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Illustrative Analysis: Recent Fertility Trends in Sri Lanka

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The World Fertility Survey 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 cooperation 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.
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Preface

One of the main concerns of the World Fertility Survey has been the analysis of the data collected by the participating countries. It was decided at the outset that, in order to obtain quickly some basic results on a comparable basis, each country would produce soon after the fieldwork a First Country Report, consisting of a large number of cross-tabulations with a short accompanying text. Precise guidelines for the preparation of the tables were produced and made available to the participating countries.

It was also recognized, however, that at later stages many countries would wish to study in greater depth some of the topics covered in their first reports, or indeed new but related subjects, using more refined analytic techniques. In order to assist the countries at this stage a general 'Strategy for the Analysis of WFS Data' was outlined, a series of Technical Bulletins was started, dealing with specific methodological issues arising in the analysis, and a list of 'Selected Topics for Further Analysis of WFS Data' was prepared, to serve as a basis for selecting research topics and assigning priorities.

It soon became evident that many of the participating countries would require assistance and more detailed guidelines for further analysis of their data. Acting upon a recommendation of its Programme Steering Committee, the WFS then launched the present series of 'Illustrative Analyses' of selected topics. The main purpose of the series is to illustrate the application of certain demographic and statistical techniques in the analysis of WFS data, thereby encouraging other researchers and other countries to undertake similar work.

In view of the potentially large number of research topics which could be undertaken, some selection was necessary. After consultation with the participating countries, 12 subjects which are believed to be of top priority and of considerable interest to the countries themselves were selected. The topics chosen for the series span the areas of fertility estimation, levels, trend and determinants, marital formation and dissolution, breastfeeding, sterilization, contraceptive use, fertility preferences, family structure, and infant and child mortality.

It was envisaged that each study would include a brief literature review summarizing important developments in the subject studied, a clear statement of the substantive and methodological approach adopted in the analysis, and a detailed illustration of the application of such an approach to the data from one of the participating countries, but with emphasis on the general applicability of the analysis. These studies have been conducted in close collaboration with the country concerned, where possible with the active participation of national staff.

It should perhaps be emphasized that the studies in the 'Illustrative Analyses' series are meant to be didactic examples rather than prescriptive models of research, and

should therefore not be viewed as cookbook recipes to be followed indiscriminately. In many cases the investigators have had to choose a particular course of action from several possible, sometimes equally sound, approaches. In some instances this choice has been made more difficult by the fact that demographers or statisticians disagree among themselves as to the approach most appropriate for a particular problem. In the present series we have, quite intentionally, resisted the temptation to enter the on-going debates on all such issues. Instead, and in view of the urgency with which countries require guidelines for analysis, an attempt has been made to present what we believe to be a basically sound approach to each problem, spelling out clearly its drawbacks and limitations.

In this difficult task the WFS has been aided by an *ad hoc* advisory committee established in consultation with the International Union for the Scientific Study of Population (IUSSP) and consisting of Ansley Coale (Chairman), Mercedes Concepción, Gwendolyn Johnson Ascádi and Henri Leridon, to whom we express our gratitude. Thanks are also due to the referees who have generously donated their time to review the manuscripts and to the consultants who have contributed to the series.

Many members of the WFS staff made valuable contributions to this project, which was co-ordinated by V.C. Chidambaram and Germán Rodríguez.

DIRK J. VAN DE KAA
Project Director

Acknowledgements

The authors wish to thank Dr Noreen Goldman for her comments and constructive suggestions.

1 Background and Objectives

1.1 INTRODUCTION

Sri Lanka is one of the few south Asian countries where a substantial and sustained decline in fertility has been registered since the late 1950s. It appears that in recent years its pace has accelerated considerably. The objective of this analysis is to augment earlier evidence of this trend and to study the changing fertility behaviour of various subgroups of the population, using the data collected in the retrospective birth histories of the Sri Lanka Fertility Survey (SLFS). In the process of studying the fertility levels, trends and differentials, we plan to illustrate procedures that can be applied to other WFS data sets.

From the very beginning it should be said that in no way will we be able to exhaust all the possible approaches and techniques which can be used for such an analysis. This report merely indicates some of the ways of handling these data.

In order to place this study in the context of the Sri Lankan fertility transition, we will briefly review in the following paragraphs previous evidence of fertility decline in the country along with the data available from previous studies.

1.2 HISTORICAL ACCOUNT OF FERTILITY LEVELS, TRENDS AND DIFFERENTIALS IN SRI LANKA

Sri Lanka has a reasonably good vital registration system, which is still uncommon in south Asia. Appendix A provides a description of the system and a review of the evidence of its completeness. Moreover, the country has also had a series of population censuses starting in 1881. Previous analysis of fertility has been based mainly on these two sources.

The most commonly used measure of fertility is the Crude Birth Rate (CBR), or number of births per year per 1000 population. The CBR estimates for the 1941-74 period are summarized below:

Period	*CBR*
1941-45	36.6
1946-50	38.9
1951-55	38.1
1956-60	36.5
1961-65	34.3
1966-70	31.1
1971-74	28.7

Source: ESCAP (1976), table 115, p 154.

It is evident from this set of figures that a decline in the CBR started in the late 1950s. Before this the rate had remained more or less unchanged.

Many studies have been undertaken to investigate this changing level of the CBR. Jayewardene and Selvaratnam (1967), analysing registration and census data for the 1953-63 period, have attributed the decline to a rise in age at marriage. A similar but more precise conclusion was reached by Wright (1968). After analysing the 1953-63 data, he concluded that nearly all the changes in the CBR could be attributed to changes in the age structure and in the marital status of 15-19 year old women, and that marital fertility had remained more or less unchanged. Extending his analysis to the 1963-8 period, he concluded that changes in this period occurred both because of continuing postponement of marriage and because of a decline in marital fertility among women 25 years and over. Fernando (1970) further analysed the 1953-68 data and added another dimension to Wright's conclusions, namely the impact of malaria in reducing the cohort size of women who reached peak childbearing ages in the 1960s, which in turn depressed the birth rate.

Fernando (1972) later supplemented his analysis using the 1963 population census, the 1969-70 Socio-Economic Survey and vital registration statistics. He concluded that the most significant contributory factor in the decline of the CBR had been a decrease in the proportions ever-married from 65.2 per cent of women aged 15-49 in 1963 to 60.1 per cent in 1969. Further, he noted that the proportions ever married in the age group 20-24, which contribute nearly 27 per cent of total births, declined from 57.4 per cent in 1963 to 42.6 per cent in 1969.

In 1974, Fernando enlarged his analysis to incorporate urban-rural and regional differentials in fertility and observed that the traditional pattern of lower urban fertility relative to rural held true both in 1963 and 1970, though the gap was narrowing. Similar urban-rural differentials were observed for all the four regions. Contrary to his earlier contention that all the changes in fertility were due to rising age at marriage during 1963-9 period, he concluded that there had been changes in marital fertility levels which could be attributed in part to the success of the family planning programme and to some extent to induced abortions.

It seems highly improbable that the family planning programme had a significant impact on fertility levels for the 1963-69 period, in view of the very low acceptance rates for 1968-71 reported by Wright and Perera (1973). In a later study, Fernando (1979) has also acknowledged this by saying that in 1971 family planning appears to have played a minor role in the fertility decline. Of course, the increasing use of traditional methods of birth control or resort to commercial sources of family planning supplies could account for any decline in marital fertility.

In a recent analysis of fertility trends between 1971 and 1975, Fernando (1980) again finds little evidence of any substantial effect of contraceptive use on marital fertility.

He attributes nearly all (90 per cent) of the decline in the CBR over this period to the changing marital distribution of the female population.

To summarize, it appears that the CBR over the last 20 years has been responsive to changes in all three of its major components, namely female age structure, proportions married and marital fertility. However no entirely consistent and clear picture has emerged from previous studies of the relative importance of the three factors. One of the aims of this present analysis will be to re-assess the relative contribution of changes in nuptiality and changes in marital fertility to the overall fertility decline, both for the country as a whole and for different geographical subgroups of the population.

Much of the above research on Sri Lanka fertility has been based on cross-sectional analysis, due to the lack of other data. Insight into cohort trends in the timing and spacing of births can only be derived from special enquiries, and before the SLFS there had been no sample survey where comprehensive marital and reproductive histories were collected. Consequently, the SLFS provides the first opportunity to study in detail the changing reproductive behaviour of the various subgroups of the population and also makes possible an identification of the main demographic and social components of fertility change.

1.3 AN OUTLINE OF THE SURVEY AND ITS MAIN FINDINGS ON FERTILITY

The SLFS was conducted from August to November 1975 and had national coverage. In all, 6812 ever-married women were successfully interviewed out of a sample of 7112 eligible women, with a non-response rate of 4.2 per cent. The level of non-response was even across the country, the highest (4.8 per cent) being in the central region and lowest (3.7 per cent) in the south-eastern region.

The questionnaire consisted of three parts: the household schedule, part I; the household schedule, part II; and the individual questionnaire. The household schedule, part I was used to list the household members, to collect information on age, sex, marital status, relationship and residence (*de facto* or *de jure*) for each household member, and to identify respondents eligible for the detailed interview. The eligibility criteria were that the woman should be aged between 12 and 49, ever married and should have spent the previous night in the household. The household schedule, part II obtained information on housing conditions, ownership of assets, and other economic information. The individual questionnaire consisted of seven sections: (1) respondent's background; (2) birth history; (3) contraceptive knowledge and use; (4) marriage history; (5) fertility regulation; (6) work history; and (7) current (last) husband's background. In the present analysis we will be considering only information gathered in the household schedule, part I and the individual questionnaire, particularly the birth and marriage history sections.

We turn now to a brief consideration of the key findings, presented in the First Country Report (Department of Census and Statistics, Ministry of Plan Implementation 1978), that are relevant to the design of the present more detailed study. This report dealt extensively with socio-economic and other differentials in cumulative and recent period fertility. Little divergence in reproductive behaviour in the early years of marriage was noted but, when attention was focussed on women in the middle or at the end of their reproductive lives, substantial differences were apparent. As expected, rural fertility was higher than urban fertility. More surprisingly, in view of their low age at marriage and educational level, women residing on the tea and rubber plantations, the so-called estate sector, reported an even lower level of fertility than urban women.

A pronounced negative association between educational attainment of women and the number of children ever born was observed, but much, if not all, of this relationship was attributed to differences in age at marriage between educational categories. Sharp variations according to husband's occupation were also apparent, with the lowest fertility in the professional and managerial category and the highest amongst self-employed farmers.

Ethnic and religious background were also found to be major differentiating factors. Cumulative fertility was lowest for the Tamils, who are mostly Hindu, highest among the Muslim Moors and intermediate for the largest ethnic group, the Sinhalese who are predominantly Buddhist.

The reported incidence of pre-marital births was low; only 2 per cent of women reported such an occurrence. The level of pre-marital conception was also low, with only 6 per cent of births falling within the first seven months of marriage. After five years of marriage, nearly all women (97 per cent) had at least one live birth. Even though age at marriage had increased considerably, little trend across age groups was observed in the mean interval to first birth. The average number of births in the first five years of marriage was 1.9 and this tempo of early childbearing varied little according to age at marriage.

In the absence of any thorough evaluation of survey data, the subject of fertility trends was not examined in detail in the First Country Report. A straightforward interpretation of the birth and marriage history data at their face value indicated an average annual decline of 2.5 per cent in the total fertility rate for the years 1963 to 1970 and a steeper annual decline between 1970 and 1974 of 5.7 per cent. In terms of marital fertility rates, the 1963-70 period was characterized by a decline among older women that was more or less balanced by an increase at younger ages. However, in the most recent period, 1970-74, a decline in marital fertility was observed for all age groups.

In many ways, the First Country Report has furnished the ideal background information necessary for the more detailed and narrowly focussed study attempted here. It has revealed a rich diversity of demographic behaviour across geographic, ethnic and socio-economic groups and indicated a recent acceleration in the downward trend of fertility. Our prime objective will be to re-examine these trends in more detail and examine the extent to which they have affected all major subgroups of the population.

1.4 SUBGROUPS FOR THE PRESENT STUDY

Based on the pattern of results described in the First Country Report, a small number of variables have been constructed to define subgroups of the Sri Lankan population for the detailed analysis of fertility. It should be recognized from the outset that the choice of variables is restricted to the

information collected in the survey. Most of these variables relate to the respondent's or her husband's current status, and any changes which have occurred in characteristics over time remain unrecorded. For example, the husband's occupation relates to his current position. To the extent that age is a factor in upward occupational mobility, an older man may have reached a higher occupational status now than during the years of greatest reproductive activity. This limitation is present in nearly all cross-sectional data, but its impact can be reduced by restricting the analysis to the last 10-15 years. Furthermore, the composition of the population in terms of those variables most subject to possible change over the course of adulthood has remained reasonably stable for the preceding decade and thus we do not expect any systematic bias in the measurement of background variables.

In the First Country Report, fertility and related aspects of behaviour were examined in relation to seven variables:

1 Type of place of residence
2 Region of residence
3 Respondent's level of education
4 Religion
5 Ethnic group
6 Occupation of current (last) husband
7 Respondent's pattern of work.

For the present analysis we have used all these variables with the exception of pattern of work, which is particularly subject to change over time and therefore inappropriate for a study of fertility trends. However, we have combined religion with ethnic group and respondent's education with her current (last) husband's education to form two joint variables. In addition we have constructed a variable combining childhood and current type of place of residence. A description of each variable is given in chapter 4 and the weighted and unweighted distribution of respondents across categories of each variable may be found in appendix table B1.

2 Quality of the Data

2.1 INTRODUCTION

The estimation and analysis of fertility trends from cross-sectional surveys are particularly sensitive to errors in the data. Before proceeding with the substantive part of this study, it is therefore necessary to subject the SLFS data to a critical examination in order to detect the direction and approximate magnitude of any systematic biases or errors and thus minimize the risk of reporting spurious findings.

As the estimation of fertility trends draws not only on the maternity history data but also on current age of the respondent and her age at first marriage, all three classes of data will be evaluated. The methods employed will consist mainly of checks on internal consistency but, wherever possible, comparison with external sources of data, censuses and vital registration will be made.

2.2 AGE REPORTING

The age distribution of the SLFS has been analysed both for age heaping and age misreporting. The former denotes the common tendency of respondents and interviewers to record ages ending in preferred digits, for instance 0 and 5 and even numbers. Its impact can be minimized by grouping into broad age categories. In contrast, age misreporting is defined as a systematic tendency to over or under-report age. To the extent that its occurrence is associated with marital status or parity (for instance age under-reporting for single women and over-reporting for highly fertile women), this phenomenon results in biased estimates, which are not always easy to detect and are always difficult to correct.

In table 1, the age and sex distribution recorded in the household schedule is compared with the 1963 and 1971 census distributions. It is evident from the table that the three distributions are quite different. In the two census distributions, the categories 0-4 and 5-9 constitute larger proportions of the total population than they do in the survey, while age groups 15-19, 20-24 and 25-29 are proportionately smaller than in the survey. These differences are caused by the fall in fertility levels in the last 15 years. However, it should be pointed out that this decline makes it difficult to draw any firm conclusion from these observed differences as to the quality of age reporting in the two censuses and the survey.

Inspection of the survey population pyramid (figure 1) does not show any gross irregularities, indicative of severe age misreporting. A shifting of women across the upper age boundary that defines eligibility for the individual interview has been found in a few WFS surveys and is a potentially serious bias. In the SLFS household survey, there is no evidence of a surplus of women aged 50-59 nor a corresponding deficit in the 40-49 age range.

There are, however, indications of slight deficits of women aged 30-34 and 40-44, perhaps because of a more pronounced heaping at ages 35 and 45 than at 30 and 40. Potentially of more consequence is the possibility of a shift of women aged 15-19 to the next younger age group. Further evidence concerning the 15-19 cohort will be given later in this chapter.

A tendency to report ages at digits ending at zero and five is observed in all three enumerations. A comparison of Myers' Index of digital preference (table 2) indicates that age heaping for females is less severe in the survey than in the 1963 and 1971 population censuses. A gradual improvement over time is observed in the quality of reporting, from a Myers' Index value of 32.6 in 1963 to 19.2 in 1971 and to 16.9 in the 1975 survey for females. The values for males do not follow any pattern, recording a decline for successive censuses but an increase in the survey. An improvement in the index is to be expected in response to improvement in overall educational levels in the country and the uneven trend for males can partly be attributed to the fact that the informants in the household survey, unlike the censuses, were generally females who may have been more prone to report the ages of males in rounded numbers.

The sex ratios (males per 100 females) by age group in the two censuses and the survey (table 1) show a somewhat different pattern. They are similar for age groups 0-4 and 5-9 in the three distributions, but, in the 10-49 age groups, the survey shows an excess of females compared to the two censuses, which are themselves considerably different from each other. (The 1963 census ratios are higher for ages 30-49.) Part of the variation can be attributed to the different pattern of age misreporting for the two sexes. The overall sex ratio is lower in the survey than in the two censuses. Whether this is due to selective migration or differential coverage by sex or a combination of the two is difficult to ascertain.

As a matter of relatively minor methodological interest, the consistency of age reporting of ever-married women in the fertile age range has been studied by comparing the age distribution from the individual interviews with that reported in the household schedule (appendix table A2). In the individual survey nearly all the women reported a calendar year of birth (72 per cent reported month and year), while in the household interview all ages were reported in completed years. The two distributions are quite close. A large majority (87 per cent) reported identical ages and in only 1 per cent of cases was the discrepancy greater than two years. However, this is not surprising since the respondent for both interviews was in many cases the same. Furthermore, ages in the two schedules may have been cross-checked by the interviewers. Nevertheless the high level of consistency in age reporting does suggest an awareness of age in the population.

Table 1 A Comparison of Age Distribution of Population by Sex and Sex Ratios Reported in Sri Lanka Fertility Survey and 1963 and 1971 Population Censuses

Source	Age group														All ages
	0–4	5–9	10–14	15–19	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	65+	
Male															
SLFS	11.8	12.7	12.6	11.5	9.8	7.6	5.9	5.5	4.3	4.4	3.7	3.0	2.4	4.8	100.0
Census 1971	13.0	13.0	12.6	10.5	9.8	7.3	5.8	5.6	4.8	4.4	3.5	2.9	2.3	4.5	100.0
Census 1963	14.8	13.3	12.4	9.4	8.1	6.8	6.5	6.3	4.8	4.6	3.6	2.9	2.6	3.9	100.0
Female															
SLFS	11.5	12.3	13.3	11.4	10.2	8.3	6.1	5.5	4.5	4.5	3.2	3.0	2.1	4.3	100.0
Census 1971	13.1	13.2	12.7	10.7	10.0	7.5	5.8	5.7	4.6	4.3	3.3	2.8	2.1	4.3	100.0
Census 1963	15.3	13.8	12.7	9.7	8.4	7.1	6.4	6.2	4.5	4.2	3.3	2.6	2.3	3.6	100.0
Sex ratio															
SLFS	1034	1046	958	1022	966	921	966	1020	975	993	1165	1034	1142	1166	1010
Census 1971	1032	1026	1042	1026	1013	1008	1073	1023	1156	1135	1189	1222	1282	1061	1061
Census 1963	1026	1020	1047	1028	1006	1020	1123	1107	1217	1253	1275	1371	1348	1212	1082

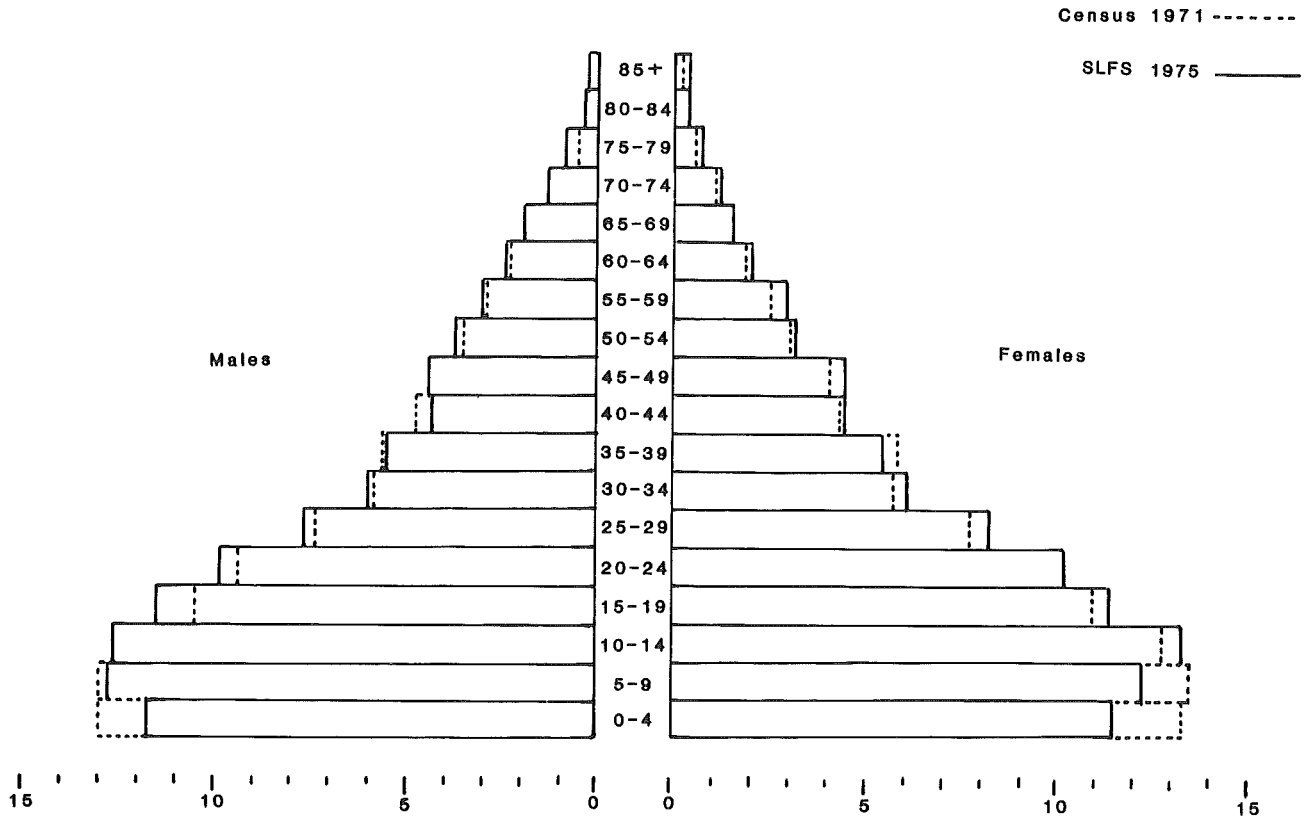

Figure 1 Population Pyramids for Sri Lanka, 1971 Census and SLFS 1975

Table 2 Blended Percentages of Myers' Index for 1963 and 1971 Population Censuses and Sri Lanka Fertility Survey Household Data for Males and Females

	Females			Males		
Digit	Census 1963	Census 1971	Survey 1975	Census 1963	Census 1971	Survey 1975
0	18.85	14.31	12.17	15.85	12.94	13.13
1	6.32	8.10	7.93	6.81	8.73	7.96
2	9.90	9.81	9.77	9.66	10.30	10.00
3	9.14	8.88	10.67	9.52	9.26	9.90
4	7.43	8.37	8.45	7.69	8.82	8.19
5	17.44	13.76	13.96	15.70	12.84	14.39
6	8.37	9.10	8.47	8.44	9.20	8.60
7	7.56	8.09	8.77	7.66	8.38	8.58
8	8.27	11.53	11.62	11.09	11.17	10.89
9	6.72	8.07	8.18	6.81	8.38	8.35
Index	32.58	19.18	16.85	25.97	14.48	16.83

Figure 2 shows the age distributions of women in the household survey according to their place of residence. The urban, rural and estate distributions show a similar pattern of age heaping and reporting biases for older women (aged 35+). However, for women under 35 years of age the estate women show a completely different pattern of heaping. Whether this is due to sampling fluctuations (as less than 9 per cent of total sample was drawn from the estates) or to other reasons, is difficult to assess.

