Patterns Of Fertility In Nigeria

A thesis submitted to the University of London
for the degree of doctor of philosophy.

By

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ABSTRACT

Estimates of recent fertility were produced for all Nigeria and for the four broad geographical regions using data from the Nigeria Fertility Survey (NFS) of 1981/1982. The results indicated that fertility was quite high in the decade of the 1970s at an average total fertility rate of 6.8. Analysis of differentials by demographic and other background characteristics, and of determinants, did not show evidence of large shifts in fertility trend towards any specific direction, especially when the quality of the data is considered alongside the estimates. It was suggested that, the influence of reporting errors in the NFS notwithstanding, fertility for all of Nigeria appeared to have remained roughly stable at very high levels in the 1970s.

Chapter 1 introduced the project, its aim, scope and methodology, and highlighted some features which should be put into consideration in any analysis using the NFS data. Chapter 2 drew attention to possible effects of the quality of the information collected in the NFS on estimates and analysis of fertility. In Chapter 3, the estimated results were presented and, with additional data from other sources, used to examine whether fertility was stable, rising or falling in the recent past in Nigeria. Chapter 4 examined any variations in fertility due to age, age at marriage and age at motherhood with measures estimated when analysis was indexed by age at survey and durations of marriage and motherhood as further search for possible sources of any early fertility change. Chapter 5 carried out an integrated examination of the socio-economic and proximate determinants of fertility with the same aim as in Chapter 4. Chapter 6 presented a summary of the major findings with a brief discussion of their implications for further research in Nigerian fertility and for the fertility target of the 1988 government policy on population.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES.

CHAPTER ONE

ANALYSIS OF FERTILITY USING DATA FROM THE NIGERIA FERTILITY SURVEY 1981/82.

1.1 THE STUDY IN CONTEXT.

Demographic knowledge of Nigeria has developed only slowly despite the fact that the country has the largest population in black Africa. The relevant data have not been available and problems peculiar to Nigeria which hinder their production have frustrated progress in research and what is known about the demographic characteristics, processes and interrelations in the country. The result of this lag is that research questions which have been settled in several African countries have not been properly worked on in Nigeria. Some problems which have received attention have remained unresolved in the face of inconclusive evidence. (See for instance Olusanya, 1969, Okore 1980, 1982 and Lucas 1982; Ware 1975 and Lucas and Ukaegbu 1977).

Before the publication of the Nigeria Fertility Survey (NFS) results, the actual levels and trend of fertility in the country remained a matter of both informed and wild guesses. Researchers and administrators relied on data from incomplete or outdated censuses and from small-scale surveys. Unfortunately, the data which come from these sources remain fragmented. The information gained from the small-scale surveys cannot be generalized for the entire country because of vast socio-economic and cultural variations. Moreover, the data which they provide give little indication of trends, and in that respect, have not been very useful for the understanding of the dynamics of Nigerian population.

In the specific area of fertility there is a danger that investigations may be running too fast to catch up with interest areas which are in vogue, without first establishing firmer bases in the form of past and recent levels and trends. There is a need to document the levels and trend of recent national fertility in verifiable forms so that even if knowledge of the more distant past eludes us, we can take our point of departure for future and advanced research from the data for these recent periods. This thesis is hoped to make some contribution in this area.

1.2 OBJECTIVES AND SCOPE.

The two major objectives of this thesis were to produce estimates of fertility levels and with the data, to examine whether fertility was stable, rising or falling in recent times in Nigeria.

The focus of the analysis was the eleven years from 1970 to 1980 although some discussions and data sometimes went beyond this period.

With respect to scope, the present work was confined to the examination of fertility levels and trends. Differentials and determinants were analysed not in their own rights but as aids in the assessment of the validity of the estimated trends.

After a long period of dearth of demographic data in Nigeria, there are many outstanding issues to be settled as well as new areas to be explored in all aspects of Nigerian demography using the NFS data. This situation poses a temptation to superficial analysis of too many issues in a single project. As much as possible this temptation was resisted here and all attention was centred on the estimation and validation of recent fertility levels. For instance, nuptiality was treated here only as

one exposure point in fertility analysis. Issues like marriage patterns (Olusanya 1982), its contexts and types (Ukaegbu 1976, 1979) and its trends (Omideyi 1986) lie outside the focus of this work. Similarly, the broad questions of the relationship between fertility and mortality (Orubuloye and Caldwell 1977, Uche 1985) and between desired or achieved family size and fertility (Ware 1975, Lucas and Ukaegbu 1977,Oyeka 1986) were not treated.

Regretably, the Nigerian dataset was not available early enough to be included in the numerous comparative analyses which used the WFS data. Recent published volumes (eg. Cleland and Hobcraft 1985, Cleland and Scott 1987, UN 1987a, 1987b) also did not include much data from Nigeria. This thesis did not aim at filling this gap either.

Even within this constricted scope, decisions on the levels and techniques of analysis were influenced by the quality of the Nigeria Fertility Survey data. It is hoped that further works with the NFS data will pay due attention to the issues which lie outside the immediate interest of the present analysis.

1.3 THE SAMPLE AND DATA.

The data for this project is the standard recode file of the Nigeria Fertility Survey. The fieldwork for the survey was carried out between 12 October 1981 and 15 October 1982. The sample was drawn from a stratified sample of 912 Enumeration Areas originally made for use in National Demographic Sample Survey of 1980. In this design, 48 Enumeration Areas were selected from each of the existing 19 States in the country (In 1987 two more states, Katsina and Akwa Ibom were created from Kaduna and Cross River states respectively). The sub-sample for the Nigeria Fertility Survey was selected from the NDSS sample with a probability proportionate to the size of the population in the EAs. A total of 250 EAs were subsampled; 182 and 68

were taken from the rural and the urban areas respectively.

A target of 12,500 was set for the NFS. To achieve this, an equal sample take of about 50 women in each EA was adopted. The ultimate sampling units in every EA were compiled by the interviewing team with the list of all eligible respondents. The eligible respondents consisted of all de facto female residents who were aged 15-49 years. The households interviewed were selected systematically using a sampling interval (defined as the total eligible respondents for all sampling units divided by 50).

Two sets of data, one for all individual women aged 15-49 years, and the other for all members of the selected households, were collected. A total of 9727 individual women out of the 10134 eligible respondents were successfully interviewed. 8624 households containing 49,114 members were successfully listed. In both the household and individual interviews the response rates were quite high (93.4 and 96.0% respectively). Details of the survey methodology are contained in the Principal Report Volume I, Lagos (1984).

There are several ways in which the NFS could be said to be unique. It has already been noted that the Nigerian Fertility Survey is the first successfully completed national demographic survey.

The decision by the Nigerian government to join in the WFS programme was belated and therefore the Nigerian survey was one of the last to be conducted. There were elements of haste in all stages of the survey.

Two breaks occurred in the process of the Survey which might have some effects on the data quality. In the North and South-West, the field staff were dispersed after training because of financial problems. Four months later they were recalled. But many of them had lost interest

and did not return. New trainees were recruited and given one week course. For the old trainees who returned, their retraining was for just two days. Haste was encouraged in the Nigerian Fertility Survey in order to meet the deadline for winding up the entire WFS programme.

In absolute figures, the NFS sample is the largest of all the WFS samples from any single developing country. At the national level however, the sample is rather small for a very detailed analysis. With an estimated population of 93.7 million in 1984 (National Population Bureau 1984), the ratio of the sample to the women population is about 1:4729. The smallness of the sample is fully appreciated when an attempt is made to cross-tabulate particular variables by geographical or socio-economic charateristics. The emphasis on national as opposed to State-level, ethnic or other subcategoric estimates creates limitations for an analyst of the NFS data. Some variables of interest may not be accessible and a breakdown of the available ones can not be carried on to a desired extent. In the State-level reports prepared by the National Population Bureau, refined fertility measures such as age-specific fertility rates and total fertility rates were not computed because there were too few births by age groups of mothers. A breakdown of the data is possible on a regional basis but not for the ethnic groups. In this regard, the NFS data have not contributed directly towards the clarification of the nature of ethnic imput in fertility patterns in Nigeria as was expected by researchers (See Lucas 1982). Data on ethnic origin of the respondents in the individual interviews were collected but were not included either in Volumes I and II of the NFS report or in the Standard Recode file.

Wide regional differentials exist in the background characteristics of the cases in the sample. Depending on what variables or relationships are being examined, these variations can give rise to a misleading picture at the national level. This point is illustrated with the regional variations of sample size for four background

variables, region of residence, type of place of current residence, educational level and religion.

There are four regions in the country, each consisting of several States. In the North-eastern region are included Benue, Bauchi, Plateau, Gongola and Borno states. The North-West comprises Niger, Kaduna, Kano, Katsina and Sokoto states. The South-Eastern region is made up of Anambra, Imo, Rivers, Cross River and Akwa Ibom states while the South-Western region include Bendel, Ondo, Oyo, Lagos, Ogun and Kwara states. The States in each region are not necessarily homogeneous in ethnic composition or in levels of socio-economic development. Table 1.1 shows that the sample is not evenly distributed among the regions. In general, clustering of cases which possess particular background characteristics in particular regions is observed. The South-Eastern region has the largest number of cases from the rural areas and the smallest number from the city. On the other hand, the majority of the town and city cases are from the South-West. Very extreme cases of sample variation by region are noticed for education and religion. Only 17 cases in the North-West have achieved secondary or higher levels of education. There are 654 cases with only Koranic education in the same region whereas in the South-East, cases with only Koranic education are just 4. Protestants are only 2 in the North-West but 566 and 497 in the South-East and South-West respectively. The South-East sample has only 5 moslems.

This pattern of sample spread has important implications for case selections in analysis using the NFS data. For instance an examination of the fertility or other demographic behaviour of Nigerian women who have secondary or higher education almost excludes the whole of the North-Western region which has only 17 cases.

Another point to be made on the sample is a stress of the importance of age structure in analysis. Inadequate attention to the age-structure of the sample or sub-groups

of the sample can lead to erroneous conclusions. Education for instance has been assigned a very important

TABLE 1.1 NUMBER OF CASES IN THE INDIVIDUAL INTERVIEW BY SELECTED BACKGROUND CHARACTERISTICS.

B/GROUND XTERISTICS.					
PLACE OF	REGION				
RESIDENCE	NORTH-EAST	NORTH-WEST	SOUTH-EAST	SOUTH-WEST	ALL
Village	1947	1876	2781	927	7527
Town	312	201	300	613	1426
City	84	144	58	489	776
EDUCATION					
None	1903	1490	1383	952	5728
Koranic	184	654	4	29	827
Prim. Inc	147	34	604	274	1059
Primary	74	25	558	308	965
Sec +	35	17	590	463	1106
RELIGION					
Catholics	204	21	1150	274	1648
Protestants	129	2	566	497	1149
Fundament's	60	2	386	318	766
Jehov. Witns	11	1	35	14	60
Adventists	2	-	114	6	123
Other Xtians	141	8	377	48	574
Moslems	1612	2071	5	737	4427
Trad. Rel	91	96	315	69	570
No Rel.	81	17	144	62	304
Other	11	3	47	1	62
ALL NIGERIA	2343	2221	3139	2027	9727

causative weight in relation to fertility differentials in African studies (see Lesthaeghe et al 1981 in Page and Lestaeghe (eds.) 1981). The age structure of the educated

or non-educated cases in samples should be considered in the analysis of fertility differentials by education.

From Tables 1.2 it is observed that in the NFS, the majority of cases who have secondary or higher education are in the 15-19 age-group, with very few cases above age 29. Since most women in the youngest age-group have never married and therefore are not yet fully exposed to childbearing, their educational achievement here may be explaining not as much differential in fertility as one is tempted to believe on the surface.

TABLE 1.2 PERCENTAGE DISTRIBUTION OF WOMEN BY AGE AND EDUCATION

AGE GROUP	EDUCATION				
	NONE	KORAN	P.INC.	PRIM.	SEC. and above
15-19	11.3	20.6	26.1	38.3	56.5
20-24	14.1	20.3	23.2	22.2	24.1
25-29	19.2	19.4	20.1	17.1	10.6
30-34	18.8	18.5	14.6	10.5	5.0
35-59	14.7	9.7	8.2	7.7	2.0
40-44	13.1	6.6	5.2	2.9	1.3
45-49	8.9	4.9	2.4	1.3	0.6
TOTAL	100	100	100	100	100

To take the issue a step further, the partial correlation coefficients for education and mean CEB were calculation for three orders. The zero order partial correlation coefficient for education and CEB was -0.33 which indicates a relatively important relationship. However, with control for age alone, the r value fell to -0.11. When current age and age at marriage were jointly controlled, the relationship between education and CEB almost disap-

peared (r=-0.01). These results indicate that it is not so much education as age (at survey and at marriage) which is responsible for the differentials observed in fertility measures in Nigeria. Differentials in exposure to demographic states appear to be a more critical factor than just educational status. The factor of education in the Nigerian case, could be viewed as an influence which only delays the starting of childbearing. No data so far have proved the existence of measurable fertility differentials by education due to different values or attitudes acquired from levels of educational achievement in Nigeria. In this respect, the dynamics of fertility transition could be quite different from those of infant and child mortality. Caldwell and Adegbola (1977) have explained the significant differentials in infant and child mortality due to a change from fatalistic attitudes and resignation to fate arising from acquisition of education on the part of the mother.

A good examination of the effects of a factor like education on fertility will have to draw samples which are large enough, equally distributed among social categories and proportionately spread in all age groups. The NFS data do not quite satisfy these conditions and for that reason, strong conclusions about the relationship between fertility and education in Nigeria and similar societies may be premature. A similar but less serious situation arises in the regional distribution of cases by type of place of residence. Whereas the other three regions have more cases from the rural areas, South-West has more cases from the urban areas (54.4%) than from the rural areas (45.6%) possibly as a result of the long history and type of urbanization in Yoruba society.

For the Nigerian context, these basic points are enough caution against making loose national generalizations without taking into account the overall sample size, the regional variations in the number as well as the age structure of the selected cases.

1.4 THE METHODOLOGY.

Two analytic techniques were chosen for this work. In the first part which dealt with estimation of levels and analysis of trends, cohort-period method was used. In the second part, determinants of fertility were examined with Fertility Exposure Analysis (FEA).

These two methods are part of the contributions of WFS to modern demographic analysis. One of their major advantages over the traditional methods of analysis is that they are capable of focusing on the individual as the unit of analysis. Also several WFS techniques including the ones used here have inbuilt capabilities for trend analysis, thus permitting the rich information collected in retrospective surveys to be fully utilized without a resort to strong assumptions and smoothing procedures which characterize other aggregate or indirect techniques.

The first method, the cohort-period approach was described in Hobcraft et al (1982), Goldman and Hobcraft (1982) and Hobcraft and Casterline (1983).
Some of the important measures which can be estimated using this method include the following:

1. Cohort-period fertility rates,
2. Cumulative fertility of real cohorts at the end of period (P),
3. Cumulative fertility of synthetic cohorts (F),
4. P/F ratios (including and excluding the common cells),
5. Ratios of successive r's, P's and F's,
6. Average years of exposures in given durations by periods.

Full Table 4 contains longer lists of the measures. The choice of which measure to examine in depths depends on analytical objectives. The reproductive history of a particular cohort can be traced by examining a table of their

cumulative fertility at each completed childbearing age group. Fertility levels are easily examined by comparing the cumulative rates for synthetic cohorts across periods. Some information about underreporting of births by a given cohort can be obtained by comparing the ratios of their successive fertility with the ratios of the successive fertility of other cohorts at similar reproductive stages. The P/F ratios can be used to detect omission of births which occurred in the past, and are good aids for the assessment of fertility trend.

Computation of the fertility measures are illustrated in the Appendix.

There are several reasons for adopting this approach in place of alternative methods of data analysis. First, the cohort-period method enhances descriptive analysis since the exposure to risk of occurrence of events are displayed in the history of the individual. Secondly, it permits measurement of variations in fertility as a consequence of passage of time.

A limitation of the traditional methods of analysis is that they usually represent the entire reproductive histories of women with only a few indices. This limitation is overcome by the cohort-period approach which rather permits classification by criteria which apply equally to women and their births and the information on a series of individual events (Ryder 1980).

Also with this technique there is no problem of developing highly specific conditional probabilities of birth because both the numerator and the denominator required for analysis are obtainable from the data. Lastly, the cohort-period method does not involve the use of model age-specific fertility rates, and therefore interpolation is not necessary.

An advanced statement of this model which incorporated more demographic controls was give by Hobcraft and Caster-

line (1983). Six demographic dimensions were identified as follows; AGE time of exposure, PERIOD before the survey, BIRTH COHORT - age at survey, MARRIAGE or MOTHERHOOD DURATION AT THE SURVEY, AGE AT ENTRY into FIRST MARRIAGE or MOTHERHOOD and MARRIAGE or MOTHERHOOD DURATION, time since first marriage or birth.

Of these dimensions, a combination of three terms which have no possible redundancies was used to develop a log-linear model incorporating age, period and duration effects on fertility. This model (Hobcraft and Casterline 1983) is represented in the form,

$$LnB(APD)=LnW(APD)+GM+AGE+PER+MDR \text{ where,}$$

AGE=Effects of 5-year age groups (with centre at A),
PER=Effects of 5-year period prior to the survey at P,
MDR=Effects of 5-yr duration with centre at D,
GM=Grand Mean,
W(APD)=Woman years of exposure in age group A,
Period P and Duration D,
B(APD)=Birth in the APD cross-classifications.

As suggested later by Pullum (1987), the dynamics of the model may be likened to the pattern of controls by partial regression coefficients in other variables; the estimated age and duration effects could be seen as net of the effects of period differences, and vice versa in so far as the underlying relationship is additional.

The second analytic method was used in Chapter 5. The effects of major background variables on proximate determinants, the reducing impacts of the proximate factors and the mechanisms through which these sets of variables operate on fertility are examined in an integrated analysis with Fertility Exposure Analysis.

FEA which was developed by Hobcraft and Little (1984) is an individual-level model for allocating the reduction from maximum achievable fertility to actual levels within

a fixed interval of a woman's history In principle, any number of states can be defined for allocation of exposure proportion if the necessary information is available in the data.

Of all the recent attempts to measure the proximate determinants and integrate them into a wider explanatory framework for fertility analysis, FEA has the most complete features. It borrows from and improves on Gaslonde and Bocas (1970), Gaslonde and Carrasco (1982) and Bongaarts (1978). Although the method is relatively new, it has produced impressive substantive results for Dominican Republic (Hobcraft and Little, 1984), Korea (Little and Hobcraft, 1984), Egypt (Nawar and Hobcraft, 1983), Pakistan and Mexico (in a somewhat modified form (Pullum et al 1987)).

Hobcraft (1987) outlined major issues in the measurement of proximate determinants and the possibilities or difficulties in improving FEA and other models put forward by Bongaarts and Mosley, Werner and Becker. For FEA, potentials for increased accuracy of measuring the proximate determinants exist. The fertility reducing effects of menarche, temporary absence of spouse, coital frequency, post-partum abstinence can be measured. Estimation of efficacies of union types can be incorporated into FEA. Endogenous estimation of protection due to post-partum amenorrhoea, breastfeeding and induced abortion are possible. The protection offered by contraception by type can be assessed.

At the moment, minimum data requirement for FEA is retrospective information collected in basic WFS format. A good number of WFS datasets, especially the later surveys contain sufficient information for an application of FEA. As more detailed information become available, it will be easier to exploit fully the potentials of FEA. For instance the original application to Dominican Republic (Hobcraft and Little 1984) did not assess the impact of induced abortion but later this variable was in-

corporated with Korean data (Little and Hobcraft 1984) which contained the relevant information.

The present application to Nigerian data adds to tests of the viability of FEA especially in Sub-Saharan Africa where FOTCAF variables are known to have considerable effects on fertility but where to date these effects have neither been successfully described in quantiative terms nor explained in a accounting manner. A minor adaptation made to FEA here is to assess the separate contribution of post-partum abstinence to fertility reduction in Nigeria. The specific steps taken to achieve this are explained in Chapter 5.

An important methodological feature of this thesis which has been mentioned earlier is the emphasis placed on data quality and its implications for results. Chapter 2 is devoted to the discussion of this problem. In the subsequent chapters, attention is drawn to the effects of data quality whenever it is suspected to be significant.

