



Scientific Reports

NUMBER 14, MAY 1980

JOSÉ MIGUEL GUZMÁN

**Evaluation of the Dominican
Republic National Fertility
Survey 1975**

INTERNATIONAL STATISTICAL INSTITUTE
Permanent Office. Director: E. Lunenberg
428 Prinses Beatrixlaan
Voorburg, The Hague
Netherlands

WORLD FERTILITY SURVEY
Project Director:
Sir Maurice Kendall, Sc. D., F.B.A.
35-37 Grosvenor Gardens
London SW1W 0BS, U.K.

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.

This publication is part of the WFS Publications Programme which includes the WFS Basic Documentation, Occasional Papers and auxiliary publications. For further information on the WFS, write to the Information Office, International Statistical Institute, 428 Prinses Beatrixlaan, Voorburg, The Hague, Netherlands.

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El proyecto está a cargo del Instituto Internacional de Estadística en cooperación con la Unión Internacional para el Estudio Científico de la Población y con la colaboración de las Naciones Unidas. Es financiado principalmente por el Fondo de las Naciones Unidas para Actividades de Población y por la Agencia para el Desarrollo Internacional de los Estados Unidos.

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JOSÉ MIGUEL GUZMÁN

National Council for Population and Family

Dominican Republic

ERRATA

Scientific Reports No. 14
Evaluation of the Dominican Republic
Fertility Survey 1975

- p. 6, Tables 17 and 18: Delete "Age Specific" from titles
- p. 21, Figure 7: in the key, "Widowed" should be shaded black.
- p. 27, Figure 11, R.H. Graph: add "Age at First Union" to horizontal axis, and number from left to right 10, 15, 20, 25, 30; and add the word "Percentage" to vertical axis.
- p. 28, Table 13: Column 3 heading and footnote: "a₀" should read "a₀".
- p. 38, Table 20: first section sub-heading should read: "Cohort-Period Fertility Rates".
- p. 40, Figure 17: delete "Age Specific" from title.
- pp. 42, 43 and 47: Tables 22, 23 and 25, first section sub-headings should read: "Cohort-Period Fertility Rates".
- p. 44, Figure 18: title should read: "Cohort-Period Fertility Rates, Centered on Age, by Type of First Union".
- p. 48, Table 28, third column (Male), total should read: 0.153
- p. 49, Table 29, fourth column (Proportion of Deaths), heading should read: "Proportion Dead".

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Preface

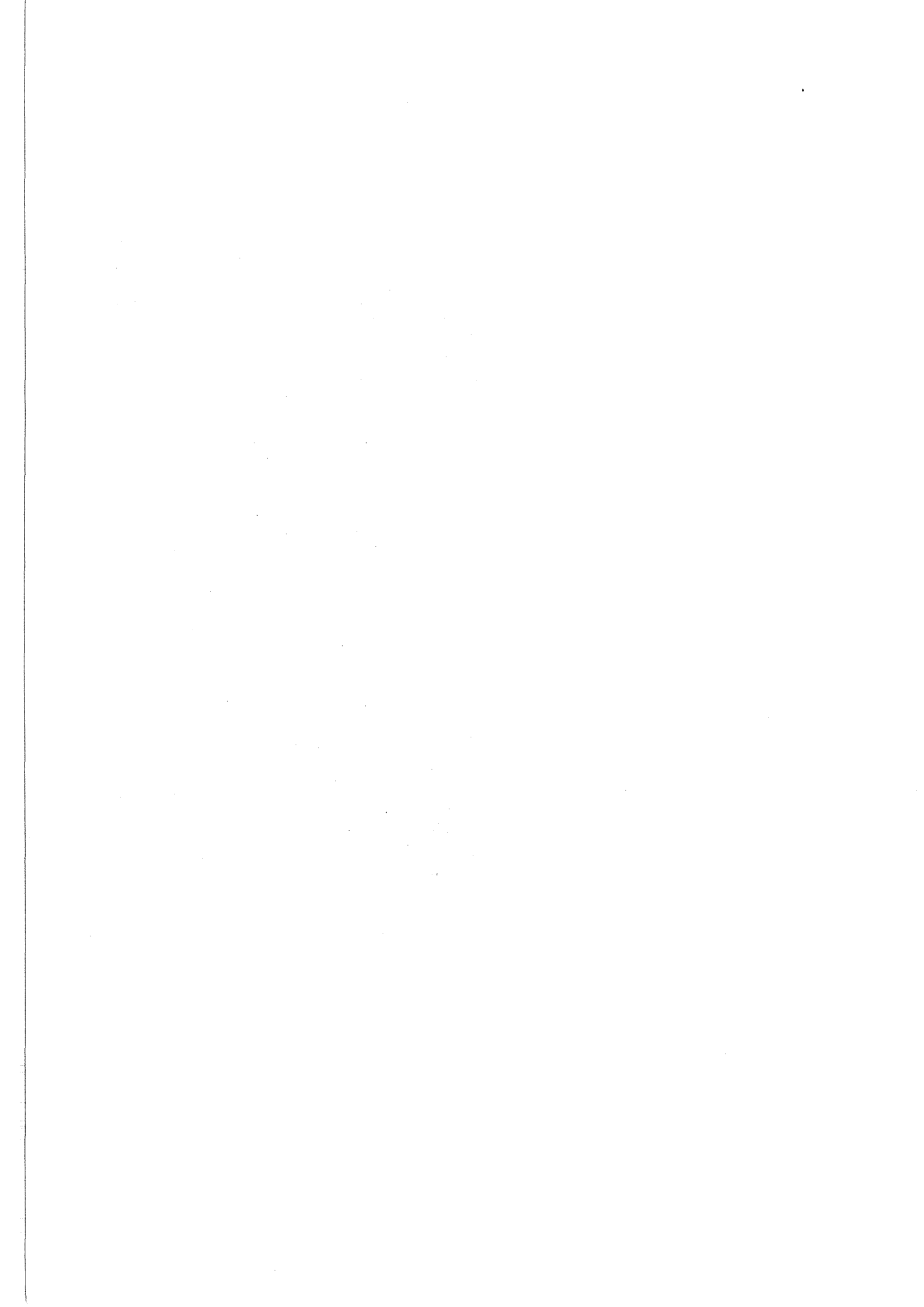
One of the major objectives of the World Fertility Survey programme is to assist the participating countries in obtaining high quality data through national fertility surveys. The high standards set by the WFS are expected to yield better quality data than typically obtained in the past, but this expectation in no way obviates the need for a detailed assessment of the quality of the data. It is recognised that such an evaluation will not only alert the analysts by identifying the defects, if any, in the data, but also may throw light on the shortcomings of the WFS approach, which can be taken into account in the design of future fertility surveys.

It is in this context that, as part of its analysis policy, the WFS has initiated a systematic programme for a scientific assessment of the quality of the data from each survey. A series of data evaluation workshops are being organised at the WFS London headquarters with the dual objective of expediting this part of the work and of providing training in techniques of analysis to researchers from the participating countries. Working in close collaboration with WFS staff and consultants, participants from four or five countries evaluate the data from their respective surveys after receiving formal training in the relevant demographic and data processing techniques.

The first such workshop, involving researchers from four Latin American countries — Dominican Republic, Peru, Mexico and Venezuela — was held between July and October in 1979. The present document reports on the results of the evaluation of the data of the Dominican Republic National Fertility Survey of 1975 and was prepared by José Miguel Guzmán, the participant from the Dominican Republic. Yolanda Cespedes, Manuel Ordorica, and Gilberto Vielma, the other participants, contributed to the present evaluation through their ideas and discussions.

Dr. Shea Oscar Rutstein as the coordinator of the workshop assumed a major responsibility in successful completion of the work, while many other staff members also made significant contributions to it. Drs. Noreen Goldman and Joseph Potter provided valuable assistance as consultants.

Sir Maurice Kendall
Project Director



1 Introduction

The National Fertility Survey (NFS) of The Dominican Republic was carried out as part of the World Fertility Survey (WFS), undertaken by the International Statistical Institute.

The fieldwork of the survey took place between April and July 1975. A Household Schedule was used for interviewing in all dwellings included in the sample, and one out of every four women aged 15 to 49 registered in the Household Schedule was selected to be interviewed with an Individual Questionnaire. A total of approximately 12,000 household interviews and 3,115 individual interviews were completed.

One of the principal objectives of the Dominican Fertility Survey was to obtain reliable information on fertility, infant and child mortality, and nuptiality. There was particular interest in learning current fertility levels and their recent trends.

The information gathered in this survey is the most valuable source of demographic data in the country, especially when one takes into account that the vital statistics suffer from serious deficiencies. For the period 1960-1975 various estimates coincide in pointing to an omission in the registers of nearly 25 per cent of births and 50 per cent of deaths. (De Mayo and Ramirez, 1967; Ramirez, 1974b; Caceres, 1977).

The main objective of the present paper is to evaluate the quality of the data obtained by the Dominican Fertility Survey with a view to learning the extent to which the estimates of the demographic variables obtained through this study are accurate.

First, an account is made of the more general characteristics of the information obtained in the World Fertility Survey Programme and errors which may possibly be present in the data. Some aspects related to the Dominican Fertility Survey are also presented. This is followed by an analysis of the quality of age reporting, with special attention paid to women aged between 15 and 49. Following this analysis, separate evaluations are made of the quality of data concerning nuptiality, fertility and infant and child mortality.

1.1 CHARACTERISTICS OF THE DOMINICAN REPUBLIC

The Dominican Republic, which covers an area of 48,442 square kilometres, had an estimated population of about five million inhabitants in 1975, representing a density of 103 inhabitants per square kilometre. In 1960 and 1970 the density was around 63 and 83 inhabitants, respectively.

The economy of the Dominican Republic is primarily agriculture — the proportion of the economically active population involved in agriculture was 61.4 per cent in 1960 and 45.3 per cent in 1970. The population of the Dominican Republic is mainly concentrated in the rural area; in 1970 only 30.2 per cent of the total population lived in towns of over 20,000 inhabitants, although available data show a tendency towards increasing urbanization.

Illiteracy is high; according to the 1970 census, 32.2 per cent of Dominicans were illiterate. According to the Survey data, 21 per cent of women aged between 15 and 49 were illiterate.

1.2 THE WORLD FERTILITY SURVEY

The International Statistical Institute, with the participation of national organizations of various countries, has promoted a programme of national fertility surveys under the name of The World Fertility Survey (WFS). The main objectives of this programme can be summarized as follows:

- (a) To provide information to enable the description and interpretation of the fertility of the population of each participating country.
- (b) To increase the national capacity of each country to investigate its own fertility and to carry out other demographic studies, particularly in the developing countries.
- (c) To make analytical comparisons of fertility and the factors affecting fertility among different countries and regions of the world.

To fulfill these objectives, the WFS promotes the execution of scientifically designed sample surveys in the countries. The procedure of the surveys involves selecting a sample of households, in order to collect information about the general characteristics of the population, and in some surveys about the dwelling; this information is obtained through a Household Schedule. From the data obtained in this household survey, a subsample of women of childbearing age is obtained; these women are then interviewed with the Individual Questionnaire. It is also the aim of the WFS to make the questionnaires of the various countries as standardized as possible in order to allow the development of an uniform tabulation programme, thus obtaining international comparability.

Measures of the levels and trends of fertility, infant and child mortality and nuptiality can be derived from the World Fertility Survey data. The reliability of these measurements depends on the quality of the information obtained. However, no matter how much care is taken in formulating the questions and the controls established for collecting the information, various situations may produce errors that affect the estimates from the data. Therefore it is necessary to evaluate the quality of the information obtained in order to assess the magnitude of the biases which may be present in the data, and to judge the final effect of these biases on the estimates produced.

1.3 CHARACTERISTICS OF THE NATIONAL FERTILITY SURVEY (NFS) OF THE DOMINICAN REPUBLIC

The Household Schedule used in the Dominican Republic Survey obtained general information about the population in the household. All persons in the household were included, both those who normally live in the household (*de jure* population) and those who were present at the time of the interview (*de facto* population). In this study we present the information covering the population according to the second criterion.

The following characteristics were obtained in the schedule: geographic location of the dwelling, relation-

ship with the head of household, *de jure* or *de facto* residence, sex, age in completed years, survival of mother, education, current marital status, and fertility of women (distinguishing between children living or not living with her, number of children who have died and date of birth of last child). In 90.5 per cent of the selected households it was possible to complete the household schedule successfully. In the remaining 9.5 per cent it was either impossible to locate the dwelling, or the house was temporarily unoccupied, etc. Refusals were few. The percentage of completed schedules was slightly higher in the urban area (92.1 per cent) than in the rural area (89.1 per cent).

The Individual Questionnaire contained the following sections:

1. Respondent's Background
2. Maternity History
3. Contraceptive Knowledge and Use
4. History of Sexual Life during the Last Year
5. Maternal and Child Care
6. Marriage History
7. Fertility Regulation
8. Work History of the Women
9. Work History of the Current (last) Husband

In this study we focus on the evaluation of data in Sections 1, 2 and 6.

In households with completed household schedules, 96.8 per cent of the individual interviews were completed. This figure did not show any important differences according to urban or rural area.

Finally we should point out that since during the fieldwork it was not always possible to obtain the infor-

mation concerning the dates of the events, both for the Maternity History and the Marriage History, as well as the date of birth of the respondents, imputation of the missing information was made in the editing stage of processing the data. (Consejo Nacional de Población y Familia, 1976) The percentages of cases imputed are as follows:

Variable	Per Cent of Cases Imputed
Month of birth of respondent	14.1
Year of birth of respondent	13.5
Month of occurrence of the event	9.0
Year of occurrence of the event	0.1
Month of beginning of current union	13.2
Year of beginning of current union	2.0
Month of beginning of first union*	26.7
Year of beginning of first union*	0.0
Month of end of first union	23.1
Year of end of first union	0.0
Month of beginning of second union	30.6
Year of beginning of second union	0.4
Month of end of second union	20.2
Year of end of second union	0.4

* If not current union

In this study we have used the data of a tape that included additional imputation in the information, so that the data presented here, particularly those concerning the dates of birth of children and of the women interviewed, show slight differences compared with those presented in the General Report of the Survey. (Consejo Nacional de Población y Familia, 1976.)

2 Errors and Biases which may Affect the Information in Fertility Surveys

2.1 SELECTION PROCEDURES

The definition of women eligible for being selected for individual interview and the procedures for selection in the World Fertility Survey vary according to country. In some cases all women of childbearing age registered in the Household Schedule were included as eligible, irrespective of their marital status. In others, only the women who were ever in a legal or consensual union¹ were eligible to be selected for the individual interview. Where the first procedure was used, as in the case of Dominican Republic, and a sub-sample of women was selected, one can compare characteristics of selected women with those of women not selected in order to detect biases in the selection of the women.

2.2 ERRORS IN THE REPORTING OF AGE

The incorrect reporting of the women's ages results from a preference for certain digits and a transference of age. In general, greater concentrations of persons are observed in the ages ending in 0, 5, 8 and 2 at the expenses of the adjacent digits. If age is obtained through reference to date of birth, preference may be given to the other digits, depending on the date of interview.

The shifting of age is a systematic tendency among the respondents and as a result some may declare a higher or lower age than their real one. One example of this type of error is that of women over 40 declaring themselves to be younger. This type of error has very important impacts on the estimation of measures in which the age of the women is involved.

The lack of reporting of the ages of the women may also distort the age structure. The survey, therefore, tried to obtain an estimate of the woman's age during the interview. However, this estimation may also be an additional source of error, especially when the interviewer (or supervisor) derives her estimate by using data on characteristics such as parity or marital status.

Age transference can have important effects on estimated fertility rates. The biases that occur depend not only on the direction of transference (i.e. to older or younger ages than the real age), but also on the real age of the woman and whether or not transference is selective with respect to fertility. As an example, let us take the case of women whose real ages were 45 to 49 at the time of interview, but who reported ages 40 to 44. If these women were not different in their fertility from women of the same age reporting correctly, this transference would upwardly bias the estimate of children ever born to women 40-44 because older women in general have higher parity. This result holds true for all age groups. With respect to current fertility rates however, a downward bias will occur for the age group 40 to 44 because women 45 to 49 have lower rates.

The result holds for women whose real age groups are 30 and above; the opposite is true for women really 20

to 24 reporting ages 15 to 19; and, the situation is indeterminate for women really 25 to 29. Now let us see the effect on period fertility for the cohort of women reporting age 40 to 44. If the women who transferred to this group from 45 to 49 report the dates of their child-bearing accurately, the ages at which they gave birth would be too low, inflating the rates for those ages less than 20 and deflating for ages 30 or greater; in other words the entire cohort fertility curve would be shifted to younger ages.

If the transferred women correctly report their ages at birth, then the age specific rates for that cohort would be correctly reported but births would be transferred to later periods. Of course, if women report older ages, the errors introduced would be in the opposite sense from those above.

2.3 ERRORS IN THE RETROSPECTIVE INFORMATION

The accuracy of fertility estimates will depend on the quality of the data involved in both the numerator and the denominator of the rates. We have already described age reporting errors which may affect the denominator of the rates; therefore we shall examine the factors which could affect the numerator, that is to say the live births.

The basic source of information on births is the Maternity History of the respondent, in which all pregnancies are listed in chronological order, as well as the outcomes of these pregnancies and the dates of their occurrences. In addition, the survival status of all live births at the time of the interview and age at death (if applicable) are also registered.

It must be pointed out that the women interviewed in each age group are the survivors of their respective cohorts, and therefore one must assume in using the Maternity History for analysis that the fertility of the survivors does not differ from that of the women who have died. The bias from the non-fulfilment of this assumption will be greater for periods more distant from the time of the interview and will also be related to the level of adult mortality. If female mortality is high and differs according to the number of children, the level of past fertility will probably have been underestimated.

The data contained in the Maternity History are obtained retrospectively, so that their quality depends on the respondents capacity for remembering each of the events and the exact date each occurred, as well as their willingness to report all their events.

(1) Omissions

A frequent error in the maternity histories is the omission of births. Generally, omission occurs more often among older women and for births that occurred long before the time of the survey. However, more recent births may also be omitted, mostly those that occurred in unstable unions. In addition children are more frequently omitted if they had died during their first years of life or were living outside the home at the time of the interview. It has also been observed in

1. For brevity, we will refer to women in both legal and consensual unions as "in union", unless a distinction is necessary.

countries with son preferences that more female births are omitted than are male births.

When the omission concerns periods more distant from the time of the survey, its effect is to underestimate fertility in these periods, with the possible result of showing a false increase in fertility with time. The level of total fertility for the older women would thus be underestimated, and therefore the mean parity by age would show a decline in the later ages. On the other hand, when children of very young ages (at interview) are omitted, the level of fertility in the latest period is underestimated, which could give the impression of a recent decrease of fertility.

Goldman et al. have found a high correlation between the poor information about age and the omission of births in a study on the quality of the data obtained in the Nepal Fertility Survey. (Goldman et al., 1979)

(2) Misdating of Births

Incorrect reporting of dates of birth of a woman's children is another important source of distortion of the Maternity History. The failure of some women to remember the dates at which their children were born may be important if there is a systematic tendency on the part of the respondents to transfer the birth date of their children nearer to or further from the time of the survey.

Analyzing the data of surveys carried out in West New Guinea around 1962, Brass (1974) found some evidence for a shift in fertility to periods further removed from the time of survey, caused by a presumed tendency on the part of the interviewers to assume that the women had begun childbearing at a very young age. The effect of this distortion was to overestimate the fertility in the earlier periods and to show a false decline in the fertility in the younger ages for the later periods.

In an analysis of the data obtained in the Bangladesh Fertility Survey of 1976, Brass (1978) found evidence of other types of displacement. Specifically, it seemed that births which occurred during the last five years had been transferred to the previous period (5 to 10 years prior to the survey), and that births which had taken place in periods further in time were brought forward, many to this same period. This error, which mainly affects the older cohorts, creates a distortion in the trend of fertility, shown as an exaggerated decline of fertility in recent periods for the older ages.

Potter (1977a), starting from certain assumptions on the manner in which the displacements of births in time are produced, developed a simulation model to find out to what extent the fertility levels and trends obtained from the data contained in a maternity history could be distorted. In his model, the following assumptions are made: the more distant the births are from the time of the survey, the less exactly the interviewed women remember the date at which the births occurred; and, if the maternity history is obtained through questions about the live births in the order in which they occurred, that is to say, starting with the oldest child, then the date a woman gives for any other birth after the first one is influenced by the information she has given about her previous births. In effect, the model assumes that the respondents report their births — at least those furthest removed from the time of the survey — in terms of birth-intervals, and that dates of birth are brought forward in time because of the reporting of a later date for the first birth and/or the exaggeration of the interval between successive births. Comparing the results of his model with the information obtained in surveys carried out in Bangladesh and El Salvador, Potter found that the distortions affecting the data of these surveys were of the type specified by his model (Potter, 1977b).

3 Reporting of Age

In the evaluation of the quality of the survey data it is essential to know the extent to which age has been reported correctly. Biases in age reporting can create important distortions in estimates of fertility and other demographic variables.

The censuses carried out in the Dominican Republic in 1950, 1960 and 1970 show that, compared to other Latin American nations, the Dominican Republic is among those with less reliable reporting of age. The Myers' index in the 1970 Census was 25.2 for men and 25.9 for women, whereas for the census of that same year carried out in Argentina the values of this index were 1.7 and 1.9, respectively (Chackiel and Maccio, 1979).

Figure 1 shows the percentage distribution of the female population from 0 to 79 years of age, registered in the Household Schedule (*de facto* population). The known pattern of preference for ages ending in digits 0, 5, 8, and 2 is quite evident, particularly from the age of 25 onwards. This pattern is the same as has been observed in the 1970 Census (see Figure 2); nevertheless, digit preference is greater in the census. This difference is clearly reflected in the Myers' index for women, which is 25.9 in the census and 17.1 in the survey.

Reporting of age shows differences by urban and rural area and by education. Figure 3 shows the age structure of the female population, according to area of residence. The Myers' index is 19.3 for the rural area and 13.9 for the urban area. It is also important to point out the low percentage of population aged under 15 in the rural area and, more startlingly, in the urban area shown in this figure. Simple omission of children of these ages would not explain this fact, since the children in the rural areas would be more likely to be omitted. Therefore, there is a possible indication that there has been a substantial decline in fertility in the last 10 to 15 years, especially in the urban area. It is one of the aims of this study to confirm if this decline is borne out by the data in the Maternity History.