Finally in order to study the possible effect of age reporting on fertility, the mean number of children ever born by single years of age is plotted in figure 3. The national figures show little sign of fluctuation at the major age boundaries of 19 to 20 or 24 to 25, which suggests the absence of age errors that are selective in terms of fertility. The curve is remarkably smooth up to age 35; oscillations may be observed at older ages, but this possibly reflects sampling error as the single-year cohorts progressively diminish in size. Similar patterns are apparent for rural and urban populations but the estate figures show considerably greater fluctuations which may be caused by the small sample size but are also suggestive of possible error.

In summary, our evaluation of age data has not detected any major errors in age reporting, though the nuptiality data, examined below, suggest the possibility of a tendency to understate age. The Myers' Index values indicate that the overall quality of female age data is better than the population censuses. Some of the differences in the sex ratios of the census and survey can be attributed to sampling fluctuations. The overall low sex ratio in the survey may reflect better coverage of females or worse coverage of males than in the censuses. Even if the latter factor is responsible, the implications for the present study of fertility trends are unimportant.

2.3 NUPTIALITY DATA

In this section we are concerned primarily with the reliability of reported date of first marriage, an essential component in the computation of marital fertility rates. Of secondary interest is the completeness of reporting marital dissolutions and remarriages and the accuracy of reporting the dates of these events. We are forewarned of possible problems in these data, because some implausibly early dates (implying implausibly young ages at first marriage) were recorded in the survey, which lead to the exclusion from the relevant First Country Report tabulations of 3.6 per cent of the sample (mostly older women) who reported ages of less than 12 years.[1] The ages at first marriage for these women have been upwardly adjusted since the completion of the First Country Report to eliminate any ages below 10 and in this present analysis these women are included.

A critical assessment of the SLFS nuptiality data has already been carried out by Trussell (1980) and we start by summarizing his main findings. By using information on the proportion ever married from the household sample and reported dates of first marriage for the individual ever-married sample, Trussell reconstructed from the survey the proportions ever married at the time of the preceding four censuses by age at those times. The comparison of census and reconstructed survey data shows a satisfactory agreement for age groups 20-24 and above. With one exception, the survey percentages ever married are one to four per cent higher than the census figures, a divergence too small to cause concern. However, for the age group 15-19, the survey proportions are consistently and substantially higher, as shown by the figures below:

Proportions ever-married of 15-19 year olds

	Census	*Survey*	*Ratio (survey/census)*
1946	.246	.377	1.53
1953	.243	.371	1.53
1963	.150	.246	1.64
1971	.105	.117	1.11

Source: Trussell (1980)

The census figures are based on answers to a single question on current marital status and are therefore sensitive only to

[1] Unlike most WFS surveys, there was no provision in the SLFS questionnaire to ascertain age at first marriage in cases where the calendar date was not recalled.

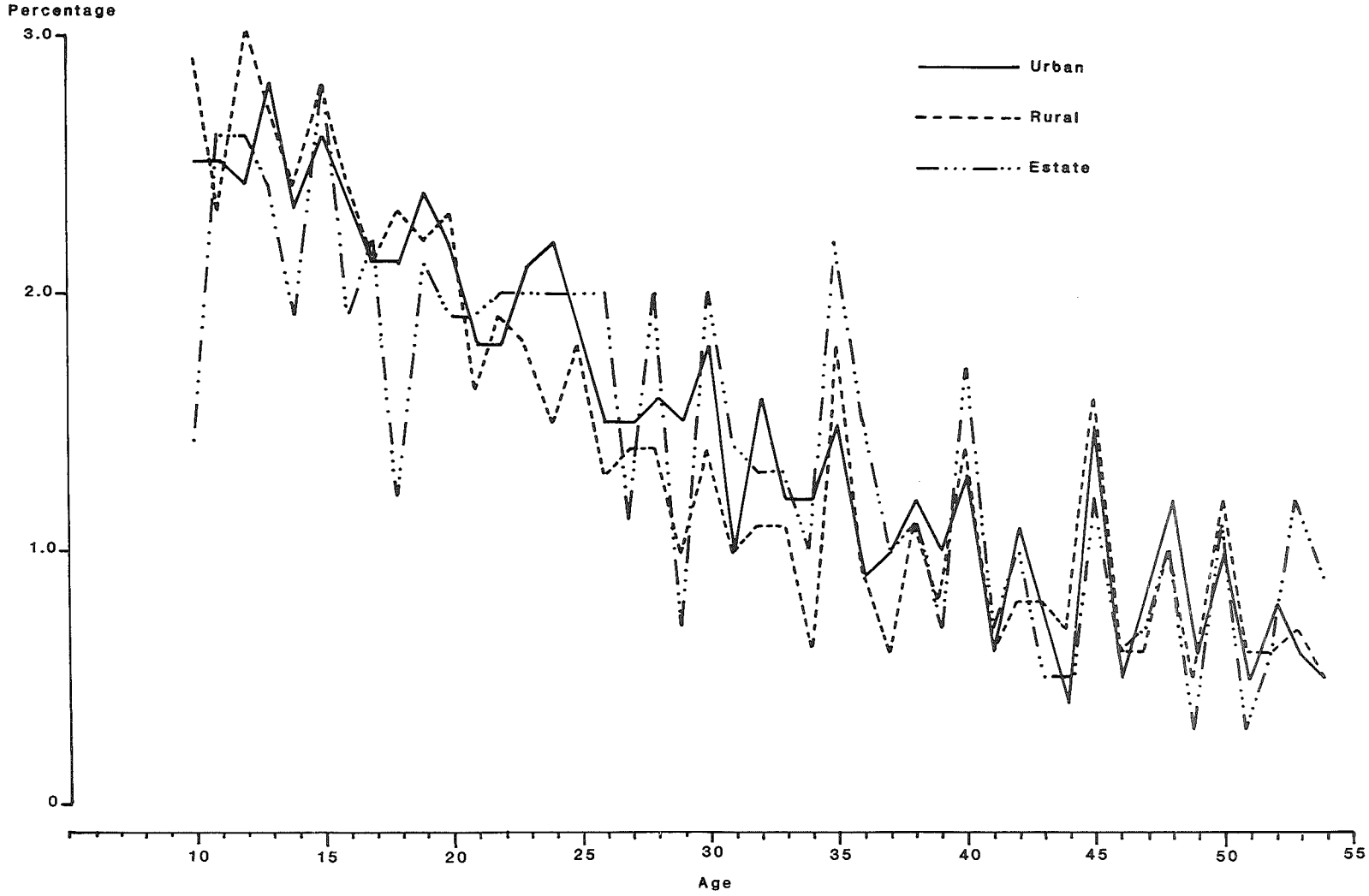

Figure 2 Per Cent Distribution of Women Enumerated in the Household Survey According to Age in Single Years, by Place of Residence

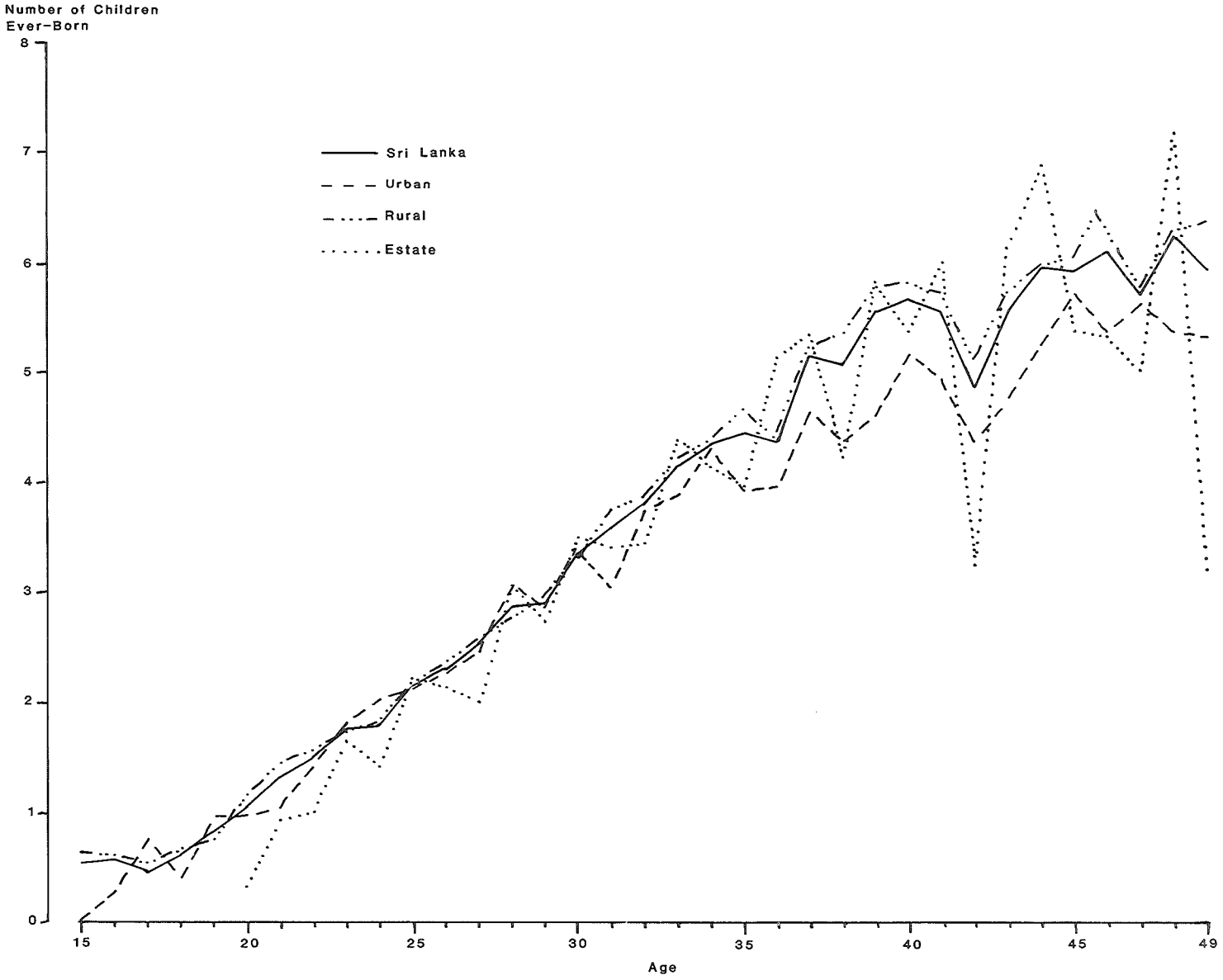

Figure 3 Mean Number of Children Ever Born to Ever-Married Women Aged 15–49, by Age in Single Years, and by Place of Residence

differential misreporting of current age between single and married women. The survey estimates, on the other hand, are highly sensitive to recall lapse. Trussell's explanation for the discrepancies is a tendency for early marrying Sri Lankan women to understate their date of, and thus age at, first marriage. By citing the work of Goldberg (1981), he strengthens this interpretation with a similar reconstruction from 1971 census data (age at marriage was asked in this census) and comparison with the three earlier censuses. The same tendency is noted by Goldberg, namely that the reconstructed proportions are higher than current census data.

Differing definitions of marriage can sometimes cause discrepancies between survey and census data. In this instance, however, this type of explanation is unconvincing. The Sri Lankan censuses record both customary and legalized unions, while the relevant SLFS question, 'in what month and year did you start living with your husband?', is clearly designed to encompass both types of union.

Further insight into this problem of the dating of first marriages can be gained by the study of the interval between marriage and first birth. Implausibly long first birth intervals or a pattern of increasing intervals across cohorts or over time would tend to support the thesis of understatement of date of marriage. The relevant data, displayed in table 3, show neither of these features. The mean interval lengths are not excessively long in comparison with other WFS data sets nor is there any discernible trend across cohorts once age at marriage is controlled. To be sure, the interval between marriage and first birth decreases as age at marriage rises but this merely reflects the effect of adolescent subfecundity among early marrying women. Thus it would appear that any displacement of marriage dates backwards in time has been accompanied by a similar displacement of first births. In the SLFS questionnaire, the date of first birth was ascertained in section 2, and the date of first marriage in section 4. Interviewers were instructed not to crosscheck marriage dates against the dates in the fertility history and it seems unlikely that flouting of this instruction could have been sufficiently widespread to account for the observed pattern of results. However, the possibility remains that Sri Lankan women tend to understate both dates of marriages and early births to an approximately equal extent.

Recent work by Goldberg provides a different and more plausible explanation for the discrepancies between census and survey data on age at first marriage than that reached by Trussell. As age at marriage in the SLFS was derived from a calendar date rather than from a direct question on age at the event, Goldberg notes that understatement of respondents' current ages or years of birth could downwardly bias estimates of ages at marriage and thus give rise to the observed discrepancies. By comparing 1971 census and SLFS data on age at first marriage, he demonstrates that the former source gives appreciably higher mean ages at marriage and that the difference stems almost entirely from the lower proportions of women in the census than the survey marrying before age 15 (4.9 compared to 14.2 per cent). It is worth pointing out at this juncture that this difference occurs despite the evidence mentioned above that ages at marriage in the 1971 census are themselves understated. He then proceeds to show that SLFS women reporting their birth as having occurred at heaped years (or reporting a heaped current age) are more heavily concentrated among those who married before age 15. A similar concentration of heaped marriage years among those with young ages of marriage is not apparent. On the reasonable assumption that heaped ages or dates are indicative of faulty reporting, this evidence suggests that misstatement of date of birth or current age rather than misstatement of date of marriage has led to a slight underestimation in the survey of age at first marriage. The attractiveness of this interpretation is enhanced by its compatibility with the apparent absence of irregularities in the interval between marriage and first birth, noted above.

There seems to be no way in which the problem of the nuptiality data can be resolved with certainty. Trussell's interpretation cannot be entirely discounted though similar biases in the reporting of marriages and first births have not been detected in other WFS surveys; indeed, where defects have been found they take the opposite form, namely exaggeration of age at first marriage and first birth. Goldberg's explanation, though plausible, is not conclusive and relies quite heavily on the accuracy of age reporting in the censuses. Part of the inconsistency could arise from a tendency for the ages of young married women to be exaggerated in the censuses. Unfortunately, investigation of possible defects in census data is precluded by the lack of published data on marital status by single years of age. The implications of the uncertainty regarding first marriage dates in SLFS will be deferred until after the evaluation of fertility data in the next section.

On the relatively minor matter of the reporting of marital dissolutions and remarriages, a detailed analysis (Smith 1981) finds no evidence of greater omission of dissolutions among older than among younger women and it thus seems unlikely that survey data on this subject are seriously defective.

Table 3 Mean First Birth Intervals in Years (Restricted to Women who Had a Birth within First Five Years of Marriage) by Marriage Cohort and Age at First Marriage, and by Place of Residence

Marriage cohort	Total	Age at marriage				Place of residence		
		<15	15-19	20-29	25+	Urban	Rural	Estate
1946-50	1.6	1.9	1.8	–	–	1.6	1.6	1.7
1951-55	1.6	2.0	1.7	1.4	–	1.7	1.6	1.6
1956-60	1.4	1.8	1.5	1.3	1.2	1.3	1.3	1.6
1961-65	1.4	2.0	1.5	1.4	1.3	1.4	1.5	1.4
1966-70	1.3	1.9	1.5	1.3	1.2	1.3	1.2	1.2

2.4 BIRTH HISTORY DATA

In the appraisal of the birth history data, we shall examine two possible defects: omission of live births and misdating of these births. Though these two types of error can produce similar effects, which may be difficult to disentangle, they are conceptually distinct; we shall therefore start with some preliminary checks for omission before applying procedures to identify both omission and displacement.

Checks on internal consistency and plausibility of the birth history data together with comparisons with independent sources will be used in the evaluation.

Screening for Omission of Live Births

The consequence of omission of births depends mainly on how the omissions are distributed by period and by cohort and other characteristics of respondents. It is thought that certain types of events are more likely to be omitted than others. They are:

1 Children who have died, particularly neo-natal deaths (ie deaths in the first month);
2 Children born a long time ago, particularly those who have moved away, either due to marriage or for other reasons;
3 Female births;
4 Births to older and less educated women.

Infant and Child Mortality Levels and Trends

Under-reporting of dead children sometimes can be identified by analysing infant and child mortality rates for periods preceding the survey. In table 4 are presented estimates of infant and child mortality by birth cohorts and birth order. The figures indicate that mortality declined substantially during the 1940s and early 1950s, a period that coincides with the malaria control programme, but that there has been relatively little change since 1955. This pattern precludes the possibility of major omission of dead children. Male mortality is generally higher than female, particularly with respect to infant deaths. With the exception of the 1945-54 period, infant mortality is higher for birth orders 5-9 and lower for orders 3-4. A simplified replication of this analysis by education of mother (figures not shown) gives no indication of omission of dead children by less educated women.

A detailed investigation of infant and child mortality based largely on the fertility survey failed to uncover serious errors in the data (Meegama 1980). Differentials by age at maternity and literacy of mother, sex of the child, socio-economic status and toilet facilities were plausible. Indeed the only serious defect identified was the probable omission of female deaths by estate women (*ibid.* p 47).

Comparison of survey estimates with figures from the vital registration system in table 5 does not entirely confirm this impression. It should be noted that survey results for earlier periods are affected by differential infant mortality according to age of mother at the time of birth because of truncation. For example, all children born during 1955-9 occurred to mothers then aged 35 years or less. In order to assess the possible impact of this truncation on survey estimates, the ratio between the infant mortality rate for births to women at ages less than a specified upper limit to the overall infant mortality rates was calculated from the complete data for the most recent period. The ratios for Sri Lanka are 1.110, 0.996, 0.921, 0.941 and 0.960 for ages less than 25, 30, 35, 40 and 45 respectively. On the admittedly

Table 4 Infant (<1 Year) and Child Mortality (<5 Years) Rates for Various Birth Cohorts by Sex and Birth Order

Birth cohort		Birth order 1-2 Age at death <1	<5	3-4 Age at death <1	<5	5-9 Age at death <1	<5	All Age at death <1	<5
1945-49	T	107.3	153.5	118.9	157.8	94.5	182.9	109.1	154.9
	M	111.7	150.5	101.4	143.7	77.0	253.2	109.1	151.5
	F	102.8	156.6	136.9	172.3	112.1	112.1	109.2	158.4
1950-54	T	64.9	108.3	56.3	112.1	45.4	113.7	60.2	110.0
	M	74.7	122.4	57.9	100.4	59.7	146.3	67.9	101.1
	F	54.5	93.1	54.7	124.0	29.9	78.7	52.0	101.4
1955-59	T	60.4	93.4	64.1	96.3	77.3	116.0	65.4	99.3
	M	68.7	98.0	67.1	93.4	92.4	132.2	73.8	104.6
	F	51.8	88.6	60.8	99.4	59.4	96.9	56.2	93.5
1960-64	T	64.9	78.8	53.4	79.3	63.7	93.9	61.4	84.5
	M	76.0	88.5	58.8	88.9	62.4	90.3	66.6	89.2
	F	53.9	69.2	47.6	68.8	65.0	97.8	56.1	79.7
1965-69	T	56.3	75.8	55.0	77.9	60.7	89.1	58.6	82.6
	M	55.6	74.9	75.3	101.5	63.3	89.0	64.1	87.3
	F	57.0	76.9	35.5	55.2	58.2	89.1	53.0	77.9
1970-73	T	55.0	–	51.4	–	57.9	–	55.3	–
	M	67.2	–	58.3	–	63.8	–	63.0	–
	F	41.9	–	44.6	–	51.7	–	47.3	–

over-simplified assumptions that the pattern of infant mortality by age at maternity and the distribution of births by age have remained constant over time these ratios indicate that the survey figures are slightly underestimated for the period 1955-69, but slightly overestimated for the period 1945-9.

The data in table 5 show that the survey estimates of neo-natal infant mortality are consistently higher than the vital registration figures for the period 1960-74, identical in 1955-9 but lower between 1945 and 1954. There are a number of possible explanations for this trend. Overstatement of age at death of children in the distant past which would have the effect of depressing infant but inflating childhood mortality is one such possibility, but Meegama's analysis provides no support for this hypothesis.

Deterioration of the vital registration system is another potential cause, but again the available evidence suggests that any change has been in the opposite direction. An association between maternal and infant mortality could account for part of the changing relationship between the two sets of figures over time but some omission from the survey of dead children born before 1960 is the most plausible explanation. However, as the substantive findings are based mainly on the period 1960-75, this omission is of little consequence.

Table 5 Infant Mortality and Neo-Natal Mortality Rates Derived from the Sri Lanka Fertility Survey and the Vital Registration System for Five-Year Periods

	Survey		Vital registration[a]	
Period	Infant	Neo-natal	Infant	Neo-natal
1945-49	109.3	–	111.2	62.4
1950-54	60.2	37.1	77.2	45.4
1955-59	65.4	39.7	65.6	38.6
1960-64	61.4	42.0	55.0	33.2
1965-69	58.6	38.4	51.6	32.0
1970-74	56.1	33.8	47.2	28.7

[a] Information from Meegama 1980, p 15, table 1.

Sex Ratios at Birth

Sex selective omission of births can be detected by analysing the sex ratios at birth. The sex ratio at birth is biologically determined and lies between 103-107 in nearly all societies. Any substantial departure from this norm indicates differential under-enumeration of male or female births. A comparison of sex ratios at birth (table 6) for different periods and cohorts shows no particular pattern of variation and rules out the possibility of any differential omission of births of a particular sex by older cohorts. A replication of this analysis for better and less well educated women gave similarly consistent ratios.

Checks for Omission and Displacement of Live Births

The detection of possible errors in the dating of live births is the most important component of the evaluation and also the most difficult to handle. Its importance stems from the facts that misdating of live births is a common defect of maternal history data (for evidence of this assertion, see Chidambaram, Cleland and Verma 1980) and that the analysis of fertility trends is critically dependent on the accuracy of dating. The difficulty of handling this topic is caused by the inevitable intertwining and overlapping of evaluative procedures and the substantive results themselves. Indeed there is a strong case for analysing and presenting both aspects simultaneously. In this instance, however, it was decided that greater clarity would be achieved by attempting to separate the two.

Table 6 Sex Ratios at Birth (per 1000 Births), by Period and Current Age of Mother

Current age of mother	Period before survey								
	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35+	Total
20-24	1014 (561)	1093 (128)	*						1030 (693)
25-29	1052 (855)	1063 (567)	994 (172)	*					1049 (1604)
30-34	1077 (657)	1015 (796)	943 (619)	924 (186)	*				1008 (2271)
35-39	967 (468)	1061 (711)	1044 (787)	1185 (490)	895 (192)	*			1050 (2662)
40-44	1128 (171)	950 (444)	941 (637)	959 (649)	1101 (471)	993 (149)	*		992 (2553)
45-49	1095 (63)	1029 (240)	980 (508)	1184 (592)	1183 (590)	1012 (476)	1095 (126)	*	1092 (2593)
All ages	1047	1031	983	1083	1110	1000	1007		

*Number of female births less than 50.
NOTE: The number of female births is given in brackets.

The existence of a good vital registration system gives us the means of detecting possible dating errors in the SLFS at the national level. In addition, information on number of children ever born was collected in the 1971 census which provides a further external check on the survey data.

Using a procedure analogous to the comparison of survey estimates of proportions married with census data, the mean numbers of children ever born at the time of the 1971 census have been reconstructed from the SLFS birth histories and are compared below to the census estimates:

	Age in 1971					
	15-19	20-24	25-29	30-34	35-39	40-44
Survey	.57	1.46	2.91	4.28	5.24	5.31
Census	.58	1.49	2.72	3.95	5.14	5.22
Ratio[a]	.98	.98	1.07	1.08	1.02	1.02

[a] Survey census.

