of this generalization.

(3) There is a weak positive association between the average age at birth among women over age 30 and change across the younger cohorts. This is evident in Figure 3, which shows a scatter of the mean for women aged 35-39 against the difference between the means for ages 20-24 and 35-39. The Pearsonian correlation in this instance is 0.28, which is not significantly different from zero under ordinary statistical tests (level of significance = .13). If Korea and Jamaica are omitted, because the trend in their means departs considerably from that of the other seventeen countries, the correlation falls to 0.12, an indication of the extent to which Korea influences the overall association observed.

The same correlation for the medians (N = 15, since the median is not calculated for ages 20-24 in four cases) is 0.23 (level of significance =.20). It follows from this positive correlation between initial levels and and change over cohorts that the variation across countries is larger for the younger cohorts than for the older cohorts: the variance of the medians is 3.80 for the cohort aged 25-29 and 1.50 for the cohort aged 45-49; the variance of the estimated means is 5.01 for the cohort aged 20-24 and 1.24 for the the cohort aged 45-49. That is, the combination of stability of the average age in some countries and change in others produces increasingly larger cross national differences as we examine more recent cohorts.

Despite the similarities in the trends across cohorts just noted, it is the essential stability of the differences across countries which is most noteworthy, as emphasized earlier in the discussion. The implications of these differences are brought out vividly in Tables 3 and 4, where percentages experiencing a first birth by age twenty are shown. Age twenty is chosen somewhat arbitrarily, but it might be argued that extensive educational attainment or employment activity before childbearing requires delaying the onset of childbearing until at least age twenty. The percentages in Tables 3 and 4 vary tremendously, ranging from lows of approximately six percent for the youngest cohorts in Korea to highs in excess of eighty percent for women aged 25-39 in Bangladesh. Even among the youngest cohorts, with respect to whom we noted higher average ages in most countries, the range remains great and in approximately one-third of the countries examined fifty percent or more of the women have experienced a first birth by age twenty. At the same time, for this cohort five of the percentages in Table 3 and four of the percentages in Table 4 are less than or equal to twenty-five. The first birth experience of these latter women, and its potential implications for other aspects of their lives as young adults, differ substantially from that of those groups of women who are already well-advanced into the first birth process by age twenty.

5 Concluding Remarks

In this report we have presented estimates of the parameters of the first birth process for all countries for which WFS survey data are available. In our discussion we have provided a summary description of the trends and differentials in the estimated medians and means.

We have not attempted to formulate explanations for the trends and differentials observed. Efforts to construct and test explanatory models follow naturally from the description of the characteristics of the intra- and inter-country differences. Such further analysis might focus on either the within-country variation in one or more selected countries or the across-country variation using these nineteen countries augmented by others as they become available, or both sources of variation through analysis of covariance (see, e.g. Hermalin and Mason, 1979) or alternative approaches.

The formulation of models explaining variation in age at first birth will surely rely heavily on the close association in most countries between age at first marriage and age at first birth. Indeed, theories explaining age at first marriage and age at first birth may be expected to overlap to a considerable extent. The overlap should be far from complete, however, due to the demographic and social differences in the two variables, as noted earlier in this report.

A further avenue of research will be the nature of the relationship between age at first birth and subsequent fertility, as reveled by the WFS data. There has been research recently on this topic using data from developed societies (Bumpass, Rindfuss and Janosik, 1978; Trussell and Menken, 1978) but to date little research using data from less developed societies. Once again, there is interest in examining the nature of the relationship and its changes over time (or cohorts) within particular countries and across a set of countries.

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Appendix I

In a few cases the observed age at first birth was implausibly low when compared with the entire age at first birth distribution. In these cases modifications were made, as specified in the table below.

In the NUPITIAL program employed to obtain the estimated age at first birth parameters, the fitted proportion experiencing a first birth at the earliest age of first birth (this age is read in on a "global parameter card") is actually the fitted proportion experiencing a first birth before the end of that age. That is, the fitted proportion for this age includes all ages below and including the minimum age specified. Thus, if the model fits the data perfectly, the modifications specified below should have no effect at all on the parameter estimates. If the model fits the data reasonably well, the modifications should have a small effect on the estimates. The changes could affect the estimated parameters only for the cohorts involved; trial calculations establish the result that even for these cohorts the differences in estimated parameters are trivial.

		Age at First Birth Change		
Country	Age of Woman	From	To	Number of Women
Bangladesh	22	9	10	2
	31	9	10	1
Indonesia	31	6	9	2
Malaysia	25	11	13	1
	27	9	13	1
Sri Lanka	29	10	11	1
	35	9	11	1
	39	9	11	2

Table 1. Median Age[a] at First Birth, by Age Cohort: All Countries

Country	Cohort					
	20-24[b]	25-29	30-34	35-39	40-44	45-49
ASIA AND PACIFIC*						
Bangladesh	16.8	16.5	16.5	16.8	17.0	17.4
N[C]	1346	1108	791	672	626	495
Fiji	22.0	20.9	20.1	19.8	20.0	20.2
N	907	1049	953	735	616	440
Indonesia	19.8	19.4	18.8	19.1	19.5	20.2
N	1624	1501	1414	1408	1250	964
Jordan	20.9	19.8	19.3	19.6	19.6	19.3
N	596	709	628	543	435	372
Korea	d	23.9	23.3	22.1	21.2	19.9
N	557	1172	1078	1024	869	675
Malaysia	23.2	22.3	21.0	20.1	19.7	19.7
N	909	1192	1089	1115	860	897
Nepal	20.2	19.8	20.0	20.6	20.9	21.0
N	1217	1136	863	733	725	518
Pakistan	20.2	19.9	19.3	19.3	18.3	18.8
N	843	913	821	624	620	503
Philippines	d	23.3	22.5	21.7	21.5	22.2
N	1212	1765	1701	1673	1410	1191
Sri Lanka	d	24.8	22.2	21.4	20.9	20.7
N	912	1295	1221	1203	968	1035
Thailand	22.8	22.1	21.6	21.6	21.8	21.7
N	609	746	607	601	580	460
CARIBBEAN AND LATIN AMERICA						
Colombia	21.7	21.3	20.9	20.8	21.4	21.8
N	1051	842	599	579	476	408
Costa Rica	22.0	22.2	21.3	21.3	21.2	22.2
N	986	839	653	583	448	426
Dominican Republic	20.8	19.8	19.7	19.7	19.8	20.4
N	659	465	331	354	240	233
Guyana	20.9	20.4	19.4	19.8	19.3	19.8
N	978	760	554	504	429	392
Jamaica	19.1	19.2	18.8	19.3	20.7	20.8
N	644	506	389	383	338	328
Mexico	21.1	20.8	20.4	20.3	20.3	20.9
N	1707	1415	1148	1053	820	682
Panama	21.6	21.1	20.5	20.4	20.0	20.3
N	872	795	730	535	405	364
Peru	d	23.0	21.4	21.3	21.0	21.9
N	895	1056	929	920	805	722

* Including West Asia

a) The base for the median is all women in the age cohort, never married and ever married. Information on first births by age is obtained from the maternity history data. Except in those cases where maternity histories were obtained from all women (the Latin American and Caribbean surveys, with the exception of Peru), information on proportions ever married by age obtained from the household listings is used in the calculation of the median so that it applies to all women.

b) In those cases where the median falls within the age interval 20-24 years, it has been calculated using a life table procedure.

c) The number of women reported in this table is the number interviewed in the individual survey. This number equals (in those surveys where women were interviewed regardless of marital status) or falls short of (in those surveys where ever-married women were interviewed) the number used as a base in calculating the median. It always equals the number of women from whom fertility data were gathered.

d) First birth experience too incomplete to allow estimation of the median. Life table approach estimates of the percentage experiencing a first birth by exact age 24.0 are as follows: Korea, 44.5; the Philippines, 48.2; Sri Lanka, 40.0; Peru, 48.8. These imply that the median will fall between exact ages 24 and 25 in the cases of Korea, the Philippines and Peru, and will probably (but not necessarily) exceed exact age 25 in the case of Sri Lanka.