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CHAPTER TWO

DATA QUALITY AND FERTILITY ANALYSIS.

2.1 INTRODUCTION.

It is the aim of this chapter to draw attention to some possible effects of the quality of the information collected in the Nigeria Fertility Survey on estimates of fertility.

Efforts have been made since the decade of the 1960's by demographers to improve the quality of the data collected and to make full use of the ones available in the developing countries. Consequently, several correction and indirect techniques have been developed for data analysis. In Africa, the work of a team of demographers pioneered some of these techniques, popular among which is the Brass P/F ratio method.(see Brass et. al. 1968) More of such earlier techniques are contained in Manual IV (UN, 1964) and in Carrier and Hobcraft (1971). More recent developments are published in Manual X (UN 1983).

With due recognition of the importance of data quality for demographic estimates, the WFS carried out intensive research into the methodologies for evaluation of survey results. A few of these basic works include Kendal, 1976, Little 1982, Verma 1982, Ómuicheartaigh 1982, 1984a, 1984b and Hobcraft and Rodriguez 1982. In addition, the quality of most of the country data were evaluated either as a second-stage analysis or as part of the First Country Report.

A general report of the quality of the NFS data was produced by Morah (1985). This and other previous studies

Abridgment?

since the 1950s indicate that demographic data collected in Nigeria have not been of a good quality. (See Van de Walle 1965, Ekanem 1971, Ekanem and Ayeni 1974, Olusanya 1966, Duru 1968, Okediji 1972, Udo 1968).

With the concern for data quality, some variables which could affect the correctness of reports were included in the NFS. There was a question on whether responses were given by self or proxy. Information on whether age was estimated or supplied by the individual was collected. If estimated, the method used was recorded. The presence or absence of others during interview on sensitive questions (mainly contraceptive practices) were also recorded. The number of visits made before the interview was completed per case, the length of time used in the interview and the degree of co-operation offered by the respondent (as assessed by the interviewer) are variables collected for their potential usefulness in data quality evaluation.

Another set of information collected is the format in which age, marriage and three orders of birth were given in the individual interview. Respondents were categorized according to whether they gave the exact date (year and month) of event, whether they gave only the calendar year or whether they simply reported "years ago".

In this chapter, possible effects of the formats of response on fertility estimates are considered. In the analysis, it is assumed that event reported in exact date are likely to be more correct than those reported in Calendar year only, and that those reported in Calendar year are likely to be more correct than the ones reported in 'Yrs ago' format. In a very loose sense, the exact date is taken as a control for reference period error and omission of events. A woman who was able for any reason to say the exact month and year of the occurrence of events 1s nearest to precision and also is most likely not to have left out any of such events unreported. The calendar year format might guarantee some measure of precision more than the "Yrs ago" in dating of events and

also, to some extent, ensures completeness of report. The 'Yrs ago' format is the most susceptible of the three to both the displacement in time and omission of events.

The relevant variables are not available in the household data. Therefore, only the individual reports are assessed.

2.2 RELATIONSHIP BETWEEN FORMAT OF EVENT REPORTS AND SELECTED VARIABLES.

With reference to Table 2.1, it is observed only 16.3% of the women in the NFS sample gave their exact date of birth. The proportion of women who reported in either exact date or calendar year is 0.43. The format in which age was reported varied widely with the background characteristics. The South-West reported highest in exact date of birth, followed by the South-East. North-Western women reported mostly in 'Yrs Ago', giving only 1.2% reports in exact date and 10.7% in calendar year.

Age was reported most frequently in exact date by city dwellers and least often by villagers. Over half of the village respondents gave their ages in Yrs Ago. The greatest variation in the format of age reports is noticed in the educational categories. While only 3.5% of the women who had Koranic education gave their exact date of birth, the figure is 59.0% for those with secondary or higher education. Women with incomplete primary schooling gave the highest report in calendar year. Quite a substantial number of the very educated group gave the report of their ages in 'Yrs Ago' format, while as many as 31.3% of those with no education were able to report their ages in either of the two good formats.

TABLE 2.1 PERCENTAGE DISTRIBUTION OF ALL WOMEN ACCORDING TO THE FORMATS IN WHICH THEIR AGES WERE REPORTED, BY SELECTED BACKGROUND CHARACTERISTICS.

BACKGROUND VARIABLES	FORMAT OF AGE REPORT			
	EXACT DATE	CAL YEAR	YEARS AGO	N OF CASES
REGION				
North-East	12.1	27.6	60.1	2343
North-West	1.2	10.7	66.1	2221
South-East	24.2	37.8	37.9	3139
South-West	25.5	24.9	49.4	2027
CURRENT RESIDENCE				
Village	12.9	28.5	58.6	7527
Town	26.0	24.9	49.0	1426
City	32.1	10.8	57.0	776
EDUCATION				
None	6.2	25.0	68.6	5728
Koranic	3.5	17.2	79.2	872
Prim Inc	18.1	37.4	44.4	1059
Primary	37.2	31.6	31.9	965
Sec +	59.0	26.7	14.2	1106
RELIGION				
Catholics	30.7	40.3	29.9	1648
Protestants	39.8	30.9	39.2	1144
Fundament.	21.6	30.6	47.6	766
Other Xtians	12.5	28.8	58.6	576
All Xtians	26.2	34.3	40.6	4133
Moslems	8.2	18.7	73.0	4427
Traditional	4.7	20.5	74.7	570
ALL NIGERIA	16.3	26.5	74.7	9727

For the religious groups, the lowest frequency of exact age format was from adherents of traditional religion. Protestants gave the most frequent report of an exact date. The early missionaries who founded the mainstream christian denominations (catholic and protestant groups) introduced accurate demographic record-keeping by documenting basic information in birth, baptism, marriage and death certificates of their members. This practice is still maintained and may be one of the factors responsible for the comparatively high exact responses given by christian groups as against muslims. A large percentage of the muslims' ages (73.0) was reported in 'Yrs Ago'.

On the whole, age was better reported in the southern part of the country than in the north. The most exact reports were collected from women who were educated up to secondary or higher levels. The reports from protestant Christians and city dwellers were comparatively very good.

Two measures are used to examine the strength of the relationship between formats of age and birth reports and other background variables. The first is Kendall's tau-b. Computation is restricted to women who have had at least four births in order to get complete response from each woman on the three orders of birth which are of interest in the analysis. The ranking of the categories of each variable used is the same as they appeared in Table 2.1 Formats of report of events are ranked as, 1. Exact, 2. Calendar Yr., 3 Yrs. Ago, and language, in the following order; English,Yoruba, Igbo, Hausa, All Others.

The other measure is partial correlation coefficient (r) computed for all women in the sample. Cases with any missing values in any of the variables used were excluded in the computation. The results are shown in Tables 2.2 and 2.3.

Format of age report showed a strong positive relationship with the format of report of all orders of births and with the format of report first marriage (refer to Table 2.2).

This means that a woman who reported her exact date of birth is very likely to have given the exact dates of all her births. The strongest relationship is observed in the format of report of first, penultimate and last births. The T value for the format of first and last birth report is 0.74 and for the first and penultimate births is 0.86. From this strong association, it is possible to predict the format in which any of the birth orders 1-16 were reported in the NFS.

The format in which first marriage was reported related stronger to the formats of births report than to the format of age report. As birth history questions were followed by nuptiality history in the interview, it is possible that respondents found it more convenient to report their first marriages in the format which they reported their first births than in the formats which they reported their ages.

TABLE 2.2 INTER-RELATIONSHIPS AMONG FORMATS OF EVENT REPORT AND SELECTED VARIABLES.
(Kendall Tau B)

	FORMAT OF REPORT OF				
	AGE	MARR.	1stB	PEN.B	LAST B
FMT AGE	-	.60	.52	.50	.43
FMT MARR	.43	-	.60	.58	.51
FMT 1st B	.52	.60	-	.86	.73
FMT Pen B	.50	.58	.86	-	.78
FMT LB	.43	.51	.73	.78	-
AGE	.08	.06	.06	.06	.10
REGION	-.09	-.14	-.14	-.15	-.15
PL. RES	-.05	-.03	-.04	-.03	-.02
EDUCATION	-.23	-.16	-.21	-.20	-.16
RELIGION	.19	-.22	.20	.20	.20
LANGUAGE	-.07	-.16	-.15	-.13	-.13

The absence of a strong relationship between format of event reports and current age in the Tau values is most likely to have resulted from the fact that these values are for relatively older women (achieved mean parity >3) There is a significant inverse relationship observed in Table 2.2 between the format of events reports and educa-

tion of the respondents. In particular, education is related to the two most distant events reported - age (T= -0.23) and first birth (T= -0.21).

In order to check the data for the impact of cultural variations on the age data quality, the correlations of five cultural variables, namely, language used in the interview (a surrogate of the respondent's language), religion, region and type of place of residence are examined. For all women, type of place of residence shows no significant relationship with patterns of event report. Region of residence is less related to data quality for older women than for the entire sample, which again is possibly a reflection of the impact of age on quality of reports.

The observed correlation between language of interview and quality of age data is not very strong in both measures. This could be due to the complex linguistic characteristics of the individual respondents. The average Nigerian understands and speaks a corrupted form of English language, the 'pidgin English'. Added to this, especially in the towns and cities, some major languages are understood and spoken by people regardless of their ethnic background. A respondent could choose to be interviewed in any language. Rather than suggesting a weak link between event report format and cultural background as represented by language of interview, this may be reflecting the cultural heterogeneity in Nigeria's four broad geographical regions. If the data were accessible for ethnic groups, ethnic differentials (a background variable which is a better representation of cultural distinctiveness in Nigeria) would have given further insights into the degree of cultural influences on age reporting.

TABLE 2.3 ZERO-ORDER PARTIAL CORRELATION FOR FORMATS OF EVENTS REPORTS AND SELECTED VARIABLES.

	FORMAT OF REPORT OF				
	Age	Marr.	1st B	Pen.B	Last B
FMT AGE	-	.08	.54	.55	.47
FMT MARR	-.40	-	.70	.54	.70
FMT 1st B	.54	.70	-	.90	.82
FMT Pen B	.55	.54	.90	-	.81
FMT LB	.47	.70	.82	.82	-
AGE	.20	-.40	.14	.09	.14
REGION	-.21	.09	-.23	-.21	-.23
PL RES	-.11	.01	-.08	-.06	-.06
EDUCATION	-.48	.39	-.36	-.32	-.31
RELIGION	-.32	-.09	-.31	-.30	-.30
LANGUAGE	-.02	-.01	-.11	.09	-.11

Religious background rather than educational achievement is more strongly associated with the format in which both marriage and last births were reported. The coefficients of association between the format of report of first and penultimate birth and religion on one hand, and first and penultimate births report and education on the other, have almost the same value. It is only in the format of age report that the tau value for education is greater than that of religion (-.23 and -.19 respectively). A similar pattern is observed for the values of the zero-order partial (Table 2.3). The strength of the relationship between education and data quality, and religion and data quality differ slightly only for format of age report. This, on the face of it, suggests a relative importance of cultural factors for data quality. However, the relationship between format of age report and religion reduced from a zero partial of -.32 to -.12 when computed with control for education. It would appear that the strong relationship between cultural factors and data quality is a result of high collinearity between education and surrogates of cultural characteristics used here.

Of the six background variables considered in this section, education has the strongest impact on the format in which events were reported by the individual women.

2.3 EFFECTS OF RESPONSE FORMATS ON AGE DISTRIBUTION.

Although it was observed in the previous section that education had a dominant impact on the data quality, this effect was by no means absolute. As much as 31.3% of women with no education reported their ages in the exact format while 14.2% of the best educated reported in the least precise format. In order to find out more about the effects of these unexplained relationships on age distribution and on fertility, the age data and the sex ratios of the reported births are examined for each format. A purer analysis of the educated who gave good reports or the educated who reported badly would have been preferred but such fine categories do not represent the population adequately. Besides, the number of cases would be unjustifiably small.

The single year age distributions are presented in Table 2.4. For each of the three formats, heaping is observed at ages ending with a zero or a five. Heaping was more acute for women who gave their ages in 'Yrs ago' format. For all Nigeria, heaping of ages at 30 years is particularly observed.

Heaping presents more problems if it occurrs across age boudaries in the usual seven age-groups used for fertility analysis. In Table 2.5 it is noticed that much of the heaping can be eliminated by regrouping the ages into wider five year intervals. The effects of heaping of ages on 30 years is significantly reduced in the five-year age distribution. However, the number of cases in the 20-24 age-group remained smaller than the number in the two ad-

joining age-groups for all Nigeria. The deficiency in the percentage reported as aged 20-24 and the apparent excess in 25-29 age-group could have serious consequences for fertility estimates. This is because some major techniques for data assessment and fertility estimation usually assume correct report of events by these two age groups.

To examine the magnitude of heaping on or avoidance of each age, Myers' blended indices for digit preference was calculated for the different formats. In the calculation, women aged 45 and above were excluded in order to achieve equal blending as well as to reduce the effects of sample fluctiation at the older ages. These indices are shown in Figure 2.1.

The value of the absolute index of age preference is smallest for the exact format and highest for the "Yrs Ago" format. For the "Yrs ago" format, massive heaping is observed on digits zero and five. For this format, there is also the highest degree of avoidance of 1 and 9.

The Calendar format shows a slight excess of women on digit 1 despite the general heaping on the digit zero. For the exact date format, heaping is highest not on zero but on five. No heaping is apparent on digit 8. Taken together, the indices show that 0 and 5 are the highly preferred digits, while 1, 3, and 9 were avoided most. Although all formats show evidence of age error, the highest degree of distortions in the age distrbution occurred for the women who reported their ages in "Yrs ago" format. In particular, much heaping on age 30 which shows very prominently in the NFS single year age distribution is contributed by women who reported their ages in this least precise format.

TABLE 2.4 MEAN NUMBER OF CHILDREN EVER BORN IN SINGLE AGES BY DATA QUALITY.

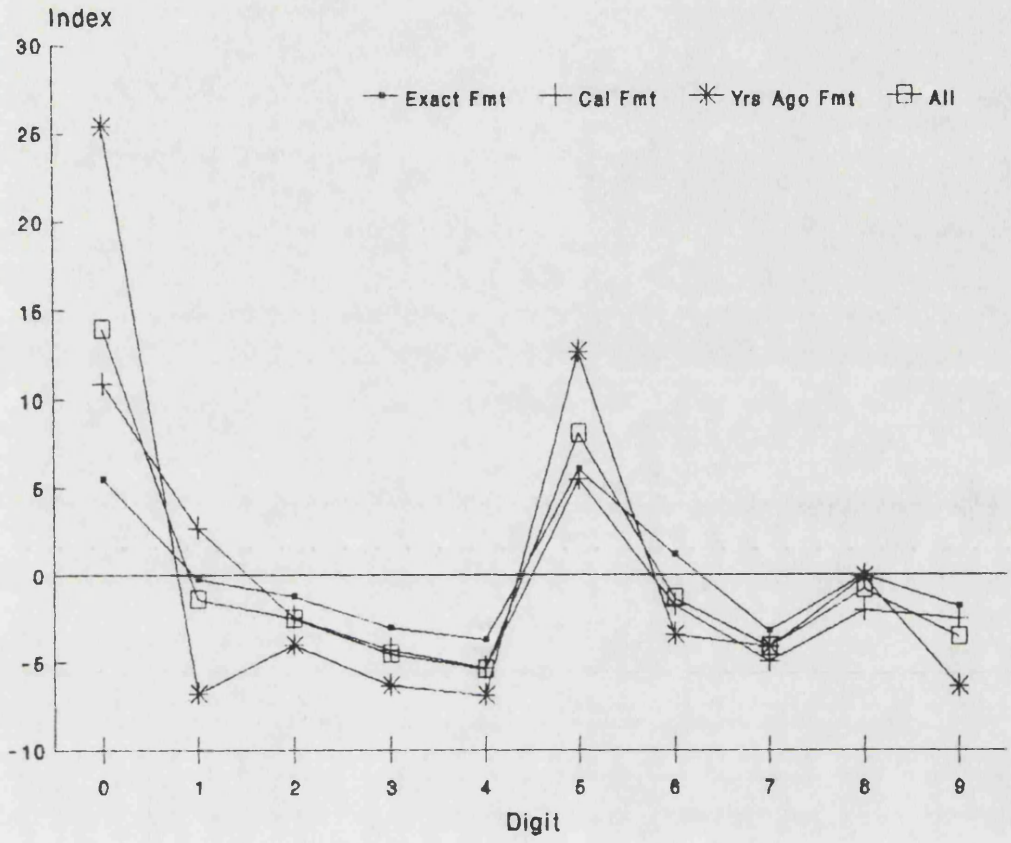
AGE	EXACT	N	CAL	N	YSAGO	N	NIGERIA	N
15	0.03	147	0.03	97	0.11	281	0.07	531
16	0.03	146	0.19	166	0.31	181	0.15	492
17	0.19	97	0.47	122	0.66	167	0.48	386
18	0.29	113	0.37	110	0.69	207	0.50	430
19	0.48	87	1.05	79	0.97	95	0.83	261
20	1.03	93	1.15	117	1.66	469	1.49	680
21	1.01	85	1.34	100	2.03	79	1.44	262
22	1.19	80	2.01	100	2.50	121	1.99	302
23	1.53	57	1.99	63	2.46	81	2.05	200
24	1.71	44	2.48	90	2.76	131	2.49	264
25	2.38	105	3.04	152	2.79	522	2.78	778
26	2.63	60	3.11	104	3.34	142	3.12	306
27	1.76	36	3.60	47	3.50	128	3.21	212
28	4.28	49	3.88	79	3.71	190	3.84	318
29	3.94	27	4.36	66	4.20	59	4.22	152
30	4.13	88	4.41	214	4.03	724	4.11	1026
31	4.59	33	4.18	99	4.68	38	4.36	159
32	4.83	14	4.31	39	4.73	98	4.63	151
33	5.20	13	5.46	36	4.34	50	4.86	91
34	4.57	18	5.99	40	4.88	53	5.23	111
35	5.22	50	5.19	132	4.97	389	4.86	570
36	5.18	29	4.77	85	5.52	95	5.17	209
37	5.72	6	6.63	14	5.10	69	5.22	89
38	5.32	9	5.33	29	6.02	106	5.84	143
39	5.12	16	4.24	38	5.18	45	4.81	99
40	6.64	19	5.72	112	4.99	465	5.18	587
41	5.29	22	4.71	71	5.20	40	4.95	132
42	5.11	15	4.25	26	4.49	54	4.52	95
43	5.22	10	5.87	16	5.33	33	5.45	59
44	3.39	4	5.85	9	6.75	17	6.02	31
45	6.64	6	4.97	66	5.58	184	5.44	255
46	8.41	8	5.67	22	6.94	48	6.73	78
47	9.27	3	6.00	10	6.20	26	6.35	31
48	7.98	7	5.82	23	5.89	96	5.99	126
49	5.29	7	4.79	11	5.94	75	5.76	93

TABLE 2.5 MEAN NUMBER OF CHILDREN EVER BORN BY AGE GROUP AND DATA QUALITY.

AGE-GROUP	MEAN CEB		
	EXACT	CAL	YRS AGO
15-19	0.20 (591)	0.38 (571)	0.54 (936)
20-24	1.29 (359)	1.79 (470)	2.28 (881)
25-29	3.36 (277)	3.59 (448)	3.46 (1041)
30-34	4.66 (155)	4.86 (428)	4.53 (963)
35-39	5.31 (110)	5.03 (297)	5.30 (704)
40-44	5.12 (70)	5.27 (234)	5.35 (600)
45-49	7.12 (31)	5.42 (132)	6.10 (428)

Number of cases are enclosed in brackets.

Figure 2.1 Myers Blended Indices of
Digit Preference By Formats of Report.



2.4 SOME EFFECTS OF REPORTING ERRORS ON OBSERVED FERTILITY

By this point it is fairly obvious which subcategories of the NFS sample to suspect for misreporting provided that the stated assumptions about the relationship between data quality and specified background variables hold.