Survey estimates are almost identical to the census figures except for age groups 25-29 and 30-34 where they are higher by seven or eight per cent. This pattern suggests that serious reference period error affecting SLFS fertility estimates in the few years preceding the survey has not occurred. The relatively high ratios for two age groups raise the possibility of a slight backward displacement of recent births in the cohort of women aged approximately 30-39 at the time of the survey. Further, it could be argued that a similar displacement by older cohorts has been masked by omission of births in the census. However, parity-related age reporting errors in the census or in the survey could also account for the slight discrepancies between the two sets of data, and this interpretation is supported by the comparison with vital registration figures, discussed below.

This comparison of age-specific fertility rates derived from the SLFS and the vital registration system may be found in table 7. The numerators for the registration rates come from published data on births by age of mother and by calendar years. The denominators for 1953, 1963 and 1971 are taken from the census enumerations of those years while, for other calendar years shown in the table, they have been calculated by applying survival ratios from Sri Lankan life tables to census data. In order to minimize the effect of sampling fluctuations, the survey data are presented in the form of three-year averages centred on the specified years.

For the most recent period, 1971-74, the correspondence between survey and vital registration estimates is astonishingly close, with almost identical total fertility rates and no systematic divergence in the age-specific figures. For 1965, the two sets of age-specific rates cumulated to age 40 also imply almost identical levels of total fertility but the survey estimate for ages 15-19 is appreciably higher than the registration figures. For earlier years, the divergence at ages 15-19 widens, with survey rates nearly twice as high as corresponding registration rates; at older ages, however, the figures remain close.

At first glance these results for ages 15-19 appear to confirm earlier evidence from Trussell that SLFS respondents have displaced backwards in time both their dates of marriage and early births. However the conflict cannot be resolved so easily, because the vital registration figures are open to doubt. If the vital registration rates for this age group are divided by the census proportions ever married, the following approximate marital fertility rates are obtained: 260, 350 and 380 for the years 1953, 1963 and 1971, respectively, representing an increase of nearly 50 per cent between 1953 and 1971. In a country where age at marriage is rising, some increase in marital fertility at young ages is to be expected both because of an increasing concentration of marital exposure in the high fertility first and second years following marriage and because a progressively smaller proportion of teenage wives are at the lower end of the age range, where the effects of adolescent subfecundity are significant. However, such a substantial increase is surprising in a country where pre-marital conception is very low and raises the possibility that over-reporting of maternal ages in birth

Table 7 Age-Specific Fertility Rates and Total Fertility Rates Derived from the Sri Lanka Fertility Survey[a] (S) and Vital Registration System[b] (R), 1953-74

	Period															
	1953		1960		1963		1965		1971		1972		1973		1974	
Age group	S	R	S	R	S	R	S	R	S	R	S	R	S	R	S	R
15-19	133	64	108	60	93	52	78	49	46	40	42	39	35	36	35	36
20-24	263	259	246	228	225	226	212	220	166	184	153	181	147	167	146	171
25-29	281[c]	295	271	281	292	276	261	269	232	232	215	214	199	203	182	188
30-34	–	246	251[c]	249	223	238	226	220	204	199	186	196	171	166	162	158
35-39	–	150	–	156	198[c]	157	151[c]	153	119	131	122	127	120	126	120	112
40-44	–	38	–	46	–	46	–	42	50	40	43	39	40	31	39	29
45-49	–	7	–	6	–	7	–	6	17[c]	6	17[c]	6	13[c]	6	12	5
TFR		5.32		5.13		5.01		4.80	4.17	4.16	3.89	4.01	3.63	3.68	3.48	3.50

[a] Three-year averages centred at specific years for 1953-73, and for 1974, 1973-4 average.
[b] Vital registration estimates for census years refer to registered births ÷ census population. For other years, the denominator is estimated by using survival ratios (P_x) from 1962-4 (Department of Census, 1970) and 1970-2 (Department of Census, 1978) life tables.
[c] Truncated exposure.

registrations of the 1950s and 1960s or the displacement of the ages of unmarried women from age group 20-24 to 15-19 in the 1953 and 1963 censuses have biased downwards the registration rates for ages 15-19. The corresponding survey estimates of marital fertility at ages 15-19 are 360, 380 and 390 for 1953, 1963 and 1971, respectively, indicating a much more modest, and perhaps more plausible, increase than indicated by the vital registration and census data.

Unfortunately this dilemma must remain insoluble and the truth of the matter may be that both sources are subject to errors in opposite directions. However it may be concluded with reasonable confidence that in the period 1965-75, there is no evidence of serious displacement of births in the SLFS sample as a whole and that before 1965 any displacement is unlikely to have distorted estimates of trends in a substantial manner.

While the birth history data at the national level appear to be of sufficient quality to sustain an analysis of the fertility trends, the same is not necessarily true for subgroups of the sample. For instance, appreciable distortions for less educated couples may be so diluted as to remain hidden by total sample estimates. As the vital registration data are not disaggregated by such variables as education, the only means of disclosing major irregularities for subgroups is to examine the internal consistency and plausibility of the survey data themselves. The relevant displays of age and duration-specific rates by five-year periods going back to 1945-49 may be found in appendix B for all subgroups which are used in the substantive section of the report.

A scrutiny of these rates reveals little evidence of irregularities or inconsistencies that are symptomatic of defects in the data. With a few minor exceptions, fertility rates for the distant past do not fall nor are there signs of a bunching of births in the period 5-14 years before the survey, a common error in maternity history data (Potter 1977a). In the absence of evidence of the contrary, we shall proceed on the assumption that data at the subnational level are sound.

Consistency between Household and Individual Survey Estimates of Fertility

As a final check on the consistency of reporting in the SLFS, we have calculated fertility rates from information on children listed in the household survey, using the 'own children' technique, and compared them with fertility rates from the birth histories of the individual survey. As both the household schedule and individual questionnaire were typically administered by the same interviewer during a single visit to the household, the two sets of data are not independent of each other and therefore it would be surprising if major discrepancies have occurred. Nevertheless the comparison is of methodological interest and perhaps can throw further light on the quality of SLFS data.

'Own children' are defined as all children who can be identified as residing with the mother, and thus may include some adopted children or stepchildren but exclude any offspring who have died or moved away. If a child is not matched to a 'mother' residing in the same household, then it is defined as a 'non-own' child. The numbers of 'own' children by age and age of mother are used to determine the numerators for age-specific fertility rates, while the numbers of women by age are used to determine the denominator.[2] The successful application of the method requires that: (1) ages of the children and women be correctly reported; (2) all children reside with the mother or one knows the appropriate factor to adjust for the 'non-own' children; (3) the mortality levels follow some known pattern and are available; and (4) the level of coverage is the same for both mothers and children.

Using the household data collected in the SLFS, we are able to calculate the rates for the 1964-8 and 1969-73 periods. Conditions 1 and 3 did not pose any problem. We have not adjusted the data for 'non-own' children. In order to avoid the possibility of missing 0 and 1 year old children, these data are excluded and thus the results presented in table 8 are for two five-year periods excluding the first two years before the survey. The exclusion of 'non-own' children may account for the small differences in TFRs for 1964-8 period. It is generally observed that the inclusion of non-own children gives higher estimates of birth rates for distant past as the proportion of non-own children increases by age of the children. The comparison of these data with the birth history estimates reveals no substantial differences. The two sets of estimates are quite close except at ages 15-19 and thus serve to strengthen earlier observations that age reporting in the household and individual survey data is consistent. The discrepancy at ages 15-19 lends no further weight to the view that individual survey estimates are too high; rather, the reverse is true because the household survey gives even higher rates for this age group.

2.5 CONCLUSIONS

The critical appraisal of the quality of SLFS data has revealed only two defects which are relevant for the substantive aims of this study. The first concerns the probable omission of children born before 1960 who have subsequently died. Though such a tendency was clearly indicated by the comparison with vital registration, other tests failed to confirm widespread omission of births in the distant past and we may therefore conclude that the defect is of minor magnitude. Estimates of fertility trends before 1960 appear to be

Table 8 Age-Specific Fertility Rates Based on (1) Household Data, and (2) Birth History Data

Age at birth	Household data 1964-68	Birth history data 1964-68	Household data 1969-73	Birth history data 1969-73
15-19	70	54	48	33
20-24	185	185	152	137
25-29	240	253	211	221
30-34	210	233	193	200
35-39	137	155	116	124
40-44	47	51[a]	44	51
45-49	14	11[a]	12	11[a]
TFR	4.51	4.71	3.88	3.89

[a] Assumed.
NOTE: Household estimates are derived using own children technique.

[2] For recent details of the application of this method see Cho (1973) and Rindfuss (1977).

only slightly affected, though the omission could be sufficient to mask a small but genuine decline in age-specific fertility rates.

The second defect concerns the possible displacement backwards in time of dates of first marriages and early births, or, alternatively, the understatement of current age, leading to a downward bias on age at marriage. Because of possible defects in vital registration and census data, it proved impossible to make estimates of the magnitude of any displacement. However it was clear that data for the 15 years before the survey were affected to only a negligible extent. As most of the substantive analysis of trends will be based on this more recent period, any displacement of marriages and births need not be regarded as a serious defect. Any tendency to understate age is potentially serious because of consequent distortions to age-specific fertility rates, but the major results of the analysis are presented in terms of duration-specific rates which will be unaffected.

3 Methodological Considerations

One approach to the study of fertility trends from WFS data is the computation of birth intervals and parity progression ratios for different cohorts of women and periods of time, recently exemplified by an analysis of Colombian survey data (Rodríguez and Hobcraft 1980). Though this approach makes maximum use of the data available in the marriage and birth histories and can identify changes both in the quantum and timing of fertility, we have chosen in this analysis to adopt a more familiar and less elaborate line of investigation by computation of fertility rates for different subgroups of the sample. All rates were calculated using the program FERTRATE, developed by the WFS and available for distribution on request.

As technical aspects of the construction of rates from WFS surveys have already been elaborated by Verma (1980) and analytical strategies described elsewhere (eg Ryder 1980), it is unnecessary to present here an exhaustive account of the methodological possibilities. Rather, we shall attempt to explain the choice of rates for the present analysis and briefly define them.

Birth history data collected in cross-sectional surveys can be classified in three main ways, according to: (1) the age or marital duration of the woman when the birth occurred; (2) the period or calendar date at which the event occurred; and (3) the birth or marriage cohort of the mother. There is an overlapping redundancy in these three modes of classification, stemming from the fact that any one is defined (approximately) in terms of the other two. Thus for nearly all practical purposes, a choice has to be made in the main analysis between the three possible combinations: age-period, age-cohort, or period-cohort rates. For many purposes, and particularly when the data are being evaluated or the data for certain cohorts are known to be defective, a cohort rate is preferable. However, we have chosen to present the main findings in terms of age-period and duration-period rates. This decision was influenced by a number of considerations. First, a detailed marriage-cohort analysis of Sri Lankan fertility, based on the same data set, has already been completed (Little and Perera 1981), and we wished to minimize overlap with that study. Secondly, it was advantageous to compute rates that were analogous to the vital registration data (ie age-period rates), in order to facilitate comparison between the two sources; and lastly, the critical appraisal of the birth history data gave no indications of variable reliability across cohorts, thus removing one of the potential drawbacks of an age-period or duration-period approach.

It should be pointed out that the major limitation of analysing fertility trends from a cross-sectional survey of ever-married women aged under 50 years, namely truncation of the data, remains whatever mode of classifying the data is used. In a cohort analysis, experience or exposure is successively less complete for more recent cohorts. When data are classified by age or duration at the time of event, information becomes successively less complete at higher ages and durations as the period before interview lengthens. Another slightly less obvious form of truncation affects duration-specific rates. As the period of observation recedes into the past, rates are progressively restricted to earlier marrying women. Thus rates at duration d for the period y years before the survey are confined to women who first married before age 50–(d+y). This point will be discussed more fully in the description of duration-specific rates below.

There is no solution to these limitations imposed by truncation. The analyst is forced to reach a compromise between depth of historical perspective and curtailment of age and duration-specific fertility schedules. In this instance, we have chosen to limit the main analysis to the 15 years preceding the survey, which fortuitously encompasses the period in which marital fertility in Sri Lanka has declined.

Another problem in using birth history data for trend analysis is the possible impact of maternal mortality on fertility estimates. Not all women married in, say, 1950 survived to be interviewed in 1975. If a substantial number of women have died and they bore children at a different rate from those who have survived, the fertility levels based on the birth histories of the surviving women are likely to be under or overestimates. This can only affect the rates in situations where adult mortality and particularly maternal mortality levels are high. In Sri Lanka, mortality levels since 1950 have been quite low and so this bias is unlikely to affect the fertility rates. A similar problem is posed by the selective out-migration. If the out-migration is selective of young adults, then there exists the likelihood that the fertility levels observed from birth histories may be biased. The level and direction depends on the age structure of the out-migrants. In Sri Lanka, some out-migration to India of Indian Tamils[3] has taken place, though estimates of actual numbers of migrants and their demographic characteristics are difficult to obtain. If such migration was substantial, then the estimates for Indian Tamils would be biased, though the impact at the national level is not likely to be great, as this group forms less than 10 per cent of the total population.

Fertility rates can be calculated for various definitions of exposure, or denominators. In the demographic literature, rates have been usually reported for only three denominators:

1 *All women*: All women in a given birth cohort irrespective of their marital status.
2 *Ever-married women*: All women in a cohort who have been married at least once. In WFS Asian surveys, this

[3] The term Indian Tamils denotes the descendants of migrants from India who came to work on tea and rubber plantations in the latter half of the 19th and early 20th centuries. In contrast, the so-called Sri Lanka Tamils are the descendants of much earlier migrants.

generally corresponds to the sample universe for the detailed interview.

3 *Currently married women*: All women who were currently married at the mid-point of a specified period or at the time of the enquiry.

As more comprehensive data sets including detailed marriage as well as birth histories are becoming available, it is now feasible to use more refined concepts of exposure, particularly women-years spent in the married state. Under this definition only those segments of a woman's life which are spent in the married state are included in the denominator, thus permitting a comparison of time trends in various subgroups of the population, net of any differentials that may exist in widowhood, divorce and remarriage between the various subgroups. An example of such differentials is the higher incidence of remarriage among Muslims in comparison to Hindus, resulting in a greater proportion of time spent in marital unions and at risk of childbearing by the former group.

The basic principle underlying the calculation of rates is that the exposure time should be the same as the interval in which a corresponding count of births is made. For example, if all births to women aged 20-24 at the time of birth are being counted in a given 12-month period, then the denominator would be the number of women-years lived at ages 20-24 in that 12-month period. Similarly, if any restriction is applied to births, then the same restriction should apply to the exposure. For example, if only marital births are counted, the exposure period should be the number of women-years lived in the married state.

Depending on the definition of exposure, a number of age or duration-specific rates can be derived. However, for our purpose, only three of these are of any major interest. These three rates are: age-period-specific fertility rates, age-period-specific marital fertility rates, and duration-period-specific marital fertility rates. These rates are defined below.

3.1 AGE-PERIOD-SPECIFIC FERTILITY RATES (ASFR)

The ASFR is the ratio of (a) births to an age group in a specified interval of time, generally a 12-month period, to (b) the total number of women-years spent in that age group in that interval of time. That is, the births in the numerator are classified according to the age of the mother at the time of childbirth,[4] and the women-years of exposure, the denominator, do not depend on the woman's marital status. It is conventional to multiply these ratios by 1000. The sum of these ratios across ages is the Total Fertility Rate (TFR), which may be interpreted as the mean number of births that a woman would have if she survived the entire reproduction span and experienced the fertility schedule prevailing in a given period.

In WFS surveys generally, two sets of data have been collected, one relating to ever-married individual respondents and the other to all household members. The calculation of ASFRs requires information from both data sets – the numerator (number of births) from the individual data and the denominator (number of women) from the household data. The approach adopted here is to use as the denominator for age-specific fertility rates the number of ever-married women from the individual survey divided by the proportion ever married for each age at the time of the survey (from the household survey), thus adjusting for women who were not married at the time of the survey. For example, if in the household survey 75 per cent of the women aged 20 are ever married, then the inflation factor for this age is $1/.75 = 1.33$. The adjustment factors are calculated by single years of age and often exhibit considerable fluctuations. The merits of smoothing proportions to remove irregularities due to sampling error is debatable but, in the case of Sri Lanka, experimental work indicated that smoothing made little difference to the rates.

It should be recognized that the computation of ASFRs in this way assumes that single women have no births, an assumption that is reasonable in the case of Sri Lanka in view of the very low reported level of premarital births. It should also be noted that these all-woman rates can only be calculated for subpopulations that can be identified in the household survey data. In the case of the SLFS, this consideration limits analysis to type of place of residence and region of residence. Period can be measured either in calendar years or in intervals of time receding from the survey in 12-month blocks. In the latter case, events in the month of interview itself and exposure in that month are omitted to avoid the problem of the extra half month of exposure. We have preferred to use the period-before-interview approach to avoid the slight inherent disadvantage of the calendar approach, stemming from the incomplete experience in the calendar year of interview, namely 1975. In the presentation of results, however, we have retained a calendar year label to denote period, in order to sharpen the historical perspective. Thus rates for the period 0-4 years preceding the survey are labelled 1970-75, rates for 5-9 years prior are labelled 1965-70 and so forth.

3.2 AGE-PERIOD-SPECIFIC MARITAL FERTILITY RATES (ASMFR)

The ASMFR is similar to the ASFR except that the denominator consists of exposure either (1) since first marriage, or (2) within marriage. In the first case, all births following date of first marriage are included in the numerator, while in the second case, births occurring in periods of separation, divorce or widowhood are excluded. The sum of these rates is the total marital fertility rate (TMFR). In societies where women marry late and age at marriage is increasing, as in Sri Lanka, changes in this measure are difficult to interpret and often misleading, as the rates for younger age groups are based on a highly selective minority of early marrying women. For this reason we have avoided cumulating age-specific marital rates in the presentation of the substantive results.

The computation of ASMFRs is similar to that of ASFRs, except that the denominators as well as the numerators are calculated from the individual data, because single women do not contribute exposure. In general, the ASMFRs will be calculated on the within-marriage basis. The reason for this decision is to control for possible differences in exposure

[4] When month of mother's birth and of the child's birth coincide, it is assumed in FERTRATE that the former precedes the latter.

following first marriage between subgroups, though in Sri Lanka where marital stability is high and fertility outside marriage is negligible, these two different ways of calculating marital fertility rates yield similar results. In surveys where less confidence can be placed on the accuracy of reported dates of births, marital dissolutions and remarriages than in the SLFS, it would be preferable to use exposure since first marriage.

3.3 DURATION-PERIOD-SPECIFIC MARITAL FERTILITY RATES (DSMFR)

The main reasons for analysing marital fertility by age, rather than duration since first marriage, are (1) comparability with other sources; (2) the recognition that biological fecundability varies by age; and (3) lack of data on duration since first marriage. The last mentioned reason does not apply in this case and there is a great advantage for subgroup comparisons in relating fertility to time since first marriage, the starting point of real exposure, rather than to age.

In our analysis, we will calculate DSMFRs for various subgroups of the population. The computational procedures are the same as for marital fertility except that instead of age, the rates are cross-classified by duration since first marriage. As summary measures, we shall cumulate DSMFRs to durations 15 and 20. These synthetic cohort measures are analogous to the TFR and represent the average number of children born in the first 15 or 20 years of marriage to a hypothetical woman experiencing the fertility rates of a specified period. The reason for presenting both summations is that the former will tend to give conservative estimates of changes in marital fertility, while the latter may yield slightly inflated estimates because of truncation. The main limitation of both these summary indices concerns the comparison of subpopulations where age at first marriage is very different. For a late marrying group, births in the first 20 years of marriage are close to completed fertility, but this is not true for an early marrying group. As earlier marriage is usually associated with higher marital fertility, the net effect will be to understate differentials between subgroups. This limitation should be borne in mind in the discussion of findings.

As intimated earlier, truncation, due to the fact that women over the age of 49 were not included in the individual survey of the SLFS, affects DSMFRs by progressively restricting rates to younger marrying women as the period before survey lengthens. For instance in the period 10-14 years before the survey (1960-5), fertility rates at duration 15-19 are totally confined to women marrying before the age of 25 and under-represent women marrying between 15 and 25. The corresponding rates for the most recent period, 0-4 years before the survey, are merely restricted to women marrying before age 35 and under-represent women marrying between the age of 25 and 35. As duration-specific marital fertility is likely to be related to age at marriage, it is clear that a straightforward comparison of DSMFRs on a 15-year period runs the risk of biased estimates of fertility decline, probably in the direction of overestimating the decline.

In a very large sample, this problem could be minimized by introducing age at marriage controls, but this is impractical in the present study, except at the national level, because it leads to excessively unstable estimates based on small numbers of women. Another approach is to eliminate the truncation effect by restricting the analysis at each duration to women marrying before a certain age. Thus the investigation of changes in fertility over the past 15 years at durations 15-19 can be restricted to women marrying before age 15; similarly at duration 10-14, attention can be confined to women marrying before age 20 and so on. This approach was tried both at the national level (see table 12 in the next chapter) and for the two extreme educational categories whose average age at marriage is very different. These results are shown in appendix table B3. As expected the differences between the truncated and untruncated rates are greater for the later marrying, better educated group than for less educated couples, and wider at longer durations. Differences in the cumulated rates, however, are not excessive. For the better educated, the estimated declines between the period 1960-5 and 1970-5 in the number of children born in the first 15 years of marriage were 23 and 20 per cent for truncated and untruncated rates, respectively. In terms of children born in the first 20 years of marriage, the figures were 28 and 22 per cent. For the less educated, the corresponding figures were 16 and 14 per cent for 15 years, and 18 and 14 per cent for 20 years.

This empirical exercise led us to conclude that a straightforward interpretation of duration-specific rates over a 15-year period without an age at marriage restriction would not yield seriously distorted estimates of change, even at the subnational level and in our main analysis we have proceeded on this assumption. The decision was strengthened by the realization that the elimination of the age at marriage truncation bias introduced a selection bias of possibly equal seriousness. This latter bias arises from the fact that Sri Lanka has experienced substantial increases in age at marriage over the past 20 years. Thus, young marrying members of more recent marriage cohorts are an increasingly atypical and selected minority whose reproductive behaviour cannot be easily compared to early marrying members of older cohorts.

3.4 DECOMPOSITION OF CHANGES IN FERTILITY LEVELS

One question predominates in any analysis of changes in period fertility, namely the extent to which one can attribute changes in fertility levels to: (1) changing proportions married; and (2) changes in marital fertility. One commonly used method of decomposition was suggested by Kitagawa (1955). It primarily dealt with crude birth rates which could be expressed as a function of age-specific proportions married and marital fertility. For data involving more than two components, her suggestion was to combine them into two and then proceed with the applications of the method. Subsequently she modified the procedure to a more direct formulation for observing changes in the TFRs as a function of changes in marital fertility rates and changes in the proportion married (Kitagawa 1964).[5]

Briefly, the method decomposes changes in the TFR into three terms: (1) a term due to changes in marriage rates; (2) one due to changes in marital fertility rates; and

[5] For a recent application of the method see Sanderson (1979).

(3) an interaction term. Thus

$$\Delta TFR(t_2, t_1) = \sum_{a=15}^{49} G(a, t_1) \cdot \Delta r(a, t_2, t_1) + \sum_{a=15}^{49} r(a, t_1) \cdot \Delta G(a, t_2, t_1) + \sum_{a=15}^{49} \Delta r(a, t_2, t_1) \cdot \Delta G(a, t_2, t_1)$$

where $\Delta TFR(t_2, t_1)$ = change in total fertility rate between time periods t_1 and t_2.

$G(a, t)$ = proportion of women of age a in year t who are currently married.

$\Delta G(a, t_2, t_1)$ = change in the proportion married at age a between years t_1 and t_2, or $G(a, t_2) - G(a, t_1)$.