In the case of education, differences in reports of age are even more important, as indicated in the Myers' index (calculated with the population aged between 20 and 69 years). For illiterate men and women with little education (0 to 2 years) this index value is 30.8, while for women with 3 years education or more it is 14.7.

The way in which digit preference operates, according to area of residence, is shown in Figure 4. In most cases either preference or rejection is greater among women in rural areas. In both urban and rural areas it would seem that preference for the digit 0 is produced at the expense of ages ending in 1 and to some extent in 9 and that preference for the digit 5 also comes from the adjacent digits. A similar pattern emerges according to the level of education.

Based on the data from the Individual Questionnaire, the age reporting was also analysed through both the year of birth and the age in completed years. In this questionnaire the interviewer was instructed to always obtain the age, albeit by her own estimate. If the interviewer did estimate the age herself, this fact had to be noted on the questionnaire². It was not always possible to obtain the date of birth. The month of birth was missing for 14.1 per cent of the respondents and 13.5 per cent of them did not state a year of birth. Better data quality is to be expected from the Individual

Questionnaire as compared with the Household Schedule since for the Household Schedule any person over 18 years of age resident in the household could respond, whereas in the Individual Questionnaire the information was always obtained from the woman concerned.

Figure 5 shows the age distribution according to the data in the Household Schedule and in the Individual Questionnaire. Except for women between 20 and 30 years of age, preference for digits 0 and 5 is greater in the Schedule. In particular, the great preference for the ages 30, 35, 40 and 45 is noticeably less in the individual data. The ratio between the population with ages ending 0, 5, and 8 and 2 and that with ages ending in other digits is 0.91 for the Household Schedule and 0.86 for the Individual Questionnaire. (No preference would result in a ratio of about 0.67.) The same pattern of a better reporting of age by more educated women and by women living in urban areas can also be observed in the data of the Individual Questionnaire.

There also is a digit preference according to year of birth, although this is smaller than according to age in completed years. Since the survey was carried out in 1975, the digit preference for reporting year of birth has a similar effect as that for reporting age.

For the present study, the information given on the Household Schedule has been matched with the responses of the woman on the Individual Questionnaire. Of the 3,115 women interviewed, 59 could be not identified in the Household Schedule from the data contained in the Individual Questionnaire. For the 3,056 women that could be matched, we calculated the difference between the age declared in the Household Schedule and the age reported in the Individual Questionnaire, both by single years of age and by five-year age groups (see Table 1). Sixty five per cent of the women had the same single year of age in both questionnaires, while 20.7 per cent were younger and 14.7 per cent were older in the Household Schedule than in the Individual Questionnaire. Similar tendencies to report a lower age on the Household Schedule were observed in all age groups, mostly among the older women.

The importance of this transference for the conventional five-year age groups is shown in the same table. It can be seen here that a high percentage of the women are reported to be in a younger age group in the Household Schedule especially in the older ages. For instance, nearly 20 per cent of the women aged 40-44 years in the Individual Questionnaire are reported as being 35-39 years of age in the Household Schedule but only 6.4 per cent are reported as belonging to the older group (45-49). Among all women, the percentage who were consistently declared in the same age group was 88 per cent.

In short, the observed tendency is to report a lower age on the Household Schedule than in the Individual Questionnaire. Flórez and Goldman (1979) found a similar tendency in the reporting of age in the data of the National Fertility Survey of Colombia.

The distribution by five year age groups of the women aged between 15 and 49 according to the data in both the Household and Individual Questionnaires is shown in Table 2, together with that obtained in the 1970

2. This information has not been coded.

Figure 1. Per Cent Distribution of Female Population According to Age

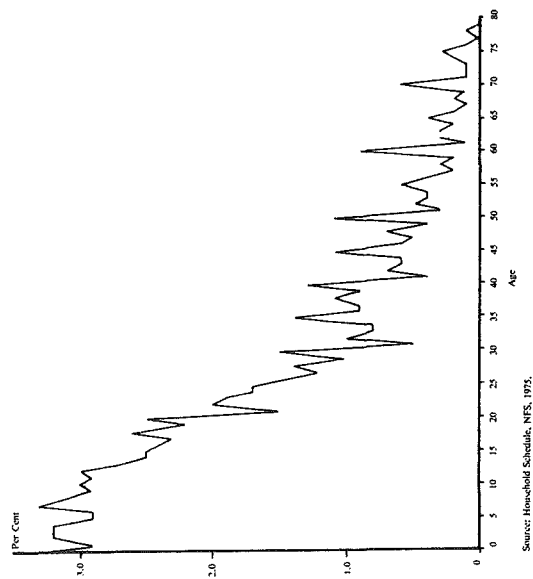


Figure 2. Per Cent Distribution of Female Population According to Age: NFS, 1975 (Household Schedule) and 1970 Census of Population

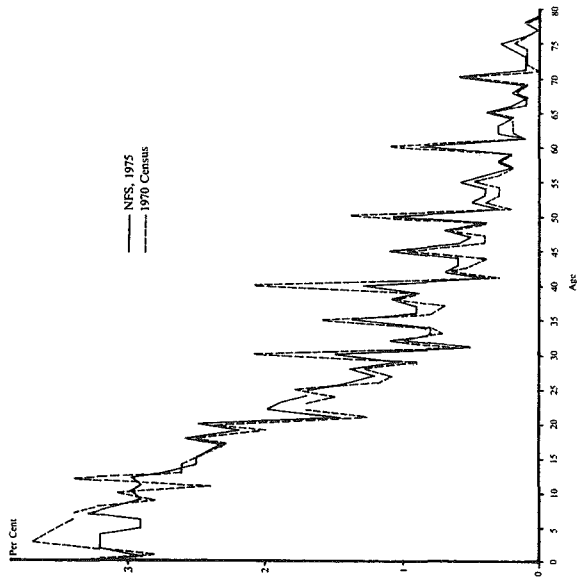


Figure 3. Per Cent Distribution of Female Population According to Age, by Area of Residence

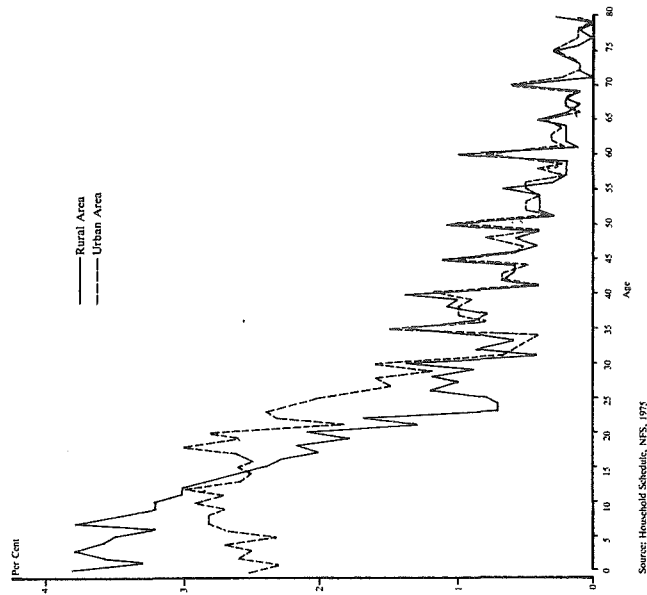


Figure 4. Preference for Digits in the Reporting of Age Among the Female Population, 10-79 Years of Age, by Urban and Rural Area, Measured by the Differences From 10 Per Cent Obtained in the Calculation of Myers' Index

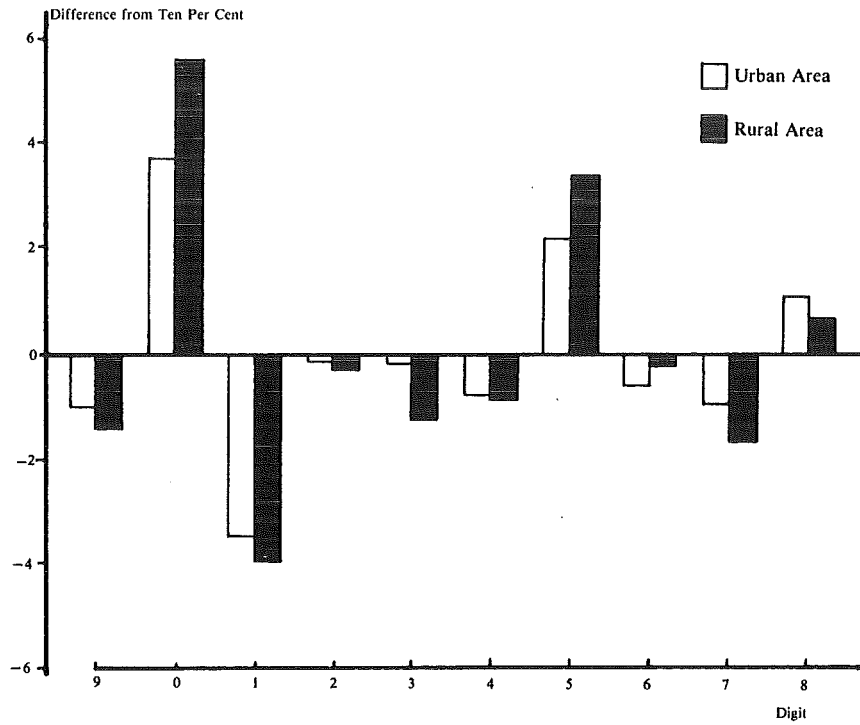


Figure 5. Per Cent Distribution of the Female Population Aged 15-49 According to Age, from the Household Schedule and the Individual Questionnaire

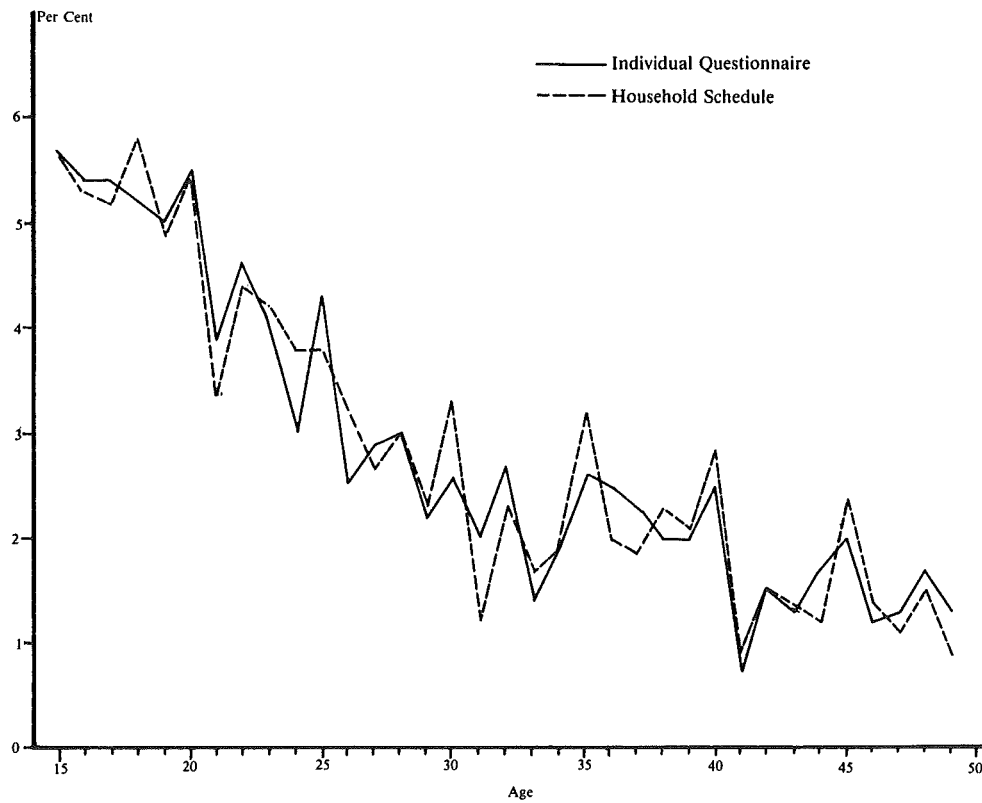


Table 1. Per Cent Difference Between Household Schedule and Individual Questionnaire in the Reporting of Age

Difference in Years	Total	Age Group (Individual Questionnaire)						
		15-19	20-24	25-29	30-34	35-39	40-44	45-49
Younger in Household								
3 or More	6.5	0.4	3.1	6.4	8.3	10.1	19.6	17.1
2	3.6	0.6	4.3	4.0	6.1	4.9	6.0	3.5
1	10.6	7.9	12.8	11.9	11.0	12.4	11.1	8.4
No Difference	64.6	78.4	63.1	59.8	59.1	57.3	50.4	62.1
Older in Household								
1	10.4	9.6	11.8	12.6	11.3	9.8	8.1	7.0
2	2.0	1.8	2.0	2.4	3.0	2.0	0.9	1.3
3 or More	2.3	1.3	2.9	2.9	1.2	3.5	3.4	0.4
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Difference in Age Groups	Total	Age Group (Individual Questionnaire)						
		15-19	20-24	25-29	30-34	35-39	40-44	45-49
Younger in Household								
2 or More	1.5	—	—	0.4	1.2	2.9	6.4	6.2
1	6.8	—	6.7	9.4	9.1	9.8	13.2	11.9
No Difference	87.7	96.7	89.1	85.3	84.8	83.3	73.9	81.9
Older in Household								
1	3.5	3.1	3.6	4.2	4.0	3.4	6.4	—
2 or More	0.5	0.2	0.6	0.7	0.9	0.6	—	—
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: NFS, 1975

Table 2. Per Cent Distribution of Women Aged 15-49 According to Age, for the Total Population, by Area of Residence and by Level of Education: 1969-1971, 1970, and 1975

Characteristics	Age						
	15-19	20-24	25-29	30-34	35-39	40-44	45-49
ALL							
NFS Household Schedule							
Total	26.7	21.2	15.0	10.4	11.5	10.3	4.9
Non-interviewed*	26.5	21.1	15.1	10.2	11.5	8.1	7.5
NFS Individual Questionnaire							
1970 Census	26.4	19.5	14.4	12.0	11.9	9.2	6.6
Demographic Survey, 1969-1971	26.0	18.4	14.2	12.3	12.4	10.1	6.6
AREA OF RESIDENCE							
URBAN							
NFS Individual Questionnaire	27.3	21.9	16.0	11.4	10.2	6.9	6.3
1970 Census	27.1	20.2	14.5	11.8	11.2	8.8	6.4
RURAL							
NFS Individual Questionnaire	26.2	20.2	13.6	10.0	12.7	8.5	8.8
1970 Census	26.2	18.9	14.5	12.1	12.2	9.5	6.6
EDUCATION							
NFS Individual Questionnaire							
None	18.0	19.3	10.4	10.4	15.4	11.8	14.7
1-3 years	18.1	16.5	13.4	13.5	16.8	12.5	9.1
4-5 years	32.2	19.2	18.3	11.8	8.5	5.0	5.1
6+ years	34.7	27.0	16.6	8.0	6.9	3.5	3.3

* Women interviewed in the Household Schedule but not with the Individual Questionnaire.

Census and in the Demographic Survey carried out between 1969 and 1971. Except for the 40-44 and 45-49 age groups, no large differences are observed in the distribution by age groups in both NFS Questionnaires. In the Individual Questionnaire, the proportions of women aged 40-44 and 45-49 are smaller and larger, respectively, than the corresponding proportions in the Household Schedule.

The high percentage of women in the 35-39 age group, which in both cases exceeds that of the previous group, 30-34, is very noticeable. Both the Demographic Survey and the 1970 Census also show similar distortions, but it seems more pronounced in the National Fertility Survey.

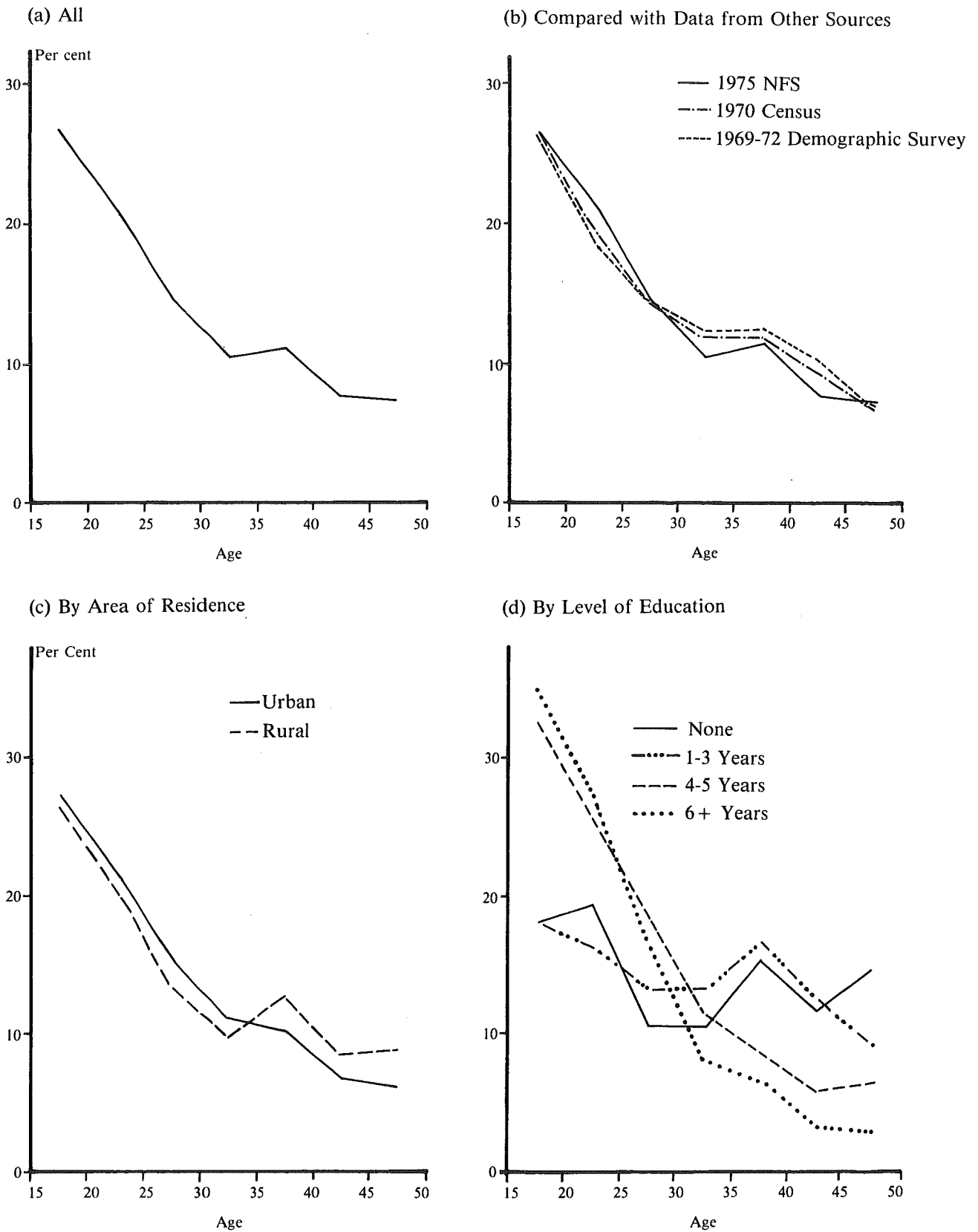
The fact that this distortion manifests itself at two different moments (1970) and (1975) eliminates the possibility that it arises from some real factor, such as international migration.

It is unlikely that the exaggeration of this group originates from a sampling bias since the distortion is even greater for non-interviewed women. In consequence, it seems more likely that the women both in the 30-34 and the 40-44 age groups have transferred themselves into the 35-39 group, which would explain why these two groups appear with relatively low population percentages. This type of transference, especially that of women who are really 40-44, has also been observed in other Latin American countries (United Nations, 1966; Guzman, 1978a) and is explainable by the fact that women over 40 have some resistance to admitting that they have passed the age of 40. As we point out further

on, the women who transferred themselves to this 35-39 age group have a very high parity. A transference of women over 40 would have this effect, since they would be women who, being older, consequently would have a higher parity. In the case of the possible transference of women aged 30-34 to the next higher group, the situation is different. What has probably happened is that women in this group have been transferred to the 35-39 group through an estimation made by the interviewer based on the number of their children, so that women who had a very high parity have been estimated to be older than they really are.

As can be seen from Table 1 and Figure 6, the concentration of population in the 35-39 age group consists mainly of women with less education and of women living in rural areas. The 1970 Census data are similar to the NFS data, by area of residence. The percentages of the population according to the level of education in each of the age groups 30-34, 35-39 and 40-44 was calculated, and the ratios of the 35-39 group to the average for the three groups were obtained. For women with no education, one to three years, and four or more years of education, the ratios were 1.39, 1.29, 1.23, 1.18, and 1.07, respectively. Thus, we may conclude that the 35-39 group contains women of other age groups, and that proportionally it contains more women living in the rural areas and in the lower education levels than the other age groups. This distortion must be especially borne in mind in the analysis of the information involving the education variable.

Figure 6. Per Cent Distribution of Women Aged 15-49 According to Age Group, by Area of Residence and by Level of Education, and NFS Compared with Data from Other Sources



Source: Individual Questionnaire, NFS, 1975.

4 Nuptiality

In many Latin American countries, the study of nuptiality acquires a special character due to the fact that a substantial part of all unions are not legal, and therefore are not registered in the vital statistics of the country. In at least five countries (Guatemala, Honduras, Panama, El Salvador, and the Dominican Republic), it was found in censuses carried out in the early Seventies, that more than half of all currently married women aged 15 to 49 years lived in consensual unions (Camisa 1977). For the Dominican Republic, the percentage was 51.7.

The study of legal nuptiality based on information from the vital statistics is not always successful, owing, in many cases, to the manner in which these data were collected and presented. A substantial part of the registered marriages are second or third unions which are legalizations of already existing consensual unions, and it is not always possible to know, on the basis of the register statistics, the extent to which this occurs.