Table 2. Estimates of the Mean and Standard Deviation of Age at First Birth, and the P-Value from the Goodness of Fit Test, by Age Cohort: All Countries

Country and Cohort	$\hat{\mu}$	$\hat{\sigma}$	p.value	N
ASIA AND PACIFIC*				
Bangladesh				
20-24	17.58	3.61	.000	1214
	(0.14)	(0.12)		
25-29	17.18	3.19	.000	1082
	(0.10)	(0.08)		
30-34	17.08	3.18	.060	772
	(0.12)	(0.10)		
35-39	17.46	3.53	.253	660
	(0.14)	(0.11)		
40-44	17.72	3.62	.126	605
	(0.15)	(0.12)		
45-49	18.32	4.12	.331	473
	(0.19)	(0.15)		
Fiji				
20-24	24.57	6.15	.007	641
	(0.66)	(0.43)		
25-29	22.44	5.63	.000	951
	(0.25)	(0.19)		
30-34	20.73	4.74	.000	903
	(0.17)	(0.14)		
35-39	20.50	4.79	.036	707
	(0.18)	(0.15)		
40-44	20.38	5.14	.001	586
	(0.21)	(0.16)		
45-49	20.72	5.32	.492	412
	(0.26)	(0.21)		
Indonesia				
20-24	22.78	6.71	.000	1283
	(0.46)	(0.33)		
25-29	20.52	5.51	.000	1363
	(0.20)	(0.17)		
30-34	19.82	5.28	.000	1324
	(0.16)	(0.13)		
35-39	19.61	4.99	.000	1323
	(0.14)	(0.12)		
40-44	20.12	5.21	.000	1192
	(0.15)	(0.13)		
45-49	20.71	5.41	.000	875
	(0.18)	(0.15)		
Jordan				
20-24	20.11	3.90	.866	509
	(0.33)	(0.26)		
25-29	20.58	4.53	.003	683
	(0.22)	(0.19)		
30-34	20.08	4.53	.103	597
	(0.20)	(0.18)		
35-39	20.24	4.64	.184	527
	(0.20)	(0.17)		
40-44	20.08	4.89	.018	423
	(0.24)	(0.20)		
45-49	19.76	4.53	.013	358
	(0.24)	(0.20)		

	$\hat{\mu}$	$\hat{\sigma}$	p.value	N
Korea, Republic of				
20-24	27.14	6.00	.328	309
	(1.42)	(0.85)		
25-29	26.26	5.32	.011	1038
	(0.36)	(0.27)		
30-34	24.30	4.18	.001	1045
	(0.15)	(0.12)		
35-39	22.68	3.27	.000	1011
	(0.10)	(0.08)		
40-44	21.82	3.63	.008	856
	(0.12)	(0.10)		
45-49	20.69	3.11	.928	664
	(0.12)	(0.10)		
Malaysia				
20-24	24.33	6.02	.015	642
	(0.80)	(0.54)		
25-29	23.94	6.22	.164	870
	(0.43)	(0.34)		
30-34	22.79	5.33	.414	752
	(0.24)	(0.21)		
35-39	22.81	5.44	.013	328
	(0.33)	(0.29)		
40-44	24.02	5.98	.826	108
	(0.61)	(0.51)		
45-49	22.22	5.14	.194	81
	(0.57)	(0.49)		
Nepal				
20-24	23.27	6.04	.000	836
	(0.54)	(0.37)		
25-29	20.69	4.27	.122	1036
	(0.18)	(0.15)		
30-34	20.82	4.42	.025	821
	(0.17)	(0.15)		
35-39	21.50	4.89	.668	711
	(0.19)	(0.16)		
40-44	21.72	5.03	.107	699
	(0.19)	(0.16)		
45-49	21.92	4.58	.682	501
	(0.20)	(0.17)		
Pakistan				
20-24	19.47	4.17	.099	673
	(0.27)	(0.22)		
25-29	19.84	4.31	.001	830
	(0.18)	(0.16)		
30-34	19.38	4.00	.617	780
	(0.15)	(0.13)		
35-39	19.34	4.01	.019	596
	(0.16)	(0.15)		
40-44	18.59	3.86	.302	592
	(0.15)	(0.14)		
45-49	18.97	3.82	.192	490
	(0.17)	(0.14)		

	$\hat{\mu}$	$\hat{\sigma}$	p.value	N
Philippines				
20-24	22.88	5.02	.492	1046
	(0.42)	(0.30)		
25-29	22.91	4.98	.006	1626
	(0.19)	(0.16)		
30-34	23.01	5.43	.000	1652
	(0.16)	(0.14)		
35-39	22.55	5.30	.001	1631
	(0.14)	(0.12)		
40-44	22.42	5.18	.000	1374
	(0.14)	(0.12)		
45-49	22.95	5.37	.001	1158
	(0.16)	(0.14)		
Sri Lanka				
20-24	24.71	6.82	.842	654
	(0.82)	(0.56)		
25-29	25.26	8.07	.317	1099
	(0.50)	(0.38)		
30-34	22.68	6.38	.044	1135
	(0.25)	(0.22)		
35-39	22.63	6.75	.041	1161
	(0.21)	(0.19)		
40-44	21.63	5.85	.001	921
	(0.19)	(0.16)		
45-49	21.56	5.66	.000	1000
	(0.18)	(0.15)		
Thailand				
20-24	22.70	5.06	.363	456
	(0.60)	(0.42)		
25-29	22.77	5.20	.009	687
	(0.30)	(0.25)		
30-34	22.22	4.75	.008	588
	(0.23)	(0.19)		
35-39	22.67	4.90	.007	592
	(0.21)	(0.18)		
40-44	22.39	4.70	.085	564
	(0.21)	(0.17)		
45-49	22.38	4.43	.056	451
	(0.21)	(0.17)		
CARIBBEAN AND LATIN AMERICA				
Colombia				
20-24	24.04	6.69	.005	529
	(0.82)	(0.56)		
25-29	22.38	5.98	.000	628
	(0.39)	(0.32)		
30-34	21.59	4.96	.194	535
	(0.25)	(0.21)		
35-39	21.70	5.58	.013	510
	(0.26)	(0.22)		
40-44	22.02	5.60	.335	429
	(0.28)	(0.22)		
45-49	22.51	6.15	.476	375
	(0.31)	(0.25)		