However, a complication arises in the analysis due to the fact that women who shift to any direction in the age scale do so carrying their nuptiality and maternity histories. These transported histories are very likely to affect the level of any observed or estimated measures at the host ages. Unfortunately, there are no easy ways of measuring the net shift effect on the host ages since it is hard to identify the particular individual women who shift. Under the assumption that the age pattern of fertility in Nigeria followed the general pattern in a typical developing African country, and that there are no major age-selective disturbances to this pattern, the observed parity levels are examined here for the effects of misreporting.

Considering first the shift effects on reported parities at ages ending with digit zero (Fig 2.2), it is noticed that the reported parity at age 20 is not lower than that for the age immediately following it. It is likely that a downward shift by women of high parity may have contributed to sustain a high level at age 20. There is also the possibility that women who shifted to age 20 from younger ages are relatively of high parity. Age 30 falls within the age range by which most women have achieved a high parity in Nigeria. For all Nigeria, the average parity recorded at this age is lower than that recorded in the younger age of 29. It is possible that women in younger ages shifted up to 30 especially if they were married or mothers.

Figure 2.2 Mean Number of Children Ever Born In Single Ages By Data Quality

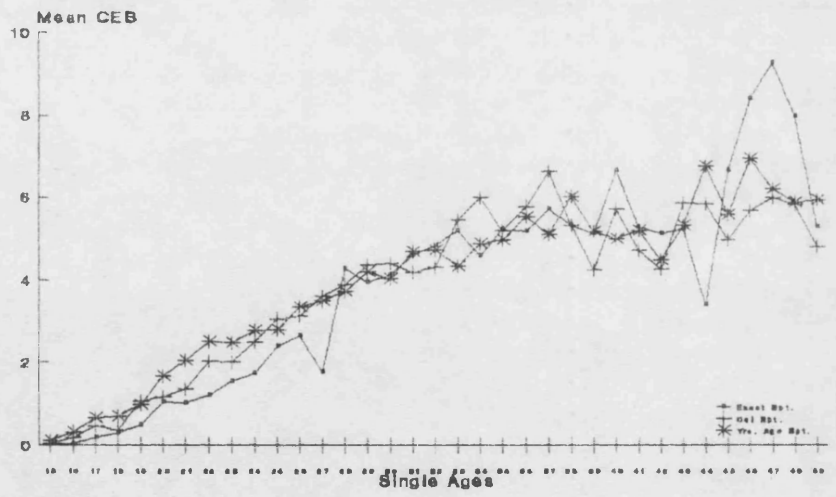
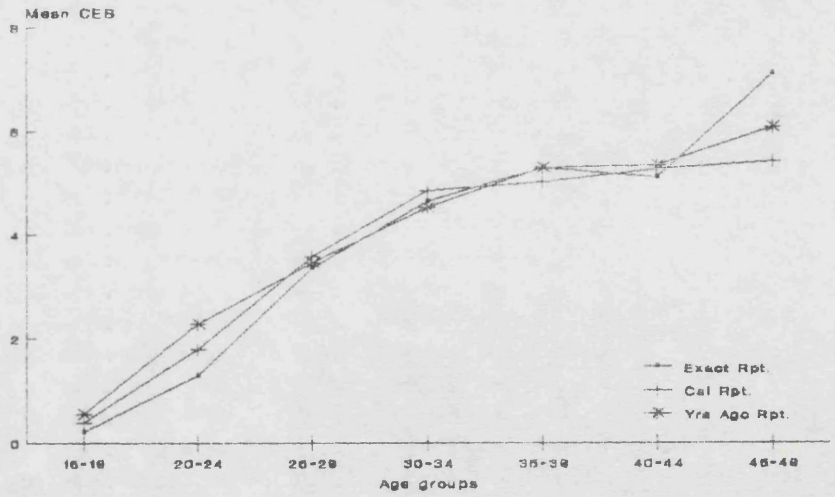


Figure 2.3 Mean Number of Children Ever Born By Data Quality In Age Groups.



By age 40 the effects of other factors such as omission of births and sampling fluctuations, have become significant and the observed parity level could be the result of combined effects of several of these variables. Comparing the parity of All Nigeria at this age with the values of other formats gives some indication of the extent of possible underreporting of births. Reports of births appear most complete for the exact format and least so for the 'Yrs Ago' format at age 40.

With regard to digit 5, the effect of shifting at age 15 is obscured by the small parity value usually recorded because of adolescent infertility and short duration of exposure to the risk of childbearing, Shifting to age 15 is most likely to be upward in direction as very young women under the age of 15 who happened to be included in the survey would most likely be reported as aged 15 years. For age 25, it would appear that the shifters were on the average high parity women, thus contributing to the maintenance of high parity at this host age.

Omission of early births is a likely explanation for the low parity at age 35 because by this age, some births have become distant events to mothers, especially those who started childbearing at very young ages. The same reason may account for the comparatively low parity level at age 45.

The parity levels for the different formats show some differences up to age 24. With the exception of age 19, the parity value for the 'Yrs Ago' format was higher than all others. This pattern is likely to be reflecting the true situation rather than being a result of errors since up to age 24 the occurrence of events are relatively recent and can be located roughly correctly and fully accounted for by women who reported in any format. It is also possible that the background characteristics of the women in "Yrs ago" format (e.g., they are predominantly rural and married at relatively younger ages) contributed to raise

their fertility despite any underreporting.

Similarly, the lowest parity values before age 25 may be a reflection of the background characteristics of the women in this age arange which have a tendency to depress fertility (- young educated, southern and residing in urban areas).

Between ages 25 and 29, the parity level of women who reported in all but the exact date formats shows gradual increases with age. The fertility depressing effect of heaping at age 30 show on parity distribution by age for all but the Calendar format.

Serious problems arise from age 39 onwards. The parity level for women who reported in the more exact formats (exact date and calendar) are affected by smallness of number while the other format is likely to have been affected by recall error and to a less extent, smallness of casses as well. As a result of these undefined effects, the impact of shifting is not easily discernible. Wild fluctuations of parity values mainly above the level of 5 is observed for these older women up to the end of childbearing ages.

Data on sex ratio by period before the survey in Table 2.6 are used to examine further possible occurrences of omission of births. In Table 2.6, the exact format means that for these women, all events (their own ages and the ages of their three orders of births were reported in ecact months and year of occurrence). The same is true for the other two formats. Following this definition, only those who have had at least three births are included in the analysis with loss of information on younger and less fecund women. This is not regretted since older women with higher parity are the group more susceptible to omission of births.

Trends in the sex ratios for five year periods before the survey are difficult to establish due to wild fluctuations

of ratios fo all formats of events report. The strict criteria applied in the selection of cases for the results presented in Table 2.6 greatly reduces the number of cases and this is very likely to have introduced sample fluctuations which might have led to implausible results for cohorts and many periods irrespective of formats.

It was observed though, that generally the sex ratios tend to increase with decrease in the quality of data. There is almost no evidence of omission of births by these category of women. For the exact format reports the sex ratio for all women is about normal (106.5).

The sex ratios for the Calendar and 'Yrs Ago' formats indicate that female births were underreported. The highest incidence of underreporting of female births occurred among women who gave their reports in 'Yrs Ago' format. A shortfall in the reported most recent female births among 25-29 is very noticeable for all formats. At the youngest age group, the deficit of female births increased after the most recent 10 years, i.e., tracing and considering the experiences of real cohorts. This trend is important as it would suggest that where omission occurred due to memory lapse, female births are more likely to have been left unreported than male births.

Although both results are shown, the average sex ratios of all births in each formats are considered a better reflection of the true effects of data quality on completeness of reports than the ratios of either individual age cohorts or periods. As a result, no conclusion is drawn from the detailed arrays of sex ratios by format in Table 2.6.

TABLE 2.6 SEX RATIOS OF ALL BIRTHS FOR MOTHERS
BY FORMAT OF REPORTS OF EVENTS,
AGE AND 5-YEAR PERIODS BEFORE THE SURVEY.

AGE GROUP	FIVE-YEAR PERIODS PRIOR TO THE SURVEY						
	1	2	3	4	5	6	7
15-19	95						
20-24	100	148					
25-29	100	98	105				
30-34	84	116	115	94			
35-39	150	138	97	94	113		
40-44	139	103	128	145	198	51	
45-49	105	92	67	55	84	118	155
All Exact Fmt.	106.5						
N of cases=1340							
15-19	177						
20-24	111	125					
25-29	68	105	140				
30-34	96	130	122	119			
35-39	114	152	118	113	159		
40-44	114	88	106	121	111	148	
45-49	113	84	101	83	78	144	120
All Cal. Fmt	112.8						
N of cases =1563							
15-19	92						
20-24	111	111					
25-29	91	139	162				
30-34	101	137	119	145			
35-39	111	126	120	94	155		
40-44	118	117	105	106	119	213	
45-49	84	92	111	98	138	119	190
All Yrs Ago Fmt.	117.5						
N of cases =1992							
15-19	123						
20-24	109	122					
25-29	91	123	132				
30-34	102	125	123	126			
35-39	114	129	118	113	136		
40-44	120	97	112	114	132	156	
45-49	75	104	92	86	110	134	174

All Nigeria, all parity, all women 112.5

Note: Periods before the survey: 1=0-4, 2=5-9, 3=10-14,
4=15-19, 5=20-24,
6=25-29, 7=30-34.

TABLE 2.7 SEX RATIO OF REPORTED BIRTHS BY BIRTH ORDER FOR 5-YEAR PERIODS BEFORE THE SURVEY.

PERIODS	BIRTH ORDERS			
	1st	2nd-3rd	4th +	All births
0-4	121	106	96	103
5-9	121	124	116	120
10-14	131	117	107	117
15-19	125	111	91	109
20-24	144	103	103	129

TABLE 2.8. SEX DIFFERENTIALS IN INFANT AND CHILD MORTALITY IN FIVE-YEAR INTERVALS BEFORE THE SURVEY.

PERIOD	1q0		4q1		5q0	
(Yrs.)	M	F	M	F	M	F
5-9	.092	.081	.073	.071	.158	.146
10-14	.107	.095	.086	.080	.184	.168
15-19	.113	.089	.102	.092	.203	.174
20-24	.107	.103	.125	.108	.218	.200
25-29	.181	.138	.079	.134	.246	.254
30-34	.216	.128	.045	.186	.252	.290

Source: Morah (1985)

Examination of sex ratio by birth order shows that higher order male births were more likely to be missed out (Table 2.7). These features could be related to the reluctance of African women to discuss dead infants and children (see Brass 1975, Caldwell and Igun 1971, Ewbank 1983). The pattern of sex differentials for the reported infant and child mortality (Table 2.8) gives some support to the suggestion that the very old women underreported their births, probably by missing out some dead male children. The probabilities of death for female children were higher than the probabilities of male children deaths in the two most distant periods before the survey.

It is appropriate to mention here three major risks involved in the interpretation of the data discussed so far in this section. It is easy to confuse the effects of (1) sample fluctuations, (2) subsample characteristics and (3) genuine fertility changes for errors. As seen from the previous section, the format in which age was reported is highly correlated to other factors such as educational status and religion. It is also noticed that when the number of cases were not proportionately distributed among age groups, results (such as is observed for exact date format at single ages 44 and 47 which have 4 and 3 cases respectively for all Nigeria) could not be trusted. Although a working assumption of completeness and correctness of exact format reports was used in the present analysis, caution should be exercised in the interpretation of the data such as those shown for young age in Figure 2.2. In very mobile populations or under changing conditions, it would be difficult to reach firm conclusions about the exact size of misreporting in age distributions, or to establish the direction of the birth displacement and the net effect of all these on the observed fertility levels. Analysis of these sorts of problems done with WFS data can be found in WFS publications cited earlier in this chapter, and in Singh (1987).

Finally, the effects of sampling errors were computed for age, age at marriage for selected socio-economic variables. The means and the standard errors are shown in Table 2.9. The standard errors are generally small. For none of the variable categories is the standard error significant at 95 percent confidence interval. Hence, sampling error effects do not appear to constitute major problems in the analysis of the NFS data except in extreme situations where very small numbers of cases are selected for analysis.

TABLE 2.9 SAMPLING ERROR FOR CHILDREN EVER BORN BY AGE AND SELECTED BACKGROUND VARIABLES.

AGE	M(CEB)	S.E	N
15-19	0.35	.04	2083
20-24	1.79	.07	1762
25-29	3.21	.11	1757
30-34	4.32	.10	1524
35-39	5.07	.16	1061
40-44	5.13	.16	946
45-49	5.84	.21	594
Age at Marriage			
Under 15	3.87	.16	2960
15-17	3.59	.10	2714
18-19	3.60	.12	1115
20-21	3.55	.21	393
22-24	3.14	.21	297
25 +	3.23	.24	297
Region			
N East	3.16	.17	2069
N West	2.83	.10	2290
S East	3.25	.22	2806
S West	2.95	.11	2562
Place of Resisence			
Rural	3.20	.10	6887
Urban	2.62	.12	2840
Educ.			
None	3.71	.11	5622
Koranic	3.10	.11	844
P. Inc.	2.98	.14	1159
Primary	2.13	.11	1014
Sec +	.66	.09	1088

2.5 COMPARISON WITH EXTERNAL DATA.

There are no recent published comparable external data source against which the NFS data could be seriously assessed. The most recent demographic sample survey of 1966 did not contain enough information in the format which could permit a rigorous comparison.

For lack of better data source, the age distribution for 1963 Census was compared with the household data from the NFS in the First Country Report (see NFS Vol.1 1984). Considering the wide time gap between these two data sets, and the technical errors and problems of the 1963 Census (Udo 1972, Ekanem 1972), it would require great analytical ingenuity to use the Census data to validate the NFS data. Even in countries where external data exist in the form of recent censuses and vital registrations, there is no guarantee that the external sources are necessarily better than the WFS data. Opinions have been expressed that attempts to validate the WFS data with external evidence "might not always be useful because census and vital registration data are usually more inaccurate than the WFS data" (Goldman 1984).

A comparison of the WFS data with external sources in Nigeria will have to wait until new data sets become available. Table 10 is produced as a rough indication of how data from the Nigerian Survey compare in quality with other WFS data in Africa. The percentages of the total respondents which provided exact date of their age, time of first marriage (if married) and time of first birth (if a mother) are used as a measure of the quality of each survey. The result shows that the Nigerian data ranked 10th among the 13 country datasets from Africa, very well below the regional average. Wider comparative analysis (UN 1987a) has indicated that data from African countries are on the average the poorest. Hence to the extent that format of events report is a correct measure of data quality, data collected in the Nigeria Fertility Survey rank among the very poor sets in the whole of the World

Fertility Survey programme.

TABLE 2.10 AFRICAN WFS COUNTRIES RANKED ACCORDING TO THE PERCENTAGE OF EVENTS REPORTED IN EXACT DATES IN THE INDIVIDUAL INTERVIEWS.

COUNTRY	EVENT				
	Age(1)	1st Un(1)	All Bths(2)	All Events	R
Lesotho	72	88	90	83	1
Tunisia	88	53	70	70	2
Senegal	38	69	99	69	3
Kenya	34	69	75	59	4
Ghana	52	40	63	52	5
Sudan	22	41	63	42	6
Morocco	22	35	60	39	7
Egypt	26	37	41	35	8
Cameroun	28	21	41	30	9
Nigeria	16(3)	18(3)	28(3)	21	10
C. D'Iv.	20	12	28	20	11
Benin	9	5	12	9	12
Maurit-ania	4	7	12	8	13

Sources:

1. UN (1987a) see references.
2. Goldman (1984) see references.
3. Computed from NFS SR Files.

R=ranked position

2.6 SUMMARY

Although this chapter contains few substantive results, its emphasis is simply to caution that straightforward results in fertility or other rates derived from the Nigeria Fertility Survey data could be misleading unless there are explicit controls or allowances made for the effects of reporting errors.

Three major types of errors found in this analysis which are likely to affect fertility estimates are age misstatement, omission of live births and displacement of births in time.

Knowledge of the exact dates when they were born or when they got married was very poor among the surveyed women. This resulted in the heaping on ages which are multiples of five. Because much of the age-heaping involved transfer across group boundaries, its effects on estimated fertility measures could be substantial even when conventional age groups are used.

The reported mean number of children ever born appear less affected by errors up to age 29. Estimates based on the fertility experience of women aged 15-29 might be reliable.

The problems of age and marriage date misstatements, birth omissions and displacement became more serious with the older women and for the more distant periods in the past. Because of this later problem, only the recent trend in fertility are fully analysed in the present work. Related to this problem are the errors in the survey year and the two years preceeding the survey. In the two survey calendar years of the NFS, incomplete exposure was probably responsible for the low level of the reported births by most women. Added to the fact that the survey took place in two different years in some parts of Nigeria, it was

decided that these two years be excluded when fertility was estimated for single calendar years.

The analysis shows that the formats in which events were reported are highly correlated with one another. For instance if a woman reported her first birth in exact date, it is likely that she reported her age and time of her first marriage in the same format. Such correlations are important in the evaluation of the quality of fertility estimates derived from the NFS since diagnosis of errors depends heavily on internal consistency checks in the absence of good external data.

Although the NFS data set is the best of its kind in Nigeria so far, its quality is admittedly poor. It is however believed that the quality of the data is good enough to give useful indications about recent levels and trends of fertility in the country. In view of the importance of reporting errors in the NFS data, any conclusions drawn from the evidence in this thesis should be taken only as possibilities, the truths of which in the end, depend on the genuineness of the data.

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CHAPTER THREE

FERTILITY LEVELS AND TRENDS.

3.1 INTRODUCTION.

Two questions which this chapter addresses are,

(i) what the level of fertility has been, and,

(ii) whether there was any identifiable single dominant trend in Nigerian fertility in the recent past.

First, single year estimates of all and ever married women fertility in the eleven years between 1970 and 1980 inclusive are produced for the four broad geographical regions. Trends in the estimated fertility levels are examined on their own and in comparison with results from other major Nigerian surveys. Secondly, possible fertility trends from the available evidence are discussed at the national level in a broader socio-economic context.

3.2 SOME NOTES ON COMPUTATIONAL METHOD.

Descriptions and illustrative analyses of the estimation procedure used in this chapter are found in Verma (1980), Hobcraft and colleagues (1982), Hobcraft and Casterline (1983), Goldman and Hobcraft (1982) and Ryder (1982, 1983). Some advantages of the cohort-period framework which led to its use in the present work have been outlined in Chapter 1. Basic fertility measures available in the framework which are relevant to this chapter are presented in the Appendix. Some notes on fertility rates,

age and period intervals and allocation of time in the past are given below.

The estimates are based on all 9727 cases in the NFS sample. In the discussion, it is assumed that women who died or left Nigeria at any point in the period for which estimates were made had the same fertility rates as those alive and staying. Births which occurred to the women before they were aged 15 years accounted for three per cent of all births reported in the survey. These were excluded from the computations so that the TFR values derived from the age-period rates would be as near as possible to those calculated with the usual 'current' fertility rates among women in the 15-49 age range.

Fertility rates for different age groups are cumulated in a fixed period to the last childbearing age group. The cumulated age-period values are the fertility experience of synthetic cohorts (defined by age groups at the time of the survey). At the oldest childbearing five-year age group, these values are equated to the traditional total fertility rates. The differences between the two measures are usually negligible.

The age-specific fertility rates of the oldest age group from 1972 to 1977, and those for the 40-44 age group from 1970 to 1972 were approximated from the averages of the rates in the three most recent years for which data are available. This was done under the assumption of fairly stable fertility among the two oldest five-year age groups in the 1970s. Where this assumption did not strictly hold, very few births usually occur in these two age groups anyway and any differences between the assumed and real values would most likely not be large enough to affect the overall trend.

As a further step to minimize chance variations in the trends, three-year moving averages of the computed age-specific fertility rates were taken before the total fer-

tility rates were computed.

Although the use of groupings other than the conventional five-year intervals has been recognised as a possibility, not many analyses have experimented on this. In an illustrative analysis, Hobcraft, Goldman and Chidambaram (1982) limited attention to the straightforward five-year intervals for both age and periods before the survey. Sampling error has been found to be high when single year periods are used (Verma 1980, 1982, Little 1982).

However, the need to work with shorter intervals of age or time or both becomes stronger when interest is as much in the result of estimation as in the evaluation of data quality. For instance, Coale (1983) used single-year intervals to assess the fertility and nuptiality trends in Egypt, and examination of the single-year age and duration-specific fertility rates showed that age misstatement was largely responsible for the observed decrease in marital fertility at young ages. Several second stage analyses of WFS country data have used single-year periods although with intentions biased towards detection of errors. A comparative analysis by Retherford and Alam (1984) is an example of the use of non-conventional periods for data evaluation, trend analysis and as a test of the performance of the cohort-period approach.