Faced with such limitations of the basic sources of information, the data collected in the present survey make an important contribution to the investigation of nuptiality and its relation to fertility and other demographic and socio-economic variables.

In this chapter we intend to evaluate the quality of these data by a study of their internal consistency and a comparison with census data.

4.1 INTERNAL CONSISTENCY OF THE DATA OBTAINED IN THE NFS

The NFS investigated marital status in the Household Schedule, by means of two questions: Has this person ever been legally married or in a consensual union? If the reply was "yes", the interviewer went on to ask the specific marital status. These questions were asked before the questions on fertility. In the Individual Questionnaire, however, the subject was investigated in greater depth. Apart from the current marital situation, a complete history of the woman's nuptiality was obtained (Marriage History), including questions about dates of entry and dissolution of unions and type of union. In the case of the Dominican Republic the questions on Marriage History were placed after the Maternity History and questions on the use of contraceptive methods.

Table 3 shows the distribution of women aged between 15 and 49 by marital status, according to the Household Schedule and the Individual Questionnaire. For the former, there are two separate groups of women, those interviewed and not interviewed with the Individual Questionnaire³. Comparing columns 2 and 3, we observe that there are no important differences between these distributions, and therefore there is no evidence of bias in the selection of women for the individual interview. A similar result can be seen in the comparison of proportions of ever-married women by age groups for interviewed and not interviewed women (Table 4).

It may be expected that the quality of information is better in the data obtained through the Individual Questionnaire. A comparison between columns 3 and 4 (Table 4) shows a slight increase in the proportion of ever-married women. The proportion of married

women decreases slightly, and that of women living in a union increases (Table 3). Comparison of the marital status reported in the Individual Questionnaire and that reported in the Household Schedule may indicate the direction taken by these inconsistencies. Table 5 shows the results of this cross-tabulation, while Table 6 shows the percentage of women who reported their marital status consistently in both questionnaires, according to marital status and age group in the Individual Questionnaire. Among all women, 93 per cent reported their marital status consistently in both questionnaires.

The Individual Questionnaire has led to a re-classification of some legal marriages as consensual unions and vice versa. However, only 2.5 per cent of the women reported as single in the Household Schedule were

3. In effect, the group of women interviewed includes only those women for whom Individual data could be matched with the corresponding Household data.

Table 3. Per Cent Distribution of Women Aged 15-49 According to Current Marital Status, as Reported in the Household Schedule for Women Interviewed and Not Interviewed and in the Individual Questionnaire

Current Marital Status	Household Schedule			Individual Questionnaire (4)
	Total (1)	Not Interviewed (2)	Interviewed (3)	
Single	27.8	27.8	27.9	27.6
In a Legal Union	22.1	22.1	22.2	21.7
In a Consensual Union	34.2	33.8	35.2	36.3
Widowed	1.6	1.6	1.6	1.3
Divorced or Separated	14.3	14.7	13.0	13.0
Ever in a Union	72.2	72.2	72.1	72.4
Total	12901	9845	3056	3115

Source: Household Schedule and Individual Questionnaire, NFS, 1975

Table 4. Percentage of Women Ever in a Union, by Current Age, as Reported in the Household Schedule for Women Interviewed and Not Interviewed and in the Individual Questionnaire

Current Age	Household Schedule			Individual Questionnaire (4)
	Total (1)	Not Interviewed (2)	Interviewed (3)	
15-19	27.4	27.3	26.7	27.7
20-24	71.1	70.6	73.2	73.7
25-29	90.2	90.2	90.3	90.4
30-34	96.6	96.5	95.4	95.2
35-39	98.4	98.4	97.9	98.3
40-44	98.1	98.1	96.5	97.1
45-49	97.9	97.2	97.4	97.8

Source: Household Schedule and Individual Questionnaire, NFS, 1975

reported as ever married in the Individual Questionnaire.

Divorced or separated women show the lowest percentage of consistent answers (86 per cent). The percen-

tage of consistent responses does not vary much by age group, except for greater consistency for the age group 15-19.

Table 5. Distribution of Women Interviewed in the Individual Questionnaire by Marital Status as Reported in the Individual Questionnaire and in the Household Schedule

Household Schedule	Individual Questionnaire					Total
	Single	Legal Union	Consensual Union	Widowed	Divorced or Separated	
Single	832	1	7	—	13	853
Legal Union	3	619	44	—	12	678
Consensual Union	—	39	1009	1	27	1076
Widowed	—	1	1	40	8	50
Divorced or Separated	7	5	46	1	339	398
Total	842	665	1107	42	399	3055

Source: NFS, 1975

Table 6. Percentage of Women Who Reported Consistently Their Marital Status in Both Questionnaires, According to Marital Status and Age in the Individual Questionnaire

Marital Status	Percentage with Consistent Reports of Marital Status	Age	Percentage with Consistent Reports of Marital Status
Single	98.8	15-19	96.6
Legal Union	93.1	20-24	90.0
Consensual Union	91.1	25-29	90.0
Widowed	95.2	30-34	91.5
Divorced or Separated	85.9	35-39	90.1
		40-44	87.0
Total	92.9	45-49	89.2

Source: NFS, 1975

4.2 DISTRIBUTION OF AGE AND MARITAL STATUS AND COMPARISON WITH CENSUS DATA

In the analysis of the age structure, we observed a concentration of women in the 35-39 age group who were transferred from the adjacent groups; this was particularly true of women living in rural areas and of women with little education. Looking back at Table 4, we can see that the percentage of ever in union women in this group is larger than for the adjacent groups, both in the Household Schedule and in the Individual Questionnaire, which leads us to assume that the indicated bias especially affects non-single women. Table 7 presents the distribution of respondents in the Individual Questionnaire according to marital status and age group. The absolute figures show that many of the women who transferred to the 35-39 age group are women who have declared themselves as legally married (see also Figure 7). As a result, the greatest number of legally married women appear in this age group (158 women in this group, 100 in the 30-34 and 80 in the 45-49 age group). The percentage of legally married women (44.6) therefore is quite high in comparison to that shown in the adjacent groups.

It is not yet clear why the transference should affect legally married women to a greater extent than women in consensual unions, as well as women with little education and women who live in rural areas. Part of

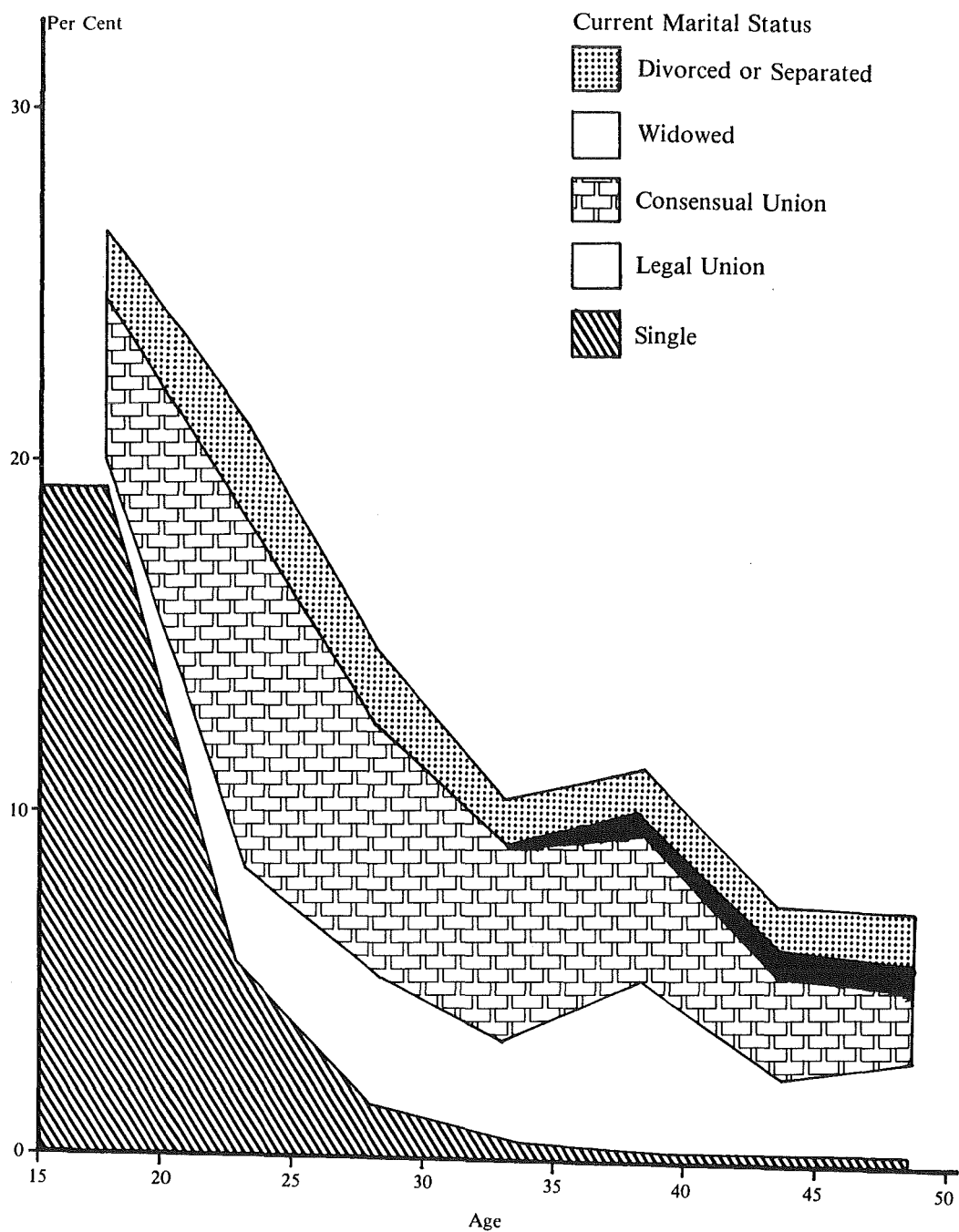
the over-enumeration of women in this age group could well arise from the fact that women of other conjugal statuses have reported themselves as being legally married. In fact, it is possible that the number of women in the single, widowed or divorced and separated categories is higher than the number observed.

In Table 8 we show classification of women according to marital status, by urban and rural area and level of education. The data allow us to reaffirm the existence of a greater proportion of legally married women in this age group. Only in the rural areas and in the category of women with less than 3 years education, do women in consensual unions also seem to contribute to the over-estimation of the 35-39 age group.

Finally, Figure 8(a) represents the distribution by age according to marital status. For in-union women the distributions are compared with the census data (see Figure 8b). In spite of the limitations of the census for the group of consensually married women, the results seem to be in general agreement.

To enable a direct comparison of the survey data with the 1970 Census data, the women registered in the Individual Questionnaire have been classified according to age and marital status at the time of the census, based on data contained in the Marriage History. Both for the total country and for the urban and rural areas the percentage of non-single women is substantially higher in the survey than in the census (see Table 9). By

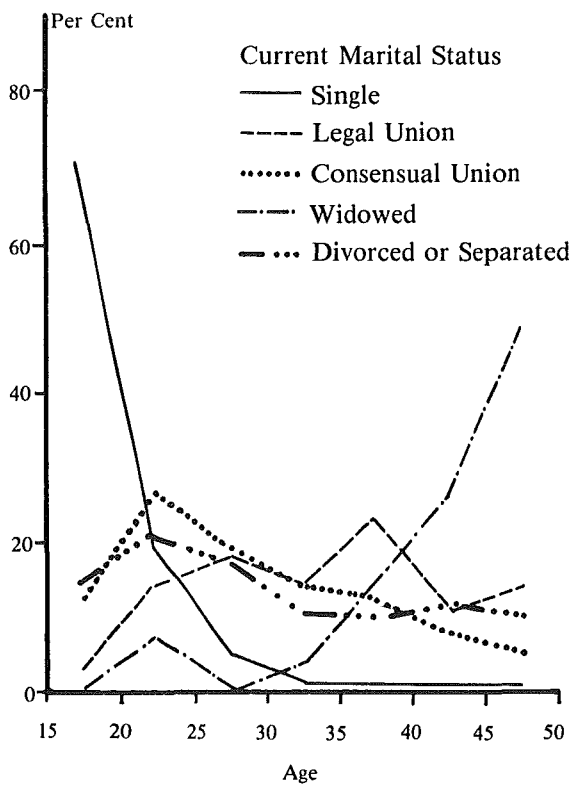
Figure 7. Per Cent Distribution of Women Aged 15-49 According to Current Marital Status, by Age Group



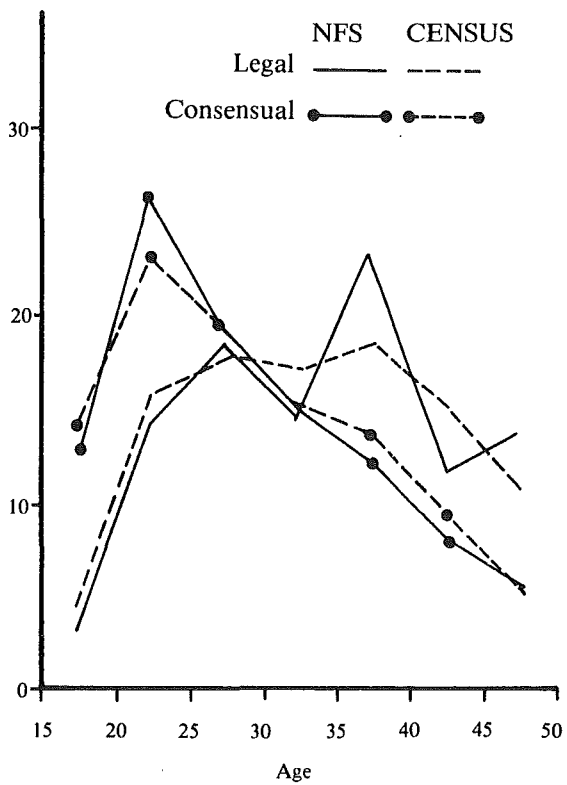
Source: Individual Questionnaire, NFS, 1975.

Figure 8. Per Cent Distribution of Women Aged 15-49 According to Current Marital Status, by Age Group, and Comparison of Women in Legal and Consensual Unions with 1970 Census

(a) Total



(b) Women in Legal and Consensual Unions — Comparison with 1970 Census



Source: Table 5, NFS, 1975.

Table 7. Number and Per Cent Distribution of Respondents According to Age and According to Marital Status

Age Group	Current Marital Status					Total
	Single	Legal Union	Consensual Union	Widowed	Divorced or Separated	
Number of Respondents						
15-19	607	24	147	0	61	839
20-24	173	97	299	3	89	661
25-29	44	124	219	0	72	459
30-34	16	100	166	2	47	331
35-39	6	158	141	6	43	354
40-44	6	80	93	11	49	239
45-49	7	94	66	20	45	232
Total	859	677	1131	42	406	3115
Per Cent Distribution According to Marital Status						
15-19	72.3	2.9	17.5	0.0	7.3	100.0
20-24	26.2	14.7	45.2	0.5	13.5	100.0
25-29	9.6	27.0	47.7	0.0	15.7	100.0
30-34	4.8	30.2	50.2	0.6	14.2	100.0
35-39	1.7	44.6	39.8	1.7	12.1	100.0
40-44	2.5	33.5	38.9	4.6	20.5	100.0
45-49	3.0	40.5	28.4	8.6	19.4	100.0
Per Cent Distribution According to Age						
15-19	70.7	3.5	13.0	0.0	15.0	26.9
20-24	20.1	14.3	26.4	7.1	21.9	21.2
25-29	5.1	18.3	19.4	0.0	17.7	14.7
30-34	1.9	14.8	14.7	4.8	11.6	10.6
35-39	0.7	23.3	12.5	14.3	10.6	11.4
40-44	0.7	11.8	8.2	26.2	12.1	7.7
45-49	0.8	13.9	5.8	47.6	11.1	7.4
Total	100.0	100.0	100.0	100.0	100.0	100.0

Source: Individual Questionnaire, NFS, 1975

definition, the census included as single all women who were separated from consensual unions and considered as married those who had been separated from legal unions. This tends to overestimate the percentage of legally married women, but mainly underestimates the proportion of ever-in-union women. To this effect must be added the under-registration of non-legal unions in censuses. The differences in definition of marital status largely explains the discrepancy of nearly 15 per cent between the percentages of women ever in a union shown in Table 9.

The same kind of reconstruction of nuptiality data from the survey was made for each specific marital status, based on the information about the dates of entry and end of the unions by type of dissolution and type of union. The results are shown in Table 10. The main differences can be observed among single women and women in consensual unions. The percentage of single women, as a complement to ever-in-union women, is overestimated in the census. In the case of legally married women, the census figures are consistent

with those of the survey. On the other hand, the percentage of women in consensual unions is substantially lower in the census. In the latter, the group of divorced and separated women is also underestimated, since, as we have noted before, separated women who had been legally married were included as still being married and women separated from consensual unions were registered as single.

It is worth noting that the percentage of women in consensual unions in the 30-34 age group is the same as in the census. We must remember that women aged 30-34 as of the 1970 Census are the same cohort of women aged 35-39 at the time of the survey. Thus, this may suggest that some women in consensual unions belonging to the neighbouring age groups have misreported both their age and their marital status. Although this conclusion is based on the supposition that the women are simultaneously misreporting marital status and age, it may be a partial explanation of the observed distribution.

Table 8. Number of Women Ever in a Union, by Current Marital Status, by Area of Residence, and by Level of Education

Age Group	Urban Area						Rural Area					
	Current Marital Status						Current Marital Status					
	In a Legal Union	In a Consensual Union	Other Marital Status	Total	In a Legal Union	In a Consensual Union	Other Marital Status	Total				
0-3 Years Education												
15-19	2 (2.2)	20 (21.7)	70 (76.1)	92	0 (0.0)	23 (33.5)	105 (66.5)	158				
20-24	9 (9.5)	60 (63.1)	26 (27.4)	95	13 (8.5)	110 (71.9)	30 (19.6)	153				
25-29	9 (15.5)	35 (60.3)	14 (24.2)	58	11 (10.3)	81 (75.7)	15 (14.0)	107				
30-34	16 (21.3)	41 (54.7)	18 (24.0)	75	18 (19.6)	61 (66.3)	13 (14.1)	92				
35-39	32 (40.5)	31 (39.2)	16 (20.3)	79	63 (42.9)	71 (48.3)	13 (8.8)	147				
40-44	14 (23.0)	21 (34.4)	26 (42.6)	61	38 (35.8)	55 (51.9)	13 (12.3)	106				
45-49	11 (21.2)	14 (26.9)	27 (51.9)	52	49 (43.8)	44 (39.3)	19 (17.0)	112				
4+ Years of Education												
15-19	20 (5.4)	37 (10.0)	313 (84.6)	370	2 (0.9)	37 (16.9)	180 (82.2)	219				
20-24	60 (22.0)	59 (21.6)	154 (56.4)	273	15 (10.7)	70 (50.0)	55 (39.3)	140				
25-29	78 (37.8)	56 (27.2)	72 (35.0)	206	26 (29.5)	47 (53.4)	15 (17.1)	88				
30-34	50 (43.5)	38 (33.0)	27 (23.5)	115	16 (32.7)	26 (53.2)	7 (14.1)	49				
35-39	44 (47.8)	26 (28.3)	22 (23.9)	92	19 (52.8)	13 (36.1)	4 (11.1)	36				
40-44	24 (42.1)	11 (19.3)	22 (38.6)	57	4 (26.7)	6 (40.0)	5 (33.3)	15				
45-49	24 (44.4)	7 (13.0)	23 (42.6)	54	10 (21.4)	1 (7.1)	3 (21.4)	14				

* Figures in brackets refer to percentage of women by marital status in each age group

Source: NFS, 1975

Table 9. Percentage of Women Ever in a Union, by Age Group at the Date of the 1970 Census: 1970 Census and NFS, 1975

Age at Census	Total		Urban		Rural	
	Census	NFS	Census	NFS	Census	NFS
15-19	22.3	34.8	18.5	29.7	25.7	41.3
20-24	60.8	81.2	54.7	76.2	66.3	88.0
25-29	83.1	92.6	74.3	90.7	81.1	95.2
30-34	84.6	96.4	80.1	93.8	85.5	98.9
35-39	83.5	99.6	81.5	100.0	87.1	99.2
40-44	83.9	96.4	80.2	95.7	86.0	97.1
45-49	80.0	-	78.8	-	85.8	-
Total	60.7	75.0	56.2	70.5	64.5	80.2

Sources: 1970 Census and Marriage Histories from the NFS, 1975

Table 10. Per Cent Distribution of Women According to Marital Status, by Age Group at the Date of the 1970 Census: 1970 Census and NFS, 1975

Marital Status at the Date of the 1970 Census	Age Group at the Date of the 1970 Census												Total	
	15-19		20-24		25-29		30-34		35-39		40-44		15-44	
	NFS	Census	NFS	Census	NFS	Census	NFS	Census	NFS	Census	NFS	Census	NFS	Census
Single	54.4	77.6	11.5	39.2	3.4	22.0	0.6	16.9	0.0	15.4	0.0	16.5	16.5	39.3
Legal Union	7.7	5.5	23.0	23.1	30.9	35.1	46.3	41.1	37.1	44.7	45.7	46.8	28.4	27.3
Consensual Union	31.0	16.4	51.7	36.3	53.4	40.8	39.1	39.2	42.8	36.1	33.5	30.7	41.8	31.2
Widowed	0.4	0.1	1.3	0.2	0.6	0.5	1.4	1.0	3.9	1.7	6.4	3.4	1.8	0.8
Divorced or Separated	6.5	0.4	12.5	1.2	11.7	1.6	12.6	1.8	16.2	2.1	14.4	2.6	11.5	1.4
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Marital Histories of NFS, 1975

4.3 DIGIT PREFERENCE IN REPORTING NUPTIALITY

The reporting of age among women in union does not present major differences concerning a preference for certain digits. For both legal and consensual unions, important preferences can be seen in the ages 20, 22, 28, 30, 40 and 45 (see Figure 9). It is evident from this figure that the overestimation of the 35-39 group does not really arise from a digit preference, but that there has been a transference to this group. In all ages of this particular group, for legally married women, there is an exaggerated number of women, even for the digits which are usually rejected.