$r(a, t)$ = fertility of married women of age a in year t.

$\Delta r(a, t_2, t_1)$ = change in the fertility rate of married women aged a between years t_1 and t_2, or $r(a, t_2) - r(a, t_1)$.

3.5 SAMPLING ERRORS OF ESTIMATES

In chapter 2 we critically examined the birth history data for possible non-sampling errors caused by erroneous reporting by respondents. The SLFS data, as those from any sample, are also subject to sampling fluctuations. In the analysis of the results, the relative importance of these two components depends upon the size of the sample as well as the sampling design. In a properly designed large-scale sample survey with a size of 20 000 or more households or individuals, the non-sampling errors tend to be relatively more important than sampling errors. However, with sample sizes of under 10 000 this generalization may no longer hold.

Little (forthcoming), in a study of sampling errors of fertility rates, has observed that the sampling errors of rates based on a five-year age group and a one-year reference period are large. They are considerably reduced if the reference period is increased, as shown below by the relative errors (ie 100 × the Standard Errors ÷ Means) of ASMFRs for Sri Lanka:

	Length of reference period (years)				
	1	2	3	4	5
Sri Lanka	8.85	5.64	4.65	4.11	3.73
Urban	15.83	10.06	10.87	8.79	8.35
Rural	9.84	6.27	5.10	4.55	4.12

Source: Little (forthcoming), table 3

The rates are highest for the single-year reference period and lowest for the five-year period. The major decrease in the relative errors is accomplished in the change from one-year reference period to three-year reference period. Further increases in the length of reference period have less impact on relative error.

The relative errors are higher for subgroups than for the total sample, for all reference periods. The error is 15.8 per cent for urban and 9.8 per cent for rural areas against 8.8 per cent for the total sample for a one-year reference period. The higher errors for urban areas than for rural areas are mainly a function of the sample sizes of the two groups. The urban sample was one-fourth of the size of the rural sample.

The relative errors vary considerably among age groups, the highest being for the age group 15-19 and the lowest for age groups 20-24 and 25-29, but this again merely reflects the varying sample size of age groups. The relative errors for the TMFRs and TFRs for Sri Lanka based on five-year age groups and one-year reference period are small (3.5 per cent). For a three-year interval of time it is only 1.7 per cent. Subgroup levels are also quite low, 6.9 per cent for urban areas and 3.9 per cent for rural areas for a one-year reference period and 3.3 per cent and 1.9 per cent respectively, for a three-year reference period. The low level of relative errors implies that if the TFR averaged for a three-year period for Sri Lanka is around 4 then, at 95 per cent level of confidence, the true TFR will lie in the range of 3.9 to 4.1, in the absence of non-sampling errors.

Though no calculations of relative errors are made for duration-specific rates or the cumulated rates representing children born in first 15 or 20 years of marriage, they will be considerably lower than those estimated by Little for ASMFRs and TFRs, because the distribution of married women by duration is more even than that by age.

In order to reduce the probable impact of sampling variability and the effect of possible misdating of births, we have restricted most of our analysis to five-year reference periods and, whenever single-year rates are presented, they are based on three-year moving averages. However, considerable caution is still necessary in the interpretation of rates based on small subgroups of women, such as the Moors or the urban-to-rural migrants.

4 Fertility Levels and Trends

4.1 FERTILITY LEVELS AND TRENDS AT THE NATIONAL LEVEL

The analysis at the national level confirms previous evidence from vital registration and census data that there has been a major decline in fertility since the early 1960s. Truncation does not allow reconstruction from survey data of complete age-specific fertility schedules for periods in the past, but if missing rates are assigned by taking the values for more recent years, it may be estimated that the TFR has dropped from 5.3 to 3.5 between 1963 and 1974, an average annual percentage decline (calculated in a compound or geometric manner) of 3.9 per cent (see table 13). During the same period the General Fertility Rate (GFR) has declined by 4.4 per cent per annum, from 187 to 115.[6] The rate of decline in the TFR for the more recent period (1971-74) has accelerated and is 4.5 per cent per annum.

It should be mentioned that the changes derived from the SLFS are greater than those recorded by the vital registration system. The annual rate of decline for the period 1963-74 based on registration data is 3.4 per cent per annum as opposed to 3.9 per cent from the SLFS. This difference is mainly due to the higher ASFRs obtained from the survey for the age group 15-19. As we were unable to resolve this discrepancy between the two sources, the relative validity of the two estimates of decline must remain in doubt.

In a country where nearly all procreation takes place within marriage, the overall level of fertility is determined by two factors, namely the fertility of married women and the proportion married among women of childbearing ages. The relative contribution of these two factors to the decline in total fertility can be estimated by the decomposition procedure discussed in chapter 3. Because of the problem of truncation, the study of the relative changes during the ten years preceding the date of the survey was done by restricting the analysis to ages 15-40. This decomposition for the period 1963-71 shows that 59 per cent of the decline in the TFR was due to changes in marital status composition, and the remainder was due to changes in marital fertility rates.[7] These results are consistent with those obtained through vital registration and census data for the same period, the comparable figures being 55 per cent and 44 per cent respectively. The slight difference (59 as against 55) in the contribution of nuptiality is probably due to the higher survey than census estimates of the proportions married in 1963 for age groups 15-19 and 20-24. For the period 1971-5 the contribution of changes in nuptiality to the decline in the TFR falls to 46 per cent.[8]

The ASFRs show unchanged fertility prior to 1962-3 at ages 25-29 and 30-34 (table 9). Truncation precludes estimation of rates at older age groups this far back in time. At younger ages, however, reductions in fertility may be observed, commencing in the early 1950s at ages 15-19 and in the mid-1950s at ages 20-24. Undoubtedly, rising age at marriage is the major cause of these early trends. Since 1963-4, substantial declines are apparent at all ages.

Annual age-specific marital fertility rates (ASMFRs) based on 'since-marriage' and 'within-marriage' exposure are presented in appendix tables B4 and B5 and a summary of the latter is provided in table 10. Not surprisingly the two sets of rates are very close, because in Sri Lanka levels of marital dissolution are low and the incidence of remarriage relatively high. Thus in the rest of this chapter we shall confine attention to 'within-marriage rates'.

Annual ASMFRs fluctuate considerably and the rise in 1974-5 at younger ages is probably an artifact of a shift of some one year old children to under one year (appendix table B4). A declining trend in marital fertility since the mid-1960s at ages 25 and over may be observed. The percentage decline between the period 1960-5 and 1970-5 is 14 and 20 per cent at ages 25-29 and 30-34, respectively (table 10). At ages 35-39, the decline appears to have been steeper, while at older ages truncation does not permit the same historical perspective. Marital fertility at ages below 25 has remained more or less unchanged over the last 20 years though, as noted earlier in chapter 3, it is possible that an increase in marital fertility at ages 15-19 has been masked by displacement of early births for more distant periods in the SLFS birth histories.

A more detailed insight into changes in marital fertility is provided by the duration-specific rates in table 11. Age at marriage panels are introduced to control the truncation effect, whereby rates at higher durations for the more distant periods are increasingly confined to early marrying women. The rates in table 11 further confirm that marital fertility changed little before 1960. Though declines between 1955-60 and 1960-5 are apparent at duration 15-19 for women marrying between ages 15 and 19 and at duration 5-9 for women marrying at ages 20-24, these are isolated examples and no general pattern of changes between these two periods emerges.

Table 11 indicates a clear pattern of decline in marital fertility over the last 15 years, which becomes more pronounced at longer durations. In the first five years following marriage, changes are minor, with modest declines among

[6] The GFR for 1963 was estimated on the assumption that fertility for women 37 years and over has not changed during the 1963-74 period.

[7] The interaction term is very small (less than 0.5 per cent).

[8] For the period 1971-5, no comparison with other sources is possible, because of lack of information about proportions currently married in 1975.

Table 9 Age-Specific Fertility Rates

Age at birth	Period														
	74-75	73-74	72-73	71-72	70-71	69-70	68-69	67-68	66-67	65-66	64-65	63-64	62-63	61-62	60-61
15-19	32	33	35	44	51	60	61	65	68	73	81	88	94	100	108
20-24	142	143	148	158	167	176	178	189	196	215	217	225	230	244	255
25-29	209	200	205	224	242	238	249	241	260	260	271	283	296	293	282
30-34	174	176	177	188	197	214	226	221	222	230	229	240	224	240	234
35-39	100	112	123	122	125	131	145	146	148	150	165	180[a]	218[a]	226[a]	
40-44	47	40	37	49	51	62	68[a]	70[a]	57[a]						
45-49	11	13[a]	14[a]												

Age at birth	Period														
	59-60	58-59	57-58	56-57	55-56	54-55	53-54	52-53	51-52	50-51	49-50	48-49	47-48	46-47	45-46
15-19	108	109	111	115	119	120	127	137	134	134	125	126	127	134	135
20-24	248	243	233	241	260	268	269	258	268	278	272	279[a]	258[a]	251[a]	
25-29	272	272	284	288	301	282	268[a]	279[a]	298[a]						
30-34	268	249[a]	272[a]	276[a]											

[a]Truncated exposure.
NOTE: Three-year moving averages are shown for all years except 1974-5 which gives a single-year average.

Table 10 Age-Specific Marital Fertility Rates (Based on Within-Marriage Exposure)

Age at birth	Period							% change
	1970-75	1965-70	1960-65	1955-60	1950-55	1945-50	1940-45	60/65 to 70/75
15-19	365	373	369	355	352	366	338[a]	−1.1
20-24	355	357	377	362	376	392[a]		−5.8
25-29	292	326	341	330	326[a]			−14.4
30-34	211	255	262	281[a]				−19.5
35-39	135	162	205[a]					−34.1
40-44	52	71[a]						–
45-49	15[a]							–

[a]Truncated exposure.

older marrying women, no changes for women marrying at ages 15-19, but a slight increase for women marrying before age 15. This latter increase may well be caused by the declining incidence of very early marriages, with a consequent diminution of the effects of adolescent subfecundity. At durations 5-9 years following first marriage, appreciable falls in fertility are registered for all women except for the youngest marrying category, where fertility has remained unchanged. The particularly large decline of 37 per cent for women marrying at the age of 25 or more probably reflects the fact that the 1970-5 rates are more influenced by women marrying at very late ages – in their late twenties or early thirties – than rates for earlier periods. Women marrying at such ages are already long past their period of peak fecundity by the second quinquennium of married life. At durations of ten years or more, declines in fertility ranging from 14 to 55 per cent may be observed.

These falls in marital fertility are summarized in table 11 by cumulating the DSMFRs to duration 15 and to duration 20. A strong relationship between age at marriage and the per cent decline in these synthetic cohort measures is immediately apparent. The declines in the rates cumulated to duration 15 are 1, 14, 18 and 27 per cent for those marrying below age 15, 15-19, 20-24 and 25 and over, respectively. Interpretation of these figures, however, is not straightforward, both because age at marriage is confounded with such background characteristics as education and ethnicity and because of the problem of selectivity, already discussed in chapter 3. In particular the data for the two extreme age at marriage categories should be treated cautiously. The general increase in age at marriage in Sri Lanka over the last 15 years implies that women marrying below age 15 are an increasingly small and selected minority. Comparison of the reproductive behaviour of these women over time is thus hazardous. For the other extreme group, women marrying over the age of 24, any selectivity bias operates in the opposite direction, as late marriage has become more common. By itself, this bias would operate to reduce declines in fertility in so far as late marrying women in the more distant past were selected for low fertility aspirations and

Table 11 Duration-Specific Marital Fertility Rates by Age at First Marriage

Duration at birth	Period 1970-75	1965-70	1960-65	1955-60	1950-55	1945-50	% change 60/65 to 70/75
A Age at marriage <15							
0-4	354	352	330	329	333	343	+7.2
5-9	329	333	323	305	355	343	+1.9
10-14	259	282	303	292	305	—	–14.2
15-19	190	261	256	287	—	—	–25.8
20-24	111	141	168	—	—	—	–33.9
25-29	47	41	—	—	—	—	
30-34	4	—	—	—	—	—	
Σ_0^{15}	4.71	4.84	4.78	4.63	4.97	—	–1.2
Σ_0^{20}	5.69	6.14	6.06	6.07	—	—	–6.1
B Age at marriage 15-19							
0-4	370	359	375	358	358	358	–1.3
5-9	286	321	356	350	329	324[a]	–19.7
10-14	219	281	286	292	332[a]	—	–23.4
15-19	178	199	226	256[a]	—	—	–21.2
20-24	92	106	163[a]	—	—	—	
25-29	25	21[a]	—	—	—	—	
30-34	4[a]	—	—	—	—	—	
Σ_0^{15}	4.38	4.81	5.09	5.00	5.10	—	–13.9
Σ_0^{20}	5.27	5.81	6.22	6.28	—	—	–15.3
C Age at marriage 20-24							
0-4	335	366	389	390	372	381[a]	–13.9
5-9	249	289	292	319	310[a]	—	–14.7
10-14	174	201	243	241[a]	—	—	–28.4
15-19	85	142	186[a]	—	—	—	–54.3
20-24	41	82[a]	—	—	—	—	
25-29	9[a]	—	—	—	—	—	
Σ_0^{15}	3.79	4.28	4.62	4.75	—	—	–18.0
Σ_0^{20}	4.22	4.99	5.55	—	—	—	–24.0
D Age at marriage 25+							
0-4	299	337	323	311	(362)	—	–7.4
5-9	166	185	265	(230)	—	—	–37.4
10-14	59	124	(130)	—	—	—	–54.6
15-19	43	(86)	—	—	—	—	
Σ_0^{15}	2.62	3.23	3.59	—	—	—	–27.0
Σ_0^{20}	2.84	3.66	—	—	—	—	—

[a]Truncated exposure.
NOTE: Figures in brackets indicate number of women-years of exposure less than 250.

performance. The fact that we find the very reverse, namely the largest decline over the 15-year period for late marrying women, may reflect the overriding impact of fecundity impairment of the increasing proportion of women who do not enter marriage until they are in their late twenties or early thirties. Alternatively, the decline may be the result of much greater fertility control in recent years (facilitated by the spread of modern methods of contraception) by late marrying women.

In table 12, we attempt to summarize the changes in

Table 12 Duration-Specific Marital Fertility Rates 1960-75 with and without Truncation of Rates by Age at First Marriage

Duration at birth		Period 1970-75	1965-70	1960-65	% change 60/65 to 70/75
0-4	All	346	361	363	–4.7
	Restricted to women marrying before age 30	351	364	364	–3.6
5-9	All	257	296	324	–20.7
	Restricted to women marrying before age 25	277	312	331	–16.3
10-14	All	191	244	275	–30.5
	Restricted to women marrying before age 20	228	282	290	–21.4
15-19	All	142	195	231	–38.5
	Restricted to women marrying before age 15	190	261	256	–25.8
Σ_0^{15}	All	3.97	4.51	4.81	–17.5
	Restricted to women marrying by specific ages	4.28	4.79	4.93	–13.2
Σ_0^{20}	All	4.68	5.49	5.97	–21.6
	Restricted to women marrying by specified ages	5.23	6.10	6.21	–15.8

duration specific fertility since the period 1960-5. Two sets of rates are given. The first set shows the fertility rates for all women and thus suffers from the defect of truncation bias, especially at longer durations. The second set eliminates this bias by successively restricting rates to women first married by specified ages, but, of necessity, introduces a selection bias of the kind described in the preceding paragraph. As expected, the two sets of estimates are close at short durations but diverge at longer durations. Also as anticipated, the per cent declines are somewhat larger for the first than for the second set.

Though neither set of rates may be regarded as more 'correct' than the other, they may be taken as maximum and minimum estimates. On this basis, we may conclude that between the period 1960-5 and 1970-5, the decline in fertility at durations 0-4 has been negligible (4-5 per cent), at durations 5-9 of the order of 16-20 per cent, at durations 10-14 between 20 and 30 per cent and finally at durations 15-19 between 26 and 38 per cent. The cumulated rates indicate a fall over the 15-year period of between 13 and 17 per cent in fertility in the first 15 years of marriage and a fall of between 16 and 22 per cent in the first 20 years of marriage.

4.2 TRENDS FOR SUBNATIONAL COMPONENTS

Fertility rates at the subnational level are presented in a sequence determined by the availability of the information. Rates are presented first for the two variables, place of residence and region of residence, for which information is available from the household schedule, thus permitting computation of all-women rates. These are followed by the remaining variables for which information is available only from the individual questionnaire, and for which, therefore only marital fertility rates can be derived.

An inherent drawback of cross-sectional survey data for the analysis of fertility behaviour in the past is that rates for previous years can only be analysed according to the characteristics at the time of the survey with the single exception of childhood residence. In countries where socio-economic and geographical mobility is not high, this restriction does not pose any serious problem. Furthermore, the problem is reduced by restricting attention to the more recent past, a strategy that is necessary in any case, because of the problem of truncation.

Another problem is the small number of women in some categories. In order to maintain comparability and reduce sampling and non-sampling variability, we have presented most of the rates in five-year aggregates. One immediate impact of this is that the fertility levels for the last five years in various subgroups are somewhat higher than those prevailing at the time of the survey, and thus the trends in fertility are somewhat underestimated.

Place of Residence

In Sri Lanka, 72 per cent of the women live in rural households, 18 per cent in urban households, and 9 per cent on tea or rubber estates. There are no significant differences in the age distribution of these three groups of women. Conspicuous is the absence of a proportionately higher concentration of young women in urban areas, at least among ever-married women.

The age-specific fertility rates for 1970-5 show that peak fertility is recorded for the age group 25-29 in all

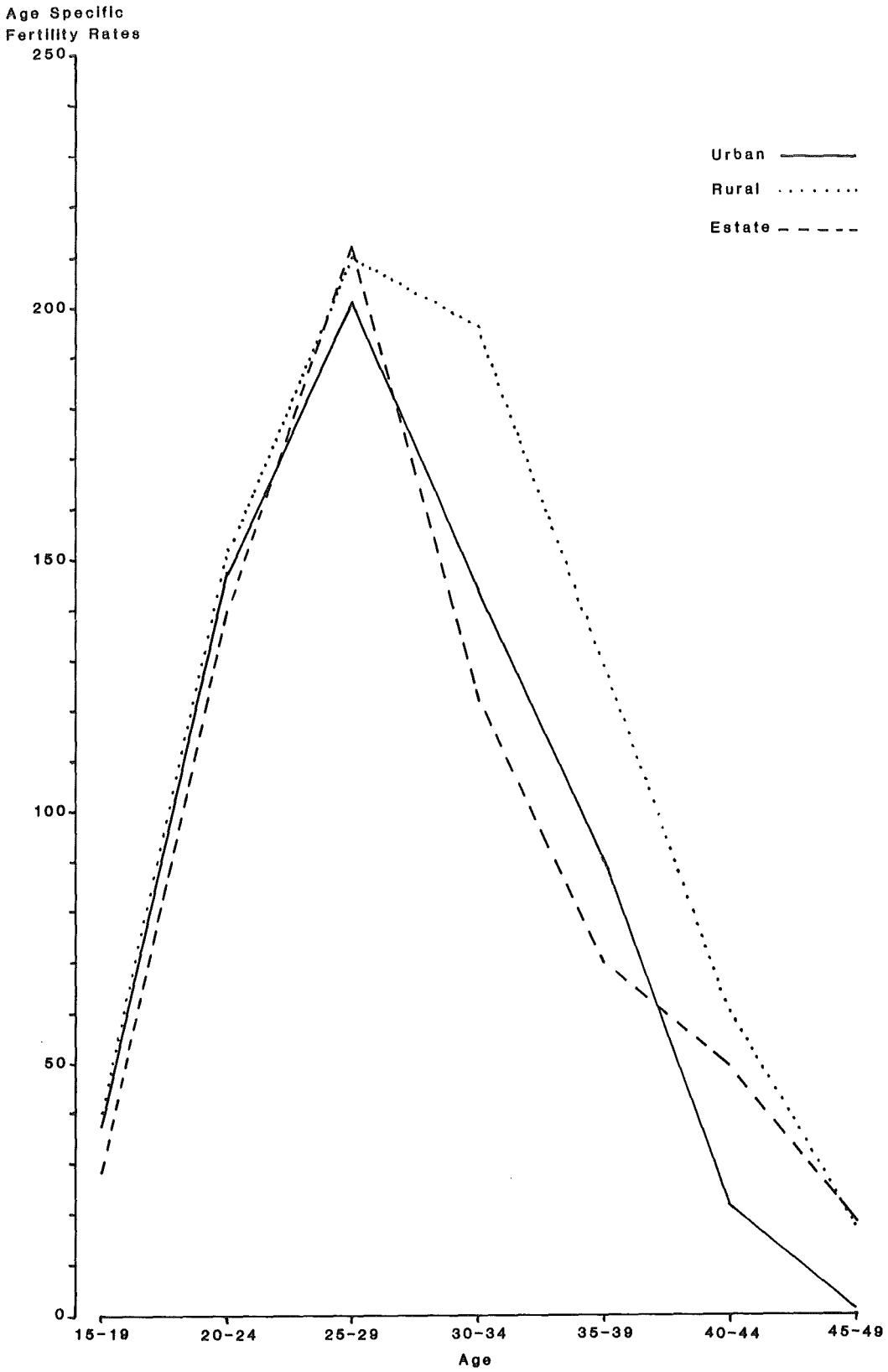

Figure 4 Age-Specific Fertility Rates, by Place of Residence, 1970-5

Table 13 Total Fertility Rates for Sri Lanka and for Place of Residence

	Period														
	74-75	73-74	72-73	71-72	70-71	69-70	68-69	67-68	66-67	65-66	64-65	63-64	62-63	61-62	60-61
Sri Lanka	3.58	3.58	3.68	3.98	4.22	4.41	4.61	4.62	4.78	4.95	5.05	5.24	5.28	5.28	5.50
Place of residence															
Urban	2.58	2.85	3.26	3.68	4.03	4.19	4.26	4.05	4.17	4.38	4.57	4.63	4.64	4.71	4.89
Rural	3.91	3.81	3.92	4.13	4.32	4.45	4.73	4.80	4.95	5.14	5.19	5.39	5.44	5.62	5.57
Estate	2.80	2.98	2.99	3.50	3.71	4.01	4.29	4.40	4.47	4.70	5.00	5.25	5.26	5.57	5.70

Source: Sri Lanka–Table 9, Place of residence–Appendix tables B6, B7 and B8.

three categories, followed by 30-34 among rural women and 20-24 among urban and estate women (figure 4).

A monotonic fertility decline in all three groups has been recorded since the early 1960s (appendix tables B6-B8). The decline has been faster in the case of estate women compared to urban and rural women. Between 1960-1 and 1973-4 TFRs have changed from 5.7 to 3.0 (–48 per cent), 4.9 to 2.6 (–42 per cent), and 5.6 to 3.8 (–32 per cent) for estate, urban and rural residents, respectively (table 13). In recent years (since 1970-1) urban fertility has changed much faster and has declined by 29 per cent, closely followed by estate residents (20 per cent). Decomposition by the Kitagawa method indicates that nuptiality changes account for 61 per cent of the urban decline and 51 per cent of the rural decline between 1964 and 1974. The net result of these trends is that estate and urban fertility have converged and are almost identical for the most recent period, but the rural-urban gap has been little affected.

The age-specific marital fertility rates (appendix table B9) show a different picture. The ASMFRs differ substantially among the three residence groups. In 1970-5, the estate residents reported the lowest fertility for age groups 15-40. Urban marital fertility was highest up to the age group 25-29 but after that rural fertility was the highest. The contribution of women 20-24 years of age to overall marital fertility was 26 per cent in estates, 24 per cent in rural and 27 per cent in urban areas and women aged 25-34 contributed nearly 36 per cent of the total marital fertility in all three groups (34 per cent for urban residents and 36 per cent for rural and estate residents).