In the present analysis, fertility estimates are presented for five-year age groups or cohorts at the survey and single calendar years from 1970 to 1980. Apart from the diagnostic insights provided by the use of five year age groups and single year periods, it produces several age-specific fertility rates with which trends could be more exhaustively analysed.

Two methods of allocating period were tried. First, periods were counted in twelve-month intervals from the survey, and labelled by the calendar years to which they approximated. Alternatively, estimates were made for the

exact calendar years as they were reported in the survey. The second method eliminated any ambiguity which could arise in the process of fixing calendar years in the past because the survey took place within two years. On the other hand, it was expected that the first method would reduce the impact of reference period errors in the estimated trend. But results from the two methods did not show marked differences. The importance attached to precision in dating of estimates in the present work led to the choice of the second method (i.e., allocation in exact reported calendar years) in the presentation of fertility levels in this chapter.

3.3 FERTILITY LEVELS

The age-specific and total fertility rates are shown in Table 3.1 for all and ever married women by region of residence in the eleven years between 1970 and 1980 inclusive. As would be expected, marital fertility rates were generally higher than those for all women in the period for all Nigeria, although the differentials narrowed after the age 29, possibly because by this age, most women in the population have been ever married.

The national estimates show slight increases in the age-specific marital and all women fertility rates in the second half of the 1970s especially for women under the age of thirty years. This increase is more observable for marital fertility rates. From 35-39 age group, all women and marital fertility rates did not change very much in the second half relative to the second half of the 1970s. The age-pattern of fertility for any year in Table 3.1 shows substantial number of births occurring to women in their teens and to those aged thirty-five years or older.

For all Nigeria, total fertility rate rose from 6.03 in 1970 to 6.76 in 1975, after which the level settled at about seven birth per woman until 1979. Total marital fertility rates show a similar rise from the beginning of

the decade to 1978. In the second half of the 1970s, the average total and total marital fertility rates were 7.0 and 7.9 respectively. These levels are quite high when compared with estimates from other WFS African countries in roughly the same period (see UN 1987). The eleven-year averages of 6.7 and 7.4 for total and total marital fertility rates respectively indicate that fertility was quite high in the decade of the 1970s in Nigeria. There is no evidence in Table 3.1 that for all Nigeria, fertility level was below six births per woman at any year in the 1970s.

There are not enough data in the NFS with which fertility in the decade of the 1980s could be directly described. No estimates of age-specific or total fertility rates are shown for 1981 and in 1982. This is because estimates for the calendar year of 1981 would include several case of incomplete exposure, mainly from the South-East. Similarly estimates for 1982 would include incomplete experiences of women in the south-west and the two northern regions and also exclude the bulk of the cases from Eastern Nigeria. In the south-east, most of the interviews took place in 1981. In the south-eastern states of Cross River and Rivers, a substantial number of interviews were held in the early part of 1982.

The only single year estimate presented for the decade of the 1980s is for 1980. In this year, the total fertility and total marital fertility rates were 6.4 and 7.4 respectively for all Nigeria. Although these values are lower than those recorded in the second half of the 1970s, they do not tell very much about levels or trend of fertility in the 1980s. Besides, several analysis have pointed out important reference period errors associated with the 0-2 years preceeding the survey (see Goldman and Westoff 1980, Hanenberg 1982, Potter 1977) which generally tend to produce low fertility estimates for the period. For Nigeria, displacement of births in the 0-2 years before the survey is much more likely to show in the trend because of the period problem already mentioned. One of the

implications is that if fertility is estimated for the five twelve-months period before the survey (as was done in the First Country Report, 1984, and in the Evaluation Report, 1985), the rates in the three most recent years which were found to be quite low would bias the level downwards, thus exaggerating any real decline. It is suspected that the comparatively lower levels of fertility for 1980 in Table 3.1 (which, depending on whether reference is to the South-East or the other regions, is the second or the last of the three most recent years before the survey,) might be partially related to this type of error.

Two patterns of fertility are observed in the results in Table 3.1. In the north, marital and all women fertility were close to each other in levels and both rose steadily from the beginning to about the end of the 1970s. But in the south, the difference between all women and marital fertility is sizeable, and while the former appears to have remained stable or slightly decreasing, the latter showed very large increases by the second half of the 1970s.

For the north-east (Table 3.1), all women fertility for the youngest age group rose from 184 per thousand in 1970 to 261 per thousand in 1979 before dropping to 237 per thousand in 1980. Women in 20-24 age group experienced very high and roughly stable fertility rates between 1973 and 1979 with a peak value of 336 per thousand in 1976. For the women in 35-39 age group, no monotonous rise in the annual fertility rates occurred. Some rise in fertility is observed for the women in the 40-44 age group in the second half of decade of the 1970s. The rates for the oldest age group indicate a roughly stable fertility.

For all age groups in the north-east, marital fertility followed a similar pattern with all women fertility. These patterns of age-specific fertility rates resulted in total fertility rates and total marital fertility rates which rose gradually from 1970 to 1978, and lowered slightly (relative to 1977/78 values) in 1979 and 1980.

The results for the north-west are similar to those estimated for the north-east except that the levels of fertility for the north-west are generally lower. Another difference in the two northern regions is that in the north-west, marital fertility is not very much higher than all women fertility. Where marital fertility showed higher levels (as in 1973, 1975 and 1977), the source of the difference is the comparatively higher fertility among ever-married younger women.

For all age groups under 40 in the north-west, 1970 and 1971 had the lowest fertility rates in the decade among all and ever married women. With the exception of the youngest age group, values of the fertility rate for all age groups in 1980 are lower than the values for 1979. Following from these, the total and total marital fertility rates in the north-west rose from the beginning to the end of the decade despite a relatively low level for all women in 1975.

The results in Table 3.1 show for the South-East, age-specific fertility rates which are lower in the second than in the first half of the 1970s for the youngest age group. A slight rise in fertility occurred in the second half of the 1970s among women in their twenties. For the women aged 30-34, marital and all women fertility declined gradually from 1970 to 1980. But for those in the 35-39 age group, marital and all women fertility remained roughly stable in the 1970s. Women in the 40-44 age group experienced some rise in the second half of the decade, and for the last age group, fertility rates remained constant at 30-31 births per thousand women from the beginning to the end of the 1970s.

Unlike in the North, there is a wide gap between the fertility of all and married women in the south-east. As can be seen in the total fertility rates in Table 3.1, both marital and all women fertility showed some rising tendency until 1976, but in the south-east, all age groups

experienced some reduction in marital and all women fertility in 1980 relative to the level in 1979..

For the south-western region, fertility for all age groups under 35 years remained roughly stable from 1970 to 1976. Marital fertility rose slightly in the second half of the decade for women under the age of 25. For those aged 25-29 marital fertility did not show much change in the 1970s but for the women in the 35-44 age range, some decline is observed in marital fertility in the second half of the 1970.

Like in the south-east, fertility in the oldest age group was stable but at higher levels in the south-west. All women total fertility rates in south-west remained about stable from 1970 to 1976 and then declined until 1980, while total marital fertility remained stable from 1970 to 1974, rose to a higher level from 1975 and did not show any decline till the end of the 1970s. Some decline however, is observed in 1980 for total marital fertility rate in the region.

One of the main concerns in this analysis is what interpretation should be given to the regional and national estimates in Table 3.1 and Figure 3.1. An important question which these data invite is whether there are any consistent changes in the trend of fertility in Nigeria in the period of interest. This question cannot be addressed easily because of the presence of reporting errors in the NFS data and also for lack of comparable external sources which could be linked in the analysis of trends.

From the data in Table 3.1, it is observed that the national trend in fertility masks important regional differentials. Figure 3.1 shows for all Nigeria, some rising trend which only dropped slightly in 1980. For all women, the difference between the average total fertility level in the first and second halves of the 1970s is 0.5 of a birth. For marital fertility this difference is about one birth. With a perfect set of data, these values would

suggest small increases in fertility from the first to the second halves of the 1970s. However, such a simplistic inference may not be drawn with the NFS data because of the data deficiencies already pointed out (see Chapter 2, and also Morah 1985), and because of the observed regional differences. For instance, the data in Figure 3.1 show that the national trend is reflecting mainly the patterns in northern Nigeria.

The analysis therefore proceeds by discussing the trend in the North and in the South separately.

TABLE 3.1 SINGLE YEAR AGE-SPECIFIC FERTILITY AND TOTAL FERTILITY RATES FOR ALL AND EVER MARRIED WOMEN, BY REGION OF RESIDENCE. PANEL A: ALL NIGERIA

	AGE-SPECIFIC FERTILITY RATES (PER 000)																TOTAL FERTILITY RATE	
	AGE GROUP	15-19		20-24		25-29		30-34		35-39		40-44		45-49			
YEAR	MAR. STATS.	ALL	EM	ALL	EM	ALL	EM	ALL	EM	ALL	EM	ALL	EM	ALL	EM	ALL	EM
	N OF CASES	2101	846	1710	1450	1766	1710	1547	1532	1110	1100	904	895	591	58	9727	8120
1980		185	328	267	331	282	288	231	233	151	152	100	100	58	58	6.37	7.45
1979		196	350	297	340	299	307	244	247	164	166	121	122	61	61	6.91	7.96
1978		214	361	294	332	307	314	240	248	177	180	130	132	60	60	7.11	8.13
1977		218	359	294	333	305	312	235	238	173	176	127	128	58	59	7.05	8.02
1976		216	344	308	337	292	299	219	218	178	179	120	123	58	59	6.95	7.79
1975		197	313	301	327	278	285	220	224	174	174	125	125	58	59	6.76	7.53
1974		184	290	305	319	275	283	224	228	182	183	118	113	58	59	6.73	7.37
1973		181	279	288	313	280	289	223	228	186	187	122	131	58	59	6.69	7.43
1972		182	267	273	298	256	263	209	211	179	180	120	120	58	59	6.38	6.99
1971		185	278	259	281	239	245	211	212	172	173	119	119	58	59	6.21	6.83
1970		169	269	242	261	236	237	218	221	165	168	119	119	58	59	6.03	6.67

TABLE 3.1 SINGLE YEAR AGE-SPECIFIC FERTILITY AND TOTAL FERTILITY RATES FOR ALL AND EVER MARRIED WOMEN, BY REGION OF RESIDENCE. PANEL B: NORTH-EAST

	AGE-SPECIFIC FERTILITY RATES (PER 000)																TOTAL FERTILITY RATE	
	AGE GROUP	15-19		20-24		25-29		30-34		35-39		40-44		45-49			
YEAR	MAR. STATS.	ALL	EM	ALL	EM	ALL	EM	ALL	EM	ALL	EM	ALL	EM	ALL	EM	ALL	EM
	N OF CASES	435	307	417	404	475	467	406	401	326	325	183	182	99	99	2343	2185
1980		237	288	286	298	282	287	216	217	145	146	122	120	32	32	6.60	7.02
1979		261	319	301	317	299	304	250	251	144	146	142	140	28	28	7.12	7.52
1978		270	332	330	350	311	317	247	248	158	160	145	146	21	21	7.41	7.87
1977		268	333	319	337	302	305	238	240	162	163	102	103	32	32	7.11	7.56
1976		257	314	336	354	280	283	179	181	160	161	99	100	32	32	6.71	7.12
1975		240	291	309	324	264	265	183	186	189	186	84	84	32	32	6.50	6.88
1974		231	292	307	323	255	256	171	173	171	168	74	74	32	32	6.20	6.59
1973		226	294	303	318	262	265	177	179	178	176	73	73	32	32	6.25	6.68
1972		214	273	276	289	225	228	141	142	160	162	84	84	32	32	5.66	6.05
1971		200	252	255	268	197	201	135	136	148	149	84	84	32	32	5.25	5.61
1970		184	248	210	220	210	194	169	172	131	132	84	84	32	32	5.10	5.41

TABLE 3.1 SINGLE YEAR AGE-SPECIFIC FERTILITY AND TOTAL FERTILITY RATES FOR ALL AND EVER MARRIED WOMEN, BY REGION OF RESIDENCE. PANEL C: NORTH-WEST

	AGE-SPECIFIC FERTILITY RATES (PER 000)														TOTAL FERTILITY RATE	
	AGE GROUP	15-19		20-24		25-29		30-34		35-39		40-44		45-49		
YEAR	MAR. STATS.	ALL	EM	ALL	EM	ALL	EM	ALL	EM	ALL	EM	ALL	EM	ALL	EM	ALL	EM
	N OF CASES	409	338	400	395	461	454	403	403	224	224	200	200	124	124	2221	2137
1980		264	286	268	273	243	245	224	224	145	143	104	104	86	86	6.67	6.80
1979		246	273	277	282	257	259	236	236	160	159	141	141	86	86	7.01	7.18
1978		265	292	264	269	269	270	236	236	168	168	129	129	84	84	7.07	7.09
1977		250	272	256	262	266	266	216	216	155	159	128	128	84	84	6.77	6.93
1976		236	250	257	262	271	271	180	180	142	142	95	95	84	84	6.32	6.42
1975		208	223	245	249	241	241	176	175	122	123	123	123	84	84	5.99	6.09
1974		198	221	236	239	238	238	207	208	147	147	113	113	84	84	6.11	6.25
1973		198	223	232	237	217	216	216	217	172	172	137	137	84	84	6.28	6.43
1972		172	191	238	240	200	201	191	192	143	143	123	123	84	84	5.75	5.87
1971		161	174	257	258	177	177	183	183	106	106	123	123	84	84	5.45	5.52
1970		132	143	233	231	177	177	178	178	97	100	123	123	84	84	5.12	5.18

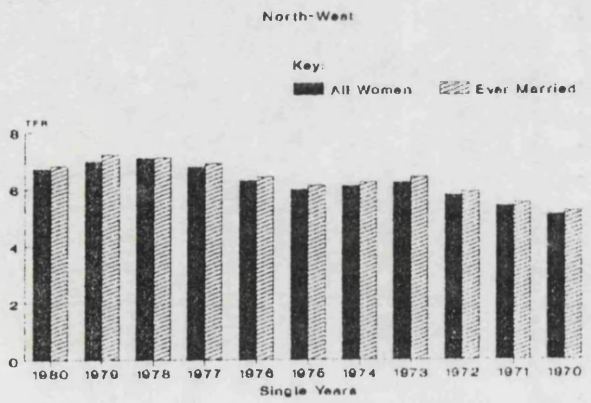
TABLE 3.1 SINGLE YEAR AGE-SPECIFIC FERTILITY AND TOTAL FERTILITY RATES FOR ALL AND EVER MARRIED WOMEN, BY REGION OF RESIDENCE. PANEL D: SOUTH-EAST

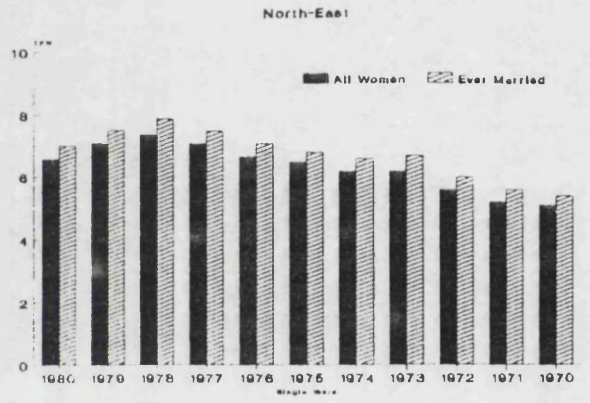
		AGE-SPECIFIC FERTILITY RATES (PER 000)														TOTAL FERTILITY RATE	
	AGE GROUP	15-19		20-24		25-29		30-34		35-39		40-44		45-49			
YEAR	MAR. STATS.	ALL	EM	ALL	EM	ALL	EM	ALL	EM	ALL	EM	ALL	EM	ALL	EM	ALL	EM
	N OF CASES	820	122	548	371	502	470	414	405	346	339	275	268	234	232	3139	2207
1980		109	370	305	393	335	346	234	237	145	149	75	78	30	30	6.16	8.01
1979		134	405	319	401	342	349	239	248	172	176	93	96	31	31	6.65	8.53
1978		167	417	323	393	357	363	244	252	198	204	109	111	30	30	7.20	8.85
1977		182	403	322	401	342	351	255	261	190	195	139	140	31	31	7.14	8.87
1976		203	413	361	408	338	351	255	262	193	197	115	113	31	31	7.48	8.87
1975		180	355	361	393	323	341	258	265	187	189	107	106	31	31	7.23	8.40
1974		179	342	375	401	317	332	260	265	186	189	85	84	31	31	7.31	8.22
1973		174	307	352	376	330	347	246	256	188	191	97	134	31	31	7.09	8.21
1972		204	326	336	363	302	314	265	266	152	155	87	87	31	31	6.88	7.76
1971		226	355	291	322	314	327	274	274	177	180	85	84	31	31	6.99	7.86
1970		216	342	275	205	295	305	274	282	165	169	85	84	31	31	6.71	7.61

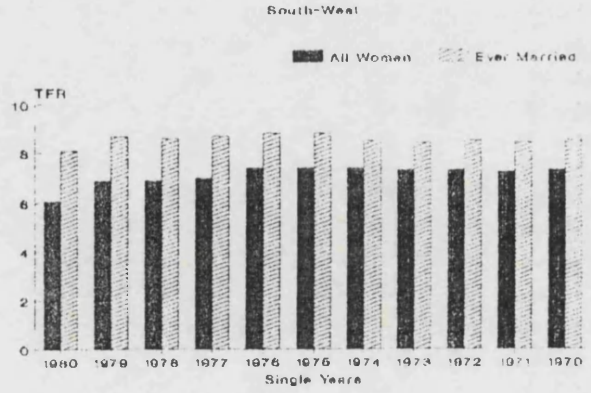
TABLE 3.1 SINGLE YEAR AGE-SPECIFIC FERTILITY AND TOTAL FERTILITY RATES FOR ALL AND EVER MARRIED WOMEN, BY REGION OF RESIDENCE. PANEL E: SOUTH-WEST

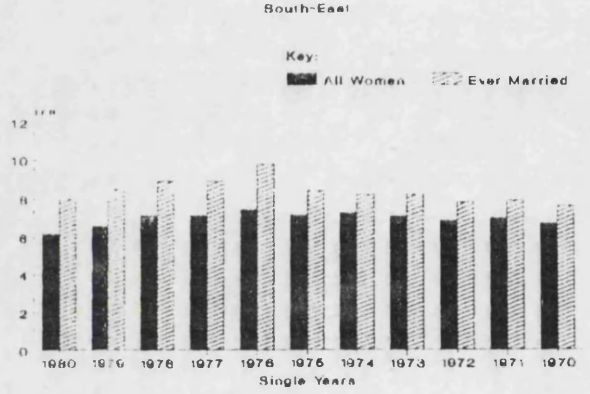
		AGE-SPECIFIC FERTILITY RATES (PER 000)														TOTAL FERTILITY RATE	
	AGE GROUP	15-19		20-24		25-29		30-34		35-39		40-44		45-49			
YEAR	MAR. STATS.	ALL	EM	ALL	EM	ALL	EM	ALL	EM	ALL	EM	ALL	EM	ALL	EM	ALL	EM
	N OF CASES	473	79	345	280	328	319	324	323	213	212	246	246	133	133	2027	1591
1980		130	368	209	361	268	275	253	257	170	171	100	101	85	85	6.07	8.09
1979		146	404	292	361	300	319	251	256	183	185	109	109	99	99	6.90	8.65
1978		154	403	259	319	293	306	253	259	186	188	139	140	104	104	6.94	8.59
1977		172	430	280	335	313	327	231	237	186	188	141	142	85	85	7.04	8.72
1976		170	401	278	327	281	292	265	250	217	218	181	184	85	85	7.38	8.78
1975		162	386	293	342	285	296	265	271	198	200	186	186	85	85	7.37	8.83
1974		129	307	261	316	293	307	261	267	226	227	201	182	85	85	7.28	8.45
1973		129	294	260	321	314	330	255	261	208	209	182	182	85	85	7.16	8.41
1972		139	297	244	301	297	311	242	247	262	263	186	186	85	85	7.27	8.45
1971		153	334	234	277	269	278	253	257	258	260	186	186	85	85	7.19	8.38
1970		145	346	253	291	262	273	251	254	269	271	186	186	85	85	7.25	8.53

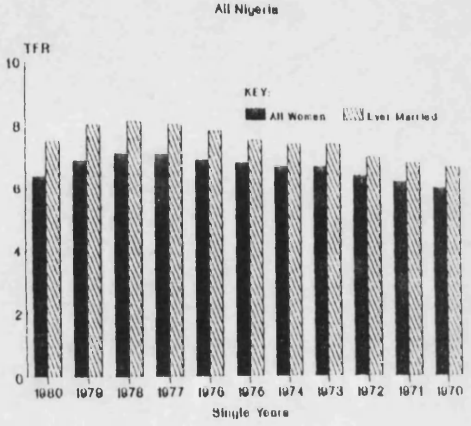
Figure 3.1 National And Regional Trends In All Women And Marital Total Fertility Rates, 1970-1980.