The distribution of the women according to years elapsed since first union (date of survey minus date of first union) shows digit preference, most importantly for women with recent unions, i.e. unions of 2, 5, 10 and 12 year durations. A similar pattern emerges in the distribution by year of first union (see Figure 10). The latter analysis concerning digit preference (not shown) has been done according to urban and rural area, education and type of first union, without observing any important differences among the subgroups studied. Additionally, no correlation was found between poor age reporting and poor duration of union reporting, of the type found by Goldman et al (1979) for the Nepal Fertility Survey.

Finally, digit preference in reporting the age at first union is very small (Figure 11) except perhaps for the age of 15, as can be seen both in rural and urban areas, as well as according to type of union.

4.4 AGE AT FIRST UNION

(1) General characteristics

One of the most important variables in the demographic analysis of nuptiality is the mean age at first union of the women.

The National Fertility Survey obtained information that enables us to analyze the patterns of age at first union of the respondents as well as the possible changes during the last few years. For this analysis, five-year cohorts of women were used, defined by age at the time of the survey.

On the basis of the distribution of the women according to age at first union and five-year age group, we can reconstruct the nuptiality experience of each cohort during its childbearing period. Thus, for each cohort, the percentage of ever-in-union women in each age group has been calculated, by means of the quotient of the cumulative number of women married before each age and the total of women in the cohort, including never-in-union women. Any modification in the nuptiality patterns, especially of the age at first union, should be reflected in these proportions.

In Table 11 the results of the above calculation are shown. As these proportions are cumulative up to exact ages, the experience of the cohort will be cut short at the initial current age of each five-year cohort. For example, for women aged 20-24 at the time of the survey the proportion ever married is known up to the exact age of 20.

As can be seen from Table 11, there is no clear trend in nuptiality except possibly for later age at marriage for the younger cohorts. As we noted earlier, the cohort of women aged 35-39 has exaggerated proportions ever in union and includes a group of women, mainly non-single, who come from the adjacent cohorts (30-34 and 40-44). Furthermore, due to their low education, these

women probably also have a pattern of early nuptiality.

Another way of viewing this analysis is through the proportions of women ever in a union, by age group, reconstructed for periods prior to the survey. As may be seen in Figure 12, the erratic behaviour over time shown in these proportions, with the possible exception of the younger cohorts (under 30 years), seems more due to errors in the data than to real trends in nuptiality.

In the early ages, the data show a recent change in nuptiality, since we notice low proportions of non-single women for the time periods nearest to the survey. The proportion in the 15-19 age group declined from 43 per cent 10 years before the survey to 37 per cent 5 years before the survey, and to 28 per cent at the time of the survey. These low proportions in recent years may also be explained by an omission of unions by younger women but it seems more likely that there has been a recent increase in age at marriage.

We note further deviations for the cohort of women aged 45-49 at the time of the survey. Although the final proportion of non-single women seems to be consistent with expectation, the cumulative proportions for previous periods are generally lower than the cumulative proportions for the 40-44 cohort. This could be explained by the displacement of the date of the first union. Such displacement could have occurred if women reported their current union as their first (e.g. if previous unions are consensual), or if the existing consensual union had been legalized and the date of the legalization was reported. These ideas are confirmed when we observe the mean number of unions for each cohort, which decreases from 1.63 for women aged 40-44 to 1.45 for women aged 45-49 (Table 12)⁴.

In summary, even though the final proportions of ever-in-union women seem to be in error only in the 35-39 age group, re-constructed proportions for the cohort of women aged 45-49 seem to be affected by displacement and/or omission of first (consensual) unions.

(2) Estimation of age at first union by application of the Coale Nuptiality Model

Working with the information on nuptiality patterns from some European countries, Australia, USA and Taiwan, from the end of the last century to the beginning and middle of the present century, Coale found that the curves of the proportion of ever-married women by age were very similar in different moments and in different countries once they were represented as arising from a common origin and with the convenient adjustments of both the horizontal and vertical scales. The curves differed in three parameters: the age of start of marriage (ao), the rate in which the proportion married increases with age (K), and the proportion married by the end of the childbearing period (C) (Coale, 1971). In the present study we applied this

4. Further evidence of the existence of omission of early unions for the cohort aged 45-49 has been obtained by calculating the percentage of consensual unions, according to cohort, for women who married or began living in a union before the age of 25, standardized according to the age distribution of the women married before that age. The following percentages have been calculated in relation to the total of women married before the age of 25. As may be seen, they are fairly low in the 45-49 group, probably as a result of omission of unions. In the 35-39 group this percentage is also low, which may be partly caused by the transference of ever-married women to this group.

Age groups	25-29	30-34	35-39	40-44	45-49
Per Cent of Women Whose First Union Was Consensual	67.3	65.2	55.0	60.7	44.2

Figure 9. Per Cent Distribution of Women Currently in a Union According to Single Years of Age, by Type of Union

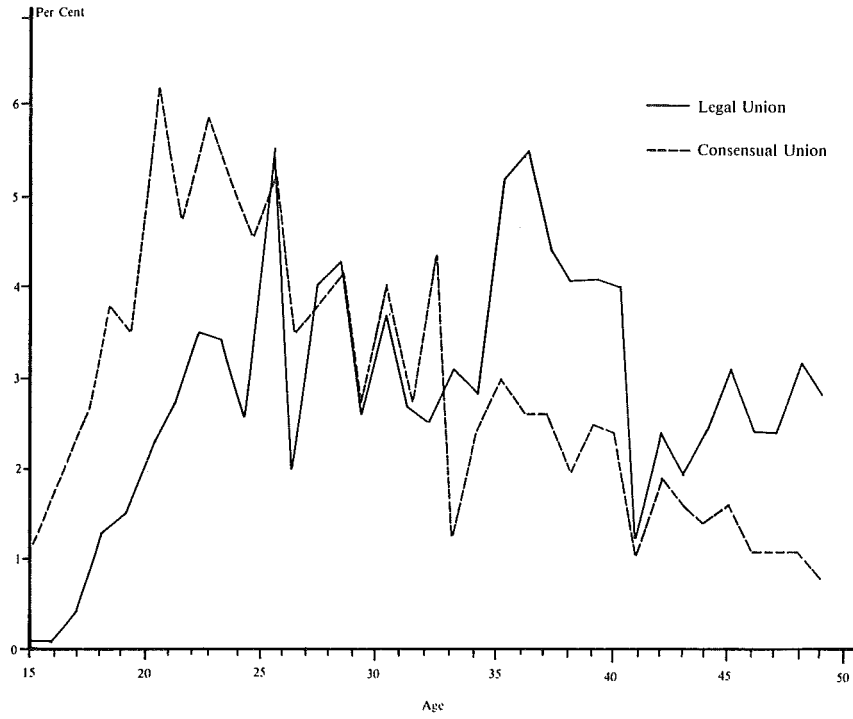


Figure 10. Per Cent Distribution of Women Ever in a Union According to Years Since First Union, by Type of Union

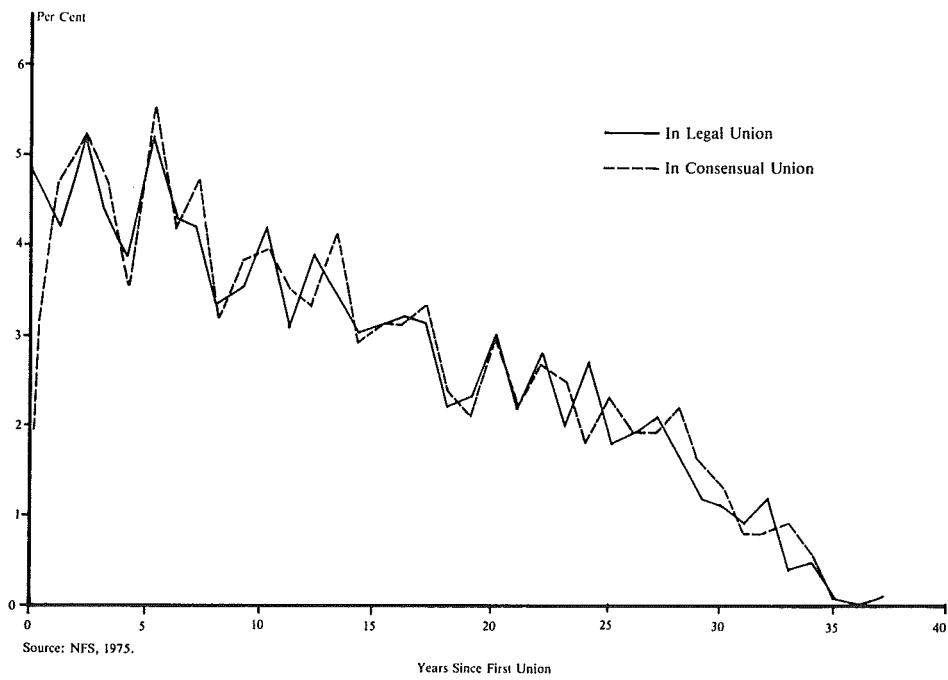


Figure 11. Per Cent Distribution of Women Ever in a Union According to Age at First Union, by Urban and Rural Area and by Type of First Union

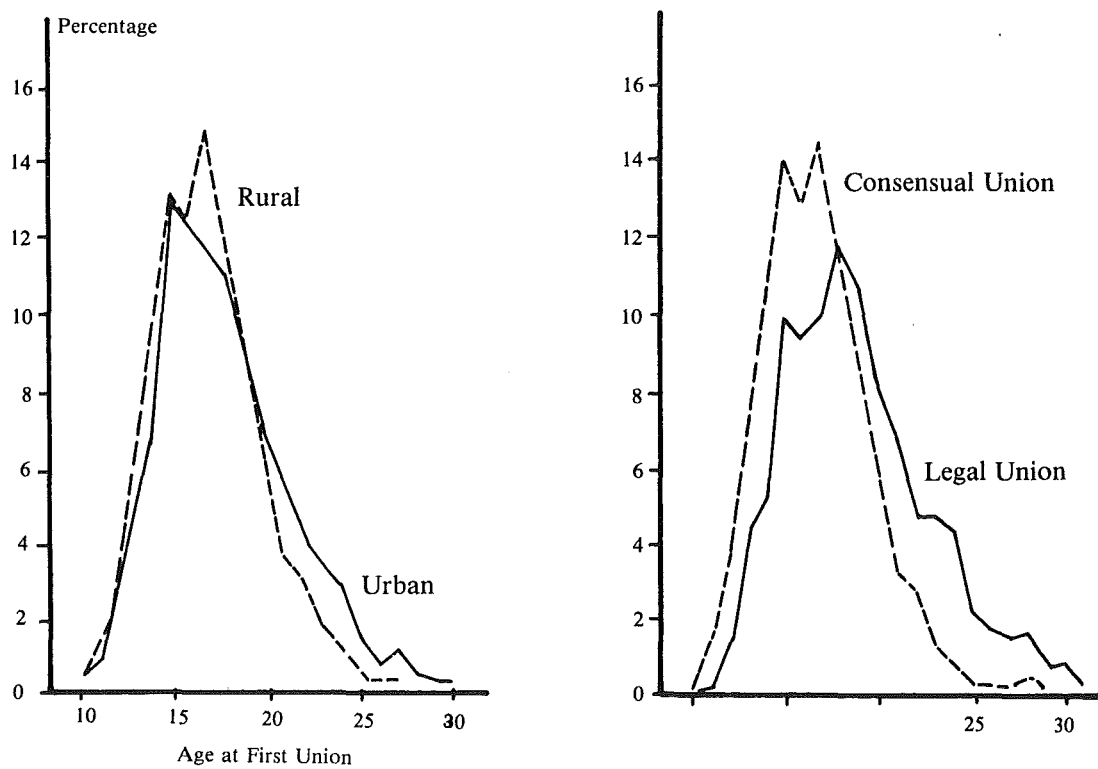


Table 11. Cumulative Percentage of Women Entering a Union by Specified Age, by Current Age

Age	Current Age						
	15-19	20-24	25-29	30-34	35-39	40-44	45-49
11	0.0	0.0	0.2	1.2	0.3	0.4	0.0
12	0.6	0.6	0.9	2.7	1.4	1.3	0.4
13	1.5	2.1	4.1	3.9	4.2	5.0	3.4
14	3.9	7.4	8.2	7.9	10.7	14.2	8.2
15	8.9	13.2	16.3	14.5	18.4	18.0	14.7
16		22.5	28.5	22.1	29.7	29.3	24.1
17		32.2	41.2	34.4	38.7	40.6	30.6
18		42.8	50.8	48.0	51.4	49.4	41.8
19		52.4	60.1	61.0	60.7	59.8	52.2
20		61.4	69.3	66.8	69.8	68.6	63.4
21			74.5	75.5	77.7	75.3	69.0
22			78.4	81.0	82.8	77.8	74.6
23			82.8	83.1	86.2	82.8	80.6
24			85.0	85.2	89.8	85.8	86.2
25			88.0	88.2	92.1	88.7	88.4
26				90.0	94.6	89.5	89.2
27				92.1	95.8	90.8	90.9
28				93.4	96.0	92.5	92.7
29				94.0	97.5	92.9	94.4
30				94.6	97.7	95.0	94.8
31					97.7	95.0	95.7
32					98.0	96.2	95.7
33					98.0	96.2	95.7
34					98.0	96.2	95.7
35					98.0	96.2	95.7
36						97.1	96.1
37						97.1	96.1
38						97.1	96.1
39						97.1	97.0
Total Number of Women	839	661	459	331	354	239	232

Source: NFS, 1975

Table 12. Mean Number of Unions, by Current Age

Current Age	Mean number of unions
15-19	1.12
20-24	1.31
25-29	1.45
30-34	1.46
35-39	1.54
40-44	1.63
45-49	1.45
Total	1.42

Source: NFS, 1975

model⁵ with a two-fold purpose: firstly, with the aim of obtaining an adjusted measurement of the mean age at first union of each cohort for the whole childbearing period, i.e. by completing the truncated experience of the younger cohorts; and secondly, to discover if the deviations between the real data and the model are able to indicate errors in the survey data.

Table 13 summarizes the results of the application of Coale's Model to the data obtained in the Household Schedule (based on the percentage of ever-in-union women) and to the data in the Individual Questionnaire for each cohort in particular (Camisa, 1977).

5. There is a computer programme which facilitates the application of this model, developed by Germán Rodríguez and James Trussell.

Table 13. Mean Age at First Union and Parameters Estimated Using the Coale Nuptiality Model, According to the Household Schedule and the Individual Questionnaire

Cohort (Current Age Group)	Parameters of the Model ^a			
	Mean Age at First Union	ao	K	C
Household Schedule ^b	20.43	12.67	0.683	0.985
Individual Questionnaire				
Total ^b	20.18	12.56	0.671	0.978
20-24	19.51	11.20	0.739	0.976
25-29	18.50	11.50	0.616	0.939
30-34	19.04 (20.18) ^c	10.73	0.732	0.972
35-39	18.54 (19.91) ^c	10.96	0.668	0.987
40-44	18.71	10.54	0.719	0.977
45-49	19.34	11.15	0.722	0.970

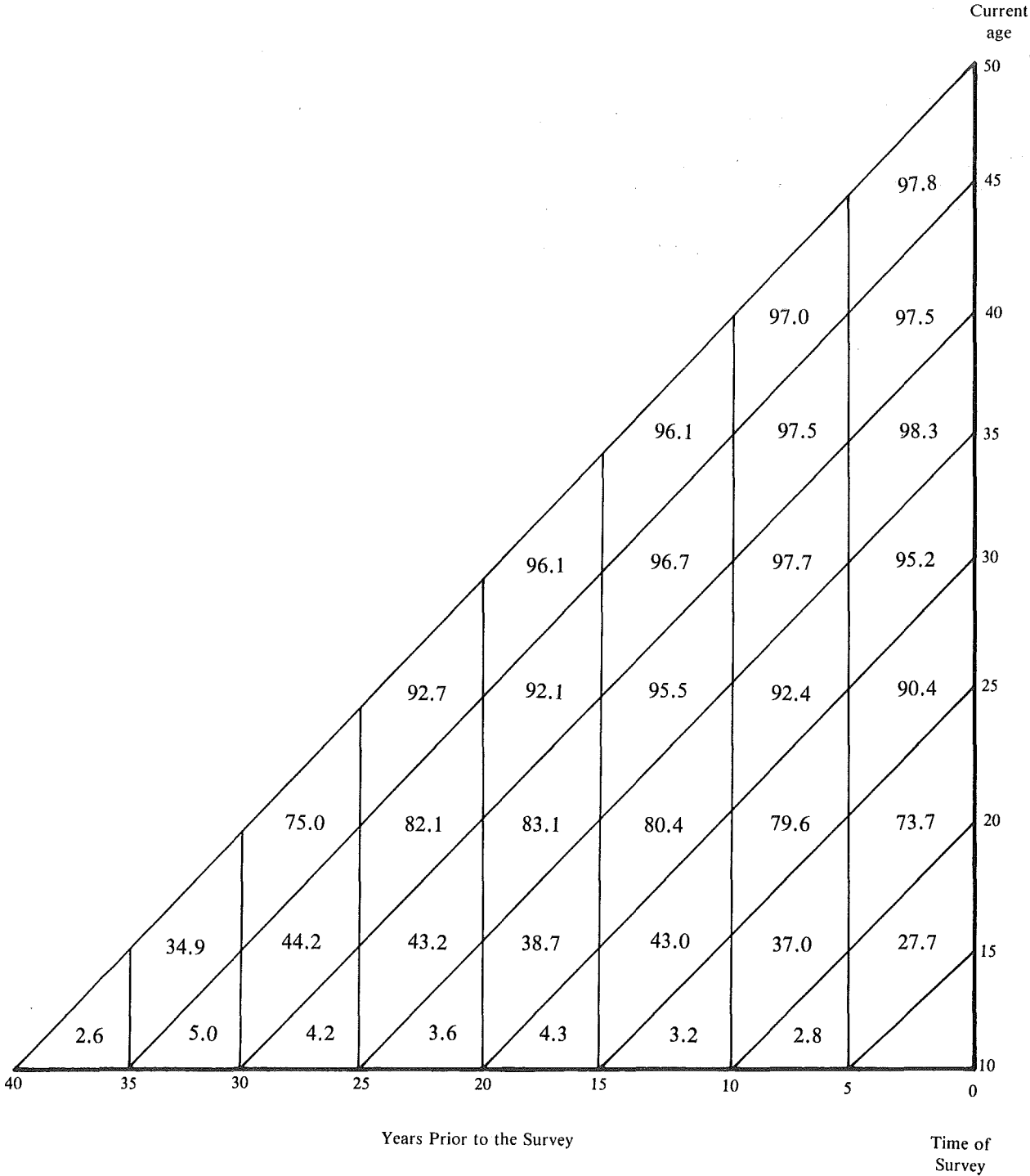
^aao represents the age of beginning of nuptiality, K, the rate at which the proportion of ever-in-union women increases with age relative to the model and C the final proportion of ever-in-union women at the end of the child-bearing period (Coale, 1971)

^bSynthetic cohort of women.

^cEstimate by Z. Camisa, based on the information from the 1960 and 1970 population censuses. (Camisa, 1977)

Source: NFS, 1975

Figure 12. Percentage of Women Ever in a Union, by Current Age and by Years Prior to the Survey, Reconstructed from Age at First Union



Source: NFS, 1975

Prior to the NFS, data for the Dominican Republic did not indicate any change in the mean age at first marriage.⁶ Nevertheless, the application of the model to our data show a slight decrease in the mean age at first marriage from the 45-49 cohort to the 35-39 cohort followed by an increase in the younger cohorts. The mean age for the 45-49 cohort (19.3) is higher than the mean for all remaining cohorts except the cohort aged 20-24. As we have already seen, this seems to be the result of a tendency to transfer the date of first marriage towards the present time or to declare second or third unions as first unions. On the other hand, the cohort of women aged 25-29 at the time of the survey shows a low age at first union, as well as a low estimated proportion of non-single women at the end of the childbearing period (93.9 per cent).

The estimation of age at first union made by Camisa (1977) for the 30-34 and 35-39 cohorts is also presented in Table 13. Although her estimates are slightly higher (probably due to the fact that census data underestimate the percentages of women in consensual unions), the

trend is consistent with estimates from the survey.

The comparisons between the data observed and those fitted by the model are presented in Figure 13. Generally, the fits are quite acceptable, although important discrepancies appear for the older cohorts. The cohort of women aged 30-34 also presents very irregular behaviour, perhaps because some women have been selectively transferred from this cohort.

In summary, the data obtained by the NFS on age at first union seem to indicate that, although no substantial change has taken place in the past in this variable, some change has occurred for the younger cohorts. In the older cohorts the age at first union has possibly been displaced, so that overestimated means for these cohorts may be hiding a more continuous trend towards an older age at first marriage.

6. Bocaz (1979) has applied a linear bilogistic model to the data concerning the age at first marriage of the Dominican Survey. For the most part, his results coincide with the results obtained from the application of the Coale Model.

5 Fertility

The measurement of the current levels and recent trends of fertility is one of the main objectives of the World Fertility Survey programme. In many countries, the Fertility Survey is the main — if not the only — source of information towards reaching these objectives. Nevertheless, as we have already pointed out, the data collected may not always have the reliability necessary for attaining these aims.

The basic information used in this analysis comes from the data obtained in the Maternity History. For each woman interviewed, all fertility events were to be recorded: the date of their occurrence and the type of outcome (live birth, stillbirth or abortion) as well as other related information such as children's current survival status and age at death if not alive.

As indicated above, the information thus obtained may be affected by several types of error, which may have different effects on fertility estimates. These errors may stem from incorrect reporting of the age of the mother, omission of births or displacement of dates of birth.⁷

In this chapter we intend to find out to what extent these errors may be present in the data obtained in the National Fertility Survey.⁸ In the first place we analyse the more general characteristics of the fertility data; secondly, we examine the trends of the fertility by cohort and period prior to the survey.