Though fertility has declined for all the groups, the steepness of the estate fertility decline is very pronounced at ages 30-39. It is not possible to determine from the data whether this is due to selective out-migration from Sri Lanka of estate women of these ages or to errors in the data, or whether this reflects a genuinely dramatic decline in response to a deteriorating economic climate on estates, though detailed work drawing on other sources is in progress and may provide clearer answers. Rural marital fertility has remained more or less unchanged for ages 15-24, but at older ages has declined. The sharpest decline is for the age group 35-39. The pace of the decline in the age group 25-29 is slower compared to other ages, probably due to changes in age at marriage and a consequential shift in early marital fertility from ages 20-24 to 25-29.

Urban marital fertility has registered a decline at all ages except 15-19, though the change is minor for the age group 20-24. The decline in fertility for women aged 30 or more is substantial, though not as sharp as evidenced for estate women.

The duration-specific marital fertility rates are shown in appendix table B10, and summarized in table 14. In the period 1960-5, the synthetic cohort measure, children born in the first 15 years of marriage, has values of 4.7, 5.0 and 4.2 for urban, rural and estate populations respectively. Over the period of observation, declines of approximately equal magnitude, varying from 14 to 18 per cent, are evident for all three sectors. The declines at specific durations are similar for urban and rural women, with little change in the first five years following marriage but increasingly large falls at longer durations. The pattern among estate women is markedly divergent. Their lower cumulated fertility in 1960-5 reflects a slower tempo of childbearing in the first ten years of marriage, while at longer durations rates are more similar to those found in urban and rural sectors. Over the last 15 years, it appears that early marital fertility on the estates has fallen substantially by 18 per cent. Indeed the decline is greater at durations 0-4 than at durations 5-9 or 10-14. This is a most unexpected and suspicious pattern, as it implies a sophisticated pattern of family formation involving postponement of first births and spacing of second births. Errors in the dates, for instance a tendency to understate date of marriage, could be responsible for these results. Nevertheless the interesting possibility remains that estate fertility in the early 1960s was lower than in the rest of the country and still remains lower, though the gap has narrowed slightly in the last 15 years.

Region of Residence

In Sri Lanka, there is considerable regional variation in population characteristics. On the basis of socio-economic and geographical characteristics of the areas, the country was divided into six zones (see figure 5). The geographical features of the country can be divided into three broad regions: the south-western lowlands, the dry region, and the south central hill part of the country. The south-western lowlands include the country's capital, Colombo, referred to as zone 1. The remainder of this region is labelled zone 2. On the basis of socio-cultural characteristics, the dry region was split into three zones: the northern part, the traditional homeland of Sri Lanka Tamils, formed zone 5; the eastern coastal belt, composed of a high concentration of Sri Lankan Moors and a high proportion of Sri Lanka Tamils, formed zone 4; the rest of the dry region was designated as zone 3. The south central part of the country, where most of the

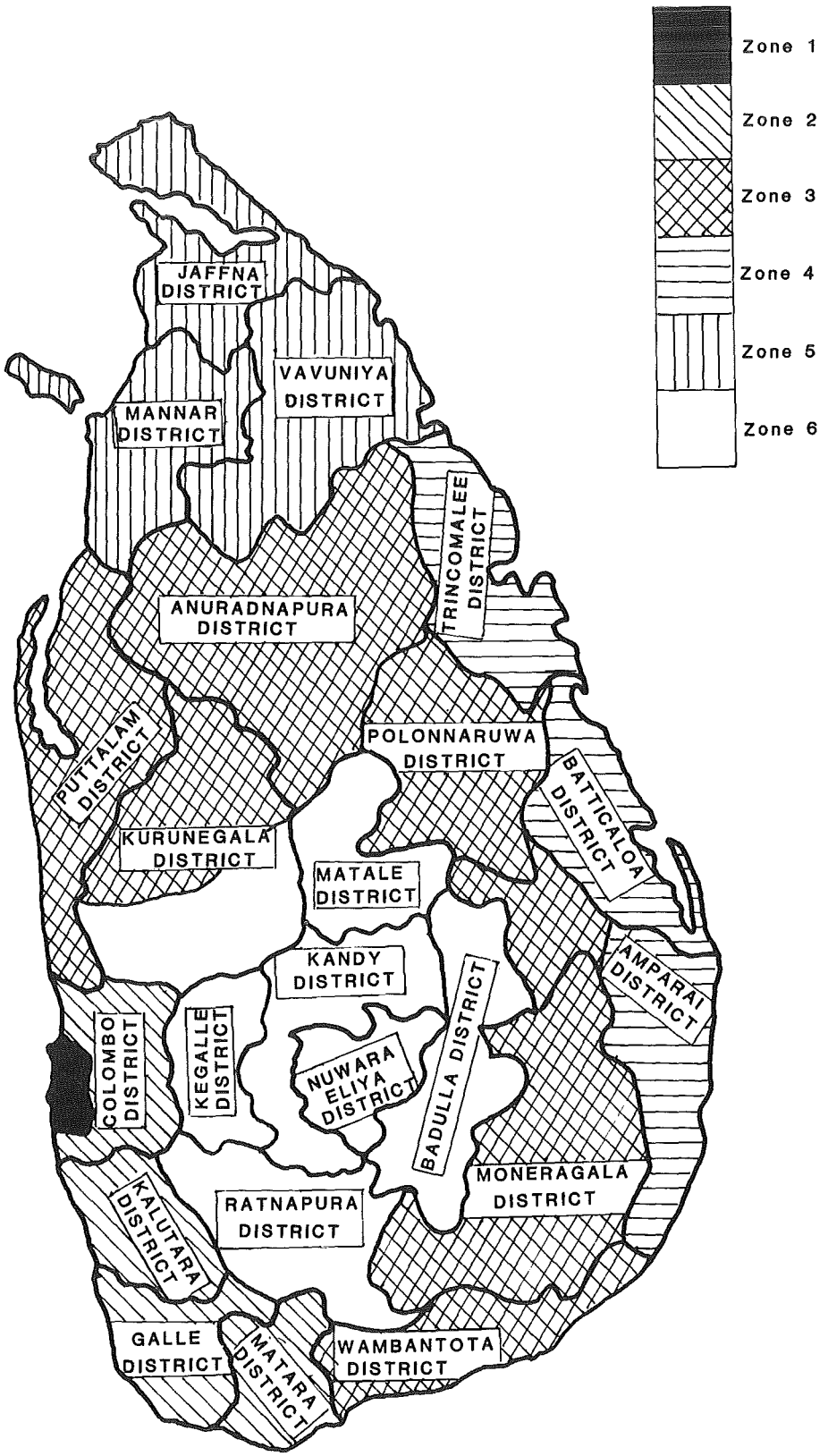

Figure 5 Sri Lanka, Showing the Six Zones

Table 14 Duration-Specific Marital Fertility Rates by Place of Residence

Duration at birth	Period 1970-75	1965-70	1960-65	% change 60/65 to 70/75
A Urban				
0-4	385	412	385	0.0
5-9	228	271	314	–26.8
10-14	164	219	234	–30.6
15-19	101	160	206	–51.1
Σ_0^{15}	3.89	4.51	4.67	–16.7
Σ_0^{20}	4.40	5.31	5.70	–22.8
B Rural				
0-4	362	365	376	–4.0
5-9	265	305	331	–19.6
10-14	199	256	291	–31.4
15-19	161	204	236	–32.0
Σ_0^{15}	4.13	4.63	4.99	–17.2
Σ_0^{20}	4.94	5.65	6.17	–19.9
C Estate				
0-4	267	310	328	–18.2
5-9	258	295	285	–9.1
10-14	192	206	232	–16.7
15-19	108	189	(207)	–47.8
Σ_0^{15}	3.59	4.06	4.23	–15.1
Σ_0^{20}	4.13	5.01	5.27	–21.6

NOTE: Figures in brackets indicate number of women-years of exposure less than 250.
Source: Appendix table B10.

tea and rubber plantations are located and one quarter of the population consists of Indian Tamils, was designated as zone 6.

These six zones vary considerably in their population size, zone 6 being the most populous (39 per cent of the total population) and the zone 1 the least populous (6.3 per cent).

For the period 1960-6, the total fertility rates of the six zones are clustered within a narrow range of 4.55 (zone 2) to 4.94 (zone 4) (table 15). Falls in fertility between 1960/5 and 1965/70 and a steeper drop in the most recent five years may be observed for all zones. With a single exception, declines in total fertility over the 15-year period have been of similar magnitude, ranging from 25 to 32 per cent. The exception is the high fertility zone 4 whose population has experienced a more modest decline of 15 per cent.

The age-specific fertility rates (appendix table B11) show interesting patterns. In recent periods zone 4 has recorded the highest fertility rates for age groups 15-19 and 20-24, while zone 2 has the lowest rates for these two groups. With the exception of zone 4, where fertility at ages 15-24 has remained unchanged, all the zones have experienced declines in fertility for various age groups. Declines are

Table 15 Total Fertility Rates by Region of Residence

Period	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
1960-65	4.61	4.45	4.81	4.94	4.77	4.69
1965-70	4.15	3.98	4.38	4.70	4.37	4.20
1970-75	3.19	3.35	3.47	4.19	3.54	3.20
% change 60/65-70/75	–30.8	–24.7	–27.9	–15.2	–25.8	–31.8

Source: Appendix table B11.

more pronounced for younger (15-24) and older (35-44) age groups. The 1970-5 ASFRs show an interesting pattern (figure 6). All the differences, with the exception of zone 2, are in early fertility and, once the peak childbearing age of 25-29 is passed, zonal variations are minor.

The age-specific marital fertility rates for 'within-marriage' exposure are presented in appendix table B12. In general, a declining trend in marital fertility is observed at ages 20 and over. The slight increase in marital fertility for the age group 15-19 is mainly due to the rise in age at marriage which makes these women older on the average. The changes in marital fertility rates are similar to those observed for ASFRs, with zones 1 and 2 registering the sharpest declines, followed by zones 3 and 6.

Changes in duration-specific marital fertility rates are shown in appendix table B13 and summarized in table 16 below. For most zones, fertility in the first five years of marriage has remained high and stable, though a decline of 16 per cent in zone 1 is evident, perhaps an indication of postponement of first births among the residents of the capital city, and an increase of 13 per cent in zone 5 is apparent. At longer durations, appreciable declines in fertility are registered in all zones, except zone 4 where there is little change at durations 5-9 and 10-14. Taking the DSMFRs cumulated to duration 15 as a summary measure, the six zones fall into two sharply contrasting groups. In zones 1, 2, 3 and 6 marital fertility has fallen by a remarkably uniform 20 per cent. In zone 4, the corresponding decline has been a mere 6 per cent and in zone 5 only 4 per cent. In the latter zone, the increase in early marital fertility has offset the appreciable falls in fertility at longer durations. It is interesting to note that zone 4 also experienced the smallest decline over the same 15-year period in total fertility. In contrast, zone 5 registered a decline in total fertility of approximately equal magnitude to the others. Thus it is clear that increasing age at marriage has been largely responsible for the total fertility decline in zone 5. Small sample sizes for the six zones and the consequent difficulty of reconstructing proportions married preclude further investigation of the relative importance of nuptiality and marital fertility in the total fertility declines among the zones.

Zones 4 and 5 are ecologically and ethnically distinct from the other zones. Zone 4, the dry eastern coastal belt, is populated largely by Moors and Sri Lanka Tamils, while zone 5, which forms the dry northern part of the country, contains the largest concentration of Sri Lanka Tamils. As will be shown later, the Moors and the Sri Lanka Tamils have experienced less change in marital fertility than the Sinhalese

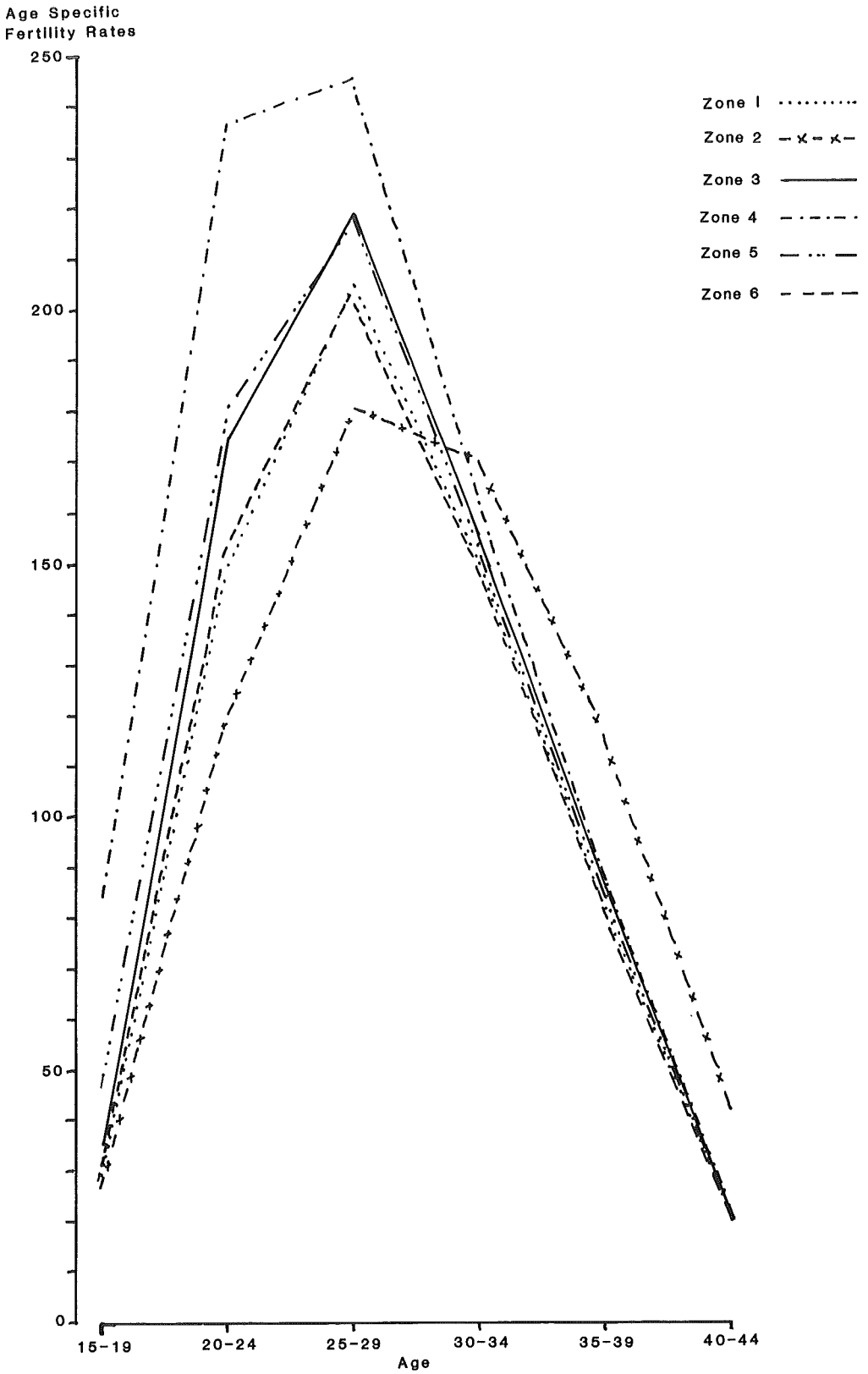

Figure 6 Age-Specific Fertility Rates, by Zone of Residence, 1970-5

Table 16 Duration-Specific Marital Fertility Rates by Region of Residence

Duration at birth	Period 1970-75	1965-70	1960-65	% change 60/65 to 70/75
A Zone 1				
0-4	372	392	397	−15.7
5-9	210	291	302	−30.1
10-14	163	191	(222)	−26.3
15-19	86	(126)	(229)	−62.0
Σ_0^{15}	3.73	4.37	4.61	−19.1
Σ_0^{20}	4.16	5.00	5.75	−27.7
B Zone 2				
0-4	375	384	372	+0.1
5-9	231	266	306	−25.0
10-14	161	196	265	−39.6
15-19	102	160	190	−45.8
Σ_0^{15}	3.84	4.23	4.72	−18.6
Σ_0^{20}	4.35	5.03	5.67	−23.3
C Zone 3				
0-4	365	385	395	−7.5
5-9	294	320	365	−19.5
10-14	222	304	332	−33.3
15-19	189	235	266	−29.3
Σ_0^{15}	4.41	5.05	5.46	−19.2
Σ_0^{20}	5.36	6.23	6.79	−21.1
D Zone 4				
0-4	347	384	381	−8.8
5-9	314	378	336	−6.7
10-14	284	357	290	−1.9
15-19	208	252	(278)	−24.8
Σ_0^{15}	4.73	5.60	5.04	−6.2
Σ_0^{20}	5.77	6.86	6.43	−10.3
E Zone 5				
0-4	379	341	337	+13.3
5-9	267	319	318	−15.3
10-14	219	263	253	−14.1
15-19	188	177	232	−18.8
Σ_0^{15}	4.33	4.62	4.54	−4.6
Σ_0^{20}	5.27	5.51	5.70	−7.5
F Zone 6				
0-4	335	348	366	−8.2
5-9	263	298	323	−19.0
10-14	188	246	272	−31.3
15-19	150	211	231	−34.7
Σ_0^{15}	3.93	4.46	4.81	−18.3
Σ_0^{20}	4.68	5.52	5.97	−21.6

NOTE: Figures in brackets indicate number of women-years of exposure less than 250.
Source: Appendix table B13.

or Tamils working on estates, and thus the explanation of these zonal differences may reflect cultural traits rather than the impact of socio-economic modernization.

As a final footnote to this discussion of regional declines in fertility, the marital fertility rates for zone 6 have been re-computed after exclusion of the estate population and are shown in appendix table B14. The decline in the duration-specific rates cumulated to duration 15 is 20 per cent. We may conclude, therefore, that the non-estate population of this zone has experienced a fertility decline of similar magnitude to those found in the majority of other zones.

Ethnicity and Religion

In the remainder of this chapter, we shall be analysing fertility change in relation to background characteristics that were not collected in the household survey. Therefore, of necessity, the discussion will be confined to marital fertility. The small estate population has been excluded from the remaining four background characteristics to be considered, on the grounds of their very distinctive features (in particular the conjunction of low educational level and low fertility) and because of uncertainty concerning the reliability of their fertility data.

The religion and ethnic variables have combined to form the following four categories: (1) Sinhalese Buddhists, (2) Tamil Hindus, (3) Moor Muslims, and (4) Christians and others. The fourth category is a mixture of all three ethnic groups and as such the results are difficult to interpret. Historically, the Sri Lankan Moors have had higher fertility than the other groups (ESCAP 1976, p 165, table 124), and have shown the least change in their fertility behaviour. The marital fertility rates presented in appendix table B15 further confirm this. The ASMFRs for this group are generally higher than for Sinhalese Buddhists, Tamil Hindus and Christians, and the changes during the last 15 years are less pronounced than for the other groups.

The DSMFRs in table 17 indicate little change in early marital fertility for any of the four categories. At longer durations appreciable declines are apparent, but these are much more marked for the Sinhalese Buddhists and Christians than for the Tamil Hindus or Moors. In the period 1960-5, the Moors had the highest level of marital fertility with an average of 5.2 children in the first 15 years of

Table 17 Duration-Specific Marital Fertility Rates by Ethnicity and Religion (Excluding Estate Women)

Duration at birth	Period 1970-75	1965-70	1960-65	% change 60/65 to 70/75
A Sinhalese Buddhists				
0-4	365	374	380	–3.9
5-9	252	297	330	–23.8
10-14	180	244	287	–37.3
15-19	143	198	236	–39.2
Σ_0^{15}	3.99	4.58	4.99	–20.0
Σ_0^{20}	4.71	5.57	6.17	–23.7
B Tamil Hindus				
0-4	358	343	349	+2.1
5-9	262	292	300	–13.0
10-14	222	296	265	–16.0
15-19	202	200	216	–7.4
Σ_0^{15}	4.21	4.66	4.57	–7.9
Σ_0^{20}	5.22	5.66	5.65	–7.6
C Moor Muslims				
0-4	393	396	384	+1.9
5-9	322	368	357	–10.1
10-14	265	280	(295)	–10.5
15-19	186	213	(263)	–28.9
Σ_0^{15}	4.90	5.22	5.18	–5.4
Σ_0^{20}	5.83	6.29	6.50	–10.3
D Christians and others				
0-4	395	406	381	+3.9
5-9	240	248	324	–26.3
10-14	188	173	255	–26.4
15-19	87	176	(164)	–46.4
Σ_0^{15}	4.12	4.14	4.80	–14.2
Σ_0^{20}	4.56	5.02	5.62	–18.7

NOTE: Figures in brackets indicate number of women-years of exposure less than 250.
Source: Appendix table B17.

marriage, as against 5.0 for Sinhalese Buddhists, 4.8 for Christians and 4.6 for Tamil Hindus. Between 1960-5 and 1970-5, major declines of 20 and 15 per cent have been experienced by the Sinhalese Buddhists and Christians, while the corresponding decreases for Tamil Hindus and Moors have been only 9 and 6 per cent, respectively. The net result of these relative shifts is that the Moorish population still experiences the highest marital fertility, but the Tamil Hindus, whose fertility was previously the lowest, now have marginally higher rates than the Sinhalese Buddhists or Christians.

Interesting differences in the time pattern of change may also be detected from table 17. During the course of the 1960s, the Christians appear to have undergone a substantial fall of 15 per cent in the duration rates cumulated to duration 15, but there has been little change in the last 10 years. The Sinhalese Buddhists underwent a modest decline of 8 per cent between 1960-5 and 1965-70, followed by a steeper decline of 13 per cent between the two most recent quinquennia. In contrast, no change in the 1960s occurred among the Tamil Hindus or Moor population. In the more recent past, however, the decline in marital fertility for the Tamil Hindus has matched that of the Sinhalese Buddhists, whereas the Moors have experienced a more modest recent decline.

Migration Status

It is frequently observed that first generation migrants retain the fertility traditions of the group of origin. In countries where the pace of urbanization is rapid, the study of fertility differentials based merely on current place of residence may be inadequate.

In order to study the fertility behaviour of the migrants and non-migrants, we have constructed a variable combining childhood place of residence and current place of residence. While this is not exactly the variable one would like for the analysis of migration and fertility, it is the closest approximation that WFS data permit. Thus, in our context, urban residents are those who spent the major portion of their childhood in an urban area, and are currently living in urban areas. Similarly, those designated as rural residents spent their childhood in a rural setting and currently reside in a rural area. The rural to urban migrants (designated as urban migrants) are those who have lived a major portion of their childhood in a rural community and are currently residing in urban areas. Conversely, the small number of women who spent their childhood in an urban setting but are now living in a rural area are called rural migrants.

The age-specific marital fertility rates show that the marital fertility of urban migrants is closer to the rural than to the urban group (appendix table B17). For the rural migrant group no specific pattern emerges. The higher fertility observed for the younger age groups among urban residents is due to their higher age at first marriage, and consequent selectivity of women.

The main feature of interest to emerge from table 18, which shows the DSMFRs for the three time periods, is that the marital fertility of both migrant groups was lower in 1960-5 than for those whose type of place of residence has remained relatively unchanged. In this period, the synthetic cohort measure indicates that urban and rural residents were having 5.9 and 6.3 children in the first 20 years of marriage, while the rates for urban and rural migrants were 5.2 and 5.6, respectively. Thus finding runs counter to the expectation that urban migrants carry with them the fertility attitudes and behaviour of their childhood, though it must be recalled that Sri Lanka has unusually modest rural-urban fertility differences and is a country where there is no vivid contrast in the economic and social fabric between these two sectors.