	$\hat{\mu}$	$\hat{\sigma}$	p.value	N
Costa Rica				
20-24	22.77	5.23	.016	494
	(0.66)	(0.48)		
25-29	22.85	5.49	.778	627
	(0.35)	(0.30)		
30-34	21.92	4.84	.967	575
	(0.24)	(0.20)		
35-39	21.72	4.90	.921	513
	(0.23)	(0.20)		
40-44	21.85	4.50	.669	409
	(0.22)	(0.19)		
45-49	22.81	4.95	.656	393
	(0.25)	(0.20)		
Dominican Republic				
20-24	20.86	4.54	.221	371
	(0.49)	(0.38)		
25-29	20.31	4.69	.857	390
	(0.30)	(0.25)		
30-34	20.69	4.91	.003	306
	(0.31)	(0.26)		
35-39	20.19	4.46	.920	338
	(0.25)	(0.20)		
40-44	20.31	4.95	.168	220
	(0.32)	(0.27)		
45-49	21.32	5.18	.466	217
	(0.35)	(0.29)		
Guyana				
20-24	21.28	4.48	.512	529
	(0.39)	(0.30)		
25-29	21.10	4.53	.487	623
	(0.25)	(0.21)		
30-34	20.39	4.32	.078	522
	(0.20)	(0.16)		
35-39	20.42	4.70	.226	470
	(0.21)	(0.18)		
40-44	20.14	4.20	.204	391
	(0.21)	(0.17)		
45-49	20.70	4.59	.425	369
	(0.24)	(0.20)		
Jamaica				
20-24	19.52	3.58	.707	448
	(0.28)	(0.22)		
25-29	20.36	5.07	.280	447
	(0.31)	(0.26)		
30-34	19.77	4.25	.001	366
	(0.24)	(0.20)		
35-39	20.31	4.59	.334	358
	(0.25)	(0.21)		
40-44	21.44	5.47	.113	314
	(0.31)	(0.26)		
45-49	21.67	5.32	.431	296
	(0.31)	(0.26)		

	$\hat{\mu}$	$\hat{\sigma}$	p.value	N
Mexico				
20-24	22.42	5.47	.015	955
	(0.43)	(0.31)		
25-29	21.71	5.36	.006	1125
	(0.21)	(0.17)		
30-34	21.26	5.00	.034	1034
	(0.19)	(0.16)		
35-39	21.18	5.02	.100	985
	(0.17)	(0.14)		
40-44	21.07	4.99	.179	755
	(0.18)	(0.15)		
45-49	21.45	5.30	.770	627
	(0.21)	(0.18)		
Panama				
20-24	22.80	5.69	.092	460
	(0.70)	(0.51)		
25-29	22.06	5.49	.188	657
	(0.32)	(0.26)		
30-34	21.20	4.69	.261	659
	(0.21)	(0.18)		
35-39	21.18	4.88	.387	505
	(0.22)	(0.19)		
40-44	21.06	4.86	.115	388
	(0.25)	(0.22)		
45-49	21.22	5.27	.726	344
	(0.28)	(0.24)		
Peru				
20-24	23.31	6.04	.223	770
	(0.57)	(0.40)		
25-29	21.59	4.91	.346	982
	(0.22)	(0.19)		
30-34	21.62	5.05	.017	901
	(0.20)	(0.16)		
35-39	21.36	5.09	.166	898
	(0.18)	(0.15)		
40-44	21.48	4.97	.012	789
	(0.18)	(0.15)		
45-49	21.89	5.35	.027	697
	(0.20)	(0.17)		

* Including West Asia

Note: Estimated standard errors of the estimates are shown in parentheses.

Table 3. Percentage of Women[a] Having First Birth by Exact Age Twenty, by Age Cohort: All Countries

Country	Cohort					
	20-24	25-29	30-34	35-39	40-44	45-49
ASIA AND PACIFIC*						
Bangladesh	80.1	86.8	83.6	81.8	75.9	72.0
Fiji	29.3	38.8	47.7	52.3	49.4	47.7
Indonesia	50.7	55.6	58.7	58.0	55.4	47.7
Jordan	43.5	51.0	55.3	53.6	54.0	56.3
Korea, Republic of	6.4	6.9	9.4	16.8	32.6	49.3
Malaysia	25.2	31.8	41.7	49.4	52.0	52.9
Nepal	47.0	51.1	48.8	43.8	40.4	38.6
Pakistan	48.7	50.0	54.5	59.6	63.6	61.5
Philippines	22.0	25.5	29.4	32.5	35.7	28.5
Sri Lanka	17.9	24.6	35.5	38.2	40.6	42.6
Thailand	26.1	29.0	29.6	27.6	31.2	25.7
CARIBBEAN AND LATIN AMERICA						
Colombia	36.6	37.8	42.1	41.5	37.4	35.3
Costa Rica	33.9	30.6	37.7	37.4	36.6	26.1
Dominican Republic	44.0	52.0	53.5	54.2	53.8	44.2
Guyana	39.3	44.3	54.3	52.0	55.7	52.6
Jamaica	56.8	57.3	63.8	53.8	43.6	41.8
Mexico	40.7	40.8	45.9	47.2	45.6	41.9
Panama	35.8	40.1	44.1	45.4	49.6	46.6
Peru	23.2	31.0	37.0	39.0	37.7	34.0

* Including West Asia

a) The base for the percentage is all women in the age cohort, never married and ever married. Information on first births is obtained from maternity history data. Except in those cases where maternity histories were obtained from all women (the Latin American and Caribbean surveys, with the exception of Peru), information and proportions ever married by age obtained from the household listing is used to adjust the percentage so that it applies to all women.

Table 4. Estimated Percentage of Women Having First Birth by Exact Age Twenty, by Age Cohort: All Countries

Country	Cohort					
	20-24	25-29	30-34	35-39	40-44	45-49
ASIA AND PACIFIC*						
Bangladesh	79.6	84.2	84.8	81.0	79.0	73.3
Fiji	22.9	38.5	52.2	54.5	55.8	53.0
Indonesia	39.7	54.8	60.5	62.1	58.1	53.3
Jordan	57.8	53.4	58.2	56.9	58.2	60.9
Korea, Republic of	5.6	5.8	10.6	19.3	35.2	48.2
Malaysia	24.1	28.4	33.8	34.1	26.5	38.5
Nepal	33.0	51.9	50.9	45.0	43.4	39.1
Pakistan	63.8	60.2	64.9	65.4	71.8	69.0
Philippines	31.4	30.9	32.5	36.1	37.0	32.6
Sri Lanka	25.5	27.4	39.4	41.0	46.6	46.6
Thailand	33.4	33.6	37.0	33.0	34.7	33.3
CARIBBEAN AND LATIN AMERICA						
Colombia	29.9	40.6	44.3	45.1	42.3	40.2
Costa Rica	33.6	33.9	40.5	42.8	39.7	31.7
Dominican Republic	50.5	56.1	53.0	57.2	56.3	47.4
Guyana	46.1	48.1	54.9	55.1	57.4	52.5
Jamaica	64.1	55.9	61.1	56.2	47.3	44.8
Mexico	38.1	44.4	47.7	48.4	49.4	46.6
Panama	35.4	41.7	47.6	48.1	48.9	48.6
Peru	32.8	44.2	44.4	47.0	45.4	42.8

* Including West Asia

Table 5. Estimates of the Proportion of Women Who Will Eventually Have a First Birth, By Age Cohort: Seven Countries.[a]

Cohort	Country						
	Colombia	Costa Rica	Dominican Republic	Guyana	Jamaica	Mexico	Panama
20-24	1.06	0.92	0.91	0.92	0.89	1.01	1.02
	(0.08)	(0.07)	(0.07)	(0.06)	(0.03)	(0.05)	(0.09)
25-29	0.92	0.94	0.93	0.92	1.00	0.94	0.99
	(0.03)	(0.03)	(0.02)	(0.02)	(0.02)	(0.02)	(0.03)
30-34	0.94	0.92	0.96	0.96	0.96	0.94	0.94
	(0.02)	(0.01)	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)
35-39	0.90	0.89	0.96	0.94	0.94	0.95	0.96
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
40-44	0.91	0.92	0.92	0.91	0.94	0.92	0.96
	(0.01)	(0.01)	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)
45-49	0.92	0.92	0.94	0.94	0.90	0.92	0.95
	(0.01)	(0.01)	(0.02)	(0.01)	(0.02)	(0.01)	(0.01)

a) The seven countries are those for which an "all-woman" sample is available. See text.