5.1 GENERAL CHARACTERISTICS OF THE INFORMATION ON FERTILITY

The simplest way of measuring fertility, and generally the most frequently used for comparative analysis between different sub-populations, is through the average number of children ever born per woman, (average parity). Table 14 shows the average numbers of children ever born per woman according to the data from both the Household Schedule and the Individual Questionnaire. The data from the Individual Questionnaire are compared with data from the census, as of the time of the 1970 Census.

In general, no major differences in mean parity can be observed. Nevertheless, for women over 40 years of age, the Individual Questionnaire respondents have a slightly lower parity than the women who had not been interviewed. In the younger ages, greater numbers of children are reported in the Household Schedule, but the differences are small. The total number of births reported in the Individual Questionnaire was 9,181, whereas in the Household Schedule 69 fewer births were reported (Table 15).

In the data from the Individual Questionnaire (Table 14), the mean parity of the 35-39 age group is the same as for the 40-44 age group. Furthermore, the difference between cumulative fertility for the 35-39 age group and for the 30-34 group is quite high (1.8 children), which seems to indicate that some of the women who have transferred to the 35-39 group from the 30-34 age group were women with a high parity. This transference seems explicable if the interviewer had estimated the age of women who did not know their ages by supposing that the greater the number of children, the higher must be the woman's age.⁹ The transfer from the 40-44 age group would also contribute to an overestimate of the mean parity of the 35-39 group.

Looking at the ratios of mean parity between the NFS and the 1970 Census as of the date of the census, we note 5 to 8 per cent higher parity levels from the survey

7. The non-fulfilment of the assumption that mortality has not affected women according to their parity may have the effect of depressing fertility in the more distant periods, if mortality is higher among women with a greater number of children. This bias may have had some importance, since female life expectancy in the years prior to 1960 was below 50 years.
8. A first evaluation of the NFS fertility data was made by Bartlema (1978). He concluded that fertility of the recent periods had been underestimated through omission of live births, with the result that the calculated fertility decline from survey information was greater than the real decline. Bartlema proposed a set of rates which in his opinion represented the country's fertility during the last 15 years.
9. Only an examination of the questionnaires in order to discover cases in which age was estimated could help either to prove or to reject this assumption.

Table 14. Number of Children Per Woman According to Household Schedule and Individual Questionnaire and Comparison of the Census with the Individual Questionnaire, as of the Date of the Census

Age Group	Household Schedule			Comparison with the 1970 Census			
	Total	Not Interviewed	Interviewed	Individual Questionnaire ^a	Individual Questionnaire (1)	Census (2)	Ratio ^b (1) / (2)
15-19	0.2	0.2	0.2	0.2	0.3	0.2	1.08
20-24	1.4	1.4	1.4	1.4	1.7	1.6	1.05
25-29	3.1	3.1	3.1	3.1	3.4	3.3	1.05
30-34	4.7	4.6	4.7	4.6	5.3	4.6	1.15
35-39	6.3	6.3	6.5	6.4	6.1	5.6	1.08
40-44	6.7	6.7	6.4	6.4	6.3	5.8	1.07
45-49	6.9	6.9	6.4	6.6	—	6.0	—
Total	3.1	3.1	3.0	3.0	3.0 ^c	2.8 ^c	1.08

^aAverage parity according to age reported in Individual Questionnaire.

^bThese ratios were calculated using more decimal places than given in the table.

^cThe totals refer to ages 15-44 at the time of the census.

Source: NFS, 1975

Figure 13. Percentage of Ever-in-Union Women, Marrying at Given Ages, by Current Age, According to Observed and Fitted Data

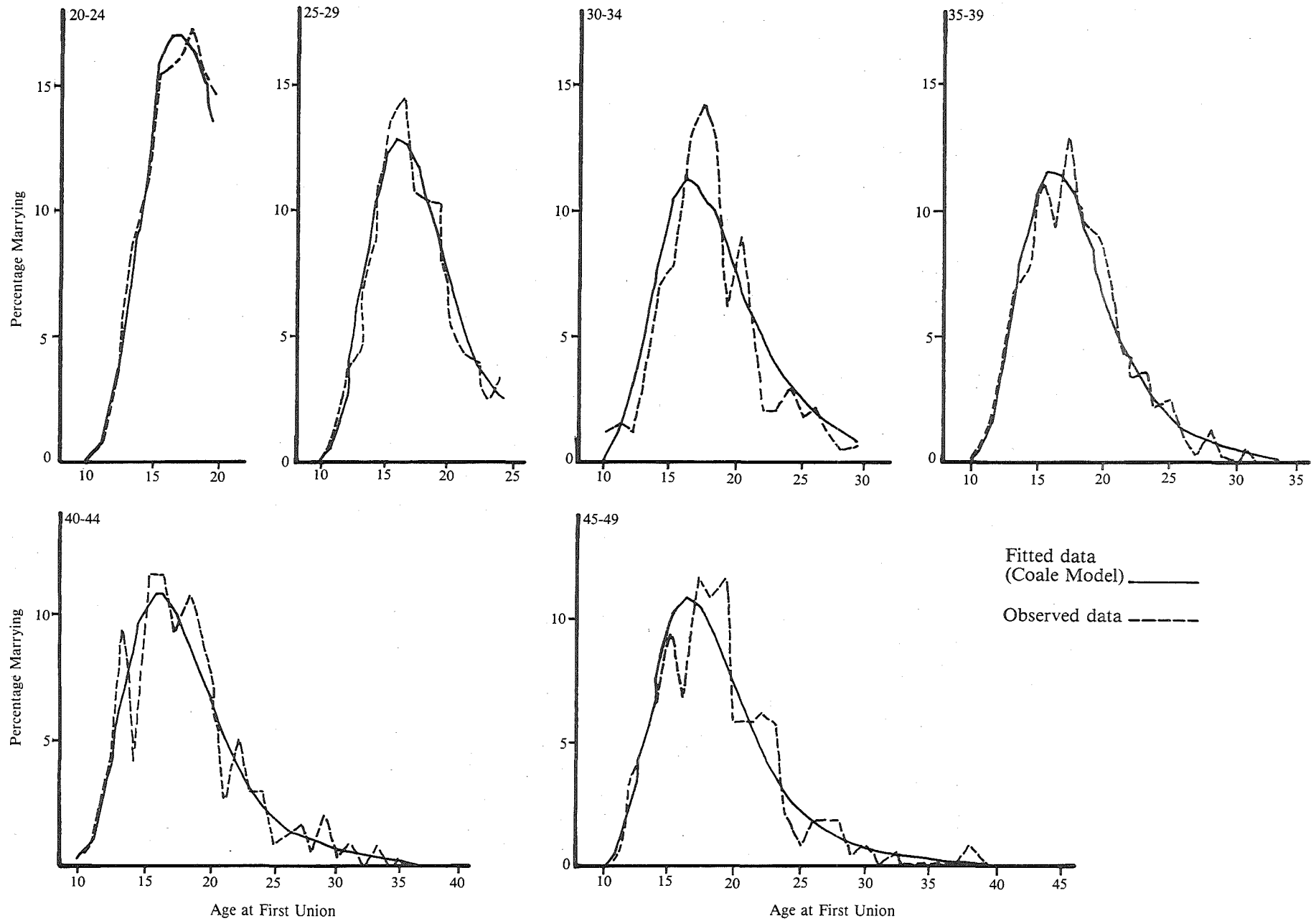


Figure 14. Mean Parity by Current Age, from the Household Schedule and the Individual Questionnaire

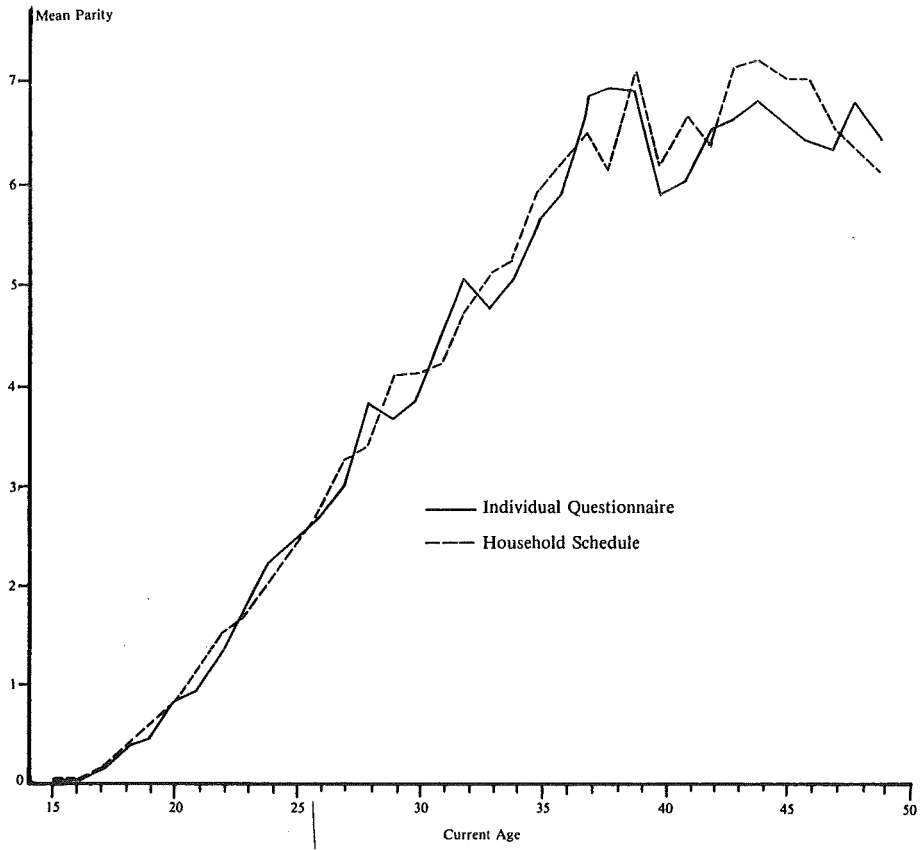


Figure 15. Total Fertility Rate Obtained from the Maternity History and from Other Sources of Information: 1960-1974

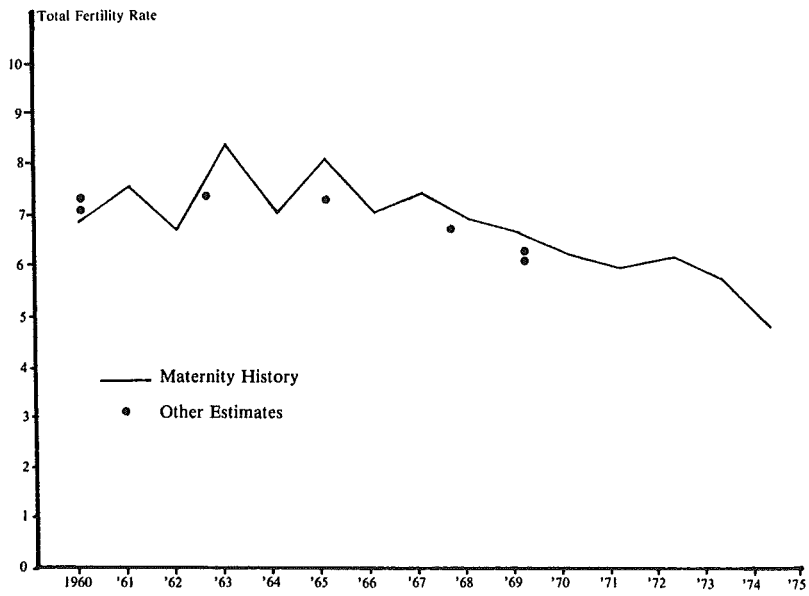


Table 15. Number of Children Reported in the Individual Questionnaire, by Age, and Number of Children Reported for the Same Women on the Household Schedule

Age (in Individual Questionnaire)	Total Number of Children Reported		
	Individual Questionnaire (1)	Household Schedule (2)	Difference (1) - (2) * (3)
15-19	173	178	-5
20-24	875	876	-1
25-29	1,395	1,409	-14
30-34	1,520	1,518	2
35-39	2,237	2,212	25
40-44	1,498	1,469	29
45-49	1,483	1,450	33
Total	9,181	9,112	69

* The differences may not be consistent with those shown on Table 14, since in this table both distributions have been tabulated according to the age reported in the Individual Questionnaire.

Source: NFS, 1975

data. These differences are most likely the result of an omission of children in the census rather than of an overestimation in the survey. Nevertheless, for the 30-34 age group (women of 35-39 years of age at the time of the survey) the mean parity according to the NFS is 15 per cent higher, which is consistent with an exaggeration of fertility of the 35-39 cohort in the information obtained by the survey.

Mean parity by single years of age according to both questionnaires is shown in Figure 14. The Household Schedule data show a fairly regular behaviour up to age 36, but from then onwards there are substantial irregularities in these averages. There is a marked decrease between the ages of 40 and 42, possibly due to transfer of women with higher parity to the 35-39 group. From 44 years onwards parity declines continuously from approximately 7.2 to 6.1 children, seemingly as a result of omissions of live births in the Household Survey. Although this tendency is not as pronounced in the data of the Individual Questionnaire, the mean parity obtained through this interview is even lower than that in the Household Survey after age 38. These data also show a relatively high parity for ages 37, 38, and 39 compared with lower values in neighbouring ages.

Finally we note that from age 39 onwards, the average number of children ever born in the Individual Questionnaire is approximately 6.5 children, a much smaller value than the estimated total fertility rate for the 1960-1970 period.

In summary, the mean parity of women over 40 years of age, in the Individual Questionnaire, is low, as a possible consequence of: (1) omissions of live births, (2) a small selection or non-response bias such that the women interviewed had a slightly lower parity than the parity of the remaining women in the Household Schedule, and (3) age misreporting.

5.2 RECENT TRENDS AND CURRENT LEVELS OF FERTILITY

As has been pointed out, one of the most important findings of the survey is that of a decline in fertility. The total fertility rate seems to have decreased from values as high as 7.5 children in the beginning of the 1960's to levels of 5.6 children for the three-year period 1972-1974, that is to say, a decline of approximately 25

per cent. This decline may have had a very close relation "with the fall of Trujillo and the ensuing greater availability to the population of new sources of information and ideas . . . and the diffusion of the knowledge and methods of family planning" (Consejo Nacional de Población y Familia, 1976).

Family planning activities in the country, although only institutionalized in 1968 with the creation of the Consejo Nacional de Población y Familia, had been developing during several years previous to the formation of the Council through various private institutions, although to a limited extent. The survey data show that of the total ever-in-union women, 97 per cent know of at least one efficient method. Of the same group of women, 47 per cent had never used a method and 27 per cent were currently using a contraceptive method. In general, these percentages are higher for the younger women (except for women 15-19), women living in urban areas and the more educated women.

Fertility rates for the year prior to the survey can be obtained from the Household Survey, based on a question about the date of the last live birth,¹⁰ and from the Maternity History in the Individual Survey. Both sets of rates are presented in Table 16.

This table also includes the structure of the rates by age group, according to the 1972 vital statistics data. We observe that the level of recent fertility seems to be better estimated from the Individual Questionnaire, than from the Household Questionnaire. In general, the pattern of fertility as derived from the NFS is in accordance with that based on vital statistics.

The estimated total fertility rate (TFR) for the last year is higher in the Individual Questionnaire (5.02) than in the Household Schedule (4.72), by approximately 6 per cent.¹¹ An analysis of the recent fertility trends will help in the evaluation of the reliability of these estimates.

Table 17 shows the total fertility rates obtained from the survey data for the 1960-1974 period, together with those of other estimates available (see also Figure 15). There is a clear decline, which is shown not only by the survey data but also by those from other sources. However, the values of the total fertility rates are somewhat higher in 1961, 1963 and 1965 and low in years neighbouring these. It is likely that the political events that occurred in this country in those years have influenced the reporting of the children's birth dates.

10. All live births for which the date of the survey minus the date of birth is below 12 months are included as births of the year previous to the survey. Given that we do not have the day of birth of the child we are in fact considering the births which occurred between 0 and 11.5 months, and this estimation is thus underrated by approximately 4% in both questionnaires. On the other hand, since the women report their fertility of the previous year, the births would have taken place, on average, half a year before. To make the corresponding adjustment to move the 14.5-19.5, 44.5-49.5 age groups to the conventional groups, we applied the procedure described by Camisa (1975).

11. Other estimates of the total fertility rate (TFR) can be obtained on the basis of the mean parity of women aged 20-24 (P_2), 25-29 (P_3) and 30-34 (P_4). The first of these is based on the relation: $TFR = P_3^2/P_2$ (1), and the second one, developed by Brass, $TFR = P_2(P_4/P_3)^4$ (2). Both assume constant fertility in recent years. Brass (1978) argues that if the TFR obtained with formula (1) is lower than the TFR calculated with (2), the first estimate is the more rational of the two. In the present case, the first estimate of 6.80 is lower than the second estimate and appears to be a reasonable estimate of the total fertility rate. Comparing this estimate with the value of 5.02 of the TFR obtained in the Individual Questionnaire, we obtain a difference of 35 per cent, which seems to indicate that the above formulas are not applicable because of the non-fulfilment of the basic supposition of constant fertility.

The total fertility rate appears almost stationary in the years 1970-1972 and decreases strongly in the last calendar year (1974). This decrease may be due to the omission of recent births. Since the estimated TFR for the year prior to the survey (which includes part of the births that occurred in 1974 and those that occurred in 1975 — children under 1 year of age) is higher than the rate obtained for the calendar year 1974, and is also more consistent with the declining trend we have observed, this possible omission of births would seem to affect children of 1 year of age rather than for those

under one year of age. This hypothesis can be reaffirmed by examining Figure 1, where we presented the age structure of the female population, from which it is evident that children one year of age are also in deficit. A possible explanation could be that in the training of interviewers, much emphasis was put on reporting recent births but perhaps not as much on that of children aged one year, but a preference for digits in reporting the age of non-infant children may also have transferred some births.

Table 16. Age Specific Fertility Rates for the Year Prior to the Survey, According to Data Obtained in the Individual Questionnaire and in the Household Schedule

Age Group	Fertility Rates		Percentage Structure		
	Household Schedule	Individual Questionnaire	Household Schedule	Individual Questionnaire	Vital Statistics 1972 ^b
15-19	0.111	0.099	11.8	9.9	8.6
20-24	0.241	0.252	25.5	25.1	22.6
25-29	0.229	0.233	24.3	23.2	24.5
30-34	0.168	0.201	17.8	20.0	20.5
35-39	0.140	0.148	14.8	14.8	14.9
40-44	0.038	0.052	4.0	5.2	6.3
45-49	0.017	0.018	1.8	1.8	2.6
Total	0.944	1.003	100.0	100.0	100.0
TFR ^a	4.720	5.015	—	—	—
Mean Age of Child-Bearing			27.89	28.82	29.49

^aTotal fertility rate

^bSee Ramírez (1974a)

Source: NFS, 1975

Table 17. Total Fertility Rate Derived from Maternity History and from Other Sources of Information: 1960-1974

Calendar Year	Maternity History (NFS)	Other Estimates ^a TFR	Reference Period
1959	—	7.0	(1959-1961)
1960	6.8	7.2	(1960)
1961	7.5		
1962	7.0	7.4	(1962-1963)
1963	8.2		
1964	7.0		
1965	8.0	7.3	(1964-1966)
1966	6.9		
1967	7.2	6.8	(1965-1969)
1968	6.9		
1969	6.7	6.3, 6.2	(1969)
1970	6.2		
1971	6.0		
1972	6.0		
1973	5.8		
1974	4.8		

^aThe first four estimates are based on the population enumerated in 1970 Census, whereas the others have been obtained by indirect methods and through the question about live births during the last year in the 1970 Census (García, 1974).

Table 18 shows the fertility rates by age groups for the 1950-1974 period. For those age groups for which information is available, we observe an increase in fertility rates from the 1950's to the early 1960's. In the 25-29 age group, fertility shows an increase from around 300 per thousand in the last years of the 1950-1955 period to nearly 380 per thousand in 1962-1963. A similar increase seems to have occurred in the 20-24 age group. It seems possible that part of this increase can be explained by omissions of births in the periods more distant from the survey (before 1960), although it is also possible that a pattern of displacement of the date of birth of the children towards the date of the survey may have contributed to the increase.

Table 19 presents the age specific fertility rates for the periods 1960-1964 and 1970-1974, and the proportional decline of these rates between those periods. The large differences shown in different age groups between the two periods do not seem consistent with a regular trend. In the 15-19 age group, the rapid decline is most likely due to an increasing age at marriage in the recent period. In the age group 35-39 the percentage decline is much lower than in the other age groups.

In summary, although the total fertility rate appears to show a consistent decline, at least in the last 10 years, the fertility rates by age group may be somewhat affected by omissions, errors in the reporting of age,

and displacement in the date of birth of the children. These aspects will be examined more closely in the following section on the analysis of fertility rates by cohorts and periods.

Table 18. Age Specific Fertility Rates (per Thousand Women) for Calendar Years

Year	Age							Total Fertility Rate ^a
	15-19	20-24	25-29	30-34	35-39	40-44	45-59	
1950	195.3	320.3						
1951	196.4	257.6						
1952	190.8	305.4						
1953	184.4	264.4	317.0					
1954	192.8	296.3	280.9					
1955	195.8	311.7	311.4					
1956	158.3	288.6	265.7					
1957	208.0	293.6	369.9					
1958	150.6	325.3	256.0	264.2				6.42
1959	220.8	350.6	331.2	321.8				7.56
1960	161.5	317.8	324.2	275.8				6.83
1961	165.0	391.4	356.7	306.6				7.53
1962	178.3	329.9	359.6	253.8				7.04
1963	220.3	385.2	395.7	335.7	211.3			8.24
1964	175.7	359.2	341.8	252.7	163.8			6.96
1965	191.7	394.7	380.2	328.3	209.1			8.02
1966	155.8	318.4	322.3	276.6	204.4			6.89
1967	181.6	336.0	321.0	293.6	215.1			7.23
1968	127.3	315.4	367.8	275.0	193.0	98.1		6.92
1969	162.6	320.1	315.1	283.4	156.9	87.8		6.66
1970	129.7	296.3	326.0	252.6	157.9	75.6		6.22
1971	138.8	297.2	272.1	270.5	160.3	49.1		5.97
1972	135.7	281.0	297.2	225.9	190.7	73.1		6.02
1973	127.4	308.6	250.3	243.3	167.7	62.9	7.5	5.84
1974	103.0	250.3	243.1	173.9	140.2	34.9	5.9	4.76

^aFor the years with incomplete information the TFR has been obtained by completing the missing information with estimated rates, assuming that the fertility of the two last calendar years for which information is available has remained constant back in time.