Over the course of the last 15 years, marital fertility has

Table 18 Duration-Specific Marital Fertility Rates by Migration Status (Excluding Estate Women)

Duration at birth	Period 1970-75	1965-70	1960-65	% change 60/65 to 70/75
A Urban				
0-4	372	430	397	−4.8
5-9	234	279	340	−30.8
10-14	181	223	227	−21.0
15-19	120	168	209	−42.2
Σ_0^{15}	3.94	4.66	4.82	−18.3
Σ_0^{20}	4.54	5.50	5.87	−22.7
B Rural to urban migrants				
0-4	368	390	388	−4.8
5-9	251	268	285	−11.5
10–14	199	245	222	−10.1
15-19	153	146	(140)	+8.2
Σ_0^{15}	4.09	4.52	4.48	−8.7
Σ_0^{20}	4.86	5.25	5.18	−6.2
C Rural				
0-4	361	361	375	−4.0
5-9	268	310	334	−19.6
10-14	200	257	296	−32.4
15-19	161	209	244	−34.0
Σ_0^{15}	4.15	4.64	5.03	−17.5
Σ_0^{20}	4.95	5.69	6.25	−20.8
D Urban to rural migrants				
0-4	410	382	371	+11.1
5-9	219	257	288	−23.9
10-14	141	215	246	−43.2
15-19	79	151	(208)	−62.2
Σ_0^{15}	3.85	4.27	4.53	−15.0
Σ_0^{20}	4.24	5.03	5.57	−23.9

NOTE: Figures in brackets indicate number of women-years of exposure less than 250.
Source: Appendix table B18.

declined least among the initially low fertility urban migrants, with the result that their recent level of childbearing is slightly higher than urban residents and closer to the fertility of rural residents. More appreciable falls have been experienced by the small number of rural migrants, whose recent fertility is now practically the lowest of all four categories. However the variations for the period 1970-5 are small and should be interpreted cautiously.

Educational Level of Husband and Wife

Throughout much of the developing world there appears to be a strong correlation between the level of educational attainment and the level of fertility. The few studies carried out in Sri Lanka on the basis of census data confirm this association (Indra 1954; Kumaraswamy 1956; and Hanna and Nadarajah 1975). Using 1971 population census data, Hanna and Nadarajah have observed that although educational attainment up to fourth grade level had no impact on fertility, a significant decline is observed for women with fifth or higher grade education.

In Sri Lanka the educational background of the wife is closely linked with the husband's, and thus, instead of separately analysing the fertility differentials for husband and wife's education, they have been analysed together. A joint variable of couple's education was constructed by combining the husband and wife's educational levels into four categories: (1) both with <6 years of schooling; (2) husband 6+ and wife <6 years of schooling; (3) wife with 6+ and husband <6 years of schooling; (4) both with 6+ years of schooling.

The age-specific marital fertility rates do not show any major differences among the various educational categories for the three most recent quinquennia (appendix table B19). Declining marital fertility at ages 25 and above over this period of time is evident at all educational levels, and appears to be of approximately equal magnitude across educational strata.

In contrast the DSMFRs in table 19 show a slight inverse relationship between educational level and marital fertility for the 1960-5 period. The cumulated rates indicate moderately sized differences of 0.4 births after 15 years of marriage and 0.9 births after 20 years between the two extreme categories, while the two other categories are intermediate. In the two more recent periods, educational differences are still apparent, though the monotonic nature of the relationship is lost. The apparent contradiction between age and duration-specific rates is undoubtedly caused by large variations among educational strata in age at marriage together with the increase over the last 15 years in female age at marriage. In such a situation, ASMFRs can give a misleading impression and are difficult to interpret because they are strongly influenced by duration of marriage effects.

With the exception of couples where the husband has six or more years of schooling but the wife is less educated, falls in fertility in the 1960s followed by steeper declines in the most recent period are evident. Bearing in mind that the truncation effect by age at marriage is more severe for the late marrying, better educated couples and may have exaggerated the decline in fertility for this group, we may draw the conclusion that these changes have probably been of approximately similar magnitude. However, it is noticeable that the downward trend in fertility at duration 5-9 years is markedly more pronounced for better educated couples, suggesting a greater propensity for early spacing or limitation than for the less educated.

Fertility among couples where the husband is educated but the wife uneducated deviates from the pattern for the other groups with a decline in the synthetic measures of only 5 and 12 per cent after 15 and 20 years of marriage, respectively. In 1960-5, their marital fertility was only marginally higher than for couples where both husband and wife had received six or more years of schooling and about

Table 19 Duration-Specific Marital Fertility Rates by Couple's Educational Level (Excluding Estate Women)

Duration at birth	Period 1970-75	1965-70	1960-65	% change 60/65 to 70/75
A Both <6 years' education				
0-4	356	355	369	−4.6
5-9	287	315	344	−11.1
10-14	215	272	305	−22.1
15-19	176	220	245	−23.1
Σ_0^{15}	4.29	4.71	5.09	−15.7
Σ_0^{20}	5.17	5.81	6.32	−18.2
B Husband 6+ years'; wife <6 years' education				
0-4	376	386	363	+0.8
5-9	278	331	312	−13.9
10-14	243	265	271	−12.0
15-19	142	186	243	−38.0
Σ_0^{15}	4.50	4.91	4.73	−4.9
Σ_0^{20}	5.21	5.84	5.95	−12.4
C Husband <6 years'; wife 6+ years' education				
0-4	370	378	395	−0.8
5-9	258	265	328	−20.1
10-14	176	276	(255)	−36.2
15-19	154	(162)	(191)	−32.8
Σ_0^{15}	4.02	4.60	4.89	−17.8
Σ_0^{20}	4.79	5.40	5.85	−18.1
D Both 6+ years' education				
0-4	370	390	401	−0.8
5-9	219	256	315	−32.2
10-14	131	178	219	−52.5
15-19	86	140	184	−62.4
Σ_0^{15}	3.60	4.12	4.68	−23.1
Σ_0^{20}	4.03	4.82	5.60	−28.0

NOTE: Figures in brackets indicate number of women-years of exposure less than 250.
Source: Appendix table B20.

the same as for couples where the wife only had six or more years of schooling. By the period 1970-5, differences of about one birth and half a birth, respectively, had emerged after 15 or 20 years of marriage. This result raises several interesting speculations concerning educational disparity between spouses, the relationship between this factor and influence in fertility decision-making and the possibility that the demand for family limitation in Sri Lanka derives disproportionately from women.

Husband's Occupation

Finally, in order to study socio-economic status (SES) differentials in fertility, we have used husband's current (last) occupation as a surrogate for SES. It should however be recognized from the beginning that the husband's current occupation may not be representative of the family's SES at the time of peak childbearing, and therefore the results should be interpreted with caution. Furthermore, the occupation information was collected from wives and in many cases may reflect their perception rather than the reality.

In order to simplify the analysis, occupational categories were amalgamated into the following six broad groups:

1 professional, technical and clerical workers (ie white collar);
2 sales and service workers;
3 self-employed agriculturalists (predominantly farmers owning or renting land);
4 agriculturalists (employees);
5 skilled manual workers;
6 unskilled manual and household workers.

Much is lost by such broad groupings, but there are inherent difficulties in any occupational classification. For example, the sales category may include a street vendor or an international salesman. The activities, requirements and rewards associated with these jobs are very different. Thus the findings may be, in part, an artifact of the classification.

The age-specific marital fertility rates do not suggest any systematic pattern (appendix table B21). Only the wives of professional and clerical (white collar) workers report slightly lower fertility and the wives of self-employed farmers (owner) slightly higher. The fertility of wives identified by the remaining four categories remains within a very narrow range.

The DSMFRs further confirm the lack of dispersion in marital fertility for the period 1960-5. Rates cumulated to durations 15 vary from 4.5 (white collar) to 5.2 (agricultural employees), while at duration 20 the corresponding range is 5.4 to 6.4 births. Declines are evident for all occupational categories both between the period 1960-5 and 1965-70 and in the more recent past. Moreover, the magnitude of the fall in marital fertility is fairly uniform, though slightly less pronounced for self-employed farmers and rather steeper for white collar workers. In the latter case, as with better educated couples, truncation may have inflated the decline as the white collar category is characterized by late marriage.

As observed almost throughout the analysis, declines in early marital fertility are minor, with the exception of the white collar group who register declines of 11 and 36 per cent at durations 0-4 and 5-9, respectively. This similarity of behaviour with better educated couples is not surprising, as there is a strong association between SES and educational attainment. In the most recent period, 1970-5, the white collar group is distinguished by the fact they they have about one child fewer after 15 or 20 years of marriage than other occupational groups. Variations between self-employed and non-self-employed agriculturists, skilled and unskilled manual workers are minor and are probably not statistically significant.

Table 20 Duration-Specific Marital Fertility Rates by Husband's Occupation (Excluding Estate Women)

Duration at birth	Period 1970-75	1965-70	1960-65	% change 60/65 to 70/75
A White collar				
0-4	341	372	381	−10.9
5-9	197	226	307	−36.1
10-14	110	176	201	−45.8
15-19	68	111	(179)	−62.3
Σ_0^{15}	3.24	3.87	4.45	−27.2
Σ_0^{20}	3.58	4.43	5.35	−33.1
B Sales and service				
0-4	377	384	372	+1.2
5-9	264	297	332	−20.6
10-14	179	238	251	−28.1
15-19	131	195	214	−38.7
Σ_0^{15}	4.10	4.60	4.78	−14.2
Σ_0^{20}	4.76	5.58	5.85	−18.6
C Self-employed agriculturalists				
0-4	347	389	352	−1.1
5-9	309	280	336	−7.8
10-14	220	279	306	−28.4
15-19	190	223	228	−17.2
Σ_0^{15}	4.38	4.74	4.97	−11.9
Σ_0^{20}	5.33	5.86	6.11	−12.8
D Agriculturalists (employees)				
0-4	372	361	380	−4.9
5-9	283	345	347	−17.9
10-14	229	281	305	−25.7
15-19	(199)	227	(245)	−18.9
Σ_0^{15}	4.42	4.94	5.21	−15.2
Σ_0^{20}	5.42	6.08	6.44	−15.8
E Skilled manual workers				
0-4	377	392	370	+2.0
5-9	235	291	316	−25.8
10-14	183	234	261	−30.1
15-19	118	167	244	−51.8
Σ_0^{15}	3.98	4.59	4.74	−16.0
Σ_0^{20}	4.57	5.43	5.96	−23.3
F Unskilled manual and household workers				
0-4	364	364	386	−5.9
5-9	266	308	311	−14.7
10-14	216	262	306	−29.4
15-19	155	182	229	−32.3
Σ_0^{15}	4.23	4.67	5.02	−15.7
Σ_0^{20}	5.01	5.58	6.17	−18.8

NOTE: Figures in brackets indicate number of women-years of exposure less than 250.

5 Summary and Discussion

There are four main problems or limitations in the analysis of fertility levels and trends from single-round surveys of the WFS type, all of which have been discussed in the preceding chapters. They are: (1) the extreme sensitivity of estimates to reporting errors in the data, particularly the misdating of live births; (2) the relatively small size of samples leading to appreciable sampling variability of estimates; (3) the truncation effect stemming from the fact that the sample universe was restricted to women under 50 years of age; (4) the limitation imposed by the failure to collect detailed information concerning single women.

The first problem is the most serious and a whole chapter was devoted to a critical examination of the quality of data. This is an essential precursor of any substantive investigation of trends, a fact recognized by the WFS and reflected in its policy to subject all data sets to a thorough appraisal (see for instance Potter 1977b; Goldman, Coale and Weinstein 1979; Guzmán 1980; Chidambaram *et al* 1980; Henin 1980). In the case of Sri Lanka, we were fortunate in having a reasonably reliable vital registration system against which to validate SLFS results. We were able to demonstrate that the analysis of national trends could not be seriously vitiated by data defects. The same confident assertion cannot be made concerning the accuracy of data for subgroups, for it is possible that deficiencies at this level are masked at the national aggregate. In a country where age at marriage and marital fertility are changing, no simple tests of validity are available to the analyst. The only approach to take, which is the one adopted here, is to inspect the full range of data and search for irregularities or implausibilities that are symptomatic of error rather than genuine shifts in reproductive behaviour. In the present study, the relevant evidence is contained in the detailed appendix tables, which indicated no gross irregularities, such as the reversal of trends over time. In the absence of evidence to the contrary, we proceeded with the substantive analysis on the assumption that the data are valid. We stress that there is no certainty in this assumption and admit the possibility that the magnitudes of some of the observed trends may be affected by dating errors. However, certainty in the measurement of variables is a rare occurrence in the social sciences and lack of it should not preclude attempts at suitably cautious analysis and interpretation.

While the first problem concerned non-sampling errors, the second relates to sampling errors, or fluctuations, associated with all sample data. We did not attempt a full discussion of this topic, but cited work by Little (forthcoming) to indicate the approximate sizes of the standard errors associated with fertility rates. An awareness of this problem considerably limited the scope of our investigation. The smallest subgroup for which results are presented (the urban to rural migrants) numbered 300 respondents and we were prevented from the examination of interactive effects by means of constructing joint variables (eg ethnicity and education), because of the very small number of cases falling into each combination. Another implication of the sizable standard errors surrounding rates was that little weight could be placed on individual estimates. Therefore we attempted to describe the general pattern of results, rather than to focus on the details.

The third problem, truncation, constituted a major limitation, restricting the depth of historical perspective to the 15 years preceding the survey. The age at marriage truncation bias affecting duration-specific fertility rates is particularly acute in Sri Lanka because age at marriage is relatively late compared to most Asian populations, varies across subgroups and has changed radically since the 1950s. In chapter 3, an attempt was made to gauge the practical effect of the bias on estimates of change in duration-specific rates. While it is clear that: (1) the estimates of change are somewhat inflated due to the fact that marital exposure at higher durations is increasingly restricted to early marrying women as the period before survey lengthens; and (2) this inflation is more severe for later marrying subgroups such as highly educated couples, the magnitude of the effect on the synthetic measures of marital fertility was insufficient to undermine a valid and broad interpretation of the results.

The last limitation, the absence of information concerning single women, affects all the WFS Asian samples, where the individual interview was restricted to ever-married women. Information on only two of the background variables, current type of place of residence (rural, urban and estate), and region of residence (zones 1 to 6), was available for single women and thus it was only for these variables that the conventional all-women age-specific and total fertility rates could be computed. Similarly, decomposition of the decline in total fertility into the contribution due to increase in age at marriage and that due to declines in marital fertility was possible for only these two background variables. In retrospect, the failure to obtain information in the household survey on such variables as ethnicity and education was a serious deficiency.

We turn now to a summary of the substantive results themselves. The evidence from the survey concerning fertility trends is generally consistent with most previous analyses based on vital registration and census data. A modest decline in total fertility began in the late 1950s, in response to rising female age at marriage. In the mid-1960s marital fertility began to fall and the downward trend in total fertility accelerated. The average annual rate of decline in total fertility for the period 1963-74 was estimated to be 3.9 per cent (compared to 3.4 per cent per annum, derived from registration data), rising to 4.5 per cent for the period 1971-74. Over the period 1963-71, slightly over half (59 per cent) of the fall in total fertility can be attributed to changes in nuptiality, but in the period 1971-5 this contri-

bution fell to 46 per cent. Thus Sri Lanka has followed the typical Asian pattern of fertility decline. Initially changes in total fertility were caused largely or exclusively by rising age at marriage; this was followed by a period in which the effects of nuptiality and marital fertility were about equal, and finally the contribution of marital fertility became more important.

The major focus of chapter 4 was on changes in marital fertility, specifically duration-specific marital fertility rates, which possess considerable advantages of interpretative simplicity over the alternative age-specific rates, in a situation of high and rising age at marriage. At the national level, a clear pattern of declining marital fertility during the last 15 years was observed. The drop in the number of children born in the 20 years following marriage was of the order of 20 per cent, with the fall becoming progressively more pronounced at longer durations. This figure of 20 per cent is a conservative estimate of the change in marital fertility between 1960 and 1975, partly because it is based on the difference between the averages for two quinquennia, 1960-5 and 1970-5, and because it does not take into account declines after duration 20.

The major part of the change probably occurred in the period 1970-5. The survey figures indicate only a modest drop (less than 10 per cent) over the decade 1960-70. In contrast the decline in the cumulated duration-specific rates between 1965-70 and 1970-5 is nearly 15 per cent. This is a steep and rapid fall, by any standards.

It is beyond the scope of this paper to attempt to explain the timing or magnitude of this transition to lower fertility in Sri Lanka. Any such attempt would have to take the form of a cross-national comparison. However, it is worth noting that Sri Lanka possesses several features thought to be relevant to fertility decline. First and perhaps most important, Sri Lanka has an educational system which is remarkably well developed, both in relation to other Asian countries and in relation to its Gross National Product. In the 1950s levels of adult literacy and school enrolment were among the highest in Asia,[9] though, by the 1970s, the relative advantage of Sri Lankans in terms of educational attainment had been reduced as other nations caught up. Adult literacy, and in particular female literacy, has played a prominent part in demographic transition theory and research, while the special importance of mass education has been argued recently (Caldwell 1979). High educational and social welfare standards,[10] and concomitant aspirations for a better material life, in conjunction with a deteriorating economic situation and increasing unemployment, especially among the better educated, provide a plausible explanation for the dramatic decline in fertility in the early 1970s. The explanation for fertility decline among the English middle classes in the late 19th century has been sought in a similar combination of high aspirations threatened by economic uncertainty (Banks 1954).

Though the relationship between mortality levels and fertility change is less firmly established than the link between education and fertility, it is worth pointing out that mortality has been low since the malaria eradication programme after the Second World War.[11] Geography and culture may also be relevant. Sri Lanka's ethnic and cultural diversity, its island nature and coastal openness to successive waves of foreign influence (Arab, Portuguese, Dutch and British in that order) may have made its inhabitants more receptive to modern ideas than the more sheltered and homogeneous populations of continental Asia. Such an island effect has been postulated by Mauldin and Berelson (1978) and more recently discussed by Cleland and Singh (1980).

The role of government efforts to provide family planning information, advice and supplies has undoubtedly facilitated the reduction in the level of childbearing, although it is clear that the decline in marital fertility had already started before the government programme, officially inaugurated in 1965 but not active until 1968, could have had much impact. Between 1968 and 1971, the number of family planning acceptors stayed constant, at a low annual average of about 50 000 women before rising to 70 000 and above in 1972 and subsequent years. A recent analysis of contraception in Sri Lanka (Immerwahr 1981) shows that two-thirds of currently married women interviewed in the SLFS who had ever used one of the major modern methods of contraception (sterilization, pill, loop and condom) had first used any of these methods between 1971 and 1975. Female sterilization was the most prevalent method in use at the time of the SLFS and, of all sterilized women, over half had had the operation in the three years preceding the survey. Widespread use of modern contraception is thus a very recent phenomenon. While the efforts of voluntary organizations to promote modern contraception and the availability of condoms and foam tablets through commercial outlets may have had some effect in the early and mid-1960s, it seems more likely that traditional non-appliance methods were the most common means of controlling marital fertility in this period. This contention is supported by the high proportion of current users in 1975 who were still using rhythm, withdrawal, abstention or other traditional methods (42 per cent according to the SLFS; 54 per cent according to the Family Health Baseline Survey, conducted in the same year).

While this analysis of fertility trends has augmented previous evidence at the national level, its main value has been to describe the changes that have taken place at the subnational level, about which much less was previously known. The main results are summarized in table 21. By far the most important finding is the relatively even and synchronous nature of the decline in marital fertility across educational, occupational and urban-rural categories of the sample. The urban and rural declines are almost identical while the much more modest change for the rural to urban migrants can be explained by their initially lower fertility in the period 1960-5. With the exception of the highest status groups (where declines are most subject to inflation because of their late age at marriage), the changes in marital fertility

[9] In 1953, 76 per cent of males and 54 per cent of females aged 10 years and over were literate (CICRED 1974). In 1955, the school participation ratios for ages 5-9 and 10-14 were 72 and 55 per cent, respectively (ESCAP 1976).

[10] In the 1960s, an exceptionally high proportion (nearly 50 per cent) of current government expenditure was devoted to social welfare (eg education, health, subsidized food and transportation).

[11] The infant mortality rate was 75 deaths per 1000 live births in the period 1951-5.

Table 21 Decline in Marital Fertility and Contraceptive Use for Subgroups

	Subgroups					
	Urban	Rural	Estate			
% decline in fertility[a]	23	20	22			
% currently using contraception[b]	35	32	18			
	Zone 1	2	3	4	5	6
% decline in fertility[a]	28	23	21	10	8	22
% currently using contraception[b]	46	40	27	14	15	36
	Sinhalese Buddhists	Tamil Hindus	Moor Muslims	Christians and others		
% decline in fertility[a]	24	8	10	19		
% currently using contraception[b]	36	19	19	43		
	Urban	Rural to urban migrants	Rural	Urban to rural migrants		
% decline in fertility[a]	23	6	21	24		
% currently using contraception[b]	40	37	32	42		
	Both <6 years' education	H 6+ years'; W <6 years' education	H <6 years'; W 6+ years' education	Both 6+ years' education		
% decline in fertility[a]	18	12	18	28		
% currently using contraception[b]	26	31	38	42		
	White collar	Sales & service	Self-employed agric.	Agric. employee	Skilled manual	Unskilled manual & household
% decline in fertility[a]	33	19	13	16	23	19
% currently using contraception[b]	44	32	26	28	26	33

[a]Per cent decline between 1960–5 and 1970–5 in duration-specific fertility rates cumulated to duration 20.
[b]Per cent of currently married who were using any method at time of SLFS.

since 1960 have been remarkably similar across educational and occupational strata and, as a consequence, differentials have not widened appreciably. This finding contrasts strongly with the process of transition in Europe which was characterized by large time-lags in the onset of decline and the emergence of pronounced differentials in fertility across social classes (see for instance Thompson 1953, chapter 9). The results also compare interestingly with those from a recent study of fertility change in Colombia (Rodríguez and Hobcraft 1980) which showed that the decline in marital fertility among the better educated preceded that for the uneducated by a full ten years.

We may only speculate that the similarity in fertility decline across social strata in Sri Lanka may be related to a greater equality of economic opportunity and income than in many other countries. Though international comparison is thwarted by lack of reliable and comparable data, there is firm evidence of income redistribution in Sri Lanka during the 1960s. Between 1963 and 1970, it has been estimated that the real income of the poorest decile of the population doubled while that of the richest decile fell by 17 per cent (Jayawardena 1974). The widespread availability of educational, medical and social welfare services (facilitated by the small size of the country) may also be relevant, but the important point is that demographic transition does not inevitably follow the Western pattern.

Though the findings in regard to socio-economic status run counter to expectations, the trends by region and ethnicity accord with the historical experience that regional and cultural factors play an important part in the timing of transition (Coale 1973; van de Walle and Knodel 1967). There can be little doubt that the Moors and the Sri Lanka Tamils and the residents of zones 4 and 5 have experienced a much more modest decline in marital fertility since 1960 than the Sinhalese Buddhists and Christians, or the residents of other regions. The low levels of contraceptive use for

these subgroups (table 21) confirm that their fertility trends are not an artifact of distortions in the birth history data.[12] In this study it was impractical to attempt to disentangle the effects of ethnicity and region, which overlap each other to a large extent. However, it appears from Little and Perera's (1981) multivariate analysis of cohort fertility that ethnic differentials cannot be explained by compositional differences in education, occupation or region. Regional differences, on the other hand, can be attributed to varying ethnic, educational and occupational composition. Thus it is ethnicity or religion rather than geographical location that appears to be the more important influence on fertility behaviour.

The Moors and the Sri Lanka Tamils are quite different communities with different demographic characteristics. The former are distinguished by early marriage and traditionally high fertility. The Sri Lanka Tamils, in contrast, have experienced slightly lower marital fertility in the past than other ethnic groups and have always had a higher mean age at marriage than the Moors. The balance of evidence in this analysis suggests that the main difference between these two communities and the Sinhalese Buddhists or Christians lies in the timing of transition rather than in a more fundamental resistance to change. Both Moors and Sri Lanka Tamils have experienced as great an increase in female age at marriage as the other groups; as already mentioned, this trend is often the precursor of changes in marital fertility. Furthermore, a marked recent decline in marital fertility is evident for Sri Lanka Tamils and the beginnings of decline apparent for the Moors.