Note: Estimated standard errors of the estimates are shown in parentheses.

Figure 1 Estimates of the Proportion Ever Having First Birth, by Age Cohort: Seven Countries

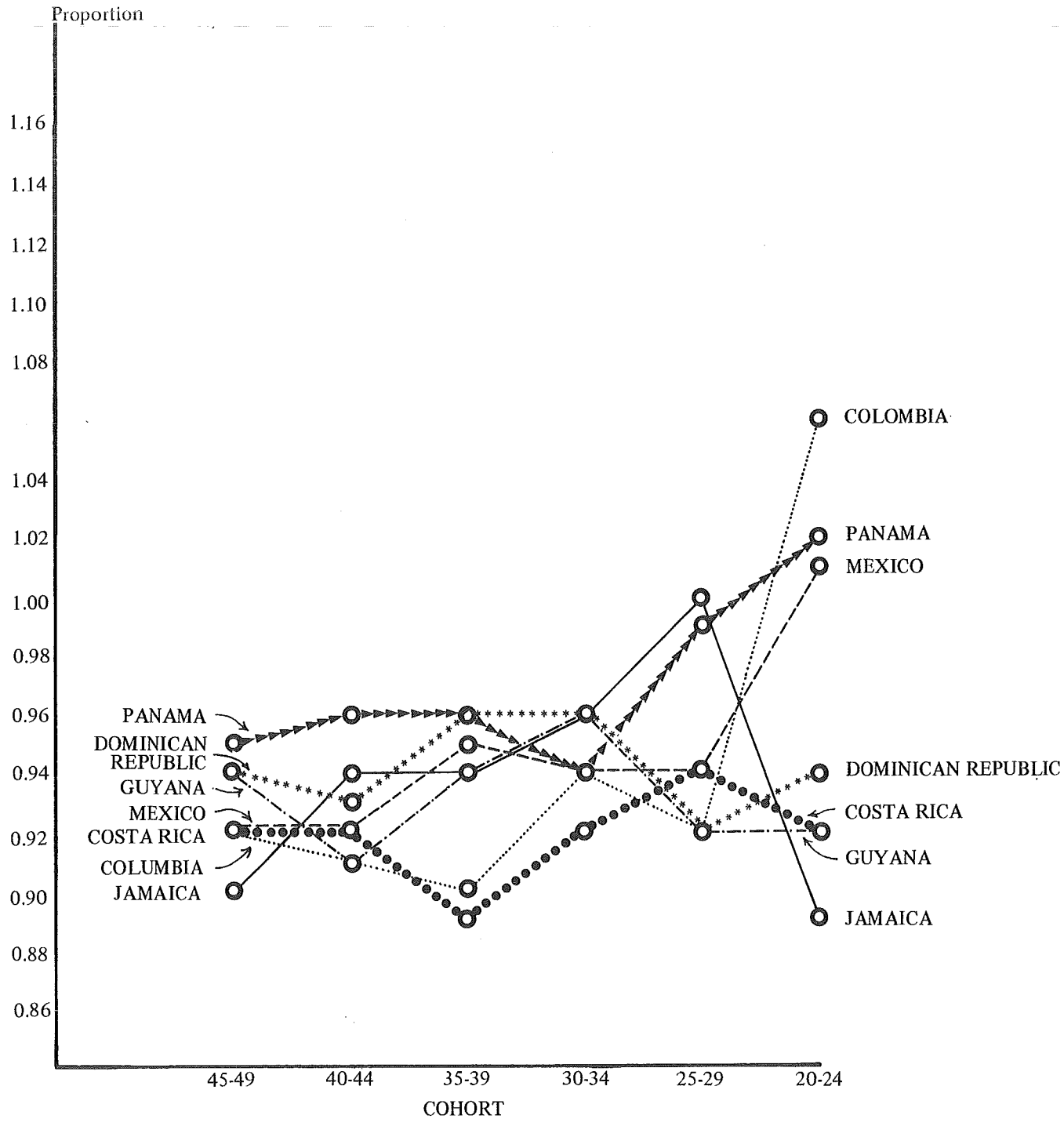


Figure 2 Median and Mean Ages at First Birth, by Age Cohort