Source: NFS, 1975.

Table 19. Age Specific Fertility Rates (per Thousand Women) and Percentage Decline in the Rates: 1960-1964 and 1970-1974

Age Group ^p	Fertility Rates		Percentage Decline (2) - (1) / (1)
	1960-1964 ^a (1)	1970-1974 (2)	
15-19	180.2	126.9	29.6
20-24	356.7	286.7	19.6
25-29	355.6	277.7	21.9
30-34	284.9	233.2	18.1
35-39	187.6 ^b	163.4	12.9
40-44	—	59.1	—
45-49	—	8.0 ^c	—
TFR	7.41	5.78	22.0

^aFor the 1960-1964 period the missing rates (ages 40-44 and 45-49) have been estimated as indicated in Table 18.

^bMean of 1963 and 1964.

^cMean of 1973 and 1974.

Source: Table 18.

5.3 COMPARISON OF COHORT AND PERIOD FERTILITY

Perhaps the clearest way of detecting possible errors in the information of the Maternity History is by analysing the fertility reported by women in a given age

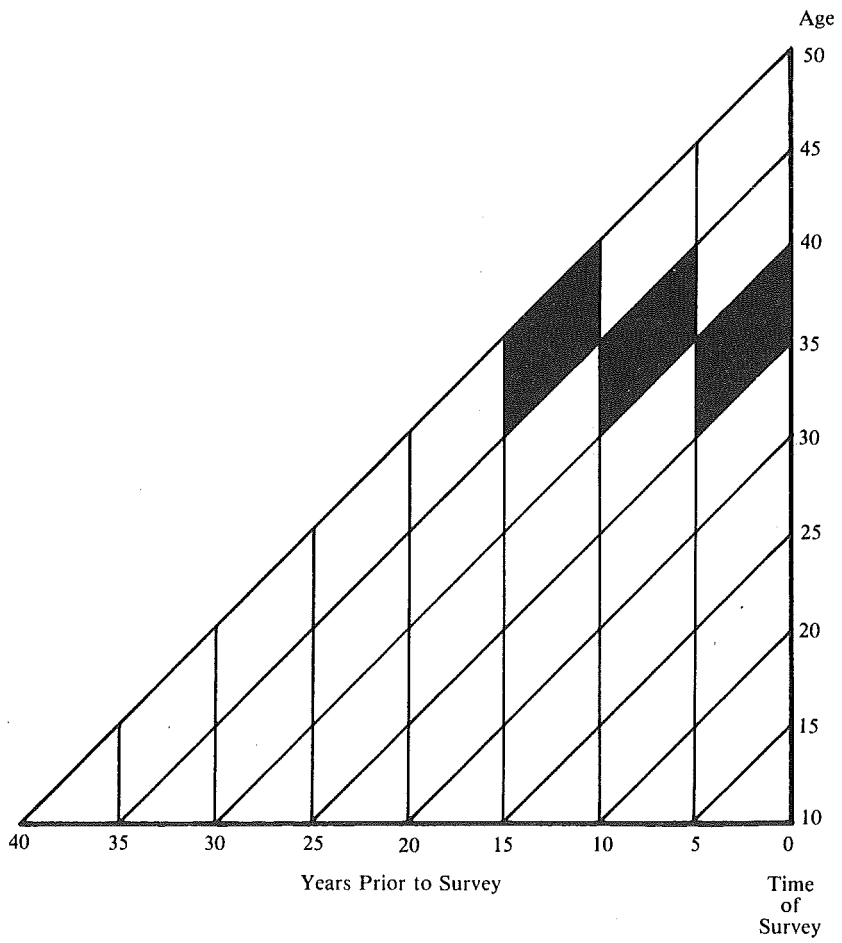
group during their whole childbearing period. The age specific rates shown previously present a disadvantage in that they mix the information reported by respondents in two different age groups.

As in the nuptiality study, we have constructed cohorts of women defined by age at the time of the survey (current age). Births are distributed according to the age of the mother at the time of the survey and the time of birth of the child, grouped together in five-year periods previous to the survey. Fertility rates specific for cohort and period are obtained by dividing the number of births occurring within a given period to each cohort of women by the number of women in that cohort. The rates by cohort and five-year periods calculated in this way (see Figure 16) represent the fertility experienced by the women of one cohort during the five-year period. The change of fertility over time is measured with these rates by comparing the fertility rates experienced at a given age by different cohorts. For example, from the shaded rates in Figure 16, it is possible to measure the change in fertility for women aged 35-39 at the end of the periods 10-14, 5-9, and 0-4 years previous to the survey.

(1) Total Fertility

The results of this calculation for the entire country are shown in Table 20. Reading horizontally in the first panel, we have the fertility experienced by the cohort passing from one age group to another in a period of 5 years. For example, the fertility rate experienced by the cohort of women aged 30-34 years at the time of the

Figure 16. Fertility Rates by Cohort and Five-Year Periods as Derived from Maternity History Data



survey, when passing from ages 15-19 to 20-24 was 271.3 per thousand during the period 10-14 years before the survey. The changes in fertility over time can be seen when comparing the rates diagonally from the lower right-hand corner to the upper left-hand corner. For instance, the rates centered on age 15 start with 68.1 for the 30-34 period and continue with 88.7, 67.7, 78.9, 52.6, and finally 41.7 per thousand for the most recent period.

Also shown, both for the total sample and for

subgroups of population, are the fertility rates for each cohort cumulated up to the end of each period and the cumulated rates over cohorts for each period. The former represent the mean parity (Pi) of the real cohort, while the latter shows the cumulative (Fi) of the synthetic cohort. The ratio between these two (Pi/Fi) is an indicator of possible errors in the data, as well as of the actual change in fertility. Some methodological aspects of the calculation and analysis of these ratios may be found in Brass (1978).

Table 20. Fertility Rates by Cohort and Period and Cumulative Rates, by Cohorts (Pi) and Periods (Fi) and Their Ratios (P/F)

Current Age Group	Five-Year Period Prior to the Survey							
	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39
Age Specific Fertility Rates (per Thousand Women)								
15-19	41.7	0.7						
20-24	218.8	52.6	2.4					
25-29	275.8	253.6	78.9	2.2				
30-34	250.8	331.7	271.3	67.7	3.6			
35-39	210.7	319.8	389.3	272.3	81.9	4.0		
40-44	107.1	223.4	296.2	309.6	246.0	88.7	4.2	
45-49	28.4	143.1	253.4	287.9	297.4	229.3	68.1	1.7
Cumulative Rates for Cohorts Up to the End of Each Period (Pi)								
15-19	0.212	0.004						
20-24	1.369	0.275	0.012					
25-29	3.052	1.674	0.406	0.011				
30-34	4.626	3.372	1.713	0.356	0.018			
35-39	6.390	5.336	3.738	1.791	0.430	0.020		
40-44	6.376	5.840	4.724	3.242	1.694	0.464	0.021	
45-49	6.546	6.404	5.689	4.422	2.982	1.496	0.349	0.008
Cumulative Rates for Periods (Fi)								
15-19	0.208	0.004						
20-24	1.302	0.266	0.012					
25-29	2.682	1.534	0.394	0.011				
30-34	3.936	3.193	1.763	0.350	0.018			
35-39	4.989	4.792	3.709	1.711	0.410	0.020		
40-44	5.524	5.909	5.190	3.259	1.658	0.464	0.021	
45-49	5.666	6.624	6.458	4.698	3.144	1.610	0.362	0.008
P/F Ratios								
15-19	1.000	1.000						
20-24	1.051	1.034	1.000					
25-29	1.138	1.091	1.030	1.000				
30-34	1.175	1.056	0.972	1.017	1.000			
35-39	1.281	1.114	1.008	1.047	1.049	1.000		
40-44	1.154	0.988	0.910	0.995	1.022	1.000	1.000	
45-49	1.155	0.967	0.881	0.941	0.948	0.929	0.964	1.000

Source: NFS, 1975

One of the most important aspects of this analysis is to discover if the decline shown by the survey is consistent with the real trend. The magnitude of the proportional decreases in fertility for the last three periods, at various ages, is shown in Table 21.

The decline of fertility cumulated up to the 35-39 age group, over the two most recent periods, is nearly double that observed between the previous periods. The large decreases seen among the younger women (20.7

per cent for the most recent period and 33.3 per cent for the previous one) are quite remarkable and are most likely due to a rising age at first union. However, total fertility is only slightly affected by this change.

Of more importance is the large decrease observed in the 40-44 age group (i.e. age at end of each period), which, according to the survey data, was higher than for any other age. This contrasts with the low decline in the 35-39 ages, which was 5.7 per cent between the two most

recent periods and higher in the two periods before that. Note also that for the age group 30-34 there is a large decline (21.6 per cent) in the recent period, but an increase for the previous period. In general, for the periods 10-14 years and 5-9 years prior to the survey, the percentage decline does not show a regular trend with the age. A more detailed examination of the rates for each cohort and each period is required in order to probe for the source of these possible distortions.

Using a specific model of misreporting of children's birth dates, Potter (1977) demonstrates that even small displacements of the date of birth and overestimates of the birth interval, when cumulated, may create an important bias in fertility rates. If the type of displacement consists in the transfer of the children's birth dates towards dates closer to the survey, the age curve of fertility for the cohort will be displaced towards the older ages. Also, as seems evident, if this bias is greater the older the cohort and the more distant the birth from the date of the survey, the comparison between the fertility experienced by adjacent cohorts, e.g. the 45-49 and 40-44 cohorts, will show, a greater decrease than the real one for the most recent periods. While omission seems to mostly affect births in more distant periods, displacement errors may also cause biases for the periods close to the date of the survey.

Let us examine whether this type of displacement is present in the data obtained by the survey. If we compare the fertility rates by periods for the two oldest cohorts (women aged 40-44 and 45-49 at the time of the survey — see Figure 17), we notice that the 45-49 cohort has a later pattern of fertility than the 40-44, that is to say, lower fertility up to approximately age 35 and higher from this age onwards. Nevertheless, as shown in Table 20, the total cumulative fertility of both cohorts up to the 40-44 age group is almost the same (6.40 for the 45-49 cohort and 6.38 for the 40-44 cohort). Displacement may also have occurred in the cohort of women aged 40-44, but to a lesser degree.¹²

Table 21. Percentage Decrease in the Cohort Fertility Rates for More Recent Periods, by Age at the End of Each Period

Age at End of Each Period	Percentage Decrease Between Periods	
	5-9 to 0-4	10-14 to 5-9
15-19	20.7	33.3
20-24	13.7	6.5
25-29	16.9	14.8
30-34	21.6	-8.0 (Increase)
35-39	5.7	11.8
40-44	25.2	—
Per Cent Decrease in Fertility Cumulated to the 35-39 Age Group	16.5	8.5

Source: Table 20

The analysis of nuptiality showed that women in the older cohorts, especially women aged 45-49 at the time of the survey, probably reported an older than real age

at first union which could have led to a displacement of the dates of their births. In fact this might also have happened in the opposite way; i.e. a displacement of the date of first birth could have caused a transfer of the date of first union towards the present since the questions on dates of birth precede the union history. In addition, the fertility rates of these older cohorts in the first age groups of their childbearing period are nearly always lower than that of the younger cohorts. For example, the fertility rates of the two cohorts (45-49 and 40-44) centered on age 20 were 229.3 and 246.0, respectively, i.e. lower values than those for the 35-39 (272.3), 30-39 (271.3), 25-29 (253.6) cohorts and only slightly higher than that of the 20-24 cohort (218.8).

It must be expected that a displacement of this nature will lead to heaping of the births during some period. According to Potter's analysis, heaping occurs mainly in the 5 to 9 years previous to the survey, and to a lesser degree between 10 and 14 years. While the total estimated fertility for the 10-14 years period is slightly higher than that obtained by estimates using the 1970 Census, the differences are not very substantial.¹³

A special case is that of the cohort of women aged 35-39 in the survey. Very high fertility rates are shown throughout their childbearing period, especially in the last three periods, in relation to the fertility of adjacent cohorts. If older women have transferred to this group, the general effect would be an underestimation of the fertility of the more recent periods and an overestimation in the more distant ones. On the contrary, if the transfer was more substantial in younger women the effect would be the reverse. The characteristics of the rates, such as shown in Table 20, suggest that the transfer was produced from both of the two adjacent groups by women with higher parity than the average for their respective age groups. This would then explain the erratic behaviour of the percentage declines in fertility observed in the two last periods in the ages 30-34 and 35-39, resulting from an overestimation of the decrease in the 30-34 age group and an underestimation in the 35-39 group.

We should bear in mind that if women with a higher parity have transferred from the 30-34 group to the 35-39 group, this would also affect the former group, through the decline in fertility. This fact is not very evident in the rates shown in Table 20, since fertility seems to have been underestimated for the younger ages of this cohort (30-34 years).

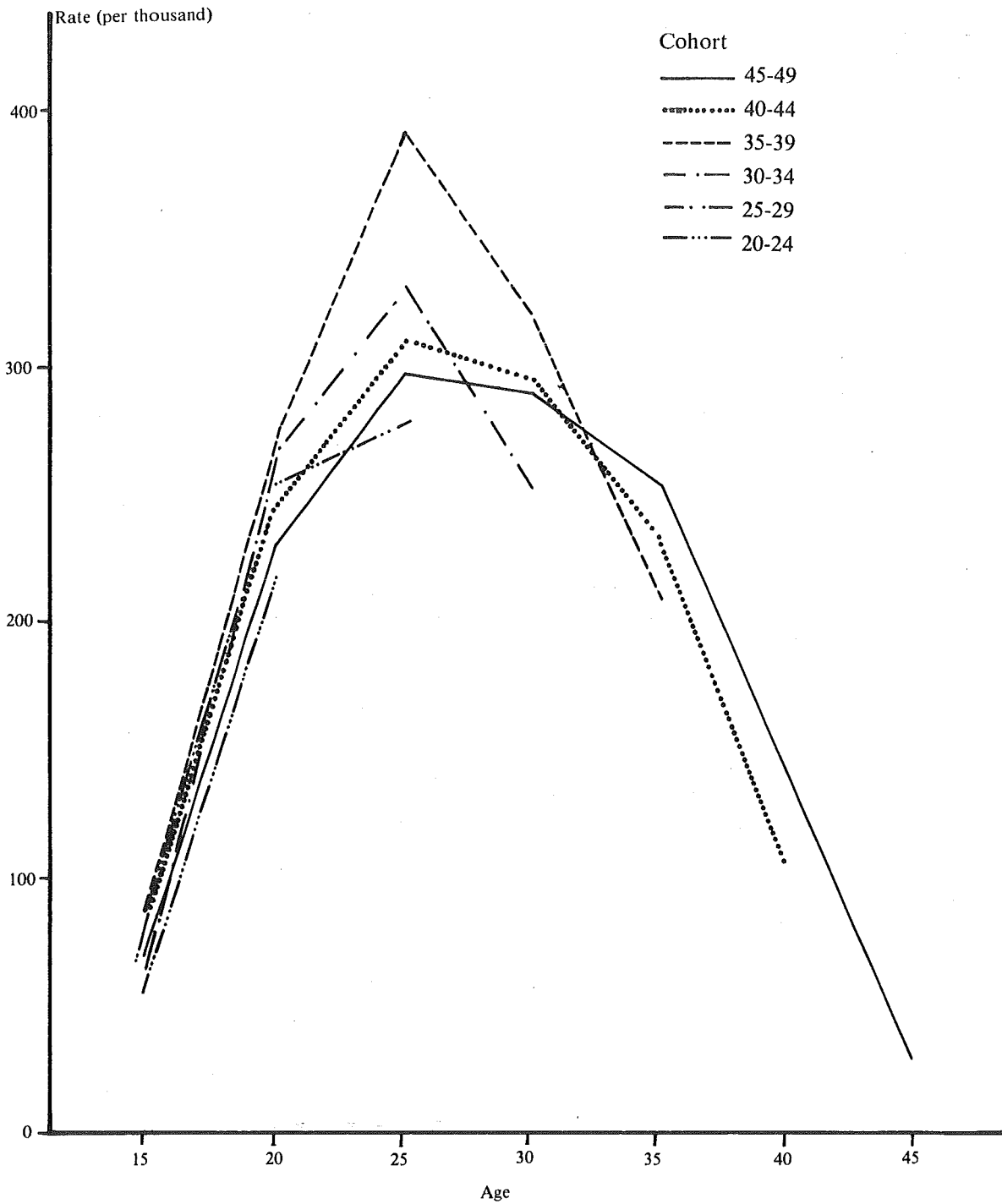
Table 20 shows the Pi/Fi ratios calculated for cohorts and periods. For the more recent periods, the values show an increase with age followed by a slight decline in the oldest ages. Nevertheless, for the cohort of women aged 35-39 the Pi/Fi value is extremely high (1.281) compared with values for the other cohorts, which reaffirms the presence in this cohort of high parity women from other age groups.

In the remaining cohorts, the behaviour of the Pi/Fi values is in agreement with recent decline in fertility, but also with omission of births by women of older cohorts. We note that for the two oldest cohorts, in the periods previous to the survey, the ratios are below unity as a result of possible omissions or displacement of dates of birth.

12. A similar behaviour can be observed in the data obtained in the Costa Rica Fertility Survey 1976, for the evaluation of which relatively reliable data from the vital statistics were available. (Guzman, 1978a)

13. Another factor which also may have had some influence is that the interviewed women over 40 have a slightly lower parity than the non-interviewed women.

Figure 17. Age Specific Fertility Rates for Five-Year Cohorts



Source: Table 20.

(2) Fertility for Subgroups of the Population

The analysis of the changes in fertility according to type of area of residence (urban or rural), level of education and other socioeconomic variables can help considerably to explain how these changes have come about and the way they have affected the various sub-populations defined by these variables. A study of the fertility rates by cohort and period, according to level of education, and urban or rural residence, not only may allow us to know the quality of the data in these sub-populations but may also help to deduce the degree of reliability of the overall fertility estimates. The rates by cohort and period according to type of area and education are shown in Tables 22 and 23.¹⁴

In the urban area, the rates at young ages (centered on age 20) show a regular trend, decreasing from 81.4 per thousand in the period 25 to 29 years before the survey to 29.9 in the most recent period. In the rural area, on the other hand, the behaviour of the rates is more irregular, presenting important swings from one period to the other. The rate for this age group of 99.5 per thousand for the period 10-14 years prior to the survey seems exaggerated as are the rates shown centered on ages 20 and 25.

Both for the urban area and for the rural area, fertility rates cumulated up to the ages of 25-29, 30-34, 35-39 and 40-44 show an increase over time for the oldest cohorts. In the last period, there is a decline in the cumulative fertility for each cohort except for the oldest ages. This may be caused by omissions of births and by displacements. The closeness of the values of cumulative rates for the two oldest cohorts up to the 40-44 age group (5.17 and 5.15 for urban and 7.55 and 7.46 for rural areas) together with lower cumulative rates at earlier ages for the cohorts leads us to believe that displacement of the date of birth of the children towards the moment of the survey is present in these data. Similar behaviour can be observed for women classified according to their level of education.

The percentages of decline in the more recent periods are presented in Table 24, according to type of area of residence and level of education. The decline in overall fertility (as measured by fertility rates cumulated up to 35-39 years of age) is consistent with the expected decline: higher in the urban area and in more educated women and in the periods closer to the survey. The declines for age groups are also consistent in the urban areas, although they are fairly high in the extreme ages, especially in the 40-44 age group.

In the rural areas, however, the percentages present an irregular pattern. For example, at the ages 30-34 there was a decline of 23.7 per cent, the largest decline in the two most recent periods, whereas in the previous periods there had been a 14.7 per cent increase in the fertility of these ages. At ages 35-39 there was a 3.6 per cent increase. These irregularities show that the problems of the cohort aged 35-39 are greater in the rural area, and do affect trends to a greater extent than in the urban area, at least for the last period. We must point out that both in the urban area and in women with 4 or more years of education, we also note some inconsistencies that seem to indicate the presence of the above mentioned problems.

In the analysis of nuptiality we have seen that the problem of the cohort of women aged 35 to 39 affected married women to a greater extent. The analysis reported above was also done classifying women according to type of first union, whether legal or consensual. The results are shown in Figure 18. In the group of women whose first union was a legal marriage

we note a decrease in fertility in the different cohorts as expected, although the fertility in the older cohorts has probably been exaggerated, since, as we have seen before, women whose first union was consensual and women with high fertility, are more likely to have reported themselves as legally married. However, the cohort of women aged 35-39 departs totally from the behaviour observed in the other cohorts. Particularly notable are the high rates observed for this cohort, at ages 25 and 30 (age groups 25-30 and 30-35 at the end of the periods 10-14 and 5-9 years before the survey).

Among women whose first union was consensual this problem does not arise in the cohort of women aged 35-39, although possible displacements can be seen in the fertility curve for older women.

Finally, it should be pointed out that the proportions of ever-in-union women in the different cohorts, for different moments in time (presented in Figure 12) are closely related to the cumulative cohort fertility rates shown in Table 20. The irregularities observed in the trends of the proportions of married women are reflected in the same irregularities in the cumulative fertility rates. If the changes in nuptiality are real, this behaviour is to be expected: that is, a greater proportion of married women implies a higher fertility rate for all women. However, some of the changes in the proportions of non-single women that have been observed seem to be due to errors in the data.

In summary, information about fertility and nuptiality are closely related, and problems encountered in the quality of either data set seem to have caused problems in the estimates of the other.

(3) Fertility According to Birth Order

The analysis of the fertility rates according to order of birth may also help distinguish between real changes in fertility and possible errors in the basic data, since it is believed that first birth rates change less than birth rates of higher orders when fertility changes. The sums of the first births rates represents the proportion of women who are mothers.