3.31 Trends in the Northern Regions.

The data in Figure 3.1 show that the apparent rising trend in fertility in the 1970s was more pronounced in the North than in the South. Two broad factors which could have produced a rising trend of fertility in Northern Nigeria are data errors and changes in proximate determinants of fertility. In Chapter 2, it was observed that, by the criteria used for assessment, data from the northern regions are relatively poorer. This makes it more certain that data error contributed to the observed rising trend in fertility in the 1970s in northern regions, although the magnitude of error effects cannot be exactly measured.

Two most common types of reporting errors which might have occurred in substantive degrees in the northern data are omission of live births and displacement in time of those reported. It is observed in Table 3.1 that the total fertility rates in 1978 and 1979 were relatively high for the two northern regions. This pattern suggests that the more recent births were fully accounted for. It could also suggest that births were brought nearer to the survey as a result of which the fertility levels in the last years of the 1970s were raised. The later situation would be more plausible if there is strong external evidence that fertility the level in the northern regions was higher in the first part of the 1970s than is shown in Table 3.1. But available external evidence for 1970-1974 (see Omideyi 1984) shows fertility levels for northern Nigeria which are generally lower than the estimates presented in Table 3.1 (see Table 3.4). Hence shifting of births nearer to the time of the survey could be a possible explanation for the rising trend in the northern regions if it is accepted that the total fertility rates for 1970-1974 in Table 3.1 are under-estimates, or if it is argued that births were shifted from the 1960s into the first half of the 1970s, and that these births compensated for any serious depletion which TFRs for the early 1970s might

have suffered.

Many studies have noted that birth history data from African countries show under report of dead children, especially if they died very young and some years before the survey. The data in Table 3.2 show that infant and child mortality rose by 9.5 and 19.6 per cents in the 1970s in the north-east and north-west respectively. It could be argued that high infant death rates in the north contributed to shorten the birth intervals for northern women, thereby raising their fertility. Another explanation could be that improvement in health in the northern region in the later part of the 1970s resulted in less live births dying, and hence, more recent birth being accounted for by women. This explanation would imply that infant and child mortality, though relatively high in the north, did not actually rise but that northern women omitted many of their live births (which died later) during the 1970-1974 period.

For the northern regions, both types of errors might have occurred but to different extents. Some omission of earlier live births which died or left home, and shift of the more recent ones towards the end of the decade of the 1970s, most probably, contributed to the observed fertility trend in the north-east and north-west.

The impacts of changes in proximate determinants of fertility are discussed in details in chapter 5. Only two variables, fecundity status and age at marriage, are considered here in relation to trends in fertility. If it is the case that more women were fertile in the second half than in the first half of the 1970s, then some of the rise in fertility which is not accounted for by reporting errors, may be due to declining trend in primary or secondary sterility in the same period. The data in Table 3.3 do not however show very much of a declining trend in primary sterility in the northern regions. In the north-

TABLE 3.2. NUMBER OF CHILDREN DYING AT OR BEFORE THEIR FIFTH BIRTHDAY AMONG MOTHERS AGED 14-44 IN THE TWO HALVES OF THE 1970S BY REGION OF RESIDENCE.

		DEATH PER 1000 BIRTHS		
REGION	PERIOD	1975-1979	1970-1974	% CHANGE
NORTH-EAST		169	154	+ 9.5
NORTH-WEST		194	162	+19.6
SOUTH-EAST		131	193	-33.1
SOUTH-WEST		109	133	-18.0
ALL NIGERIA		151	160	- 6.0

TABLE 3.3 PERCENTAGE OF EVER MARRIED WOMEN WHO ARE STERILE IN EACH AGE GROUP BY REGION OF RESIDENCE.

	% STERILE				
AGE GROUP	NE	NW	SE	SW	NIGERIA
15-19	0.0	0.0	0.0	0.0	0.0
20-24	9.8	14.6	2.7	2.1	7.3
25-29	4.9	7.0	1.4	0.9	3.5
30-34	4.6	10.0	1.0	2.1	4.4
35-39	7.0	3.7	1.8	0.4	3.2
40-44	9.0	6.6	1.3	2.5	4.8
45-49	2.0	3.4	1.3	0.7	1.8
All	5.3	7.0	1.5	1.5	3.8

east, the percentage of the women sterile at the extremes of childbearing age groups make it difficult to infer any trend from the data. Assuming that these two values are affected by some misreporting errors, a decline of the percentage sterile by age group is observed (from 9.0 per cent in the 40-44 age group to about 5.0 percent for the 25-29 age group). No such trend is obvious in the north-western data. For the 20-24 age group in the northern data, duration of exposure might not have been long enough to establish permanent sterility. In effect, some of the women who had not had any birth in this age group might do so with time. It would appear that too many wives in this young age group were regarded as sterile just because they happened not to have had any birth at the time of the survey.

The low percentage of women reported sterile in the oldest age group might be related to adoption effect. By this old age group, sterile women would have tried to avoid the social stigma associated with being sterile by adopting other children formally or informally, and thus becoming social mothers. Consequently they would neither respond nor be classified as being sterile in interviews. However, even if the percentage for these age group are ignored the data do not show a consistent trend, especially in the north-west.

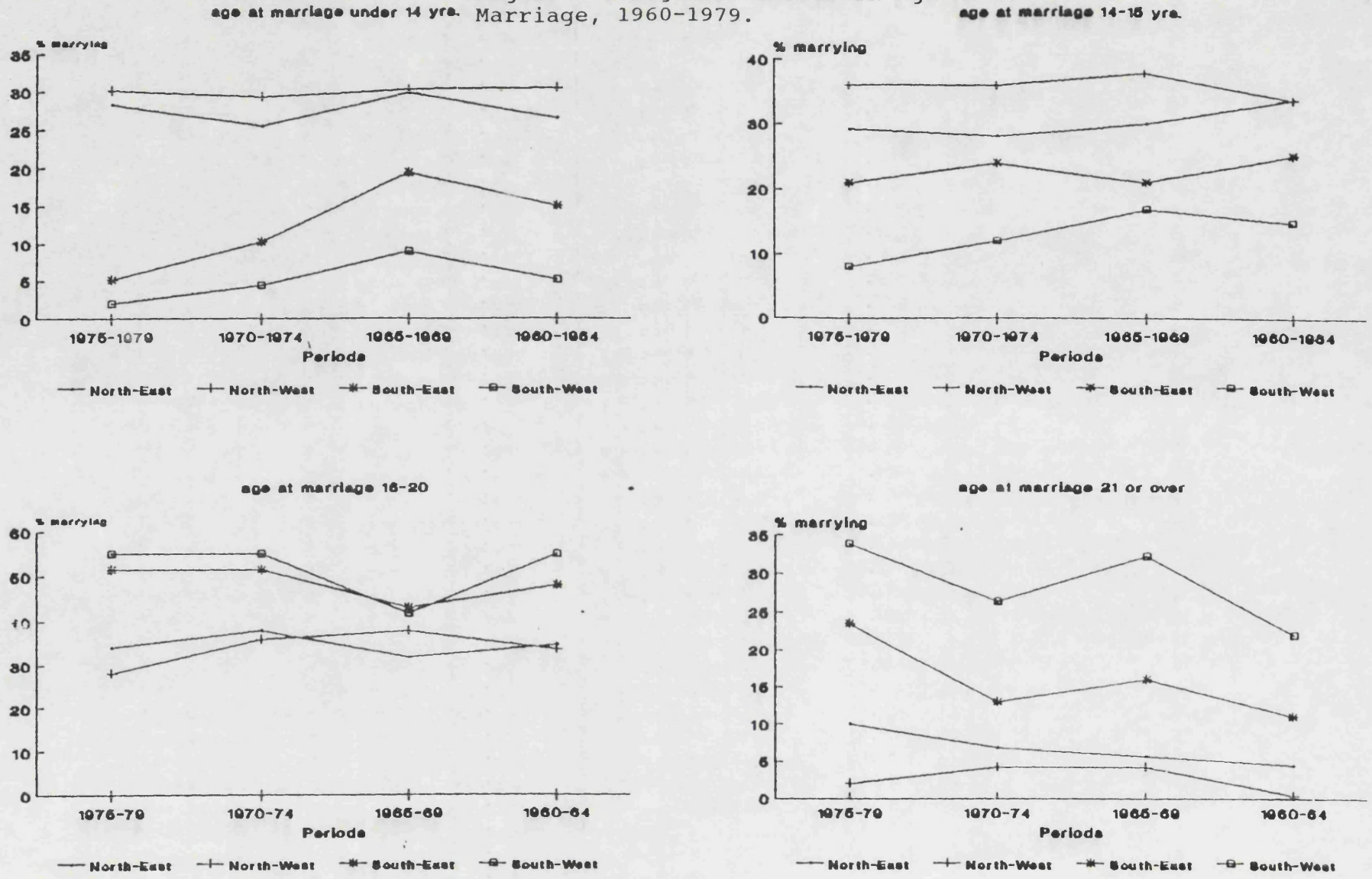
Although the data in Table 3.3 provide insights into regional differentials in primary sterility, they do not show any clear trends within regions which could make it easier to link trend in sterility to trend in fertility with simple observation. Further discussion of this issue is carried out in Chapter 4.

The last variable considered here for its possible contribution to the observed trend in northern fertility is age at which women married. The age at marriage in each

five-year calendar period from 1960 to 1979 are shown in Figure 3.2 for each region. Ages at marriage are grouped in order to avoid fluctuations arising from small numbers. The single age against each region refers to the median age at marriage for all women in that region. For the northern regions, the data show only small changes in trends in age at marriage from 1960 to 1979. In the 1970s which is the focus here, the percentage of women marrying while aged 14-15 years remained rather unchanged. In the north, the percentage of women who married after age 15 decreased slightly in the second half of the decade from what it was in the first half, although in the north-east, the percentage marrying after age 20 increased from about 7 to 10 per cent. Some increase is observed for those who married under age 14 in the 1970s but it is unlikely that this might have caused all the observed rise in fertility, since subfecundity rate is usually high at such very young ages.

At the median quartile of age at marriage for the north, no significant change is observed in the trend in the 1970s. Even further back into the second half of the 1960s, the proportion of women who married at age 15 or younger remained roughly stable in the northern regions.

Figure 3.2 Regional Trends In Age At First Marriage, 1960-1979.



See P.259 for graph points.

3.32 Trends in the Southern Regions.

Although the South has comparatively more data on fertility than the North, the task of interpreting the estimated trend using the NFS data is no less difficult. However, following the finding in Chapter 2 that the quality of the NFS data is better in the South, one is more confident to interpret the estimated trends with less emphasis on possible effects of data errors. This is not to assume that the southern data are entirely free of reporting errors.

In the south-east marital fertility rose gradually from the beginning of the 1970s to about the end, while all women fertility remained fairly stable. In the south-west, marital fertility rose from a plateau to a higher one from the beginning to the end of the decade while all women fertility remained essentially unchanged. These trends are consistent with findings of past surveys which indicated rising fertility. Further analysis of the proximate determinants of this trend is carried out in Chapter 5. Here, attention is drawn only to a few pieces of evidence which point to the genuineness of much of the trend in fertility which was estimated for the southern regions.

First, it has already been mentioned that data from the south are relatively of good quality. Secondly, measured with any economic indicator, the southern regions are more developed than the northern regions. The effects of modernization on fertility are likely to be more obvious in the south than in the north.

Data on age at marriage in Figure 3.2 show that the percentage of women entering into marriage before age 14 fell while the percentage marrying after age 20 rose by the 1970 in the southern regions. It is also observed that

the median age at marriage in the south-east and south-west are 4 and 5 years higher than that in the north. The percentage marrying at higher ages was higher in the 1970s in the south than in the north. It is therefore not surprising that all women fertility in the southern regions had begun to show signs of reduction by 1980.

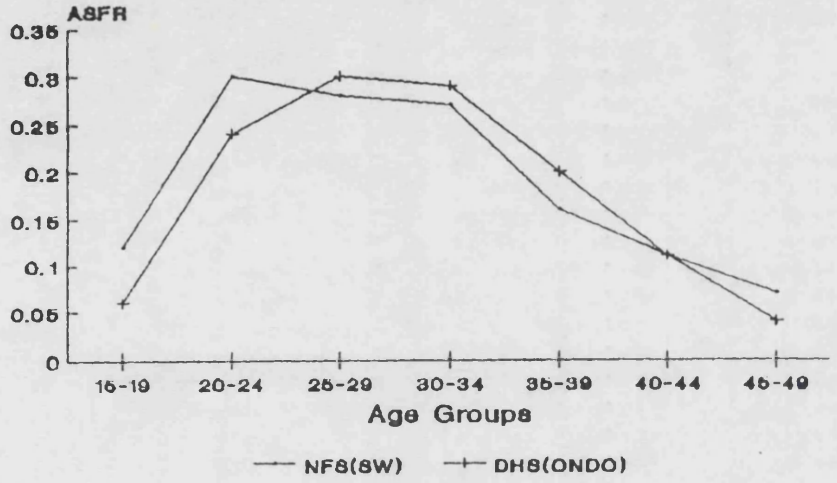
The age pattern of fertility and the TFRs recorded for all women in the NFS and about five years later in the Demographic and Health Survey (Ondo State Ministry of Health 1988) are presented in Figure 3.3. There is a two-points drop in total fertility rate from the second half of the 1970s (6.4 in the NFS) to the first half of the 1980s (6.2 in the DHS). Although it is not yet certain if this slight difference would be maintained or would change in direction with controls applied for data quality, sample differences and differences in research design, it does indicate some slight change in fertility in the Southern Nigeria which needs to be carefully monitored.

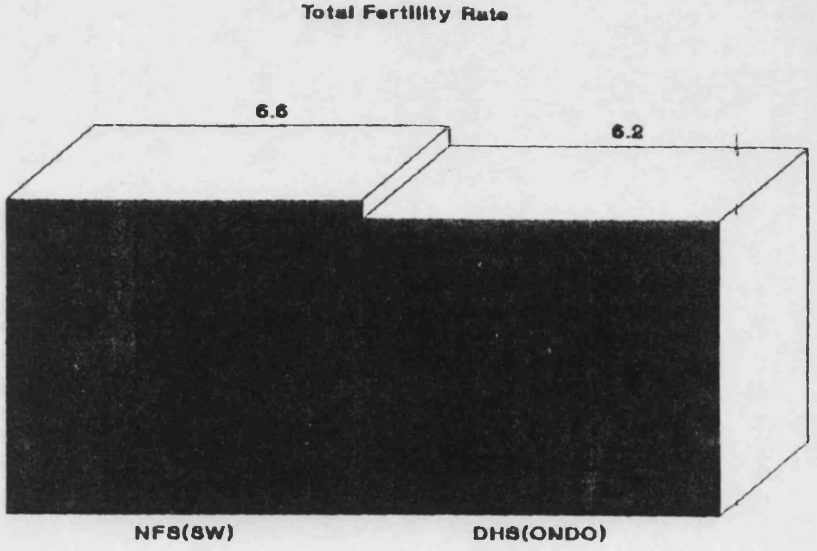
With reference to Figure 3.3, it looks as if the differences between the two surveys was more in the pattern than in the level of fertility. In the intervening period, the peak of childbearing age group shifted upward to 25-29, and more women in their thirties had more births than did their counterparts in the late 1970s.

On the whole, it appears that the small difference between the NFS and the DHS fertility levels resulted from less births occurring to women under the age of 25 in the DHS. Trends in age at marriage in Figure 3.2 show a substantial decline in the proportion of South-Western women marrying under the age of 20 and this shift in nuptiality pattern most probably continued into the first half of the 1980s to reflect in the DHS fertility schedule.

It is most likely that the slight downward trend in all women fertility by the end of the 1970s was a

Figure 3.3 Age Patterns Of Fertility And Total Fertility Rates In The NFS(S.W) and DHS (Ondo State, SW).





result of genuine rising age at marriage in the southern regions. For marital fertility, there is yet no strong basis to suggest or believe that an observable decline occurred in the same period.

3.33 Regional Comparison.

Table 3.4 shows that southern fertility levels were higher for 1975-1979 but lower than the levels recorded for the north in 1980. One explanation for this pattern of differential could be that shifting of more recent births nearer the survey was more acute in the northern data. Secondly, it is possible that some decline in primary sterility contributed to raise the fertility of northern women by the 1980s (see Chapter 4).

Some higher fertility for the south has been documented in the past (see for instance Coale and Lorimer 1969, Ekanem 1971, Omideyi 1984). However, the actual differences in TFR values (by the end of the 1970s and in the early 1980s - in Table 3.4), even if it can be proved that they were not influenced by any known reporting errors, were too small to form the basis for a conclusion on North-South differentials in fertility levels.
In Omideyi (loc.cit.) for example, the observed TFR was highest in the East and slightly higher in the North than in the South-West. But when Relational Gompertz model was fitted to the data, although the South-East retained the lead, the level for the South-West became higher than the Northern level (see Omideyi 1984). Differentials in regional age pattern of fertility is likely to be one of the causes of this reversal observed for the South-West and the North.

Table 3.4. Regional Estimates of Total Fertility Rates in Nigeria 1950-1982.