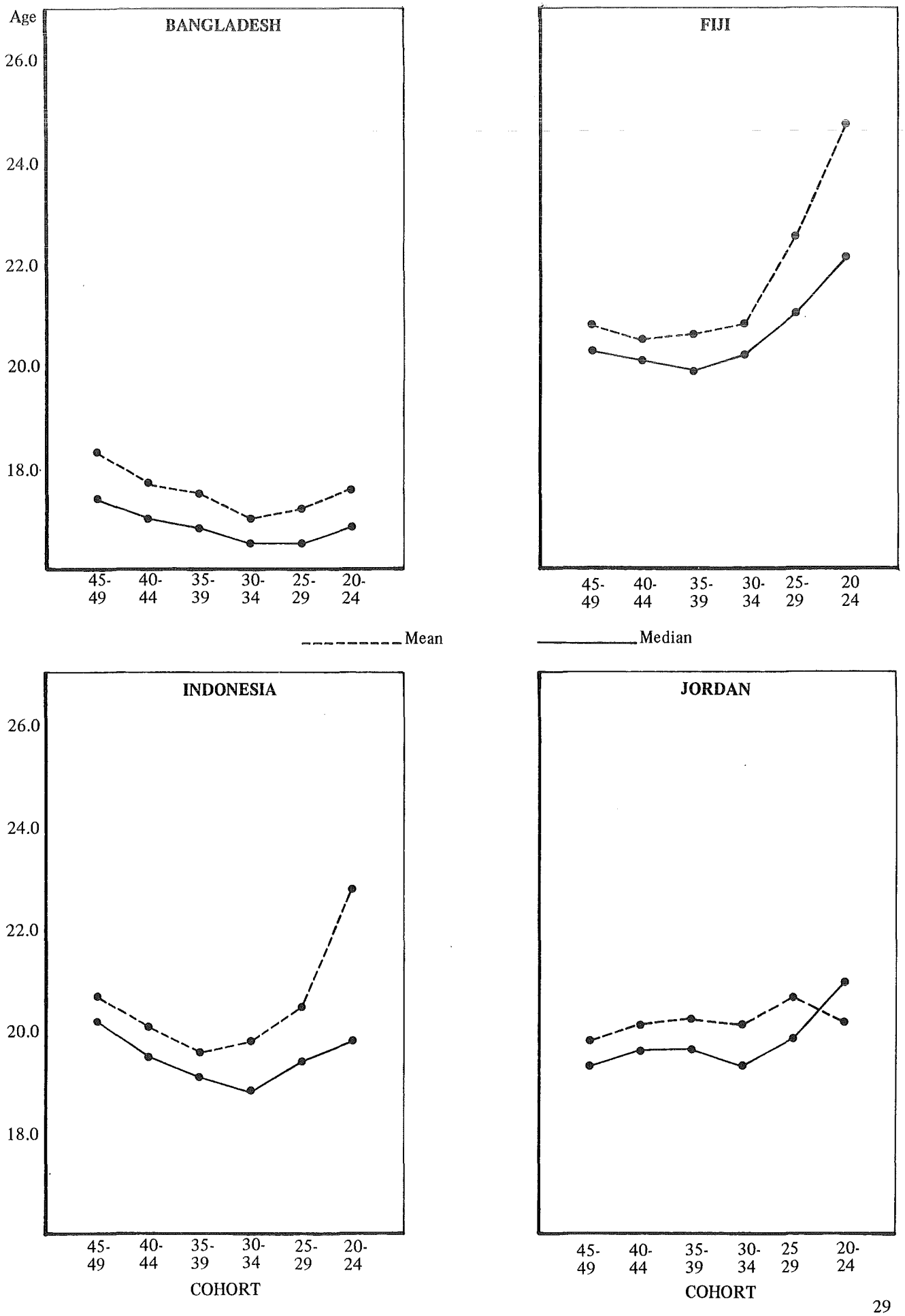
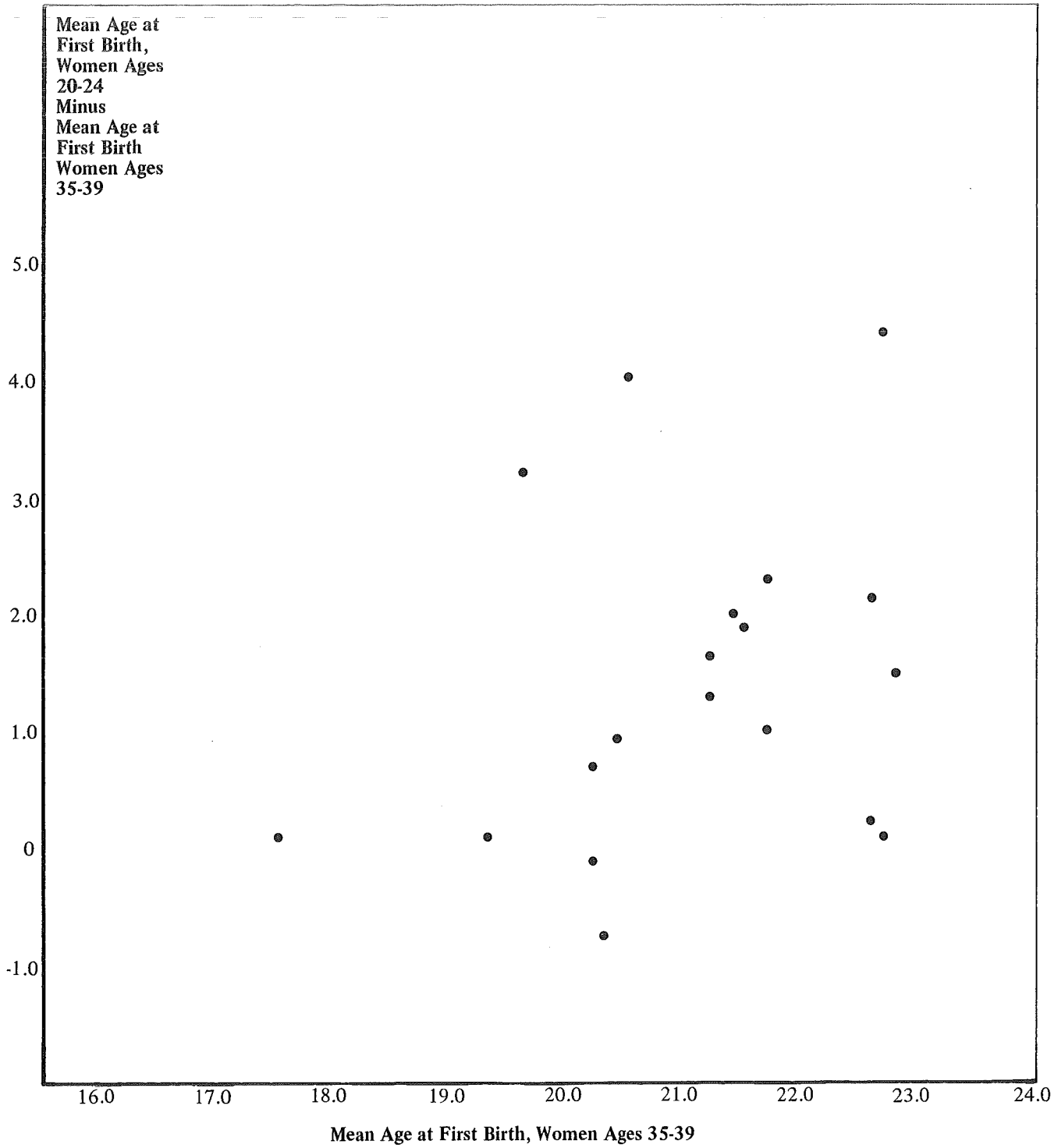
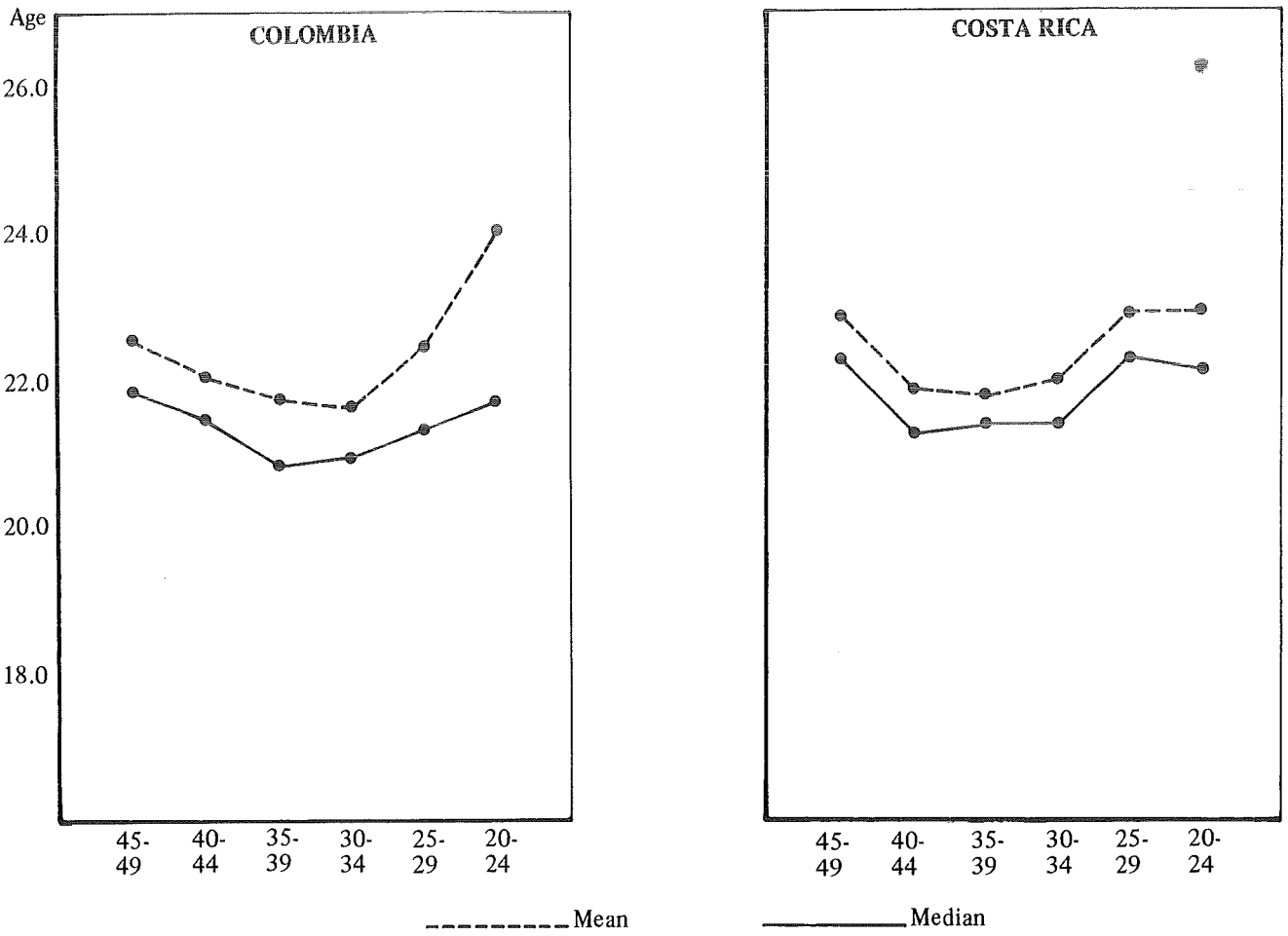
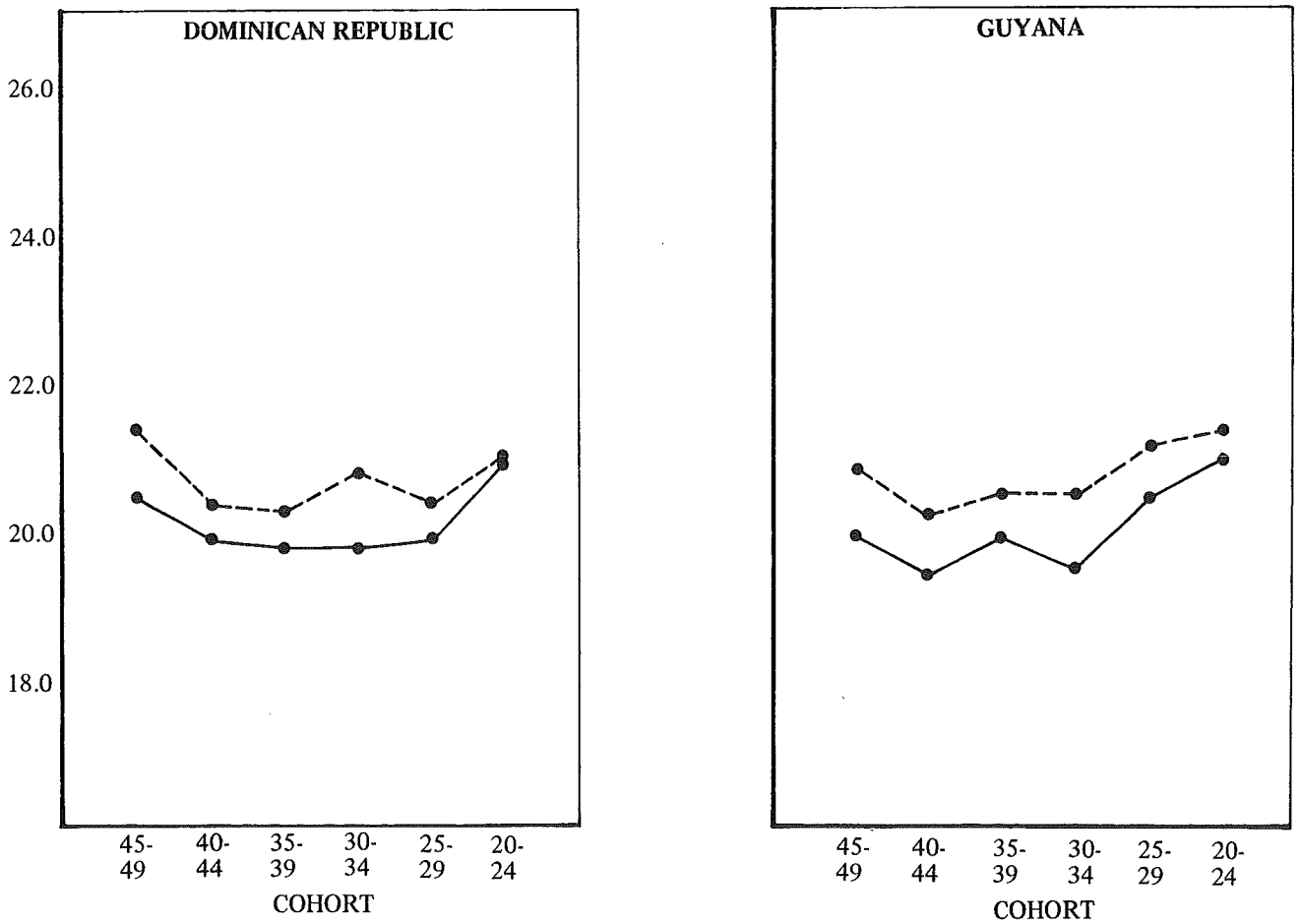