In Table 25 we present birth rates of first order births and of orders 4 or higher. The proportion of mothers in the older cohorts (40 years and over) is slightly low when compared to that found in the 30-34 cohort. In the 35-39 cohort, the proportion of mothers is very high (95.8), as a probable result of the transfer of women with early fertility to this group. The proportions of mothers calculated for periods show extremely low values for the last two periods (not higher than 79 per cent), contrasted with the exaggerated proportions in the period 10-14 years previous to the survey. This fact is also reflected in the P_i/F_i ratios, also shown in the table. These ratios are very high in the two last periods and below unity in the 10-14 years period. Two factors may explain this situation. First is the fact that there has been a real change in the pattern of first births because of women having deliberately postponed their first pregnancy (low rates for the 5-9 year period are shown in all cohorts), such as the change observed in Costa Rica in its first stage of fertility decline (Rosero, 1978). The other explanation is that some first order births that occurred in the 5-9 year period, may have been reported as

14. Since we are taking the residence at the time of the survey, the rates by urban and rural areas will be affected by the migratory movements towards urban areas. In general, if migrant women have a higher fertility than those resident in urban areas, this may tend to increase the fertility of urban areas, especially in the more distant periods, thus resulting in the reduction of the differences of fertility by area.

Table 22. Fertility Rates by Cohort and Period and Cumulative Rates, by Cohorts (Pi), by Periods (Fi), and P/F Ratios, by Current Residence

Urban								
Current Age Group	Five-Year Period Prior to the Survey							
	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39
Age Specific Fertility Rates (per Thousand Women)								
15-19	29.9	0.4						
20-24	172.3	47.3	2.2					
25-29	226.5	231.8	63.6	1.5				
30-34	218.9	290.5	243.2	60.0	2.1			
35-39	122.8	250.3	366.1	255.0	78.4	5.8		
40-44	50.8	162.7	255.9	279.7	201.7	81.4	1.7	
45-49	15.1	94.3	186.8	235.8	241.5	207.5	62.3	1.9
Cumulative Rates for Cohorts Up to the End of Each Period (Pi)								
15-19	0.152	0.002						
20-24	1.109	0.248	0.011					
25-29	2.617	1.484	0.326	0.008				
30-34	4.074	2.979	1.526	0.310	0.010			
35-39	5.392	4.778	3.526	1.696	0.421	0.029		
40-44	5.170	4.916	4.102	2.822	1.424	0.416	0.008	
45-49	5.226	5.150	4.679	3.745	2.566	1.358	0.321	0.010
Cumulative Rates for Period (Fi)								
15-19	0.150	0.002						
20-24	1.011	0.238	0.011					
25-29	2.144	1.398	1.329	0.008				
30-34	3.238	2.850	1.545	0.308	0.010			
35-39	3.852	4.102	3.376	1.582	0.402	0.029		
40-44	4.106	4.915	4.655	2.981	1.411	0.436	0.008	
45-49	4.182	5.386	5.589	4.160	2.618	1.474	0.320	0.010
P/F Ratios								
15-19	1.013	1.000						
20-24	1.097	1.042	1.000					
25-29	1.221	1.062	0.991	1.000				
30-34	1.258	1.045	0.988	1.006	1.000			
35-39	1.400	1.165	0.957	1.202	1.047	1.000		
40-44	1.259	1.000	0.881	0.947	1.009	0.954	1.000	
45-49	1.250	0.956	0.837	0.900	0.980	0.921	1.003	1.000
Rural								
Age Specific Fertility Rates (per Thousand Women)								
15-19	56.2	1.1						
20-24	277.1	59.4	2.7					
25-29	342.6	283.1	99.5	3.1				
30-34	293.6	387.2	309.2	78.0	5.7			
35-39	292.9	384.7	410.9	288.5	85.2	2.2		
40-44	162.0	282.6	335.5	338.8	289.3	95.5	6.6	
45-49	39.7	184.1	309.5	331.7	344.4	247.6	73.0	1.6
Cumulative Rates for Cohorts Up to the End of Each Period (Pi)								
15-19	0.286	0.006						
20-24	1.696	0.310	0.014					
25-29	3.642	1.928	0.513	0.016				
30-34	5.368	3.900	1.964	0.418	0.028			
35-39	7.322	5.858	3.934	1.880	0.437	0.011		
40-44	7.554	6.744	5.330	3.653	1.959	0.512	0.033	
45-49	7.658	7.460	6.539	4.992	3.333	1.611	0.373	0.008
Cumulative Rates for Periods (Fi)								
15-19	0.281	0.006						
20-24	1.666	0.302	0.014					
25-29	3.380	1.718	0.511	0.016				
30-34	4.848	3.654	2.057	0.406	0.028			
35-39	6.312	5.578	4.112	1.848	0.454	0.011		
40-44	7.122	6.990	5.789	3.542	1.901	0.490	0.033	
45-49	7.320	7.911	7.336	5.200	3.623	1.728	0.398	0.008
P/F Ratios								
15-19	1.018	1.000						
20-24	1.018	1.026	1.000					
25-29	1.078	1.122	1.004	1.000				
30-34	1.107	1.067	0.995	1.005	1.000			
35-39	1.160	1.050	0.957	1.017	0.963	1.000		
40-44	1.061	0.965	0.921	1.031	1.030	1.045	1.000	
45-49	1.046	0.943	0.891	0.960	0.920	0.932	0.937	1.000

Source: NFS, 1975

Table 23. Fertility Rates by Cohort and Period and Cumulative Rates, by Cohorts (Pi), by Periods (Fi), and P/F Ratios, by Level of Education

		0-3 Years							
		Five-Year Period Prior to the Survey							
Current Age Group	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44
Age Specific Fertility Rates (per Thousand Women)									
15-19	80.8	2.4							
20-24	307.3	81.5	4.0						
25-29	335.8	303.0	113.9	6.1					
30-34	287.4	355.7	331.7	93.4	6.0				
35-39	238.0	354.9	400.9	310.6	100.0	5.3			
40-44	138.9	259.9	313.8	324.6	256.3	100.6	4.8		
45-49	35.4	157.3	279.3	291.5	312.2	245.1	81.7	2.4	
Cumulative Rates for Cohorts Up to the End of Each Period (Pi)									
15-19	0.416	0.012							
20-24	1.964	0.428	0.020						
25-29	3.794	2.115	0.600	0.030					
30-34	5.371	3.934	2.156	0.497	0.030				
35-39	7.048	5.858	4.084	2.080	0.526	0.026			
40-44	6.994	6.300	5.000	3.432	1.808	0.527	0.024		
45-49	7.024	6.848	6.061	4.664	3.207	1.646	0.420	0.012	
Cumulative Rates for Periods (Fi)									
15-19	0.404	0.012							
20-24	1.940	0.420	0.020						
25-29	3.620	1.934	0.590	0.030					
30-34	5.056	3.713	2.248	0.498	0.030				
35-39	6.246	5.488	4.252	2.050	0.530	0.026			
40-44	6.941	6.787	5.822	3.674	1.812	0.530	0.024		
45-49	7.118	7.574	7.218	5.131	3.372	1.755	0.432	0.012	
P/F Ratios									
15-19	1.030	1.000							
20-24	1.012	1.019	1.000						
25-29	1.048	1.094	1.017	1.000					
30-34	1.062	1.059	0.959	0.998	1.000				
35-39	1.128	1.067	0.960	1.015	0.992	1.000			
40-44	1.008	0.928	0.859	0.934	0.998	0.994	1.000		
45-49	0.987	0.904	0.840	0.909	0.951	0.938	0.972	1.000	
4 Years and More									
Age Specific Fertility Rates (per Thousand Women)									
15-19	25.1	0							
20-24	165.6	35.4	1.5						
25-29	242.2	225.9	59.2	0					
30-34	213.4	307.3	209.8	41.5	1.2				
35-39	162.5	257.8	368.8	204.7	50.0	1.6			
40-44	33.3	138.9	255.6	275.0	222.2	61.1	2.8		
45-49	11.8	108.8	191.2	279.4	261.8	191.2	35.3	0.0	
Cumulative Rates for Cohorts Up to the End of Each Period (Pi)									
15-19	0.126	0.000							
20-24	1.012	0.184	0.008						
25-29	2.636	1.426	0.296	0.000					
30-34	3.866	2.799	1.262	0.214	0.006				
35-39	5.227	4.414	3.126	1.282	0.258	0.008			
40-44	4.944	4.778	4.084	2.806	1.430	0.320	0.014		
45-49	5.398	5.338	4.794	3.838	2.442	1.132	0.176	0.0	
Cumulative Rates for Periods (Fi)									
15-19	0.126	0.000							
20-24	0.954	0.177	0.008						
25-29	2.169	1.306	0.304	0.000					
30-34	3.232	2.843	1.352	0.208	0.006				
35-39	4.044	4.132	3.196	1.231	0.256	0.008			
40-44	4.210	4.826	4.747	2.606	1.367	0.314	0.014		
45-49	4.270	5.370	5.430	4.003	2.676	1.270	0.190	0.0	
P/F Ratios									
15-19	1.000	1.000							
20-24	1.061	1.040	1.000						
25-29	1.218	1.092	0.974	1.000					
30-34	1.196	0.984	0.933	1.029	1.000				
35-39	1.293	1.068	0.978	1.041	1.008	1.000			
40-44	1.174	0.990	0.913	1.077	1.046	1.019	1.000		
45-49	1.264	1.006	0.883	0.959	0.913	0.891	0.926	1.000	

Source: NFS, 1975

Figure 18. Age Specific Fertility Rates, by Cohort and by Type of First Union

(a) Legal Union

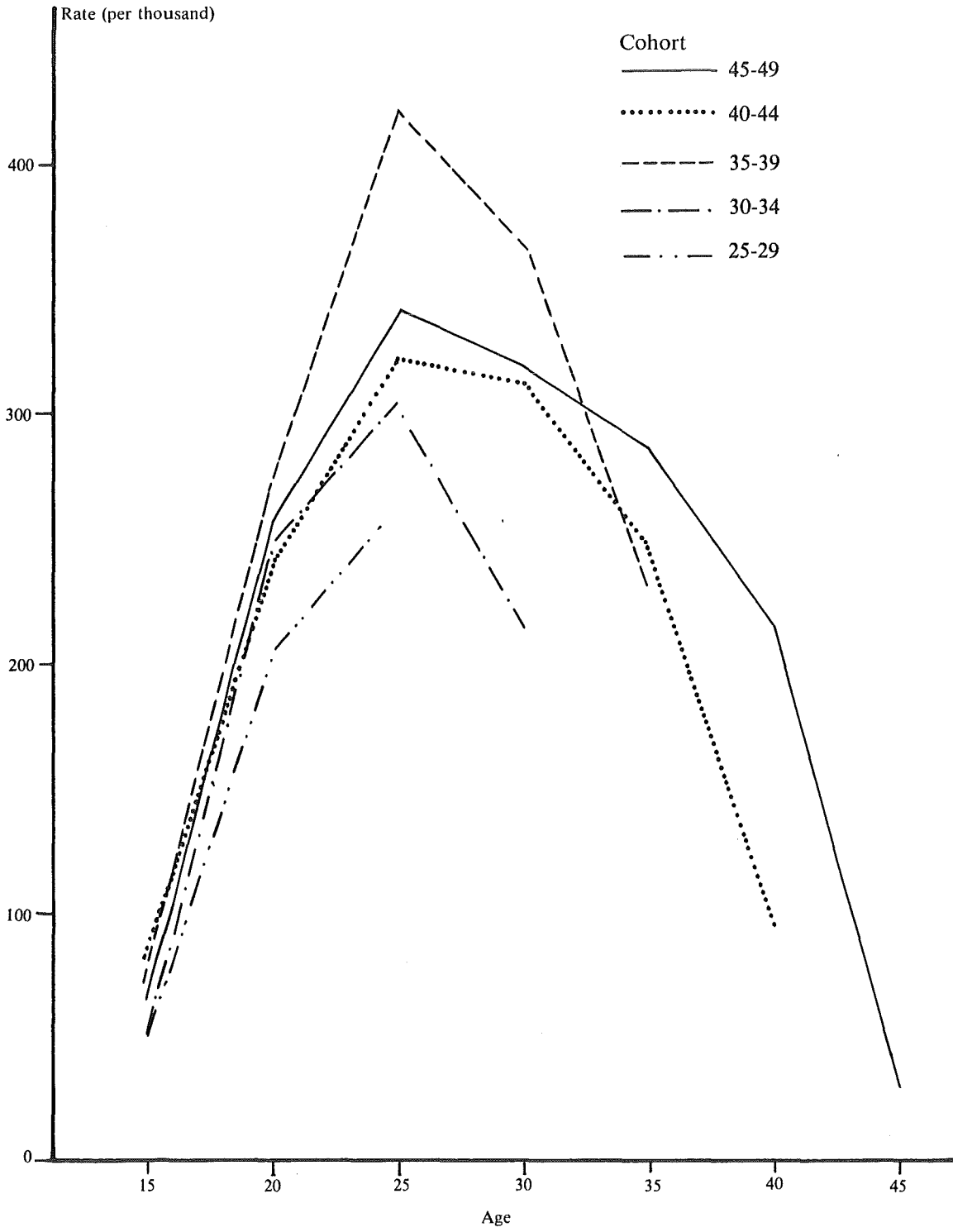


Figure 18. — Continued

(b) Consensual Union

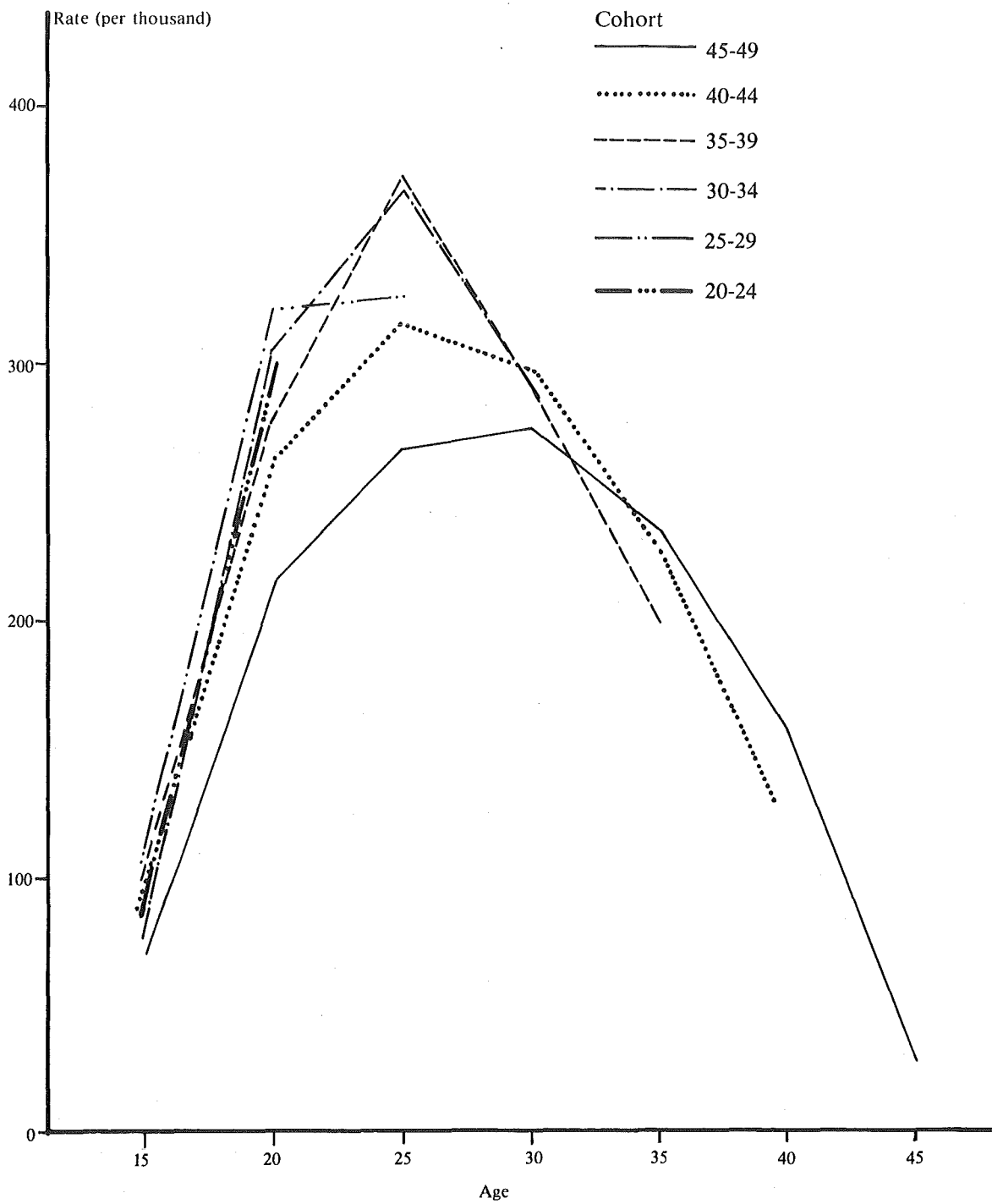


Table 24. Percentage Decline^a in Cohort Fertility for More Recent Periods, by Level of Education and by Current Residence

Age at the End of Each Period	Level of Education				Current Residence			
	0 to 3 Years		4+ Years		Urban		Rural	
	(5-9) to (0-4)	(10-14) to (5-9)	(5-9) to (0-4)	(10-14) to (5-9)	(5-9) to (0-4)	(10-14) to (5-9)	(5-9) to (0-4)	(10-14) to (5-9)
15-19	0.9	28.4	29.1	40.2	36.8	25.6	5.4	40.3
20-24	+1.3	8.7	26.7	+7.7	25.7	4.7	2.1	8.4
25-29	5.6	11.3	21.2	16.7	22.0	20.7	11.5	5.8
30-34	19.0	+13.1	17.2	+0.9	12.5	2.2	23.7	+14.7
35-39	8.4	6.9	+17.0	27.4	24.5	12.9	+3.6	8.7
40-44	11.7	-	69.4	-	46.1	-	12.0	-
Overall Decline ^b	8.2	6.0	21.6	11.1	23.7	12.1	9.9	4.7

^a Plus sign indicates increase in fertility.

^b For the decline between the more recent periods (5-9) to (0-4), this percentage is calculated with fertility cumulated up to 40-44 years. For the decrease between 10-14 and 5-9 it refers to fertility cumulated up to ages 35-39.

Source: Tables 22 and 23.

occurring in the 10-14 period. Preference for the digit 10 and for the politically important years 1961, 1963 and 1965 also would partly explain the higher fertility in this latter period.

The P/F values for first order births are slightly higher than those for order 4+, which should not happen if the decline has been larger for women with high parity. Nevertheless, when we calculate these ratios for women according to education (see Table 26) we see that for women with low education the P/F ratios are generally higher in the higher orders, as well as being close to unity, indicating that the decrease in these women has not been very substantial. But for more educated women, P/F ratios are generally higher for first order births, as we would expect.

5.4 TESTS FOR DETECTING OMISSIONS OF LIVE BIRTHS

Notwithstanding the better reporting of live births in the Individual Questionnaire compared with the Household Schedule, the analysis so far has shown evidence of omissions, particularly among women aged over 40, and in periods more distant from the survey. Under the assumption that certain types of events are more commonly omitted (female births, children who have died, children living away from home, etc.), we undertook the following tests for detecting possible omissions.

(1) Sex Ratios of Births

The ratio of male to female births for the nation as a whole was 1.055. This value is quite consistent with the expected ratio of 105 male births for every 100 female births, so that, at least at a global level, it cannot be inferred that there has been differential omission by sex.

Table 27 shows sex ratios by periods, for total births and according to various characteristics of the women. For periods closer to the survey this ratio is very close to the expected value, but slightly high in the more distant periods, which does suggest the existence of some omission of female children in these periods. However,

when we classify the births according to urban and rural areas and by level of education, sex ratios are not higher in the rural areas and among less educated women, as might have been expected from differential omission by sex. Ratios according to birth order and cohorts do not show clear evidence of omission for female births, though the ratios for the period 20 to 24 years ago are quite high.

(2) Proportion of Children Who Died

A second test examines the possibility that the children most commonly omitted are those who died in their earliest years of life. Table 28 shows the proportion of children who died according to the mothers' age group.

The proportion dead increases with age, up to 40-44 as expected, but shows a decline for the 45-49 age group. If the trend of increase of this proportion up to the age of 44 continued in a linear fashion up to 49 years we could expect a proportion of children who died on the order of 175 per thousand instead of 149, as shown by the data. This might be evidence of omission of children who have died for this cohort of women aged 45-49. However, no substantial difference is shown in this omission by sex.

The proportions of children who died before their fifth year of life (5q0) have also been calculated, by sex, for periods prior to the survey (except for the most recent period which does not include complete exposure). The results are shown on Table 29, together with the corresponding mortality levels in the Coale-Demeny "West" model life tables (Coale and Demeny, 1966). Again, we do not observe a major omission in either sex. However, the comparison of these estimates with estimates of Garcia (1974) shows that in both sexes the estimates of mortality in the survey are lower than those of Garcia. This may well be a result of the omission of children who have died in the periods prior to the survey, especially in the more distant ones, without any substantial difference between sexes. In the following pages, we shall examine in more depth the probability of dying according to age at death, for periods prior to the survey.