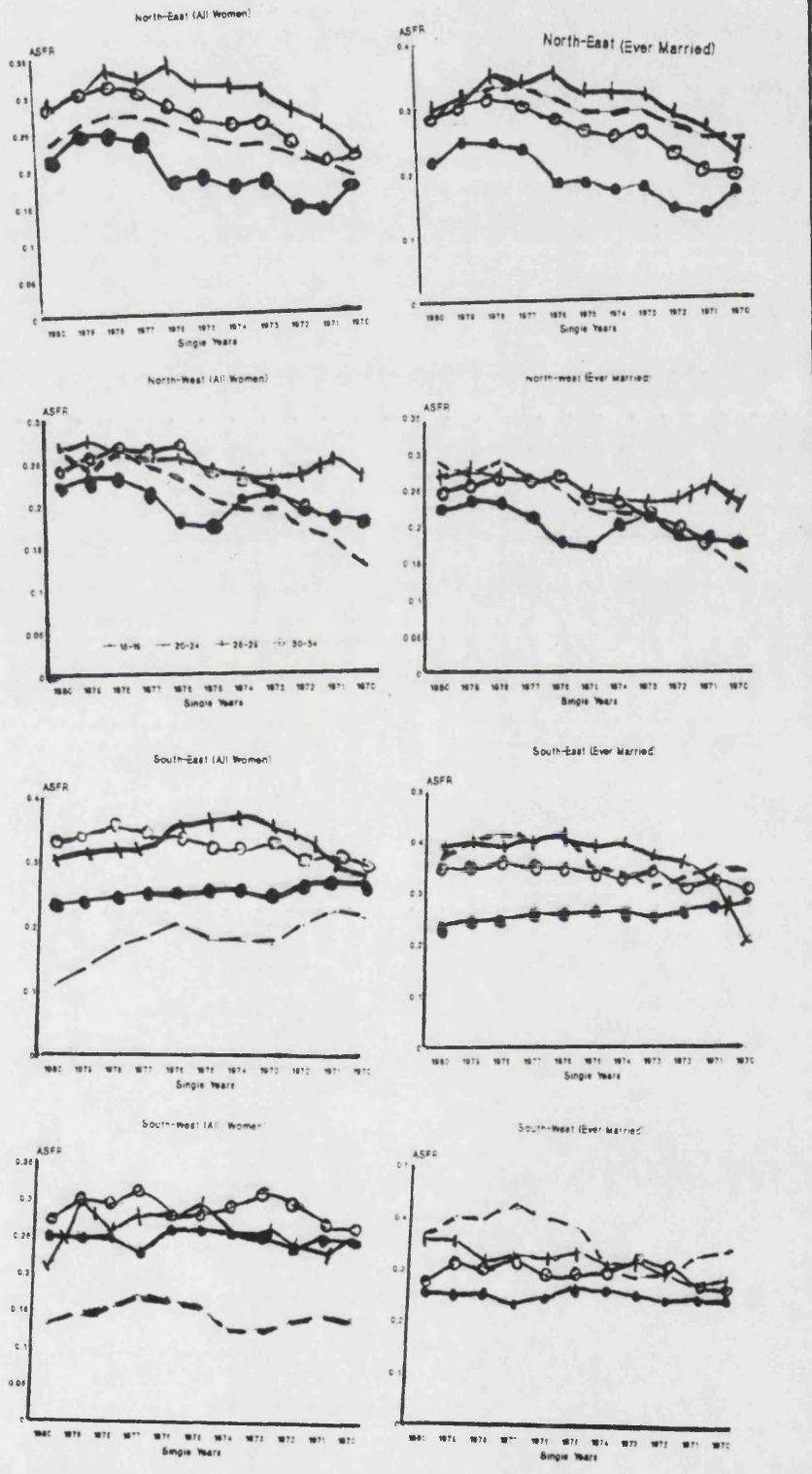
Region/Per.	1980-82	1975-79	1970-74	1965-69	1950-59
N. E.	6.6	7.0	5.7	4.9	6.0 (a)
N. W.	6.9 6.5 (h)	6.6 6.8 (g)	4.2 (e) 5.7	5.8	6.0 (a)
S. E.	6.2	7.0	7.1	7.2	7.0 (a)
S. W.	6.1	7.1	7.2	7.2	6.9 (a)
Nigeria	6.4	6.9	6.4 5.7 (f)	6.4 5.4 (d) 5.6 (c)	6.5 (a) 7.0 (b)

Notes: (a) computed from Brass et. al. (1968), eliminating regions which are no longer part of modern Nigeria and rearranging to correspond to the four broad geographical regions.
(b) from Adegbola (1977) see text.
(c) from US Census Bureau (1979) see text.
(d) from Federal Office of Statistics (ND)
(e) from Omideyi (1984) see text.
(f) from the KAP
(g) from Bradley et. al. (1982) see text.
(h) from Varma and Singha (1982) see text.
The figures with no alphabets are estimates from the NFS data.

TABLE 3.5 PERCENTAGE CHANGES IN TOTAL FERTILITY RATES FOR ALL AND EVER MARRIED WOMEN FOR DIFFERENT PERIODS BY REGION OF RESIDENCE.

REGION/ MARITAL ST.	PERIOD FROM, 1976/78 TO 1979/80	1973/75 TO 1976/78	1970/72 TO 1973/75	1970/74 TO 1975/79
NORTH-EAST				
All women	-2.9	+12.0	+18.3	+22.4
Ever Married	-3.1	+11.9	+17.9	+21.9
NORTH-WEST				
All women	+1.7	+ 9.8	+12.5	+15.5
Ever Married	+2.6	+ 9.6	+13.3	+15.2
SOUTH-EAST				
All Women	-11.9	+0.8	+5.1	-2.1
Ever married	-6.6	+7.1	+6.8	+9.6
SOUTH-WEST				
All women	-8.1	-2.0	+0.5	-1.5
Ever Married	-3.6	+1.5	+1.3	+3.1

Figure 3.4 Trends In National And Regional Age-Specific Fertility Rates, 1970-1980.



These differentials need to be interpreted cautiously. It is pointed out here that where indirect techniques of estimation are used, (as in Omideyi 1984) the assumptions and methods influence the results to the extent that it becomes even more difficult to say if the observed dif ferentials were due to methods, data errors or genuine fertility changes.

For three periods in the 1970s and one which cuts into 1980, the percentage change in fertility was calculated based on the data in Table 3.1. The results are shown in Table 3.5. It is clearer from these data that the rising trend was more in the North than in the South, which cast more doubts on its genuineness. The South-Western region showed some consistent signs of decline in all women TFR and very small rises in marital fertility by the end of the 1970s. In the most recent period shown in Table 3.5 (the first column), all but North-Western region indicated slight reductions in both marital and all women fertility level.

Trends in regional age-specific marital and all women fertility rates for the four youngest age groups are produced in Figure 3.4 in order to examine this issue further. The marital ASFRs for the two northern regions followed a trend which was similar to that of all women ASFRs for all age groups. At the peak of childbearing age groups, both marital and all women fertility showed some rises in the 11-year period for the South-East. For the 30-34 age group, a rather stable trend was observed for all and married women in the same period. In the South-East, marital fertility for women under the age 20 and to a less extent both marital and all women fertility for those under the age of 30 appeared to have experienced slight rises in the period. For the South-West, teenage fertility level remained more or less constant but marital teenage fertility rose in the second half of the 1970s. For 20-24 age-group marital fertility also showed some increases over the same period in the south-west.

These data suggest some rising trend for married women under 25 years of age in the southern Nigeria might be genuine. The trend in marital fertility at the national level thus incorporated these two similar patterns from the north and from the south which, presumably have different sources and degrees of validity. It would appear that differentials in regional data quality on one hand, and in genuine regional fertility changes on the other, have produced results which are essentially similar, namely, nearly equal levels of total fertility rates by the end of the 1970s. However, this observation does not assume that the southern data are free of errors or that no change at all was taking place in northern fertility.

3.34 Trends for Data Quality Categories and P/F Ratios.

Further direct assessment of the trend is carried out by data quality with achieved fertility up to the age of 39 as shown in Table 3.6. For all women, small differences exist among the data categories. The 'exact' quality data category shows for all women, fertility levels which were on the average lowest among the three data groups in both the first and second halves of the 1970s. All data categories show slightly higher fertility levels for 1975-1979 than for 1970-1974. Marital fertility for the exact quality data was not only higher on the average in the period, but also recorded the greater increase of 1.0 birth from 1970-1974 to 1975-1979. For this group, the wide gap between all women and marital fertility in the second half of the 1970s is likely to have arisen because of comparatively fewer number of people married at younger, especially teenage, age groups.

The data in Table 3.6 did not show major differences in the trend of fertility either among data category or within each categories by marital status. Some change in levels was however observed as mentioned above for the

married women in the exact data group. The same problem which was encountered in the interpretation of the regional data arises here for categories of data quality. All three data groups showed a similar trend, namely, some slight rises by the end of the 1970s. If the trend is rejected, there is the danger of overestimating the impacts of errors, especially among women who gave the most precise reports of events. Probably, the same conclusion arrived at with the regional data might apply here. It would appear that errors in sub-sections of the data and some genuine changes in other sub-sections had essentially the same effects on fertility trend. It is fairly obvious that the category of data in which trend is likely to be distorted by shifting of births or omission is the "Yrs ago", while from the insights provided in Chapter 2, the cases in the "exact" format might be experiencing some changes net of error effects.

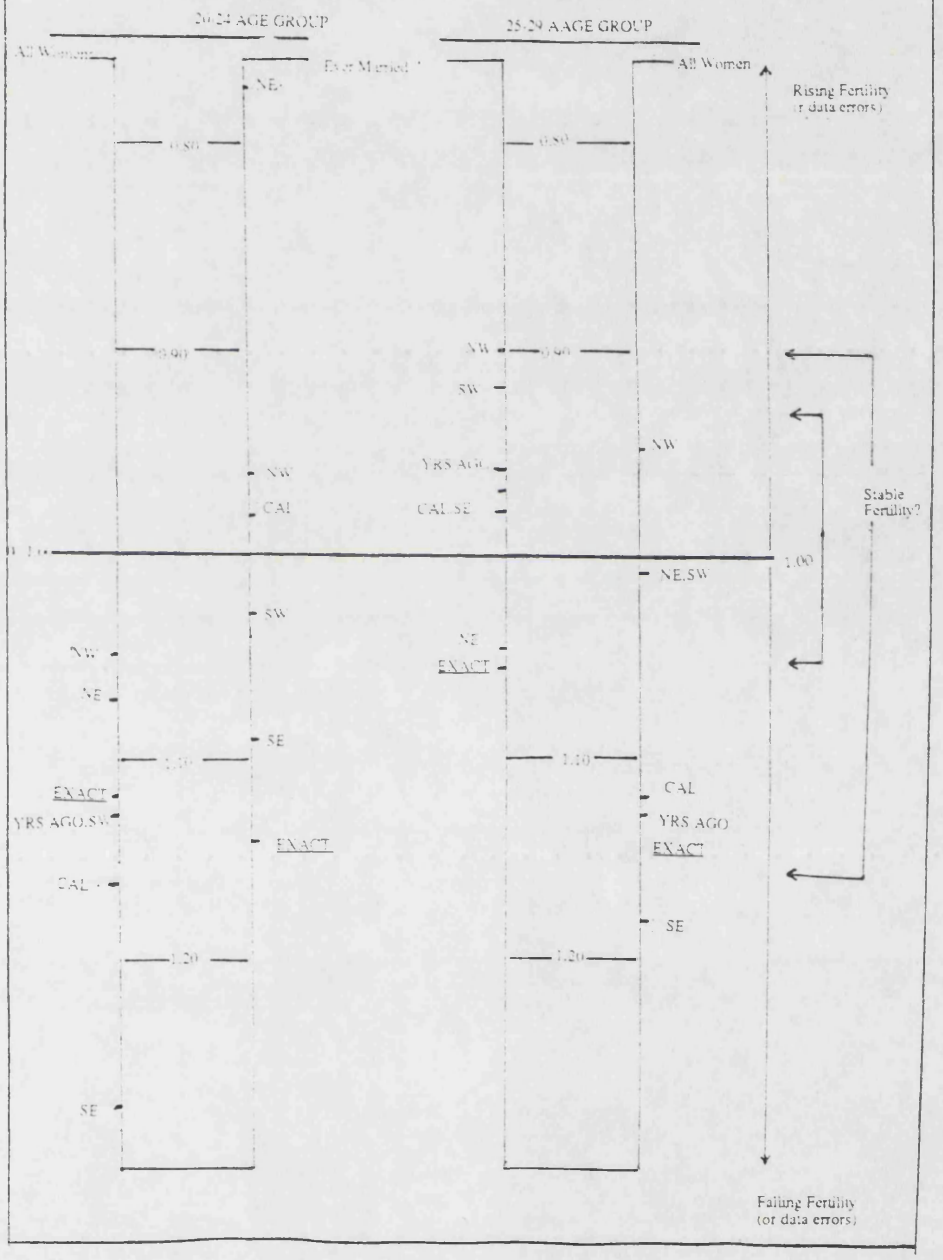
The P/F ratios for two age groups which are less likely to be affected by omission and displacement of births in the most recent times are computed for all and ever married women by region and data category. The ratios for the most recent period are displayed graphically in Figure 3.5. In the absence of data errors or recent changes in fertility, the ratios should equal one for each region or data quality group. It is hard to know whether the source of any observed deviations from unity is data quality or fertility changes in this case. A type of error which is usually common in retrospective data is omission of live births in the past. This could exaggerate any rising trend in fertility. Among the younger age groups, displacement of birth in time could be a more serious type of error. It is observed in Figure 3.5 that the ratios for all subgroups fall above unity for all women in 20-24 age group, a trend which control for marriage altered only for northern regions and 'calendar' data group. For the 25-29 age group, all women P/F ratios for all but North-Eastern, regions were above unity whereas most marital P/F ratios were below unity.

TABLE 3. 6 PARTIAL TOTAL FERTILITY RATES* FOR ALL AND EVER MARRIED WOMEN FROM 1970 TO 1980 BY DATA QUALITY, ALL NIGERIA.

YR/GRP OF YRS	PARTIAL TOTAL FERTILITY RATES					
	ALL WOMEN			EVER MARRIED WOMEN		
	EXACT	CAL	YRS AGO	EXACT	CAL	YRS AGO
1980	4.6	4.8	4.9	6.3	5.7	5.3
1979	4.8	5.2	5.3	6.7	6.3	5.5
1978	5.0	5.3	5.4	6.8	6.3	5.7
1977	5.0	5.2	5.4	6.8	6.2	5.5
1976	5.1	5.1	5.3	6.8	6.0	5.4
1975	5.2	4.9	5.4	6.8	5.5	5.2
1974	5.1	4.7	5.0	6.6	5.4	5.2
1973	4.8	4.9	5.0	6.1	5.7	5.2
1972	4.6	4.8	4.7	5.8	5.3	5.0
1971	4.4	4.8	4.7	5.5	5.1	4.7
1970	4.2	4.2	4.7	5.1	5.1	4.7
1979-1980	4.7	5.2	5.1	6.5	6.0	5.4
1976-1978	5.0	5.2	5.4	6.8	6.1	5.5
1973-1975	5.0	4.8	5.1	6.5	5.5	5.2
1970-1972	4.4	4.6	4.5	5.5	5.3	4.8
1975-1979	5.0	5.1	5.3	6.8	6.8	5.4
1970-1974	4.6	4.6	4.7	5.8	5.4	4.9

* Age-period rats cumulated to age 39; see text.

Figure 3.5 Age-specific P/F Ratios In The Most Recent Period For All And Ever Married Women By Region And Data Quality.



The slight decline in fertility indicated by 20-24 age group persisted for the southern regions, 'exact' and 'yrs ago' data groups. This contrasts with the experience of the 25-29 age group. In these ages (25-29) control for marriage reversed the direction of the ratios for all but North-Eastern region and 'exact' data subgroup.

The P/F ratios for the 1973-1977 period fall below unity for married women in both age groups in all regions and data quality. The ratios are generally below unity for all women in 1973-1977.

Attention is drawn to three features of the data in Figure 3.5 as follow;

1. Among women in 20-29 age group, the only subgroup for which the P/F ratios are consistently indicative of a slight decline despite marriage effect is the 'exact' category.

2. The P/F ratios which suggest some rising trend in both the two southern regions and in North-west are mostly for the married women in the 25-29 age group.

3. The ratios for all women in all regions, and for ever married women in the south indicate a falling trend in in fertility among the 20-24 age group.

To the extent that some of the decline in fertility indicated by the P/F ratio of some women in their twenties was genuine and sustained into the 1980s, we encouter another significant pattern of recent fertility in Nigeria. The rising trend in fertility for much of the 1970s which was discussed in a previous section, was not a uniform experience for <u>all age groups</u> even within a category of data quality or within a region.

As commented in note 1 above, it is only for women aged 20-29 in the 'exact' data group that fertility showed a decreasing trend which appeared consistent for all and ever married women. If this trend was genuine, it still could not have reflected in the national trend because these women constitute only a small proportion of the entire sample. In general, the picture shown by the P/F ratios at the national level is that of slightly increasing fertility with some signs of stability or decline at the younger age groups in the most recent years. This observation is based on an interpretation of the P/F ratios which assumes mild data and other error effects. It is possible to assume a greater impact of errors on the ratios and view, say, all values in the range 0.90 - 1.15 as indicative of a roughly stable fertility, in which case our substantive interpretations of the trends in Figure 3.5 would be changed; the results would be suggesting that in general, fertility remained fairly stable with only small changes (mainly in the south) resulting from some upward shift in marriage patterns in the recent past.

3.4 External Evidence.

Apart from the censuses, only two demographic surveys since the 1950s produced results which attempted a national coverage. These are the KAP survey (1971-1974) and the Rural Demographic Sample Survey (1965-1966). Using secondary data, Coale and Lorimer (1968), Adegbola (1977), United States Census Bureau (1979), Economic Commision for Africa (1979) and World Bank (1983, 1987) have produced different estimates of total fertility rates for different periods within the past three decades. Some of these estimates and the results of the present work are located in time as shown in Figure 3.6.

The estimate from Rural Demographic Sample Survey, the USCB estimate based on it and the KAP result are quite

lower than all other estimates in all periods. These low values may not be unrelated to the quality of the data collected in the surveys. Unfortunately, the data on which the estimates for the more distant periods were based are not available in forms detailed enough to permit further assessment of their quality.

For the NFS, the TFR for the four periods in the past changed only slightly from 6.1 to 6.2 while a major increase to 7.01 in the latest period was recorded. In the earliest period of 1952-53, estimates by Coale and Lorimer and Adegbola showed quite high levels. The estimates using Brass simple P/F ratio adjustment for the most recent period showed a very high level of 7.10 while the more sophisticated Brass Relational Gompertz model fitted to the same data in the same period yielded a lower estimate of 6.29. The Brass methods being primarily corrective procedures, are usually insensitive to small fertility changes in the data. This may be a reason for the wide gap in the results of the applications of the two techniques here.

The apparent trends in fertility in Figure 3.6 should be viewed very cautiously. First, it is observed that some of the periods were overlapped in order to fix some surveys more accurately. For instance, although much of the northern phase of the KAP survey took place in 1973-1974, fieldwork in Kano state was actually completed in 1975. The survey results were assigned into 1970-1973 in Figure 3.5 as this is the most convenient period for which other data are easily available.