[12] The one notable discordance between reported level of contraceptive use and fertility decline occurs in the estate population who have a large decline but low use. The balance of evidence (Langford forthcoming) suggests that induced abortion is the explanation for this apparent anomaly.

Appendix A Vital Registration System

Introduction

The first ordinance to regulate the registration of births and deaths was passed in 1847. The current law was promulgated in 1951 and came into operation in 1954. It covers the registration of births, deaths and still births.

Under the Act, the father or mother of every child born alive is required to register the birth with the registration office within 42 days of the date of birth. In situations where the parents are unable to do so, the responsibility falls to any person who was present at the time of birth or has knowledge of the birth. In estate areas the time limit is even shorter.

Illegitimate births are also covered by the Act. The registration schedule incorporates the name, age, race and occupation of father and mother, whether they are married or not, and number of living and dead children born to the mother. Information regarding the births includes sex, weight, date and place and type (multiple or single). In case of a birth out of wedlock, the name of the father is not included except: (1) at the joint request of the mother and of a man acknowledging himself as the father of the child; or (2) upon an order of a court of law.

Information regarding a death or a still birth is collected by a medical officer of health in urban areas or by the local superintendent in estate areas. The event is to be reported to them within hours of its occurrence. In rural areas the event is to be reported to the registrar within five days.

Failure to register a birth or death or still birth or a false declaration of one are punishable offences. The penalties for failure to register a death or still birth are more severe than for a live birth and are covered under the penal code. It is worth mentioning that the birth registration Act states 'the main incentive to register births is the administrative requirement to produce the birth certificate for school admissions, employment, issue of rice ration books, passport, proof of citizenship, etc.'.

Completeness of Coverage by Matching

The first attempt to verify the completeness of the vital registration system was made in 1953. The births and deaths occurring between 1 January and 31 March 1953 were recorded in the census blocks selected for the Post-Census Enumeration Survey. These were matched with the birth and death records kept at the registration offices. The non-matched events were re-checked in the field by a visit from an experienced investigator from the Registrar's office.

The following table gives estimates of the percentage of completeness of births and deaths for Sri Lanka and for urban/rural place of residence (Kannangara 1963).

	Birth	Death
Sri Lanka	88.1	88.6
Urban areas	96.8	94.7
Rural areas	86.6	86.9

This table shows a better coverage of vital registration system in urban areas than in rural areas. Estate areas were excluded from the sample.

The second attempt to determine the extent of completeness of the vital registration system was made in 1967. It was based on a one per cent random sample of census blocks as defined in the 1963 population census and included estate areas. Similar to the earlier survey, births and deaths occurring between 1 January and 31 March 1967 were recorded and matched. The results are presented in table A1 (Aponso 1971). Unlike the 1953 survey, no field checking was done for the unmatched events. Even without this, the estimated coverage was very impressive: 98.7 per cent for births and 92.3 per cent for deaths.

The registration of births and deaths was 100 per cent complete for urban and estate areas the the under-reporting was found in rural areas only.

Table A1 Births and Deaths Recorded and Matched during 1 January-31 March 1967 and Percentage Completeness of Registration

Type of place of registration	Births			Deaths		
	Recorded	Matched	% registered	Recorded	Matched	% registered
Sri Lanka	682	673	98.7	142	131	92.3
Urban	104	104	100.0	19	19	100.0
Rural	504	495	98.2	105	94	89.5
Estate	74	74	100.0	18	18	100.0

Table A2 Completeness of Enumeration of Children Aged 0, 1, 2, 3 and 4, at 1963-71 Population Censuses

Census year	Age	Number boys enumerated in census	Number boys estimated from birth to death statistics	Ratio census to vital registration	Number girls enumerated at census	Number girls estimated from birth and death statistics	Ratio census to vital registration
1963	0	173 020	178 654	96.9	169 770	173 434	97.9
	1	142 551	175 409	81.3	137 215	170 523	80.5
	2	166 328	171 044	97.2	162 631	166 488	97.7
	3	168 576	167 484	100.7	166 370	162 721	102.2
	4	160 800	159 758	100.7	155 242	154 710	100.7
	0-4	811 275	852 349	95.2	791 728	827 876	95.6
1971	0	174 825	185 813	94.2	169 291	179 451	94.3
	1	154 710	177 485	87.3	148 354	172 409	86.1
	2	164 137	178 381	92.0	158 900	173 847	91.4
	3	177 102	180 313	98.2	173 351	175 252	98.9
	4	174 689	173 710	100.7	169 319	169 550	99.9
	0-4	845 463	895 702	94.5	819 215	870 509	94.1

Source: ESCAP (1976), p 384 table 8.

Comparison of Children 0–4 and 5–9 Enumerated in the 1953 and 1971 Population Census with the Vital Registration Estimates[13]

Another way of evaluating the completeness of registration is to compare the registered birth and death estimates with the enumerated population estimates. In table A2 such a comparison is presented. It is clear that the census estimates are lower, especially for ages 0–2, than those obtained from the vital statistics. At ages 3 or 4, census and vital registration estimates are very close. The general impression from the comparison is of slight under-enumeration at ages 0–2 in the census (a common phenomenon in Asian censuses), but there is little evidence of under-registration. Moreover, the completeness of registration appears to have remained more or less constant between 1963 and 1971.

The 5-9 age group enumerated in the census are the survivors of births which occurred 5-9 years before the census. By comparing the children enumerated in the census with the births counted by the registration system, we can estimate the coverage of vital statistics 5-10 years before the census. Such an analysis shows that the 1963 census population slightly exceeded (by 1.5 per cent) the population estimated from vital registration, suggesting a slight under-registration of births. However, in 1971, the census-enumerated population for ages 5-9 is slightly (0.5 per cent) lower than the 1961-66 birth registration, suggesting complete coverage of births in the registration.

ESCAP, using the age distribution of the 1963 and 1971 census after adjusting for migration, has estimated the coverage of death registration to be approximately 90 per cent.

Discussion

All the information reported above suggests a high level of coverage of births by the vital registration system. The coverage of deaths is estimated to be around 90 per cent. However, it is necessary to evaluate critically all information before forming an opinion about the level of coverage.

The 1953 and 1967 surveys of completeness of vital registration were census post-enumeration types. The main goal was to find births missing from the registration. The matching was done to see whether the recorded birth was registered or not. It is generally observed that such surveys are reasonably good in estimating the under-count of the population and not very reliable in estimating the over-counts. In what way this might affect the results of these two surveys is hard to evaluate. However, it is obvious that in both of these surveys no effort was made to find out about the births which might have been missed by both the registration system and the survey.

In summary, it can only be said that we did not find evidence of any systematic over or under-reporting of births in the vital registration system. Rather, all the available evidence suggests a high level of coverage of births.

[13] The analysis reported here was done by ESCAP and for details see ESCAP 1976, pp 383-5.

Appendix B Base Tables

Table B1 Frequency and Per Cent Distribution of the Sample (Weighted and Unweighted), Excluding Estate Residents, According to Selected Background Variables

A Place of residence

		Urban	Rural	Estate
Weighted	(N)	1254	4919	642
	(%)	18.4	72.2	9.4
Unweighted	(N)	1800	4542	468
	(%)	26.4	66.7	6.9

B Region of residence

		Zone					
		1	2	3	4	5	6[a]
Weighted	(N)	432	1894	961	391	472	2019
	(%)	7.0	30.7	15.6	6.3	7.6	32.7
Unweighted	(N)	928	1083	1248	864	774	1445
	(%)	14.6	17.1	19.7	13.6	12.2	22.8

C Ethnicity and religion[b]

		Sinhalese Buddhists	Tamil Hindus	Moor Muslims	Christian and others
Weighted	(N)	4455	726	437	467
	(%)	72.2	11.8	7.1	7.6
Unweighted	(N)	3817	1195	670	558
	(%)	60.2	18.8	10.6	8.8

D Migration status[c]

		Urban	Rural to urban migrants	Rural	Urban to rural migrants
Weighted	(N)	731	505	4488	293
	(%)	11.8	8.2	72.8	4.7
Unweighted	(N)	1150	619	4174	269
	(%)	18.1	9.8	65.8	4.2

E Educational level of husband and wife

		Both <6 years' education	H 6+ years'; W <6 years' education	H <6 years'; W 6+ years' education	Both 6+ years' education
Weighted	(N)	2321	1228	530	2028
	(%)	37.6	20.9	8.6	32.9
Unweighted	(N)	2408	1314	531	2089
	(%)	38.0	20.7	8.4	32.9

F Husband's occupation[d]

		White collar	Sales & service	Self-employed agric.	Agric. (employee)	Skilled manual	Unskilled manual & household
Weighted	(N)	713	1059	1633	671	1340	680
	(%)	11.6	17.2	26.5	10.9	21.7	11.0
Unweighted	(N)	790	1083	1687	669	1310	736
	(%)	12.5	17.1	26.6	10.5	20.7	11.6

[a] Zone 4 excludes 642 weighted or 468 unweighted estate residents.
[b] 83 (1.3 per cent) weighted or 102 (1.6 per cent) unweighted women are excluded.
[c] 151 (2.5 per cent) weighted or 130 (2.0 per cent) women are excluded.
[d] 71 (1.2 per cent) weighted or 67 (1.1 per cent) unweighted women are excluded.

Table B2 Per Cent Distribution of Women According to Difference between their Ages Reported in Individual and Household Surveys

Age as reported in individual survey	Individual compared to household age				
	−3 or more	−1 to 2	Same	+1 to 2	+3 or more
15	–	–	64	–	–
16	–	17	78	7	–
17	–	5	81	14	–
18	–	8	86	4	1
19	–	9	85	6	–
20	–	7	82	8	3
21	–	8	89	2	1
22	–	12	84	3	1
23	–	8	87	4	1
24	1	10	84	4	1
25	–	7	88	3	1
26	–	9	86	5	–
27	–	7	90	4	–
28	–	8	87	4	–
29	1	5	90	3	1
30	1	8	84	6	2
31	1	9	87	4	–
32	–	7	86	6	1
33	–	8	86	4	2
34	1	10	84	3	2
35	1	9	84	3	2
36	–	7	89	3	1
37	–	5	92	3	–
38	1	10	87	3	–
39	2	7	89	2	–
40	–	7	86	3	3
41	1	7	88	2	1
42	1	7	84	6	2
43	–	6	92	2	–
44	1	5	89	5	–
45	1	7	89	2	1
46	–	6	91	2	1
47	–	10	85	5	–
48	1	7	89	3	–
49	7	9	84	–	–
All	21	271	3006	138	28

Table B3 Duration-Specific Marital Fertility Rates, 1960-75, for Two Educational Categories, with and without Truncation of Rates, by Age at First Marriage

Duration at birth		Period 70-75	65-70	60-65	% change 60/65 to 70/75
A Both <6 years' education					
0-4	All	356	355	369	−4.6
	Restricted to women marrying before age 30	358	362	371	−3.5
5-9	All	286	315	344	−11.1
	Restricted to women marrying before age 25	303	331	349	−13.2
10-14	All	215	272	305	−22.1
	Restricted to women marrying before age 20	235	312	314	−25.2
15-19	All	176	220	245	−23.1
	Restricted to women marrying before age 15	205	233	248	−17.3
Σ_0^{15}	All	4.29	4.71	5.09	−15.7
	Restricted to women marrying by specified ages	4.48	5.03	5.17	−13.3
Σ_0^{20}	All	5.17	5.81	6.32	−18.2
	Restricted to women marrying by specified ages	5.51	6.19	6.41	−14.0
B Both 6+ years' education					
0-4	All	370	390	401	−0.8
	Restricted to women marrying before age 30	376	395	402	−6.5
5-9	All	219	256	315	−32.2
	Restricted to women marrying before age 25	241	278	312	−22.8
10-14	All	131	178	219	−52.5
	Restricted to women marrying before age 20	165	222	273	−39.6
15-19	All	86	140	184	−62.4
	Restricted to women marrying before age 15	139	184	195	−28.7
Σ_0^{15}	All	3.60	4.12	4.68	−23.1
	Restricted to women marrying by specified ages	3.91	4.48	4.94	−20.9
Σ_0^{20}	All	4.03	4.82	5.60	−28.0
	Restricted to women marrying by specified ages	4.74	5.40	5.91	−19.8

Table B4 Age-Specific Marital Fertility Rates, 1945-75 (Restricted to Ever-Married Exposure)

Age at birth	Period														
	74-75	73-74	72-73	71-72	70-71	69-70	68-69	67-68	66-67	65-66	64-65	63-64	62-63	61-62	60-61
15-19	407	364	330	360	361	395	379	381	363	354	356	358	361	363	373
20-24	353	345	341	348	350	357	350	354	350	365	356	361	361	378	386
25-29	297	273	278	297	316	305	316	302	322	317	326	336	348	343	325
30-34	201	200	198	210	218	235	247	239	240	247	244	254	236	254	247
35-39	107	119	131	129	132	137	151	151	153	154	170	186[a]	226[a]	234[a]	163[a]
40-44	049	041	038	051	052	064	070a	071[a]	058[a]	028[a]	–	–	–	–	–
45-49	012	013[a]	014[a]	011[a]	005[a]	–	–	–	–	–	–	–	–	–	–

Age at birth	Period														
	59-60	58-59	57-58	56-57	55-56	54-55	53-54	52-53	51-52	50-51	49-50	48-49	47-48	46-47	45-46
15-19	355	353	349	358	353	339	346	358	357	351	339	346	351	364	369
20-24	370	364	344	352	366	371	371	358	370	379	372	391[a]	373[a]	385[a]	(236[a])
25-29	314	310	323	326	339	318	303[a]	314[a]	337[a]	245[a]	–	–	–	–	–
30-34	283	263[a]	284[a]	290[a]	220[a]	–	–	–	–	–	–	–	–	–	–

[a]Truncated exposure.
NOTES: (1) Figures in brackets indicate number of women-years of exposure less than 250.
(2) Three-year moving averages are shown for all years except 1974-5 which gives a single-year average.

Table B5 Age-Specific Marital Fertility Rates, 1945-75 (Based on Within-Marriage Exposure)

Age at birth	Period														
	74-75	73-74	72-73	71-72	70-71	69-70	68-69	67-68	66-67	65-66	64-65	63-64	62-63	61-62	60-61
15-14	415	368	331	362	364	399	384	386	368	360	362	365	368	368	377
20-24	365	353	348	354	355	363	356	361	356	373	364	368	367	380	392
25-29	306	281	285	303	321	311	322	309	332	327	336	347	358	353	334
30-34	211	210	208	222	231	249	260	252	252	260	257	266	246	264	258
35-39	118	131	144	142	146	151	164	163	165	165	182	200[a]	244[a]	253[a]	176[a]
40-44	057	047	043	057	058	070	078[a]	079[a]	064[a]	031[a]	–	–	–	–	–
45-49	014	016[a]	017[a]	013[a]	006[a]	–	–	–	–	–	–	–	–	–	–

Age at birth	Period														
	59-60	58-59	57-58	56-57	55-56	54-55	53-54	52-53	51-52	50-51	49-50	48-49	47-48	46-47	45-46
15-14	358	354	351	339	353	339	349	363	362	356	345	354	359	369	374
20-24	376	369	348	356	370	375	375	362	377	388	380	399[a]	381[a]	393[a]	(241[a])
25-29	321	316	328	333	346	326	310[a]	325[a]	348[a]	254[a]	–	–	–	–	–
30-34	292	269[a]	291[a]	298[a]	227	–	–	–	–	–	–	–	–	–	–

[a]Truncated exposure.
NOTES: (1) Figures in brackets indicate number of women-years of exposure less than 250.
(2) Three-year moving averages are shown for all years except 1974-5 which gives a single-year average.

Table B6 Age-Specific Fertility Rates for Women Living in Urban Areas, 1945-75

Age at birth	Period														
	74-75	73-74	72-73	71-72	70-71	69-70	68-69	67-68	66-67	65-66	64-65	63-64	62-63	61-62	60-61
15-19	25	27	32	45	51	59	64	66	73	69	82	72	77	75	97
20-24	133	140	148	156	165	179	181	182	178	199	211	214	222	222	222
25-29	174	181	202	225	242	247	250	239	225	230	237	265	271	275	271
30-34	125	116	143	173	207	210	205	183	195	216	222	213	197	209	227
35-39	41	86	105	101	109	110	120	107	130	129	136	144[a]	148[a]	–	–
40-44	15	17	19	33	30	36	34[a]	(45)[a]	–	–	–	–	–	–	–
45-49	2	2[a]	(2)[a]	–	–	–	–	–	–	–	–	–	–	–	–

Age at birth	Period														
	59-60	58-59	57-58	56-57	55-56	54-55	53-54	52-53	51-52	50-51	49-50	48-49	47-48	46-47	45-46
15-19	97	93	81	88	83	78	79	89	88	84	81	99	114	125	102
20-24	207	203	207	241	260	276	242	240	250	269	257	261[a]	(240)[a]	–	–
25-29	261	262	268	281	286	290	274[a]	(316)[a]	–	–	–	–	–	–	–
30-34	258	251[a]	(223)[a]	–	–	–	–	–	–	–	–	–	–	–	–

[a]Truncated exposure.
NOTES: (1) Figures in brackets indicate number of women-years of exposure less than 250.
(2) Three-year moving averages are shown for all years except 1974-5 which gives a single-year average.

Table B7 Age-Specific Fertility Rates for Women Living in Rural Areas 1945-75

Age at Birth	Period														
	74-75	73-74	72-73	71-72	70-71	69-70	68-69	67-68	66-67	65-66	64-65	63-64	62-63	61-62	60-61
15-19	38	35	36	44	50	59	60	65	64	73	78	88	94	102	106
20-24	145	145	149	158	164	170	172	190	200	222	216	229	229	245	254
25-29	217	200	208	222	245	239	257	248	276	274	286	292	308	301	290
30-34	195	200	195	204	203	225	239	233	229	235	234	246	233	252	240
35-39	119	122	132	132	133	138	150	155	153	155	174	193[a]	248[a]	(264[a])	–
40-44	56	46	41	52	55	67	77[a]	74[a]	(57[a])	–	–	–	–	–	–
45-49	13	15[a]	17[a]	13[a]	(7[a])	–	–	–	–	–	–	–	–	–	–

Age at birth	Period														
	59-60	58-59	57-58	56-57	55-56	54-55	53-54	52-53	51-52	50-51	49-50	48-49	47-48	46-47	45-46
15-19	104	105	110	112	119	120	133	142	143	140	133	130	130	134	142
20-24	249	249	237	239	260	268	277	258	267	275	277	289[a]	262[a]	(256[a])	–
25-29	278	280	289	297	312	291	275[a]	279[a]	(290[a])	–	–	–	–	–	–
30-34	273	251[a]	282[a]	(278[a])	–	–	–	–	–	–	–	–	–	–	–

[a]Truncated exposure.
NOTES: (1) Figures in brackets indicate number of women-years of exposure less than 250.
(2) Three-year moving averages are shown for all years except 1974-5 which gives a single-year average.

Table B8 Age-Specific Fertility Rates for Women Living in Estates 1945–75

Age at birth	Period														
	74–75	73–74	72–73	71–72	70–71	69–70	68–69	67–68	66–67	65–66	64–65	63–64	62–63	61–62	60–61
15–19	3	27	31	44	55	66	65	66	79	86	103	113	129	129	153
20–24	133	130	133	162	181	208	211	191	202	195	241	(221)	(260)	(284)	(327)
25–29	219	200	193	229	217	205	185	198	214	220	224	244	239	267	235
30–34	108	129	119	114	134	138	168	203	(207)	(213)	(198)	(246)	(198[a])	(208[a])	(199)
35–39	67	83	84	(5)	(86)	(116)	(160)	(152)	(155)	(156)	(146)	–	–	–	–
40–44	(21)	(26)	(38)	(65)	(69)	(80)	–	–	–	–	–	–	–	–	–
45–49	*	(20[a])	(13[a])	–	–	–	–	–	–	–	–	–	–	–	–

Age at birth	Period														
	59–60	58–59	57–58	56–57	55–56	54–55	53–54	52–53	51–52	50–51	49–50	48–49	47–48	46–47	45–46
15–19	167	179	184	189	187	200	172	193	172	194	157	153	139	149	(144)
20–24	(315)	(283)	(258)	(278)	(262)	(252)	(257)	(319)	(342)	(338)	*	*	*	*	–
25–29	251	218	277	229	240	184	–	–	–	–	–	–	–	–	–
30–34	(251)	–	–	–	–	–	–	–	–	–	–	–	–	–	–

*Number of women-years of exposure less than 50.
[a]Truncated exposure.
NOTES: (1) Figures in brackets denote number of women-years of exposure less than 250.
(2) Three-year moving averages are shown for all years except 1974–5 which gives a single-year average.

Table B9 Age-Specific Marital Fertility Rates, by Place of Residence, 1945–75 (Restricted to Within-Marriage Exposure)

Age at birth	Period					
	70–75	65–70	60–65	55–60	50–55	45–50
A Urban areas						
15–19	396	431	373	366	315	368
20–24	379	375	420	386	406	407[a]
25–29	297	329	336	326	362[a]	–
30–34	171	247	239	275[a]	–	–
35–39	108	141	151[a]	–	–	–
40–44	28	39[a]	–	–	–	–
45–49	1[a]	–	–	–	–	–
B Rural areas						
15–19	371	366	373	358	358	372
20–24	358	356	376	361	375	393[a]
25–29	294	342	350	340	328[a]	–
30–34	232	263	270	285[a]	–	–
35–39	148	165	225[a]	–	–	–
40–44	58	78[a]	–	–	–	–
45–49	17[a]	–	–	–	–	–

Age at birth	Period					
	70–75	65–70	60–65	55–60	50–55	45–50
C Estate						
15–19	(260)	(321)	(344)	(334)	(354)	(311)
20–24	294	335	321	337	(330)	(350)[a]
25–29	268	215	272	246	(230)[a]	–
30–34	138	196	229	(259)[a]	–	–
35–39	81	(173)	(127)[a]	–	–	–
40–44	(58)	(80)[a]	–	–	–	–
45–49	(20)[a]	–	–	–	–	–

[a]Truncated exposure.
NOTE: Figures in brackets indicate number of women-years of exposure less than 250.

Table B10 Duration-Specific Marital Fertility Rates by Place of Residence, 1945-75

Duration at birth	Period 70-75	65-70	60-65	55-60	50-55	45-50
A Sri Lanka						
0-4	357	369	373	368	366	363
5-9	257	298	323	329	334	330
10-14	192	244	276	283	308	(510)[a]
15-19	144	196	229	273	(359)[a]	–
20-24	081	115	167	(225)[a]	–	–
25-29	031	030	(193)[a]	–	–	–
30-34	005[a]	(007)[a]	–	–	–	–
B Urban areas						
0-4	385	412	385	394	368	382
5-9	228	271	314	307	358	(346)
10-14	164	219	234	296	286	–
15-19	101	160	206	269	(346)	–
20-24	042	078	104	(519)	–	–
25-29	018	017	–	–	–	–
30-34	–	–	–	–	–	–
C Rural areas						
0-4	362	365	376	371	366	366
5-9	265	305	331	336	335	324
10-14	199	256	291	289	321	*
15-19	161	204	236	275	*	–
20-24	089	127	176	*	–	–
25-29	034	030	*	–	–	–
30-34	006[a]	*	–	–	–	–
D Estate						
0-4	267	310	328	309	363	(296)
5-9	258	295	285	314	(266)	(361)
10-14	192	206	232	(207)	(231)	–
15-19	108	189	(207)	(260)	–	–
20-24	082	(083)	(159)	–	–	–
25-29	(024)	(043)	–	–	–	–
30-34	–	–	–	–	–	–

*Number of women-years of exposure less than 50.
[a]Truncated exposure.
NOTE: Figures in brackets indicate number of women-years of exposure less than 250.