Table 25. Fertility Rates by Cohort and Period and Cumulative Rates, by Cohorts (Pi), by Periods (Fi), and P/F Ratios, by Order of Birth

First Order Birth								
Current Age Group	Five-Year Period Prior to the Survey							
	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39
Age Specific Fertility Rates (per Thousand Women)								
15-19	31.0	0.7						
20-24	84.4	36.9	2.1					
25-29	32.2	81.9	53.1	2.2				
30-34	9.1	28.4	96.1	48.3	3.0			
35-39	1.7	6.8	36.2	93.2	50.3	3.4		
40-44	0.0	2.5	10.0	35.0	75.3	56.1	4.2	
45-49	0.0	0.9	5.2	15.5	40.5	81.0	42.2	1.7
Cumulative Rates for Cohorts Up to the End of Each Period (Pi)								
15-19	15.9	0.4						
20-24	61.7	19.5	1.1					
25-29	84.7	68.6	27.6	1.1				
30-34	92.4	87.9	73.7	25.7	1.5			
35-39	95.8	95.0	91.6	73.5	26.8	1.7		
40-44	91.6	91.6	90.3	85.3	67.8	30.2	2.1	
45-49	93.5	93.5	93.1	90.4	82.7	62.5	22.0	0.8
Cumulative Rates for Periods (Fi)								
15-19	15.5	0.4						
20-24	42.2	18.8	1.1					
25-29	73.8	59.8	27.6	1.1				
30-34	78.4	74.0	75.6	25.3	1.5			
35-39	79.2	77.4	93.8	71.8	26.7	1.7		
40-44	79.2	78.6	98.8	89.4	64.3	29.8	2.1	
45-49	79.2	79.0	101.4	97.1	84.6	70.2	23.2	0.8
P/F Ratios								
15-19	0.957							
20-24	1.050	1.037						
25-29	1.132	1.147	1.000					
30-34	1.164	1.188	0.975	1.016				
35-39	1.196	1.227	0.977	1.024	1.004			
40-44	1.141	1.158	0.914	0.954	1.054	1.013		
45-49	1.165	1.184	0.918	0.932	0.978	0.890	0.948	
Births of Order Four or Higher								
Age Specific Fertility Rates (per Thousand Women)								
15-19	0							
20-24	26.9	0.3						
25-29	139.9	37.5	0.4					
30-34	200.0	174.0	39.3	0.6				
35-39	197.2	268.4	215.8	42.4	2.8			
40-44	105.4	201.7	231.8	166.5	47.7	1.7		
45-49	28.4	137.1	223.2	212.9	146.6	37.1	1.7	
Cumulative Rates for Cohorts Up to the End of Each Period (Pi)								
15-19	0							
20-24	0.136	0.002						
25-29	0.889	0.190	0.002					
30-34	2.070	1.070	0.200	0.003				
35-39	3.633	2.647	1.305	0.226	0.014			
40-44	3.774	3.247	2.238	1.080	0.247	0.008		
45-49	3.935	3.793	3.108	1.992	0.927	0.194	0.008	
Cumulative Rates for Periods (Fi)								
15-19	0							
20-24	0.134	0.002						
25-29	0.834	0.189	0.002					
30-34	1.834	1.059	0.198	0.003				
35-39	2.820	2.401	1.278	0.215	0.014			
40-44	3.347	3.409	2.436	1.048	0.252	0.008		
45-49	3.489	4.095	3.525	2.112	0.986	0.194	0.008	
P/F Ratios								
15-19	—							
20-24	0.996	1.000						
25-29	1.063	1.005	1.000					
30-34	1.127	1.010	1.010	1.000				
35-39	1.287	1.102	1.021	1.051	1.000			
40-44	1.127	0.952	0.919	1.030	0.980	1.000		
45-49	1.127	0.926	0.875	0.943	0.940	1.000	1.000	

Source: NFS, 1975

Table 26. P/F Ratios by Order of Birth and by Level of Education for the Period 0-5 Years Prior to the Survey

Current Age Group	Total		0-3 Years of Education		4+ Years of Education	
	1st Order	Orders 4+	1st Order	Orders 4+	1st Order	Orders 4+
15-19	0.957	—	1.000	1.000	0.971	—
20-24	1.050	0.996	0.997	0.996	1.070	0.987
25-29	1.132	1.063	1.012	1.026	1.205	1.106
30-34	1.164	1.127	1.026	1.055	1.209	1.100
35-39	1.196	1.287	1.025	1.154	1.258	1.278
40-44	1.141	1.127	0.971	1.020	1.259	1.066
45-49	1.165	1.127	0.989	0.952	1.234	1.309

Source: NFS, 1975

Table 27. Sex Ratio of Births by Periods, According to Some Characteristics of the Mothers

Years Prior to Survey	Area		Years of Education		Order of Birth		Current Age Group				
	Total	Urban	Rural	0-3	4+	1	4+	Less Than 25	25-34	35-44	45-49
0- 4	1.058	1.136	1.006	0.986	1.160	1.088	1.018	1.143	.975	1.088	(.833)
5- 9	1.046	1.187	.945	1.037	1.066	1.032	1.038	1.080	1.122	0.928	(1.143)
10-14	1.059	1.130	1.006	1.012	1.155	1.176	1.046	—	1.114	1.025	1.085
15-19	.971	1.018	.937	.942	1.063	1.013	0.977	—	(1.127)	0.977	.909
20-24	1.189	1.257	1.146	1.173	1.220	0.941	(1.406)	—	—	1.100	1.333
25+	1.095	1.129	1.070	1.006	1.405	1.186	1.316	—	—	(1.306)	(1.017)
Total	1.055	1.139	.995	1.014	1.131	1.073	1.042	1.127	1.068	1.017	1.077

Note: Ratios shown in brackets were calculated with a denominator (female births) of less than 100 cases.

Source: NFS, 1975

Table 28. Proportion Dead of Children Ever Born, by Sex and by Current Age of Mother

Current Age Group	Proportion Dead of Children		
	Total	Male	Female
15-19	0.090	(0.171) ^a	0.029
20-24	0.118	0.122	0.113
25-29	0.121	0.136	0.105
30-34	0.132	0.142	0.120
35-39	0.148	0.155	0.140
40-44	0.165	0.180	0.150
45-49	0.149	0.165	0.132
Total	0.140	1.153	0.127

^aLess than 100 births

Source: NFS, 1975

Table 29. Proportion of Children Born at Least Five Years Before the Survey Who Died Before Their Fifth Year of Life ($s q_0$), by Sex, for Periods Prior to Survey

Years Prior to Survey	Births	Deaths of Children Less than 5 Years Old	Proportion of Deaths	Level in Coale-Demeny Life Tables	Level Obtained with Garcia's Estimates of e_0
(A) MALES					
25-30	203	42	.207	12.1	—
20-25	428	55	.128	17.2	11.7
15-20	642	96	.149	15.7	13.8
10-15	1016	165	.162	14.9	14.8
5-10	1179	153	.130	17.1	15.8
Total ^a	3508	521	.148	15.8	—
(B) FEMALES					
25-30	176	27	.153	14.7	—
20-25	360	43	.119	17.0	11.7
15-20	661	87	.132	16.1	13.4
10-15	959	125	.130	16.2	14.9
5-10	1127	149	.132	16.1	15.9
Total ^a	3329	439	.132	16.1	—

^aIncludes births and deaths whose date of birth was at least five years prior to the Survey

Source: NFS, 1975

6 Infant and Child Mortality

The Maternity History obtained in the National Fertility Survey provided information that enables us to derive mortality estimates for the first years of life.

For each live birth reported by the respondents, survival status at the time of the survey was also asked. For those children who had died, the date of death was also obtained. These data enable us to estimate infant and child mortality directly rather than through indirect estimation procedures as previously required.¹⁵

As was true for the data concerning fertility, mortality information may be affected by incorrect reporting of the date of birth of the children with the consequent erroneous placing of the events in the time scale, and by omissions of children who have died. Another possible source of error is the declaration of the age of the child at death. Incorrect reporting of this date will substantially bias the infant mortality rate (1q0). However, estimation of mortality in the first five years (5q0) will not be substantially affected, since very few children die after 5 years of age.

Another aspect related to the estimate of probability of death is the fact that the information given for the past is progressively restricted to younger women. In the face of relationships between age and parity of the mother to infant and child mortality, some distortion is to be expected in the total measures of mortality

calculated for periods prior to the survey. However, this factor does not seem to have any substantial effect, at least when estimates refer to periods not over 20 to 25 years prior to the survey.

Based on the survey data, we have calculated the probabilities of death in the first year of life (1q0), between 1 and 5 years (4q1) and in the first five years as a whole (5q0). Probabilities were calculated by single calendar years of birth of the children (see Table 30). Figure 19 shows these probabilities of death calculated for the 1950-1974 period, which have been averaged (three year moving averages) in order to reduce random errors in the annual rates. Infant mortality shows an important decline in the most recent years. The probability of death in the first year of life decreased from values of approximately 100 per thousand, in the 1960-1965 period, to values close to 80 per thousand during the latest period. However, for the years prior to 1960, values of 1q0 and 5q0 are too low. The probability of death between 1 and 5 years for early periods shows values consistent with the trend from 1960 onwards.

15. Two studies have used the information on proportions of children who died according to age of the mother in the survey and applied the methodology suggested by Brass (Sullivan variant) for the estimation of mortality between birth and the second year of life. (Guzman, 1978b; De Moya and Behm, 1977)

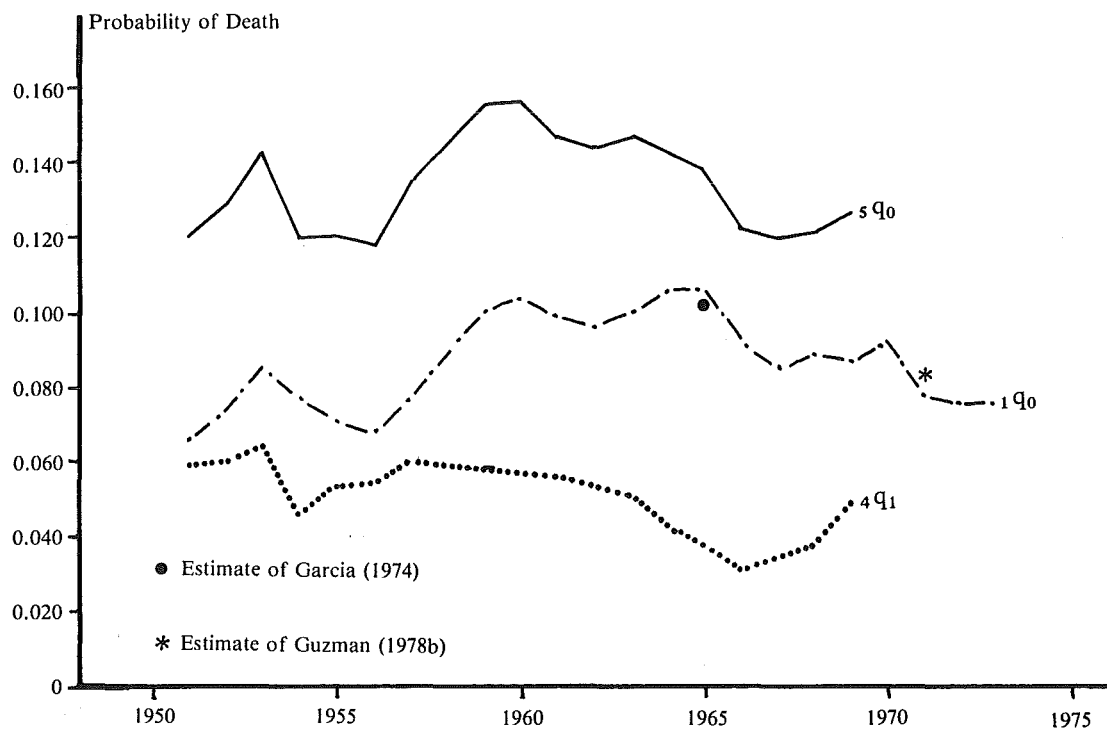
Table 30. Probabilities of Infant and Child Death, by Calendar Years: 1950-1975

Year	Births	Deaths, by Age of Child at Death			Probabilities of Death ^a		
		Less Than 1 Year (1)	1 to 4 Years (2)	0 to 4 Years (1) + (2)	1q0	4q1	5q0
1950	119	8	4	12	.067	.036	.101
1951	123	7	5	12	.057	.043	.098
1952	147	11	13	24	.075	.096	.163
1953	160	15	6	21	.094	.041	.131
1954	182	16	9	25	.088	.054	.137
1955	215	11	9	20	.051	.044	.093
1956	210	16	12	28	.076	.062	.133
1957	262	20	15	35	.076	.062	.134
1958	245	20	14	34	.082	.062	.139
1959	326	38	16	54	.117	.056	.166
1960	310	33	17	50	.106	.061	.161
1961	368	33	19	52	.090	.057	.141
1962	358	34	17	51	.095	.052	.142
1963	447	47	22	69	.105	.055	.154
1964	398	41	18	59	.103	.050	.148
1965	483	49	12	61	.101	.028	.126
1966	425	45	15	60	.106	.039	.141
1967	474	35	13	48	.074	.030	.102
1968	467	36	20	56	.077	.046	.120
1969	490	57	19	73	.116	.044	.149
1970	476	35	21	56	.073	.048	.118
1971	488	44	—	—	.090	—	—
1972	511	39	—	—	.076	—	—
1973	534	36	—	—	.067	—	—
1974	458	42	—	—	.092	—	—

^a 1q0 probability of death between birth and first year of life
 4q1 probability of death between first and fifth year of life
 5q0 probability of death before the age of five

Source: NFS, 1975

Figure 19. Probabilities of Infant and Child Death, by Calendar Year, 1950-75



Source: Three-year moving averages of probabilities of death in Table 30.

In Figure 19 we have used a three year moving average of the estimated annual mortality probabilities for the years 1950-1974. The probability of infant death shows a decline, particularly from 1965, which is in close agreement with two indirect estimates for the period 1960-1970 and for 1971 (Garcia, 1974; Guzman, 1978b). The higher values indicated for the years 1960, 1965 and 1970 and for the adjacent years are notable and may be due to preference for these years in the reporting of dates of births of children who later died. For the years prior to 1960, the infant mortality shown by the survey is extremely low (80-85 per thousand). However, the probabilities of dying between one and five years do not show very low values for the years prior to 1960 and show the expected trend from 1960 onwards. This suggests that omissions of children who died arose mainly from those who died before completing one year of age. The probabilities of infant and child mortality calculated for five-year periods prior to the survey are shown in Table 31. In this table, the low mortality values observed in the periods prior to 1960 can be seen more clearly.

The incorrect reporting of the age of death of a child, although not discarded as a possible source of error, would not explain the low mortality probabilities indicated for the years before 1960, in view of the fact that a similar decline is shown in the overall probabilities for the first five years of life (${}_5q_0$). On the other hand, a pattern of displacement of birth-date selective of the children who die would increase mortality in a given period more than could be expected. Nevertheless, mortality does not seem to be overestimated in any period prior to the survey so the influence of this factor could only be minor.

It seems reasonable to conclude, therefore, that there

Table 31. Probabilities of Infant and Child Death for Periods Prior to the Survey, 1950-1974

Periods	Probabilities of Death			
	${}_1q_0$	${}_2q_0$	${}_4q_1$	${}_5q_0$
1950-1954	.078	.101	.062	.135
1955-1959	.083	.110	.057	.136
1960-1964	.100	.131	.055	.149
1965-1969	.095	.115	.037	.129
1970-1974	.079	.102 ^a	—	—

^aPeriod 1970-1972

Source: NFS, 1975

Table 33. Probability of Death in the First Year of Life (${}_1q_0$) by Periods Prior to Survey and by Age of Mother at Time of Child's Birth

Age at Birth	Total	Periods Prior to Survey						
		1-4	5-9	10-14	15-19	20-24	25-29	30-34
10-14	.221	(.154)	(.176)	(.161)	(.300)	(.174)	(.323)	(.235)
15-19	.099	.091	.089	.094	.124	.085	.126	(.149)
20-24	.084	.065	.100	.111	.078	.057	.057	
25-29	.082	.075	.082	.091	.074	.081		
30-34	.080	.081	.090	.087	.054			
35-39	.096	.087	.101	.117				
40-44	.111	(.077)	(.095)					
45-49	.159	(.250)						

Note: The figures in brackets indicate that they have been calculated with less than 100 cases in the denominator

Source: NFS, 1975

is evidence of important omissions of dead children for the years prior to 1960, especially affecting those children who died during their first year of life. These omissions, though perhaps not introducing a substantial decrease in total mean parity, could explain, at least partially, the low rates of fertility in the more distant periods prior to the survey. For example, on the assumption of a linear decline in infant mortality throughout the past, we obtain estimated omission rates of 4 per cent, 7 per cent, 8 per cent, and 9 per cent for the periods ranging from 15-19 to 35-39 years prior to the survey, respectively.

A classification according to the mother's place of residence and level of education has not revealed selective omissions among women with little education and/or resident in rural areas (Table 32). In both groups of women, mortality is quite low in the periods prior to 1960.

Table 32. Probability of Death in the First Five Years of Life (${}_5q_0$), by Area of Residence and by Level of Education of Mother

Period Prior to the Survey	Area of Residence		Level of Education	
	Urban	Rural	0 to 3	4 or More
25-29	0.178	0.185	0.199	0.125
20-24	0.114	0.131	0.145	0.069
15-19	0.125	0.152	0.163	0.075
10-14	0.139	0.148	0.159	0.113
5-9	0.134	0.128	0.148	0.103

Source: NFS, 1975

One of the characteristics of infant mortality by age of mother that has been observed is that it is high for women aged 15-19, low between the ages of 20 to 30, and increases again from that age onwards (Puffer and Serrano, 1973). Knowledge of this relation could help to identify the sources of possible errors in the data. Probability of infant death according to the mother's age group (at the time of the child's birth), for periods prior to the survey, is presented in Table 33. For births of all periods, the expected pattern seems to occur in the survey, with the exception of women aged 30-34 at the time of birth among whom this probability is too low. For the period immediately prior to the survey, infant mortality by age of the mother is very consistent with the expected pattern. However, in periods prior to this, we note inconsistencies which are probably due to

errors. For instance, for the 15-19 period, infant mortality declines continuously from ages 10-14 until 30-34 years, an age at which it reaches very low values (54 per thousand).

Examining these probabilities for age of mother over time (horizontally on the diagram), we find lower mortality rates in the more distant periods as found previously for all ages combined.

In summary, the data in the survey allow us to

undertake a detailed study of the characteristics of infant and child mortality. However, it is necessary to bear in mind the limitations of the data, especially the omission of infants who died in the period prior to 1960 and the irregularities shown in the annual rates. Thus, it would seem advisable to restrict estimates of infant and child mortality to the last 10 or 15 years and to estimate rates for five-year periods to minimise sampling errors.

7 Summary of Findings

On the strength of the information supplied by the National Fertility Survey of the Dominican Republic, we have attempted in this study to ascertain the quality of the data concerning nuptiality, fertility and infant and child mortality. The main conclusions are as follows:

(1) *In the analysis of reporting of age* we found that, although the quality of data is better in the survey than in the census, values of the Myers' Index indicate that strong preferences for certain ages ending in the digits 0, 2, 5 and 8 still exist, mostly among women in rural areas and with little education.

A comparison made between the data reported in the Household Schedule and those obtained with the Individual Questionnaire has shown that only 65 per cent of the women reported the same age in both questionnaires and 88 per cent declared themselves as belonging to the same age group. Frequently, the differences result from women declaring a younger age in the Household Schedule than in the Individual Questionnaire (the latter being considered the more reliable information).

Finally, in the distribution by age groups it was found that there is a concentration of women in the 35-39 age group, as a result of transference of women from adjacent groups. This misreporting, apparent throughout the entire analysis of the data seems to have been caused by older women reporting a lower age (especially those aged 40-44) and by a possible tendency of the interviewers to estimate the respondents' age based on their fertility. Thus, the parity of this group at survey has been exaggerated. The reason why this transfer should mainly affect married women has not become very clear in the present evaluation, though it is possible that women who reported their age wrongly have also declared the wrong marital status.

(2) *In the evaluation of nuptiality data*, no evidence of any selection bias has been found with regard to women interviewed with the Individual Questionnaire. Comparing the information given for the respondents in both questionnaires, we found that overall 93 per cent of the women had consistent reports of their marital status. The remaining 7 per cent included mainly women in consensual unions who had previously been reported to be legally married or divorced or separated. It was among these two latter groups of women that the reporting of marital status was least consistent.

Using the Coale Nuptiality Model to fit data on age at first union, we did not find major changes by cohort, except for a later age of first union for the youngest cohort. The older cohorts appear to have displaced the date at first union as a result of the omission of first consensual unions and/or the reporting of the date of legalization of a previously existing consensual union instead of the real date in which that union had begun. Age at first union for less educated women shows a supposed decline for the older cohorts, which does not seem reasonable, but which could have been caused by the more frequent displacement of the date of first union in this group.

(3) *In the evaluation of fertility data*, we examined both the recent trend and the current levels of this variable through the study of age-specific rates over time, as well as the rates by cohorts and periods. The mean parity of women over 40 years old in the Individual Questionnaire is lower than might have been expected, as a consequence of possible omissions of live births, even though interviewed women reported for themselves in the survey. Apparently, interviewed women over age 40 had a slightly lower parity than those who were not interviewed.

The level of fertility in the 12 months prior to survey is better measured from data in the Individual Questionnaire (TFR of 5.0) than in the Household Schedule (TFR of 4.7). The total fertility rate for the five years prior to survey appears to have been correctly estimated at 5.8 births per woman, as derived from data in the Individual Questionnaire.

With regard to the trend in fertility, there has undoubtedly been a substantial decline during the past decade. Although estimates from the survey are somewhat higher than external estimates, the trend in fertility over the past 15 years is consistent as derived from different sources of data. However, age misreporting (i.e., the high parity of women aged 35-39) and displacement of children's dates of birth appear to have exaggerated the decline in fertility. In particular, reporting errors appear to have exaggerated fertility rates in the period 10 to 14 years prior to survey so that the calculated decline of 23 per cent between the period 0 to 4 and 10 to 14 years prior to the survey may be about five per cent too high.

An analysis of fertility rates by cohort and period shows that omission and displacement of births has occurred, particularly for the oldest cohort. Displacement of dates of birth toward the survey date has resulted in too low estimates of fertility for the more distant periods. Hence, at least part of the apparent rise in fertility through the 1950's appear to be due to reporting errors.

Omissions of birth do not appear to be differential by sex, but do seem to be selective of infants who died.

The cohort of women aged 35-39 shows especially high fertility rates in the fifteen years prior to the survey. The transfer of women to this age group has been selective of married women, women residing in rural areas, and women with little or no education — i.e. women with high parity.

(4) *In the evaluation of the data on infant and child mortality*, substantial omissions have occurred of children who died, mostly affecting years prior to 1960. Apparently, these omissions have primarily occurred among children who died before their first year of life. The levels of infant mortality (1q0) and child mortality (5q0) estimated for the 10 to 15 years prior to the survey seem quite reasonable. The results presented here suggest that future analyses of infant and child mortality be restricted to the past 15 years and be based upon moving averages of annual probabilities.

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