Secondly, there are major differences in the estimation techniques although all values shown are total fertility rates. The indirect NFS estimates used alfa and beta values of .07 and.93 respectively for the Relational Gompertz fit, and an adjustment factor, k of p2/f2=1.14 for the Brass P/F ratio estimate. The USCB estimate was based on the rural population only, as was the RDSS with no correction for this important selection bias. Although Brass

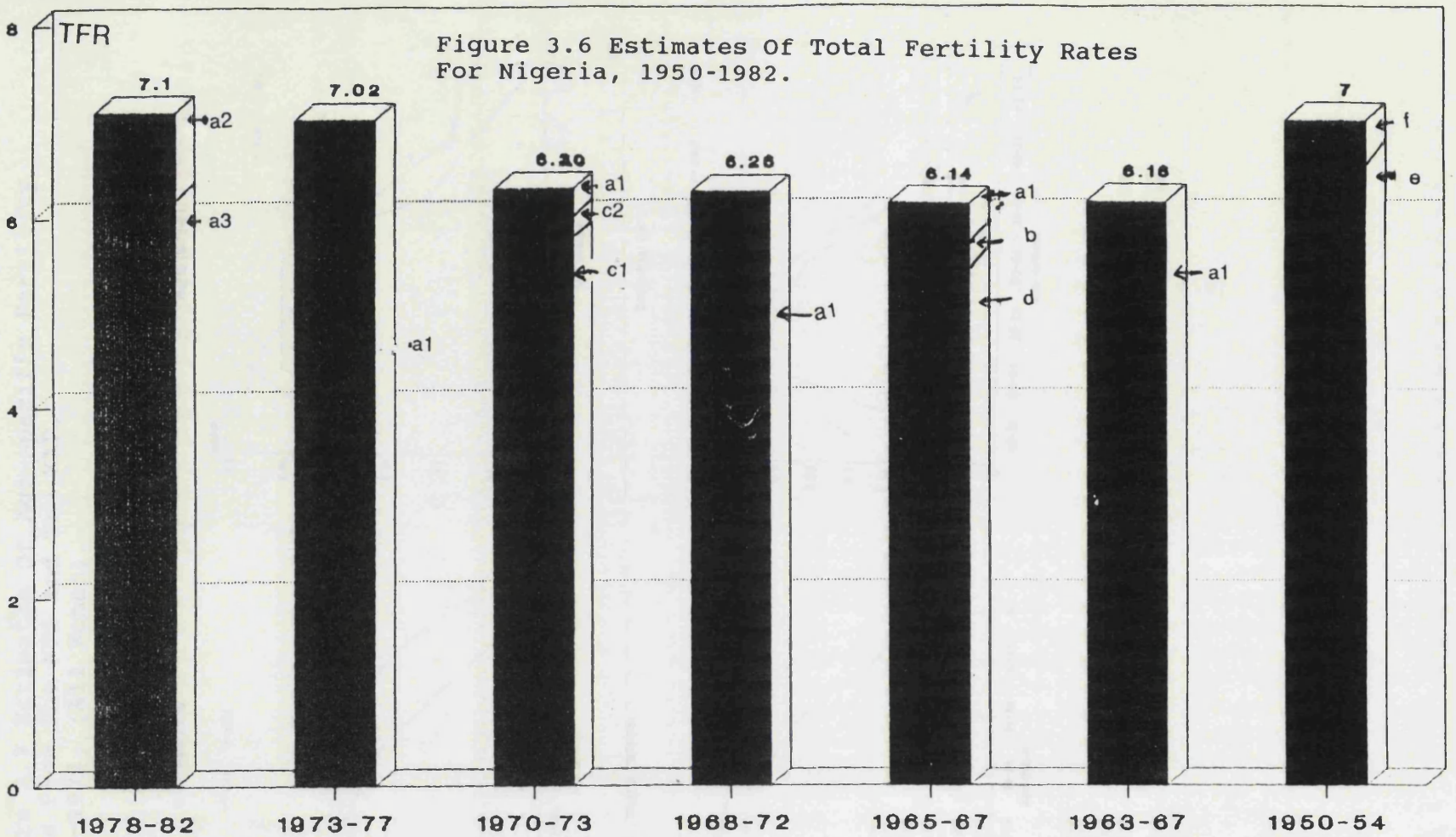
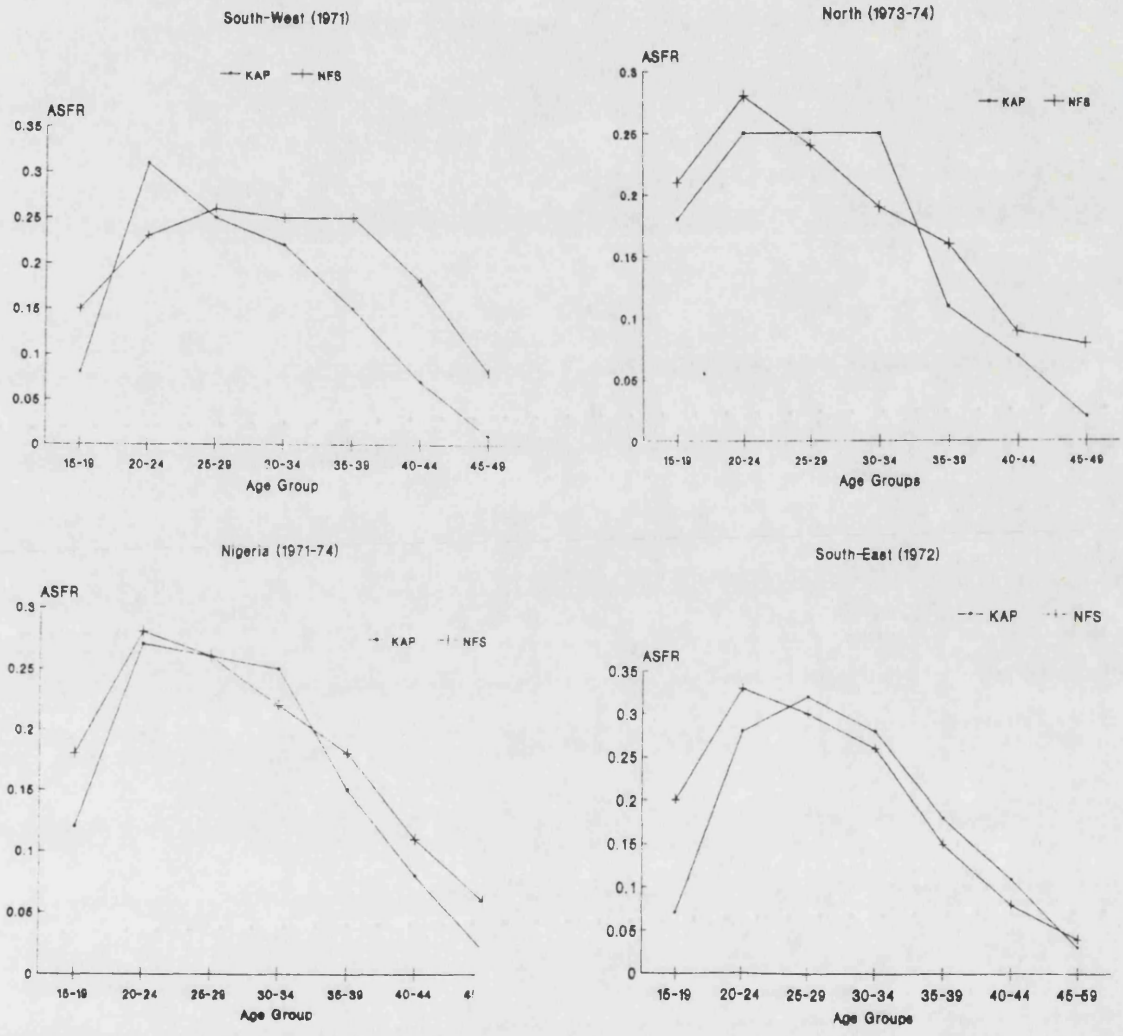


Figure 3.6 Estimates Of Total Fertility Rates For Nigeria, 1950-1982.

Sources:
a1 = Direct estimate from the NFS Data.
a2 = Indirect estimate using Brass simple P/F ratio technique (NFS data).
a3 = Indirect estimate using Relational Gompertz model (NFS data).
b = US Census Bureau estimate using data from (d).
c1 = KAP (1971-1973).
c2 = Omideyi 1984 (using data from the KAP)
d = Nigeria Rural Demographic Sample Survey 1966.
e = Coale and Lorimer 1968 (using data from 1952-53 national census).
f = Adegbola (1977) Using data from (e),

Note: Actual TFR values for a1, a2 and f are shown. Others are: a3,6.29; b,5.57; c1,5.68; c2, 6.0; d,5.42; e,6.47.

Figure 3.7 Estimates Of Age-specific Fertility Rates From The NFS And The KAP, 1971-1974, (All Women).



P/F ratio was used by Coale and Lorimer, the parameters or even the basic age-specific fertility rates used in calculations were not shown with their results.

Thirdly, attention is drawn to the quality of the different datasets with which estimates were produced since this determines the degree of validity of the results. The NFS is by far the most comprehensive and most available of all the data. There is not much information contained in the other sources with which they (1952/53 census, the RDSS and the KAP survey) could be compared scientifically with the NFS data. From a description of the shortcomings of the 1952-53 census data (Van de Walle 1965) it was obvious that estimates of fertility using such materials would almost amount to technical guesswork. In a recomputation based on the results in Coale and Lorimer, Adegbola (1977) indicated that in the absence of basic data, the values of necessary parameters were guessed. It is reasonable to suppose that the NFS data were better than the other sources because of the level of technical expertise invested in the project.

With these serious qualifications, it is hard to arrive at any strong conclusions about the trend of fertility since the 1950s using the data in Figure 3.6. Fertility in the 1950s probably was in a natural state as would be expected given the relatively low level of socio-economic development in Nigeria at that period. From the two estimates for the earliest period, one is inclined to feel that the national fertility level was clearly above six births per woman in the 1950s.

The gap between the NFS direct estimates (a1 in Fig. 3.6) and the other two direct estimates (KAP and RDSS) at the periods when they compared exactly, suggests that some improvement was achieved in the NFS. The KAP results (c2 in Fig. 3.6) are nearer the NFS results than are the RDSS results (d in Figure 3.6). It is possible that the survey results improved with time, as more women became literate

and were able to report events more accurately, and as survey techniques and fieldwork improved. But taking these views would mean a presupposition that differences in the survey results are entirely due to errors.

The direct estimates from the NFS for the 1960s and early 1970s are suspected to have been affected by omission of live births and/or forward shifts of the date of births or ages of the reported children nearer to the survey. If the first of these situations was the case, any form of adjustments of the 1960s and early 1970s estimates (NFS) would tend to raise fertility levels further higher above six; and when viewed alongside the estimates by Coale and Lorimer and Adegbola, results from such adjustments would make the 1950s estimates more plausible and would probably give an impression of stable fertility from the 1950s to the first half or all of the 1970s. If the errors were mainly due to shifting of births, averaging the rates for the 1960s and 1970s would still result in a level of fertility which is significantly above six births per woman.

When the highest estimates at the two extreme periods are considered, one is easily drawn to the conclusion that fertility has remained stable in Nigeria since the 1950s, on the assumption that any variations in the estimates in-between were most likely to be functions of data errors. The Economic Commission for Africa (1979) shared this view of stable fertility since the past three decades, although later (ECA 1981) it relaxed the stability assumption and produced estimated TFR values of 7.3, 7.0 and 6.6 for 1980, 1985 and 1990 respectively.

The World Bank produced a more conclusive set of estimates of exactly 6.9 births per woman for each quinquenium from 1960 to 1975 and for single years from 1976 to 1981 (World Tables 1983) and also 6.9 births per woman in 1973 and 1987 (Social Indicators of Development 1987, 1988). No details of the data or methods used in the estimation (by the World Bank) were given with the figures which would have aided detailed assessment. Therefore further remarks

on the quality of these figures are not possible. It is however pointed out that, (i), the techniques used to produce the later results must have assumed perfect stability for fertility in Nigeria, and, (ii), the estimates produced for the second half of the 1970s in the present work do not differ significantly from the World Bank results.

Recent re-estimations of fertility using the KAP data (Omideyi 1984) yielded a national observed and fitted (with Relational Gompertz model) TFR values of 6.0 and 5.3 respectively in the first half of the 1970s. Fitted TFR values of 4.2, 6.3 and 5.5 were also derived for the Northern, South-Eastern and South-Western regions respectively. Following the assumption of stability inbuilt in the technique of estimation used, the analysis indicated that current births appeared to have been over reported by 5 per cent in the North and South-West and underreported by about 4 per cent in the South-East. No evidence of a major change in trend was reported although some decreasing trend in the North was noted among women at the age groups with more reliable reports of events.

The age patterns of all women fertility estimated in the present analysis and in the KAP (Omideyi 1984) are compared as shown in Figure 3.7. The fertility of the youngest age-group appear to have been underreported in the KAP. At the peak of childbearing age groups (20-29), both the NFS and KAP show remarkable agreement at the national level but from age 35, the KAP recorded slightly lower ASFRs than the NFS. From age-group 25-29 the South-Western NFS ASFRs show relatively higher values than the KAP's, while in the South-East, the opposite tend to be the case. In the North, the KAP showed higher values in the 25-34 age range after which the differential reversed in favour of the NFS. For the North and South-East, the fertility of the two youngest age groups are higher in the NFS. The widest gap in the age pattern of fertility between the two surveys is observed in the South-West.

Low fertility rates would be expected in the NFS as a result of the progressive omission of births further back in the past which are characteristic of data from many retrospective surveys. Hence it would appear that current fertility was correctly reported by the older age groups in the South-East, 30-34 age group in the North and 20-24 age-group in the South-West in the KAP. Displacement of older births into the 'current year' or past 12 months prior to the KAP survey may not be ruled out in these results. For example the peak fertility shown for South-Western women aged 20-24 in the KAP result might have been affected by such errors. On the whole, the data in Figure 3.7 suggest that the differentials in TFR estimated from the NFS and KAP arose mainly from underestimate of the fertility for the very young and older age groups in the KAP.

Apart from the major national and regional estimates discussed so far, there are several small-scale estimates spanning from the 1960s through the 1980s (Ohadike 1968, Olusanya 1967, Morgan and Ohadike 1975, Farooq and Adeokun 1969, Lucas 1974, 1976, Katcha 1977, Omiata 1975, Orubuloye 1977, Mott 1974, Ekanem 1972, 1973, Ukaegbu 1975, Okore 1982, Bradley and Colleagues 1982, Varma and Singha 1982, Adeokun 1985, Uche 1985, Udjo 1987). The levels of fertility in these surveys as measured by the mean number of children ever born by women in each age-group are compared with results from the NFS in the present work as shown in Table 3.7.

The NFS mean CEB results presented here are computed for the exact region and period in which the other surveys took place, and also are stratified to correspond to the type of women in the sample of each survey (currently married, ever married, all women). Where no comparable small-scale survey is available, no NFS results are presented. For all but the most recent periods, truncation effects in the NFS forced the results to be shown for less than the complete reproductive age groups.

TABLE 3.7. ESTIMATES OF MEAN NUMBER OF CHILDREN EVER BORN IN SELECTED NIGERIAN SURVEYS BY PERIOD AND REGION.

	1963-1967				1968-1972			1973-1977										1978-1982								
	SOUTH-WEST				SOUTH-WEST			SOUTH-WEST						SOUTH-EAST			NE	NORTH-WEST			SOUTH-EAST				
AGE	WIVES		EV. M.		WIVES			WIVES			EV. M		ALL WOM.	EV. M.		ALL WOM.	EM	WIVES		ALL WOM.		ALL WOM.			AGE
GROUP	1	A	2	B	3	4	C	5	6	D	7	E	8	F	9	G	10	H	11	I	12	J	13	K	14	L	GROUP
15-19	0.7	1.7	1.0	1.3	1.0	1.2	1.7	0.7	0.2	1.9	0.8	1.9	0.4	0.3	0.9	1.9	0.1	0.4	0.3	1.4	0.3	1.3	0.7	1.2	1.5	0.1	15-19
20-24	1.3	3.6	1.8	2.3	2.4	1.8	3.4	1.6	1.2	3.9	1.6	3.5	1.8	1.3	1.9	3.8	1.1	1.8	1.5	2.8	1.5	2.5	2.1	2.4	2.5	2.3	20-24
25-29	2.3	5.4	2.9	3.7	4.1	3.1	5.7	2.6	2.4	5.6	3.1	5.0	1.6	2.7	2.9	5.5	2.9	3.7	2.8	4.1	3.2	3.6	3.5	3.5	3.5	2.9	25-29
30-34	3.2	6.9	4.2	4.8	5.5	4.1	6.5	3.9	3.4	6.9	3.9	6.2	3.6	3.8	4.4	6.8	4.6	4.8	3.8	5.2	4.2	4.7	4.9	4.5	4.8	4.3	30-34
35-39					6.2	5.1	7.5	4.6	4.2	8.0	4.6	7.1	4.5	4.4	6.4	7.8	5.9	5.6	4.6	5.9	5.7	5.3	5.5	5.1	4.9	5.2	35-39
40-44								4.9	4.7	8.8	5.6	7.9	4.9	5.4	6.9	8.4	7.0	6.5	5.0	6.3	6.0	5.8	5.8	5.6	5.2	5.9	40-44
45-49																			5.2	6.4	6.3	6.7	6.0	6.4	4.9	6.2	45-49

Survey No.	Investigator	Location	Sample size
1	Olusanya	Ife, Oyo,Rural West	5027
2	Ohadike	Lagos	596
3	Farooq/ Adeokun	Ishan	5232
4	Morgan	Lagos	572
5	Lucas	Lagos	1205
6	Sambiwaje	Ibadan	6606
7	Orubuloye	Ibadan & Ekiti	1207
8	Omiata	Ekiti	1491
9	Okore	Umuahia &Arochuku	659
10	Ukaegbu	Ngwa	2464
11	Udjo	Maiduguri & Marte	3241
12	Varma/Singha	Malumfashi	NA
13	Bradley et al	Malumfashi	6449
14	Uche	Ebe & Lokpaukwu	860

NFS		
A	South-West	1545
B	South-West	1591
C	South-West	1545
D	South-West	1545
E	South-West	1591
F	South-South	2027
G	South-East	2207
H	South-East	3139
I	North-East	2185
J	North-West	2131
K	North-West	3243
L	South-East	3139

As was noted in Chapter 1, it is not possible to derive much information on trend from these smaller surveys either by single or comparative analysis. Regarding fertility levels, the results in Table 3.7 shows that for all age groups and in all periods for which data were available, the NFS recorded higher fertility than every other survey with currently or ever married sample. The differences between Varma and Singha (NW) and NFS for currently married women are not as large as the differences between Southern currently married surveys and the NFS. This could be as a result of the nature of the data used by Varma and Singha. Their results were based on registration data whose entries were being upgraded since 1977 and it would be expected that the quality of fertility estimates would equally show some improvement.

The mean CEB comparison shown in Table 3.7 are exact for regions, periods and marital status. It is possible to proceed a step further to include type of place of residence by comparing for instance, the NFS mean CEB for South-West rural currently married women in 1968-1972 with the results by Farooq and Adeokun for Ishan which is predominantly rural. However this makes much demand on the NFS sample size especially since the mean CEBs were calculated retrospectively. Therefore, for sample reason and for progressive trucation of cohort experiences further back in the past, the NFS results are presented for comparison only at the levels of region and period. The point here is to caution that any differences which might be introduced by rural-urban differentials in the samples are not explicitly controlled but are assumed to be small (see Chapter 5) to the extent that they can be justifiably deemphasised when the focus is on national fertility trend.

Where available (in results by Omiata, Ukaegbu, Bradley and colleagues and Uche), all women fertility do not show consistent higher NFS levels. The results by Omiata for the South-West for 1977 are higher in the two youngest and

second to the last age groups than the NFS results. For the same period, the results by Ukaegbu for the South-East are higher than those from the NFS. Although the NFS results were higher than those of Bradley and colleagues, the differentials are very small. All women results depend much on the proportion of the women in each aze especially since the mean CEBs were calculated retrospectively. Therefore, for sample reason and for progressive trucation of cohort experiences further back in the past, the NFS results are presented for comparison only at the levels of region and period. The point here is to caution that any differences which might be introduced by rural-urban differentials in the samples are not explicitly controlled but are assumed to be small (see Chapter 5) to the extent that they can be justifiably deemphasised when the focus is on national fertility trend.

Where available (in results by Omiata, Ukaegbu, Bradley and colleagues and Uche), all women fertility do not show consistent higher NFS levels. The results by Omiata for the South-West for 1977 are higher in the two youngest and second to the last age groups than the NFS results. For the same period, the results by Ukaegbu for the South-East are higher than those from the NFS. Although the NFS results wer shown. A discussion of this issue would necessarily exclude regions which had no comparable other surveys in each period, thus making it less national. For instance it could be misleading to draw a conclusion on likely national levels by comparing the results in 1978-1982 for the North-West. Apart from the unrepresentativeness of this sub-sample for use in national generalizations, it was observed earlier in this analysis (see chapter 2) that the northern data suffered more from data errors than southern data. On the other hand, estimates by Uche for the South-East were derived from a comparatively small sample (860); the NFS subsample from the South-East is 3135.

It is clear though that in the two earlier periods for

which data are available (for the South-West), the NFS results are generally higher. This suggests that the effect of omission of some more distant births by women was not acute on fertility levels in the NFS data from southern Nigeria. Also, from the data in Table 3.6 it noticed that most of these other small-scale surveys underestimated fertility levels. Consequently, it is not advisable to compare their results with those obtained from the NFS with the aim of assessing the correctness of the later.

There are a few other small surveys whose results were not included in Table 3.7 either because of their small sizes (e.g. Mott 1973, Katcha 1977) or due to differences in methodology (e.g. Adeokun 1985). (Katcha produced a TFR value of 5.6 for the rural Sakpe village in the middle belt of North-West; Mott (1973 estimated a level of 6.7 (mean CEB) for Midwest and Adeokun (1984) estimated TFR values of 6.8 for Ikale-Yoruba and Ekiti-Yoruba in the South-West).

A major reason for hesitation to draw strong conclusions so far on the national trend in fertility in this analysis should have been obvious by now. Data (of whatever quality) are more available for the South-West than for all other regions in Nigeria. The South-Western region has the best-staffed and most active demographic research centre (located at Obafemi Awolowo University, Ife). It may be that for reasons of convenience and cost, researchers did most surveys in Western Nigeria. It is worth noting in this regard that the initial hopes that the Demographic and Health Survey in Nigeria (1986-1987) would add to clarify the national trend in the 1980s is seriously cut short. This is because the sample is drawn from only one of the five States in the Western Region (out of the twenty-one States there are in the country). Besides, Ondo, the surveyed State, is probably more culturally homogenous (yoruba) than other states in the West such as Lagos and Oyo. Therefore it is highly unlikely that the result of the Demographic and Health Survey will

easily improve the availability of fertility data at the national level. It has been suggested that even within the Yoruba society there are important cultural variations which affect demographic processes and which should necessitate caution in demographic analysis based on data collected from that region (see Adeokun 1985, 1988). However, with careful analysis, much information on data quality and also on fertility trends can be derived by locating the results of the DHS in its proper regional and time contexts.