Table B11 Age-Specific Fertility Rates by Region of Residence, 1945-75

Age at birth	Period 70-75	65-70	60-65	55-60	50-55	45-50
A Zone 1						
15-19	029	051	068	076	077	099
20-24	150	203	226	244	278	(245)[a]
25-29	205	242	265	305	(278)[a]	–
30-34	150	188	216	(246)[a]	–	–
35-39	081	124	(158)[a]	–	–	–
40-44	019	(055)[a]	–	–	–	–
45-49	(003)	–	–	–	–	–
B Zone 2						
15-19	027	045	043	050	071	075
20-24	121	137	171	173	224	232[a]
25-29	181	221	261	280	263[a]	–
30-34	170	213	234	219[a]	–	–
35-39	116	126	170[a]	–	–	–
40-44	043	058[a]	–	–	–	–
45-49	011[a]	–	–	–	–	–
C Zone 3						
15-19	036	060	073	079	081	102
20-24	175	217	235	256	287	(251)[a]
25-29	219	251	279	315	(285)[a]	–
30-34	156	197	223	(253)[a]	–	–
35-39	085	128	(162)[a]	–	–	–
40-44	020	(056)[a]	–	–	–	–
45-49	(003)[a]	–	–	–	–	–
D Zone 4						
15-19	084	081	082	082	082	103
20-24	237	243	246	260	289	(251)[a]
25-29	245	263	283	316	(286)[a]	–
30-34	163	200	224	(253)[a]	–	–
35-39	086	129	(162)[a]	–	–	–
40-44	020	(056)[a]	–	–	–	–
45-49	(003)[a]	–	–	–	–	–
E Zone 5						
15-19	047	062	073	078	080	101
20-24	181	217	233	254	285	249[a]
25-29	218	249	276	312	282[a]	–
30-34	154	195	221	250[a]	–	–
35-39	084	127	161[a]	–	–	–
40-44	020	056[a]	–	–	–	–
45-49	003[a]	–	–	–	–	–
F Zone 6						
15-19	028	052	068	076	079	101
20-24	152	202	226	251	283	(248)[a]
25-29	204	242	273	311	(282)[a]	–
30-34	150	193	220	(250)[a]	–	–
35-39	083	127	(160)[a]	–	–	–
40-44	020	(055)[a]	–	–	–	–
45-49	(003)[a]	–	–	–	–	–

[a]Truncated exposure.
NOTE: Figures in brackets indicate number of women-years of exposure less than 250.

Table B12 Age-Specific Marital Fertility Rates by Region of Residence, 1945-75 (Restricted to Within-Marriage Exposure)

Age at birth	Period 70-75	65-70	60-65	55-60	50-55	45-50
A Zone 1						
15-19	(408)	(395)	(368)	(394)	(352)	(421)
20-24	362	399	428	417	440	436
25-29	282	313	332	356	(330)[a]	–
30-34	179	218	243	(265)[a]	–	–
35-39	093	144	(172)[a]	–	–	–
40-44	022	(64)[a]	–	–	–	–
45-49	(004)[a]	–	–	–	–	–
B Zone 2						
15-19	(424)	427	318	309	340	319
20-24	385	348	379	351	371	382[a]
25-29	296	334	356	340	326[a]	–
30-34	216	259	261	241[a]	–	–
35-39	142	142	196[a]	–	–	–
40-44	051	067[a]	–	–	–	–
45-49	014[a]	–	–	–	–	–
C Zone 3						
15-19	371	363	401	419	345	354
20-24	344	370	397	384	414	(424)[a]
25-29	307	353	361	359	(348)[a]	–
30-34	223	278	299	(264)[a]	–	–
35-39	165	200	(246)[a]	–	–	–
40-44	081	(070)[a]	–	–	–	–
45-49	(023)[a]	–	–	–	–	–
D Zone 4						
15-19	(354)	(386)	(375)	(350)	(334)	(315)
20-24	340	411	367	(393)	359	*
25-29	306	373	(346)	(338)	(365)[a]	–
30-34	278	(294)	(275)	(388)[a]	–	–
35-39	(145)	(203)	(247)[a]	–	–	–
40-44	(044)	(095)[a]	–	–	–	–
45-49	*	–	–	–	–	–
E Zone 5						
15-19	(410)	(381)	(347)	(326)	(335)	(344)
20-24	371	321	355	352	346	(377)[a]
25-29	276	324	298	307	(381)[a]	*
30-34	236	234	258	(299)[a]	–	–
35-39	122	156	(150)[a]	–	–	–
40-44	043	(059)[a]	–	–	–	–
45-49	(005)[a]	–	–	–	–	–
F Zone 6						
15-19	326	343	371	354	368	387
20-24	340	351	365	354	372	371[a]
25-29	289	307	337	310	307[a]	–
30-34	199	250	251	318[a]	–	–
35-39	129	169	218[a]	–	–	–
40-44	053	075[a]	–	–	–	–
45-49	018[a]	–	–	–	–	–

*Number of women-years of exposure less than 50.
[a]Truncated exposure.
NOTE: Figures in brackets indicate number of women-years of exposure less than 250.

Table B13 Duration-Specific Marital Fertility Rates by Region of Residence, 1945-75

Duration at birth	Period 70-75	65-70	60-65	55-60	50-55	45-50
A Zone 1						
0-4	372	392	397	398	(384)	(415)
5-9	210	291	302	(330)	(373)	*
10-14	163	191	(222)	(294)	*	–
15-19	086	(126)	(229)	*	–	–
20-24	(029)	(098)	*	–	–	–
25-29	(013)	*	–	–	–	–
30-34	*	–	–	–	–	–
B Zone 2						
0-4	375	384	372	378	369	360
5-9	231	266	306	301	311	(278)
10-14	161	196	265	250	(286)	–
15-19	102	160	190	(166)	–	–
20-24	053	061	(135)	–	–	–
25-29	013	(015)	–	–	–	–
30-34	–	–	–	–	–	–
C Zone 3						
0-4	365	385	395	411	364	363
5-9	294	320	365	365	365	(379)
10-14	222	304	332	285	(362)	–
15-19	189	235	266	(317)	–	–
20-24	125	155	(165)	–	–	–
25-29	053	(036)	–	–	–	–
30-34	–	–	–	–	–	–
D Zone 4						
0-4	347	384	381	369	353	(311)
5-9	314	378	336	350	(326)	(348)
10-14	284	357	290	(355)	(276)	–
15-19	208	252	(278)	(266)	–	–
20-24	118	(172)	(260)	–	–	–
25-29	(063)	(083)	–	–	–	–
30-34	(021)	–	–	–	–	–
E Zone 5						
0-4	379	341	337	330	311	367
5-9	267	319	318	321	364	(236)
10-14	219	263	253	319	(319)	–
15-19	188	177	232	(213)	–	–
20-24	078	126	(118)	–	–	–
25-29	017	(012)	–	–	–	–
30-34	(012)	–	–	–	–	–
F Zone 6						
0-4	335	348	366	350	373	365
5-9	263	298	323	333	327	354[a]
10-14	188	246	272	286	309[a]	*
15-19	150	211	231	327[a]	*	–
20-24	086	125	184[a]	*	–	–
25-29	034	034[a]	*	–	–	–
30-34	006[a]	–	–	–	–	–

*Number of women-years of exposure less than 50.
[a]Truncated exposure.
NOTE: Figures in brackets indicate number of women-years of exposure less than 250.

Table B14 (a) Age-Specific Marital Fertility Rates for Zone 6, Excluding Estate Residents, 1945-75 (Restricted to Within-Marriage Exposure)

Age at birth	Period 70-75	65-70	60-65	55-60	50-55	45-50
15-19	353	347	386	365	375	(403)
20-24	361	358	379	361	377	386[a]
25-29	298	338	354	327	325[a]	–
30-34	216	266	256	331[a]	–	–
35-39	142	168	237[a]	–	–	–
40-44	052	075[a]	–	–	–	–
45-49	018[a]	–	–	–	–	–

[a] Truncated exposure.
NOTE: Figures in brackets indicate number of women-years of exposure less than 250.

Table B14 (b) Duration-Specific Marital Fertility Rates for Zone 6, Excluding Estate Residents, 1945-75

Duration at birth	Period 70-75	65-70	60-65	55-60	50-55	45-50
0-4	358	361	378	365	377	381
5-9	265	298	337	340	340	340
10-14	187	261	286	303	(330)	*
15-19	166	218	(237)	(345)	*	–
20-24	(187)	(134)	(191)	*	–	–
25-29	*	*	–	–	–	–
30-34	*	–	–	–	–	–

*Number of women-years of exposure less than 50.
NOTE: Figures in brackets indicate number of women-years of exposure less than 250.

Table B15 Age-Specific Marital Fertility Rates by Ethnicity and Religion, Excluding Estate Women, 1945-75 (Restricted to Within-Marriage Exposure)

Age at birth	Period 70-75	65-70	60-65	55-60	50-55	45-50
A Sinhalese Buddhists						
15-19	392	367	375	375	365	370
20-24	364	365	388	369	385	393[a]
25-29	295	343	357	341	324[a]	–
30-34	221	269	265	283[a]	–	–
35-39	145	163	232[a]	–	–	–
40-44	055	075[a]	–	–	–	–
45-49	014[a]	–	–	–	–	–
B Tamil Hindus						
15-19	(369)	370	364	318	312	(316)
20-24	347	318	320	365	318	(413)[a]
25-29	283	330	317	298	(346)[a]	–
30-34	219	248	239	(295)[a]	–	–
35-39	132	150	(181)[a]	–	–	–
40-44	050	(057)[a]	–	–	–	–
45-49	(038)[a]	–	–	–	–	–
C Moor Muslims						
15-19	354	390	380	328	379	(436)
20-24	379	385	382	(383)	(401)	(344)[a]
25-29	321	349	378	(364)	(387)[a]	–
30-34	231	(249)	(276)	(292)[a]	–	–
35-39	133	(171)	(168)[a]	–	–	–
40-44	053	(045)[a]	–	–	–	–
45-49	(008)[a]	–	–	–	–	–
D Christians and others						
15-19			*	*	*	*
20-24	373	392	(435)	(314)	(424)	(430)[a]
25-29	310	291	309	321	(356)[a]	–
30-34	211	208	266	(259)[a]	–	–
35-39	104	159	(142)[a]	–	–	–
40-44	032	(072)[a]	–	–	–	–
45-49	(005)[a]	–	–	–	–	–

*Number of women-years of exposure less than 50.

[a] Truncated exposure.
NOTE: Figures in brackets indicate number of women-years of exposure less than 250.

Table B16 Duration-Specific Marital Fertility Rates by Ethnicity and Religion (Excluding Estate Women), 1945-75

Duration at birth	Period 70-75	65-60	60-65	55-60	50-55	45-50
A Sinhalese Buddhists						
0-4	365	374	380	380	377	374
5-9	252	297	330	336	336	322
10-14	180	244	287	288	323	*
15-19	143	198	236	287	*	–
20-24	081	117	169	*	–	–
25-29	030	029	*	–	–	–
30-34	005	–	–	–	–	–
B Tamil Hindus						
0-4	358	343	349	334	309	334
5-9	262	292	300	318	312	(330)
10-14	222	296	265	329	(264)	–
15-19	202	200	216	(204)	–	–
20-24	095	111	(173)	*	–	–
25-29	032	(037)	*	–	–	–
30-34	(020)	–	–	–	–	–
C Moor Muslims						
0-4	393	396	384	395	(395)	(381)
5-9	322	368	357	(331)	(379)	(330)
10-14	265	280	(295)	(293)	(332)	*
15-19	186	213	(263)	(311)	*	–
20-24	(089)	(143)	(197)	*	–	–
25-29	(064)	(035)	*	–	–	–
30-34	(–)	*	–	–	–	–
D Christians and others						
0-4	395	406	381	376	378	(371)
5-9	240	248	324	297	(352)	*
10-14	188	173	255	(232)	*	–
15-19	087	176	(164)	*	–	–
20-24	048	(101)	*	–	–	–
25-29	(011)	*	–	–	–	–
30-34	*	–	–	–	–	–

*Number of women-years of exposure less than 50.
NOTE: Figures in brackets indicate number of women-years of exposure less than 250.

Table B17 Age-Specific Marital Fertility Rates by Migration Status, Excluding Estate Women, 1945-75 (Restricted to Within-Marriage Exposure)

Age at birth	Period 70-75	65-70	60-65	55-60	50-55	45-50
A Urban						
15-19	(410)	(464)	(382)	(386)	(306)	(392)
20-24	370	380	436	407	412	(426)[a]
25-29	285	338	342	335	(368)[a]	–
30-34	189	251	237	(295)[a]	–	–
35-39	112	142	(141)[a]	–	–	–
40-44	020	(044)[a]	–	–	–	–
45-49	–	–	–	–	–	–
B Rural to urban migrants						
15-19	(347)	(371)	(382)	(283)	(292)	(408)
20-24	370	359	327	376	378	(409)[a]
25-29	304	328	(340)	342	(298)[a]	–
30-34	205	259	247	(283)[a]	–	–
35-39	171	136	(228)[a]	–	–	–
40-44	061	(104)[a]	–	–	–	–
45-49	(048)[a]	–	–	–	–	–
C Urban to rural migrants						
15-19	*	*	*	*	*	*
20-24	(393)	(364)	(393)	(375)	(391)	*
25-29	330	316	340	329	*	–
30-34	160	246	237	*	–	–
35-39	109	(142)	*	–	–	–
40-44	*	*	–	–	–	–
45-49	*	–	–	–	–	–
D Rural						
15-19	378	363	374	363	364	363
20-24	357	358	377	361	376	392[a]
25-29	296	342	352	337	331[a]	–
30-34	234	265	272	284[a]	–	–
35-39	146	170	227[a]	–	–	–
40-44	(058)	(058)[a]	–	–	–	–
45-49	*	–	–	–	–	–

*Number of women-years of exposure less than 50.
[a]Truncated exposure.
NOTE: Figures in brackets indicate number of women-years of exposure less than 250.

Table B18 Duration-Specific Marital Fertility Rates by Migration Status (Excluding Estate Women), 1945-75

Duration at birth	Period 70-75	65-70	60-65	55-60	50-55	45-50
A Urban						
0-4	372	430	397	397	391	420
5-9	234	279	340	308	348	(330)
10-14	181	223	227	327	(265)	–
15-19	120	168	209	(273)	–	–
20-24	038	088	(074)	–	–	–
25-29	013	(012)	–	–	–	–
30-34	–	–	–	–	–	–
B Rural to urban migrants						
0-4	368	390	388	384	373	(359)
5-9	251	268	285	309	(289)	*
10-14	199	245	222	(265)	*	–
15-19	153	146	(140)	*	–	–
20-24	083	(082)	*	–	–	–
25-29	023	*	–	–	–	–
30-34	*	–	–	–	–	–
C Urban to rural migrants						
0-4	410	382	371	390	341	(336)
5-9	219	257	288	307	(364)	*
10-14	141	215	246	(267)	*	–
15-19	079	151	(208)	*	–	–
20-24	047	(067)	*	–	–	–
25-29	(025)	*	–	–	–	–
30-34	*	–	–	–	–	–
D Rural						
0-4	361	361	375	370	365	367
5-9	268	310	334	338	341	316
10-14	200	257	296	290	324	*
15-19	161	209	244	278	*	–
20-24	089	130	172	*	–	–
25-29	035	029	*	–	–	–
30-34	006	*	–	–	–	–

*Number of women-years of exposure less than 50.
NOTE: Figures in brackets indicate number of women-years of exposure less than 250.

Table B19 Age-Specific Marital Fertility Rates by Couple's Educational Attainment, Excluding Estate Women, 1945-75 (Restricted to Within-Marriage Exposure)

Age at birth	Period 70-75	65-70	60-65	55-60	50-55	45-50
A Both <6 years' education						
15-19	368	365	372	358	362	374
20-24	351	356	370	368	379	411[a]
25-29	297	350	349	334	328[a]	–
30-34	217	269	274	280[a]	–	–
35-39	146	166	220[a]	–	–	–
40-44	061	074[a]	–	–	–	–
45-49	022[a]	–	–	–	–	–
B Husband 6+ years'; wife <6 years' education						
15-19	398	417	370	(415)	(327)	(285)
20-24	380	367	414	367	425	(409)[a]
25-29	288	324	372	351	377[a]	–
30-34	222	262	264	273[a]	–	–
35-39	123	164	200[a]	–	–	–
40-44	040	072[a]	–	–	–	–
45-49	001[a]	–	–	–	–	–
C Husband <6 years'; wife 6+ years' education						
15-19	(424)	(369)	(419)	(358)	(297)	(391)
20-24	354	383	397	374	(328)	(386)[a]
25-29	289	277	336	(354)	(308)[a]	–
30-34	204	266	(219)	(281)[a]	–	–
35-39	163	(152)	(217)[a]	–	–	–
40-44	(056)	(050)[a]	–	–	–	–
45-49	(013)[a]	–	–	–	–	–
D Both 6+ years' education						
15-19	(358)	380	348	331	342	374
20-24	354	362	372	361	364	345[a]
25-29	318	369	325	324	320[a]	–
30-34	230	233	243	308[a]	–	–
35-39	142	153	208[a]	–	–	–
40-44	043	064[a]	–	–	–	–
45-49	009[a]	–	–	–	–	–

[a]Truncated exposure.
NOTE: Figures in brackets indicate number of women-years of exposure less than 250.

Table B20 Duration-Specific Marital Fertility Rates by Couple's Educational Level (Excluding Estate Women), 1945-75

Duration at birth	Period 70-75	65-70	60-65	55-60	50-55	45-50
A Both <6 years' education						
0-4	356	355	369	379	358	373
5-9	287	315	344	336	355	346
10-14	215	272	305	298	301	–
15-19	176	220	245	287	–	–
20-24	96	137	194	–	–	–
25-29	43	49	–	–	–	–
30-34	9	–	–	–	–	–
B Husband 6+ years'; wife <6 years' education						
0-4	376	386	363	354	372	390
5-9	278	331	312	332	312	(294)
10-14	243	265	271	297	(332)	–
15-19	142	186	243	(262)	–	–
20-24	74	91	(144)	–	–	–
25-29	20	(20)	–	–	–	–
30-34	–	–	–	–	–	–
C Husband <6 years'; wife 6+ years' education						
0-4	370	378	395	365	(334)	(377)
5-9	258	265	328	(300)	(304)	–
10-14	176	276	(255)	(329)	–	–
15-19	154	(162)	(191)	–	–	–
20-24	(100)	(69)	–	–	–	–
25-29	(10)	–	–	–	–	–
30-34	–	–	–	–	–	–
D Both 6+ years' education						
0-4	370	390	401	391	399	345
5-9	219	256	315	322	362	(319)
10-14	131	178	219	241	(368)	–
15-19	86	140	184	(219)	–	–
20-24	36	106	(102)	–	–	–
25-29	8	–	–	–	–	–
30-34	–	–	–	–	–	–

NOTE: Figures in brackets indicate number of women-years of exposure less than 250.

Table B21 Age-Specific Marital Fertility Rates by Occupational Categories, Excluding Estate Women, 1945-75 (Restricted to Within-Marriage Exposure)

Age at birth	Period 70-75	65-70	60-65	55-60	50-55	45-50
A White collar						
15-19	(363)	(411)	(384)	(366)	(327)	(353)
20-24	368	356	384	402	383	(343)[a]
25-29	278	294	356	321	(325)[a]	–
30-34	189	242	266	(188)[a]	–	–
35-39	113	142	(154)[a]	–	–	–
40-44	044	(075)[a]	–	–	–	–
45-49	–	–	–	–	–	–
B Sales and service						
15-19	(402)	(390)	(306)	(347)	357	365
20-24	400	384	381	373	398	393[a]
25-29	281	353	360	348	335[a]	–
30-34	234	259	255	275[a]	–	–
35-39	141	130	201[a]	–	–	–
40-44	027	071[a]	–	–	–	–
45-49	008[a]	–	–	–	–	–
C Self-employed agriculturalists						
15-19	(321)	(336)	(362)	(356)	(313)	(300)
20-24	377	365	360	372	389	(424)[a]
25-29	285	336	352	327	(283)[a]	–
30-34	229	295	269	(272)[a]	–	–
35-39	163	146	(219)[a]	–	–	–
40-44	052	(044)[a]	–	–	–	–
45-49	(027)[a]	–	–	–	–	–
D Agriculturalists (employees)						
15-19	378	363	389	389	359	387
20-24	350	369	396	358	404	401[a]
25-29	324	360	346	340	346[a]	–
30-34	243	265	270	319[a]	–	–
35-39	160	186	241[a]	–	–	–
40-44	061	076[a]	–	–	–	–
45-49	017[a]	–	–	–	–	–
E Skilled manual workers						
15-19	433	399	371	347	408	369
20-24	346	338	382	368	353	(382)[a]
25-29	291	335	341	329	335[a]	–
30-34	200	270	255	277[a]	–	–
35-39	143	160	216[a]	–	–	–
40-44	061	050[a]	–	–	–	–
45-49	012[a]	–	–	–	–	–
F Unskilled manual and household workers						
15-19	(327)	394	385	330	(308)	(345)
20-24	351	362	373	380	322	(424)[a]
25-29	297	334	352	333	(345)[a]	–
30-34	219	236	262	(315)[a]	–	–
35-39	101	190	(203)[a]	–	–	–
40-44	064	(099)[a]	–	–	–	–
45-49	(026)[a]	–	–	–	–	–

[a] Truncated exposure.
NOTE: Figures in brackets indicate number of women-years of exposure less than 250.

Table B22 Duration-Specific Marital Fertility Rates by Occupational Categories (Excluding Estate Women), 1945-75

Duration at birth	Period 70-75	65-70	60-65	55-60	50-55	45-50
A White collar						
0-4	341	372	381	378	383	(327)
5-9	197	226	307	287	(275)	*
10-14	110	176	201	(238)	*	–
15-19	068	111	(179)	*	–	–
20-24	023	(088)	*	–	–	–
25-29	(021)	*	–	–	–	–
30-34	*	–	–	–	–	–
B Sales and service						
0-4	377	384	372	400	390	389
5-9	264	297	332	331	325	(308)
10-14	179	238	251	267	(382)	–
15-19	131	195	214	(252)	–	–
20-24	066	064	(161)	–	–	–
25-29	017	(011)	–	–	–	–
30-34	–	–	–	–	–	–
C Self-employed agriculturalists						
0-4	347	389	352	377	344	370
5-9	309	280	336	339	340	(316)
10-14	220	279	306	293	(259)	*
15-19	190	223	228	(208)	*	–
20-24	087	089	(175)	*	–	–
25-29	034	(024)	*	–	–	–
30-34	009	*	–	–	–	–
D Agriculturalists (employees)						
0-4	372	361	390	378	378	377
5-9	283	345	347	352	358	(323)
10-14	229	281	305	294	(359)	*
15-19	(199)	227	(245)	(340)	*	–
20-24	(105)	(145)	(197)	*	–	–
25-29	*	*	*	–	–	–
30-34	*	*	–	–	–	–
E Skilled manual workers						
0-4	377	392	370	373	365	384
5-9	235	291	316	305	354	(291)
10-14	183	234	261	292	(248)	*
15-19	118	167	244	(249)	*	–
20-24	076	117	(124)	*	–	–
25-29	028	(043)	*	–	–	–
30-34	–	*	–	–	–	–
F Unskilled manual and household workers						
0-4	364	364	386	355	322	313
5-9	266	308	311	328	312	(418)
10-14	216	262	306	347	(274)	*
15-19	155	182	229	(246)	*	–
20-24	075	171	(169)	*	–	–
25-29	042	(134)	*	–	–	–
30-34	–	*	–	–	–	–

*Number of women-years of exposure less than 50.
NOTE: Figures in brackets indicate number of women-years of exposure less than 250.

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