Figure 3 SCATTER OF $\hat{\mu}_{35\text{-}39}$ AGAINST $(\hat{\mu}_{20\text{-}24} - \hat{\mu}_{35\text{-}39})$

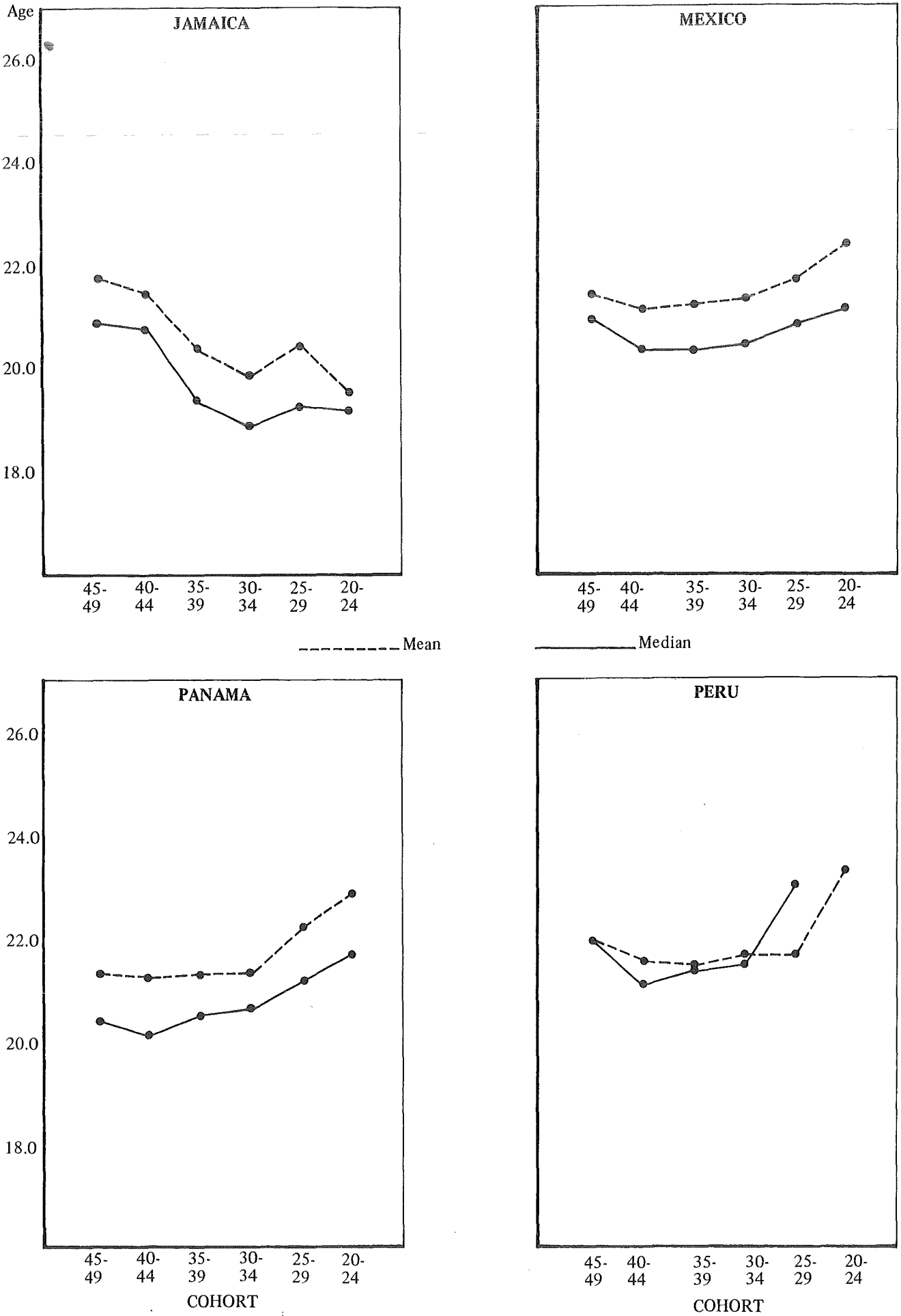


Continuation of Fig. 2





Continuation of Fig. 2



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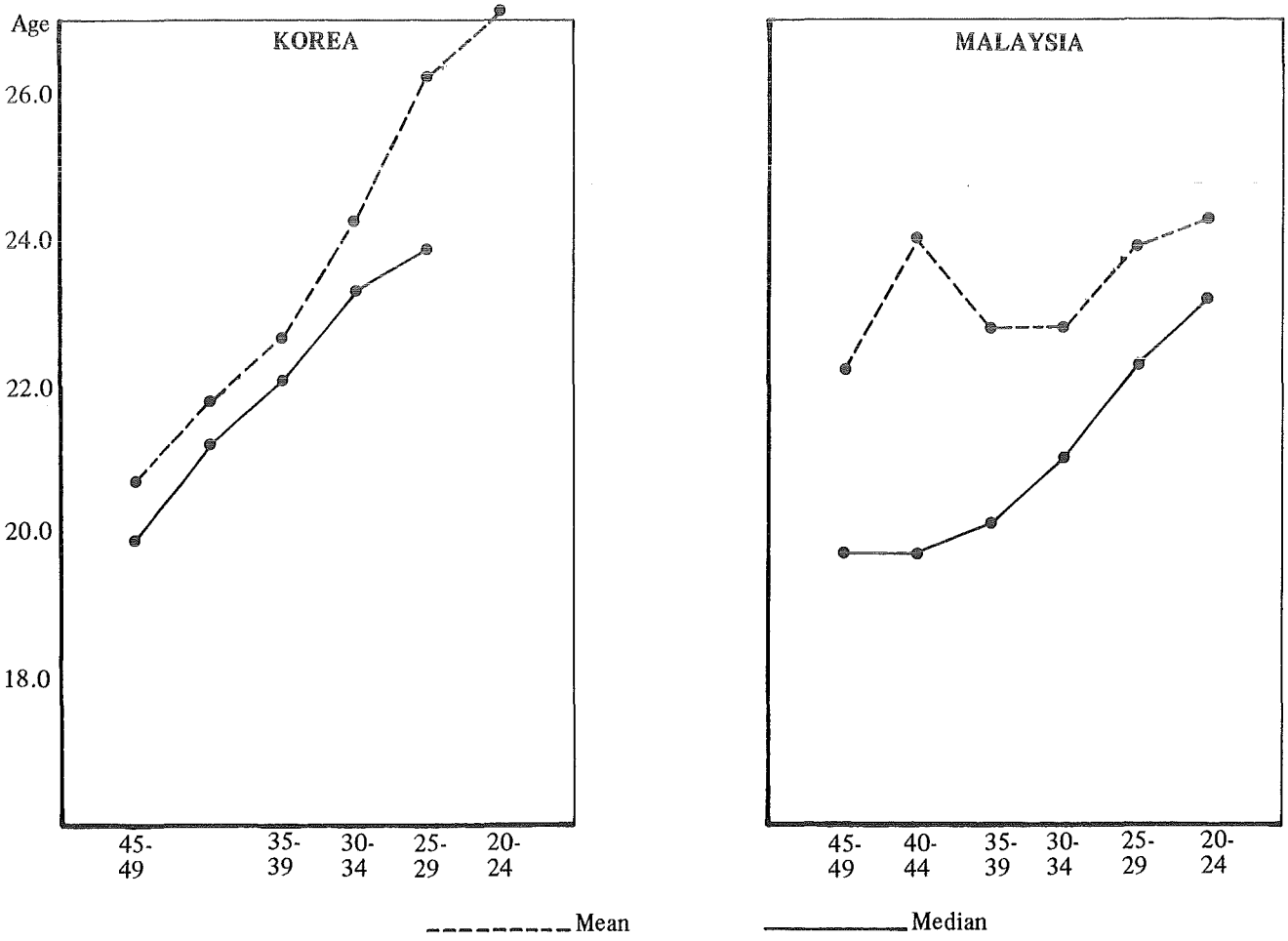

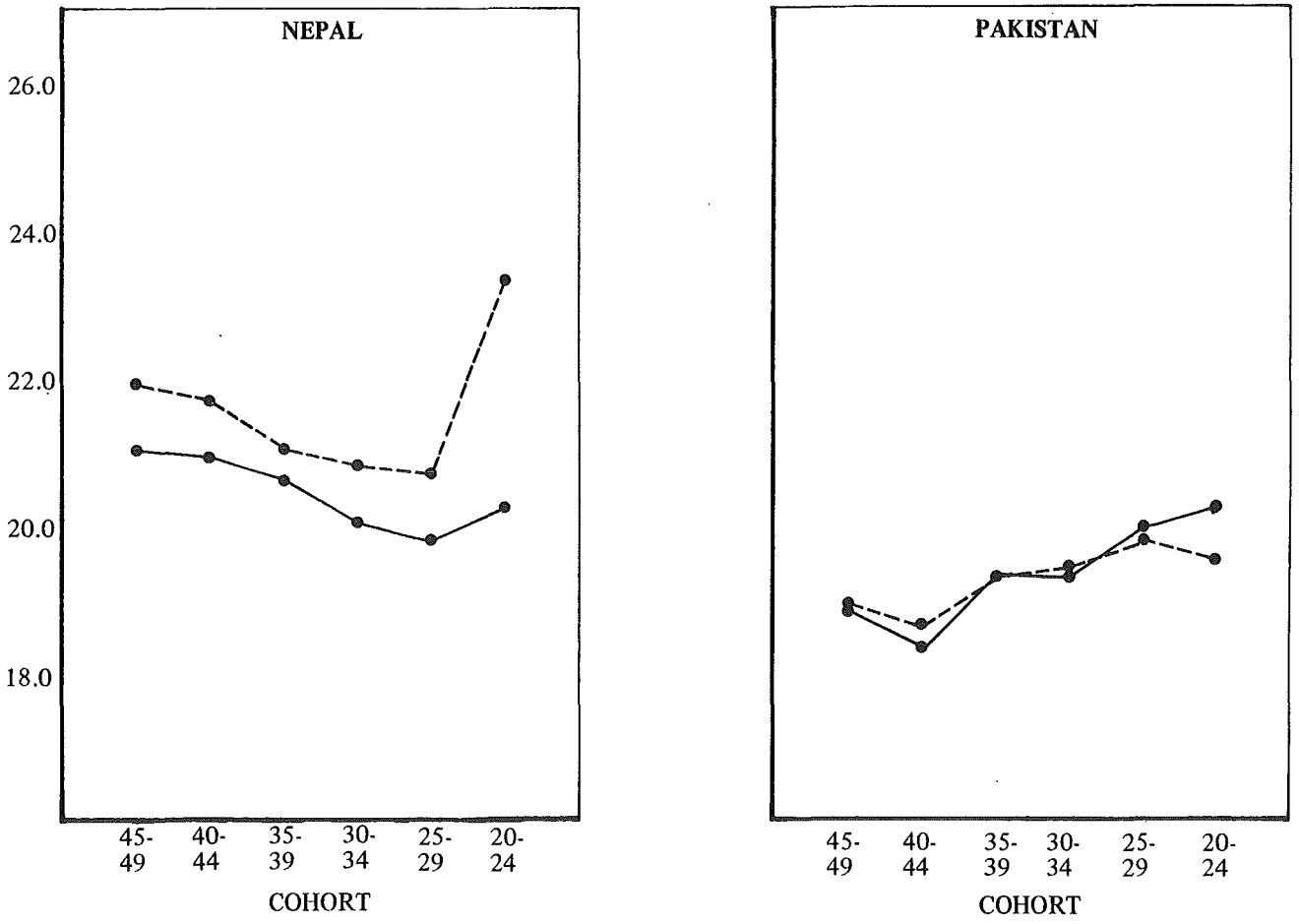
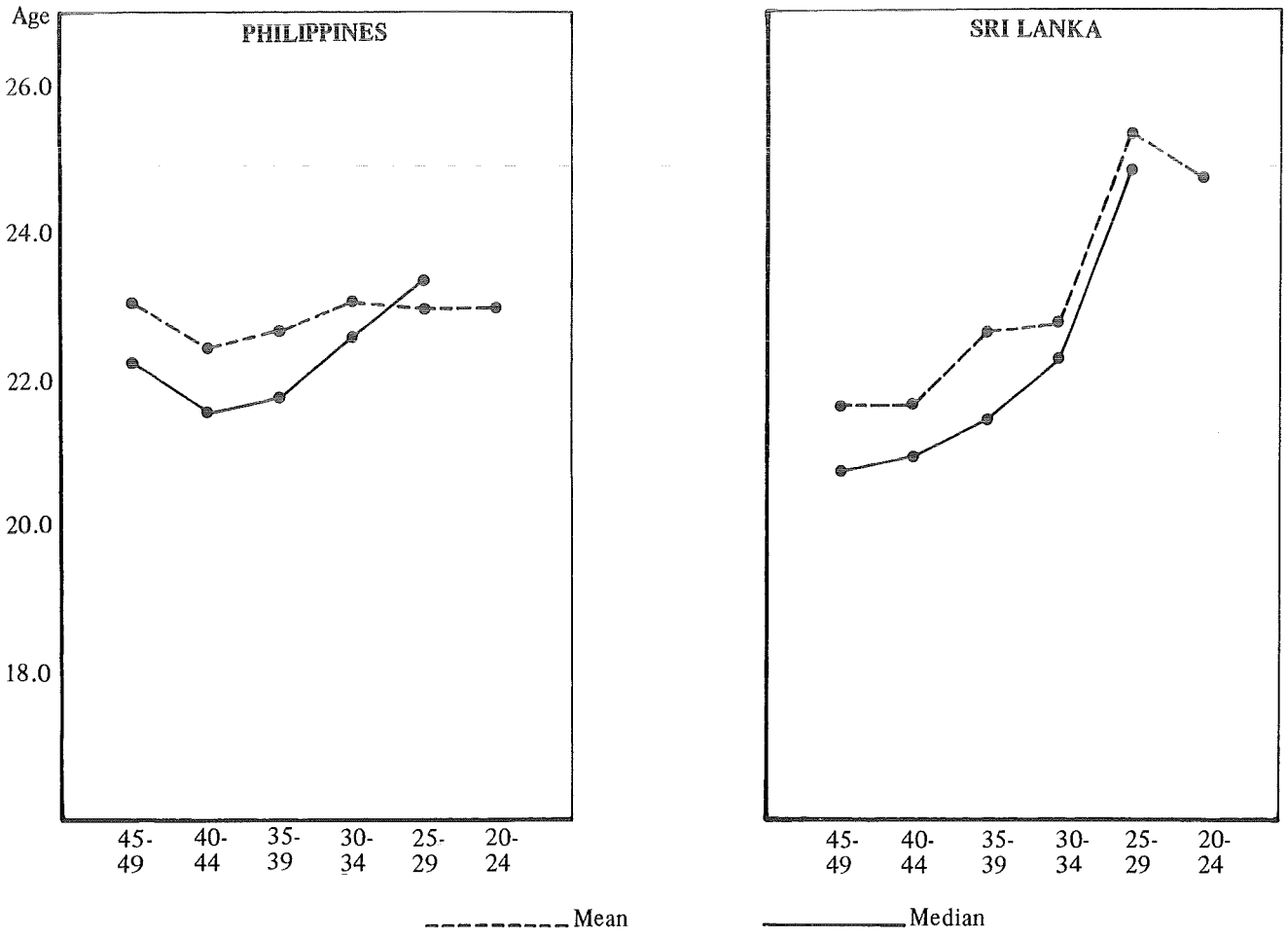
Continuation of Fig. 2