Secondly, although the effects of reporting errors have been so far emphasized and those of sampling errors are very small (see Chapter 2), possibilities of other technical errors and chance variations in the estimated trend are not entirely ruled out. In the situation where differentials in fertility net the effects of reporting error are very small, these other factors need to be given some consideration in the assessment of the data on trend. In this respect, it could be argued that a period of eleven years may not be long enough to reveal trends in TFR in a population whose socio-cultural environment suggests more of a stable fertility than anything else. Examination of longer periods could serve better as a more rigorous control for chance factors but unfortunately, good data are not available for Nigeria in the 1960s. If a longer time perspective is taken, the data and analysis in this chapter could be viewed as a first part of a comparative work, the second part of which may be completed when data become available for the 1980-1990.

To conclude this section, it is observed that the NFS fertility estimates appear to be of better quality than most past small-scale or large-scale data. Hence these external materials are not too helpful in the assessment of the fertility trend which are estimated from the NFS. The available evidence suggests a comparatively moderate effect of birth omission in the past on the fertility results of the NFS. For the southern regions where the data are presumably of better quality, this strengthens

support for the view advanced in this analysis, that fertility remained more or less stable from the 1960s to the mid-1970s. For the northern regions, if the fertility-depressing effects of reporting errors can be adequately adjusted for, a roughly similar trend in fertility might be estimated.

3.5 Possible Trends in National Fertility.

This section discusses three possible trends in fertility which could be inferred from or suggested by the evidence which is presently available for Nigeria.

(i) Stable Fertility.

The first is a trend of stable fertility. This has been the preferred working assumption for analysts in the absence of good data to prove change in the past. (see Bradley and colleagues 1982, ECA 1979) The data examined in this chapter appear to lend support for this position at the national level, especially if it is accepted that data errors affected the estimates for the more distant levels.

From the results of the KAP survey and the NFS (see also Chapter 5) it is obvious that the practice of modern contraception in the 1970s and early 1980s was too low to produce important changes in the national trend of fertility. Past surveys did not arrive at any consensus on the age at entry into marriage in Nigeria (See Ohadike 1975, Ukaegbu 1976, 1979, Omideyi 1986), although the data in Figure 3.2 show no dramatic shifts in this variable in the 1970s. Although the combined impacts of breastfeeding and post-partum abstinence are believed to be sizeable, variations among and within regions and sub-ethnic groups (Adeokun 1985) have not been sufficiently documented in order to see the overall effects which these may have on the trend of national fertility. Since substantial shifts in major determinants of fertility such as these are yet to be identified for all of Nigeria (see Chapter 5), it is most likely that in the period considered in this chapter,

fertility remained at about the same level.

With so much unknown about the determinants and differentials of fertility, analyses which presume a stable fertility as a starting point tread the safest grounds. There is sufficient evidence from past research and in the present Nigerian socio-cultural and political system from which a case can be made for stable fertility in the past. Recent research (Van de Walle ed. 1987) which are additional to themes researched by John Caldwell in Western Nigeria since the 1960s draws attention to possible cultural supports for high fertility in Nigeria. The traditional belief system which favoured high fertility in Nigeria has a strong hold on the society. Some analysts believe that the cultural system in African societies has inbuilt mechanisms for adapting successfully to changes, especially with regard to human reproduction (see Lesthaeghe and Eelaine 1985, Caldwell and Caldwell 1987). There is a consensus of opinion among researchers that in the contemporary Nigerian society, human fertility has several social, economic and cultural dimensions all of which sum up to institutionalized pronatalism.

The rationality of high fertility has been documented in several Nigerian micro-level studies. (See for instance, Caldwell 1974,1977, Orubuloye 1976, Okore 1987). Children are wanted for old age security (Caldwell 1983), for replacement in a high infant and child mortality situation, for the maintenance of lineage (Ukaegbu 1975, Okore 1979), as additional hands in family farms and to ensure multitude in case of warfare (Caldwell 1983).

In modern Nigeria, political representation at the federal and state levels are tied to population size. National revenue is allocated with a formula which emphasizes population size. For instance, after a 40 per cent allocation of revenue on equality basis for all local governments, the next 40 per cent is shared on the basis of population size while the other factors comprising local government needs and internal revenue effors share

only the remaining 20 per cent. In such a situation, it is not unlikely that opinion leaders in each ethnic group would encourage their members to maintain a high fertility for group benefits.

Rivalry between Christianity and Islam has intensified the pronatalist stance of both religions in the recent times. A population policy statement by the central government which indicated an intention to reduce fertility (Federal Ministry of Health, Lagos 1988) met with oppositions from all religious bodies partly because of mutual suspicion from the two dominant religions (Islam and Christianity) that it is a ploy by each to reduce the population of the other (see Pilling 1988) Besides the issue of inter-religious tension, the teachings of the major religious groups in Nigeria are generally in favour of a large family. Mainstream Islam usually harbours reservations against family limitation on doctrinal grounds. So does Roman Catholicism, especially when the concept of family planning involves the use modern and effective contraception.

These pronatalist forces appear to be so strong and pervasive that the elites who have had long exposure to secularization do not appear to deviate easily from the expected reproductive behaviour. Empirically, a section of the Nigerian elites has been identified which supports the maintenance of the traditional system (see Ogionwo 1978). Surveys have indicated that the desired family size is quite high in Nigeria across all social and eductional strata (see Ware 1975, Lucas and Ukaegbu 1977, Oyeka 1986).

An investigation of attitudes of physicians to family limitation in Nigeria (Covington and colleagues 1986) showed that a substantial percent still are not enthusiastic either to practice or recommend family planning. Caldwell (1987) also found among the highly successful and intellectual class, a general non-committal attitude about whether or not to support the reduction of family size.

Another study by Adamchak and Adebayo (1987) showed that Nigerians who are maximally exposed to secularizing influences through education and residence abroad still hold the traditional norm of large family size. This class of people who usually are the initiators of change appear to capitulate to family, community or religious pressure on matters regarding changes in reproductive behaviour at a personal or national level (see Adewuyi 1987). It seems that the Nigerian elites see the traditional patterns of childbearing as having rich cultural symbolisms and for that reason tend to support its preservation notwithstanding the implications for fertility levels and economic development.

The evidence so far available on fertility differentials does not show patterns which would suggest that large decline in fertility could occur soon at the national level. For instance, education at the early and middle stages and urban residence have been found to be positively related to fertility level (see Caldwell 1981). Differentials in female work status does not appear to introduce very large variations in fertility except in jobs whose roles are extremely incompatible with childrearing practices in Nigeria and only relatively few Nigerian women are currently in such positions (Fayestan 1985).

Over the years in Nigeria, it would be expected that structures and means have evolved which regulate and accommodate pressures of high fertility at the family level. Indeed several of such arrangements some of which include norms about residence do exist in Nigeria. For instance, the household, immediate and extended families have specific arrangements which permits a woman to successfully avoid pregnancy until a socially-approved post-partum interval. However, these arrangements do not usually have similar goals with modern concepts of family limitation and contraception (see Frank,1987, Lesthaeghe and colleagues 1981, and Schoenmaeckers and colleagues 1981). Hence whatever depressing effects they might have on fertility are largely unintended.

Another practice which until recently has been neglected in research is child fostering. In its traditional and modern forms (See Isiugo-Abanihe, 1983) this practice acts, among other functions, to ease pressure of numbers on large families. It is common for rural teenagers or younger children to be sent to live in the towns and cities with families which are more economically advanced. In the host families, these young migrants take care of the children and do other household works while the hostess goes out to work. This pattern of childfostering would make childbearing less inconveniencing to the urban women and less of an economic burden to the rural women.

These and other similar cultural and economic conditions in the present Nigerian society, added to the quantitative evidence examined in the previous sections, provide a strong basis for believing that fertility remained stable at the national level in the period considered in this analysis.

(ii) Rising Fertility.

At a less than national level, some trend of rising fertility was observed in previous sections which tend to persist with controls for data quality. This evidence is not particularly new in fertility research in Nigeria. Olusanya (1967) observed increasing education as a factor which was likely to undermine traditional reproductive norms. Two years later, Olusanya (1969) found that fertility level was higher in Ife town than in rural Western Nigeria. At a general level, Morgan (1976) concluded that in Western Nigeria modernization was positively related to high fertility. Santos (1978) suggested that for the Yoruba women, urban fertility was likely to exceed rural fertility in the absence of contraception. Orubuloye (1981) arrived at a similar conclusion in an

analysis of data from Western Nigeria.

These studies point out that the initial encounter between modernization and tradition in Nigeria had an effect of raising the fertility level. In a study of Lagos metropolis, Lesthaeghe, Page and Adegbola (1981) saw this rising trend in fertility as a function of imbalances in the behavioural mechanisms which regulate reproduction. Western education and urbanization ushered in subcultures which break traditional constraints on fertility with more ease than they can institute alternatives. One of the demographic consequences of this change is rising fertility among the younger generation of women.

In Kenya, Cameroon and several other developing countries, a negative association has been observed among indices of modernization on one hand and fertility on the other. (see Nag 1980, Mauldin 1981,Jain 1981, Rodriguez and Cleland 1981, Freeman 1987, Lestaeghe 1984, 1985, Lestaeghe and colleagues 1981, Roberts 1982, Knodel 1982). These empirical deviations from common assumptions have led to recent suggestions for the modification of the classical transition theory. (see Beaver 1983, Caldwell 1983, Dyson and Murphy 1986) although some demographers see them (mainly the rising marital fertility) as just a feature of a temporary phase in transition (Bongaarts and Porter 1983, Bongaarts 1987).

In the Nigerian context, although this rising trend can not be adequately explained with only the NFS data due to the confounding effects of data errors, it is at least possible to indicate that the process is in existence. Nigeria enjoyed a period of sudden outburst of wealth which followed the profitable exploitation of mineral oil resource in the 1970s. As a result, development infrastructure was spread wider. Increased health care facilities became available. Education was subsidized especially at the primary level with the result that annual enrolment rose from 5.3 per cent between 1971 and 1972 to 30.5 per between 1975 and 1976 (Fadayomi 1983). In

the same period, links between the rural and urban areas improved with the construction of new roads. Many luxury consumer items were imported including communication technology which led to the penetration of the media into almost all urban and many rural homes.

This leap forward in economic development during the 1970s carried with it some features of modernization such as increased urbanization, literacy, secularization, individualization and cultural tolerance. Although the statistical evidence is presently lacking, it is very probable that this process of change at different socio-economic levels affected the trend of fertility. For instance nutritional improvement is likely to increase the fecundity status of women (Frisch 1977).

Improved health facility is likely to reduce infant mortality (as was indicated in Morah 1985). It is also likely to reduce sterility, intrauterine mortality and check the spread of venereal diseases (see Chapter 5). It might also have decreased (adult) mortality thus increasing the proportion of her reproductive years which the average Nigerian woman spends in a stable union. Although increase in formal education is likely to raise the mean age at first marriage, such marriages are likely to be more romantic with less periods of abstinence for lactational or other cultural reasons. There is some evidence of reduction in duration of breastfeeding and post-partum abstinence for urban residents and with increase in education (see Lesthaeghe and colleagues 1981, Caldwell and Caldwell 1981).

Since modern contraception is not yet widely used, all of the above situations would have the tendency to raise fertility. However, the presence of reporting error in survey data diminishes the validity of the case to be made for increasing fertility in Nigeria. What could be concluded in this regard is that it would not be surprising if fertility is found to have experienced some increases net the effect of data error in the decade of the 1970s,

especially among some subgroups of women in the urban areas and in the southern regions.

(iii) Declining Fertility

Lastly, the evidence available in the NFS data for what might be called a possible onset of fertility decline is very weak. The two southern regions had TFR values in 1980 which were lower than the values in all other preceeding years. But this is not true in the north where the values for 1980 were actually higher than those for the early 1970s. (See Table 3.4). There is an indication in the P/F ratios (Fig. 3.5) for a sub-section of the young women (who reported events exactly) that their fertility level lowered by the end of the 1970s and in 1980. Assuming minimal error effects, these are about the only visible and consistent signs so far at the national level of a slight reduction in fertility level.

The weakening of the national economy since the beginning of the 1980s could be a source of some reduction in family size as couples experience increased difficulties with childrearing. But since it is not generally the case that family size is a direct result of economic decision in Nigeria (a point on which most analysts are now agreed; see for instance Todaro and Fapohunda 1987), it is uncertain to what extent economic difficulties has affected fertility level in the early 1980s. One obvious outcome of the deteriorating economy though, is that it has strengthened the case for calls for the rationalization of childbearing.

It is possible that fertility has started responding negatively to increased activities of national and States family planning organizations. If this be the case, it is doubtful whether the NFS was in a position to capture any national reduction resulting from programme efforts since the popularization and open government support for

family planning (see Federal Ministry of Health/National Population Bureau 1985) have only happened in the turn of the 1980s.

A World Bank projection classified Nigeria in the group of sub-Saharan African countries where fertility is expected to decline in 1990-1995 (World Bank 1986). Probably, the social and economic conditions for the onset of fertility decline may well be in existence since the second half of the 1970s. However, in the absence of widespread practice of modern contraception, no other single or combination of social, cultural or economic forces may be able to initiate systematic and sustained declines in fertility. It remains to be seen if a massive increase in contraceptive use would occur to initiate a substantial fertility decline at the national level in the near future in Nigeria.

The situation in southern Nigeria needs attentive monitoring. The south-western region in particular, has a long history of urbanization and comparatively long exposure to family planning activities. Fragments of available evidence point to the possibility that the southern regions are most likely to experience large fertility declines earlier than the northern regions.

3.6 Summary.

The estimates in this chapter show that fertility level in Nigeria has not been below six births per woman since the decade of the 1960s. For the 1950s, the scanty data available suggest equally high levels. Total fertility rates of 6.4 and 7.0 were estimated for the first and second halves of the 1970s respectively. For 1980, the estimated TFR was 6.4.

In view of the errors in the data, the observation in the First that fertility declined after a peak rise in the 5-9 years before the NFS (Lagos 1984) needs many qualifications. Several WFS countries have shown similar trends and the greater weight of evidence explains these as a function of reporting error (see Porter 1977, UN 1987 and more recently the case of Pakistan in Retherford 1987). The observed upward and downward fertility trends in the NFS data require careful interpretation because of the interference of serious data errors.

It has been argued in this chapter that although subsections of the Nigerian population appear to be experiencing slight increases or decreases in fertility, there is good evidence in the NFS data to suggest that at the national level fertility remained fairly stable in much of the decade of the 1970s. It is cautioned that one can not be presumptuous about the future course of fertility in Nigeria. The contemporary Nigerian society possesses potentials for fertility to remain stable, rise or fall. How the balance of these sets of factors will affect fertility trend is hard to know now with the NFS data. The possibility of a prolonged stability at a high level is not too remote. What will probably be a surprise is if any effects of fertility-reducing factors become strong enough to generate very observable and sustainable national decline by the 1990s.

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CHAPTER FOUR

EXPOSURE TYPES AND DURATIONS AND FERTILITY TRENDS

4.1 INTRODUCTION.

The analysis in this chapter is a further search for the sources of the trends in fertility which were observed in the previous chapter.

When analysis is based on cohort defined by age at survey only, fertility trend at younger ages could be misinterpreted because it is usually largely due to changes in age at marriage. For example, the simple effect of marriage was observed in Fig. 3.4 where although the fertility trend for the youngest southern women was falling or stable, marital fertility for the same age group was actually rising.

The present chapter introduces more demographic controls into the analysis. Examination of the trends of fertility at the same age or duration group makes it easier to see the effects of age at entry (into marriage or motherhood) on one hand and the effects of changes in fertility behaviour on the other. Also, further analysis by subgroup of age at marriage and motherhood makes it possible to assess the pace of any recent changes in fertility.

Only the substantive results are presented, as details of methodology do not fall within the aim of the present analysis. Further discussion of methodological issues related to the results shown in this chapter can be found in Hobcraft and Casterline (1983), Hobcraft and colleague (1982), Goldman and Hobcraft (1982) and Pullum (1987).

The fertility rates shown are for cohorts by period as

defined in chapter 3. (See equations 3 and 4 in Appendix 3). The quartiles which were computed for ages at marriage and motherhood refer to the ages at which 25%, 50% and 75% of the women in the sample have been married or have become mothers. The ages corresponding to these quartiles are 14, 16 and 21 years for marriage and 16, 18 and 23 for motherhood.

In order to minimize the risk of occurrence of errors, the cut-off point for analysis is 10-14 years before the survey. Although the results shown could be used to discuss period levels in fertility, emphasis in the whole of this chapter is on recent trends.

4.2 AGE, MARRIAGE AND MOTHERHOOD DURATION AND FERTILITY TRENDS.

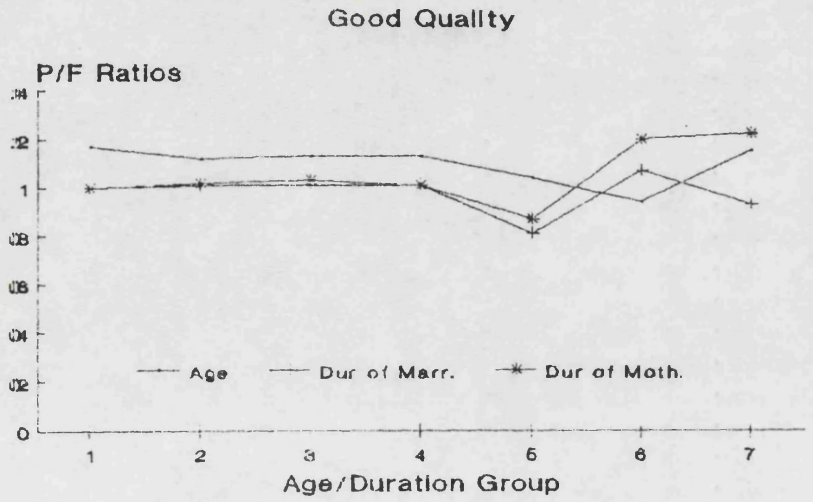
This section uses different ratios and rates to look more closely at the two related issues of a rise in fertility in 5-9 year period before the survey and some decline in the most recent period. The measures are indexed by age at survey, duration of marriage and duration of motherhood.

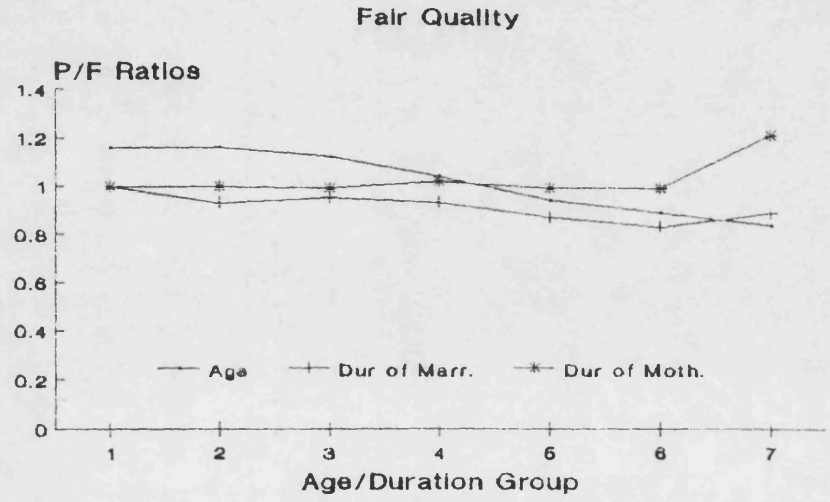
With reference to P/F ratios, a problem in the interpretation of the trends such as are shown in Figure 4.1 is that they can be used to assess changes in fertility as well as to screen for reporting errors in the same data. Where, as in the present case interest is on both, and no other external aid is available, the evidence may not be given a single conclusive interpretation. If the P/F ratios decreased with age or duration group, this suggests that either fertility is rising or that omission of births occurred at older ages or longer durations. With some insight gained so far into the data, one is inclined to interpret falling P/F ratios in this chapter by age or duration more as a function of data errors than as a clear evidence of rising fertility except in any outstanding cases.

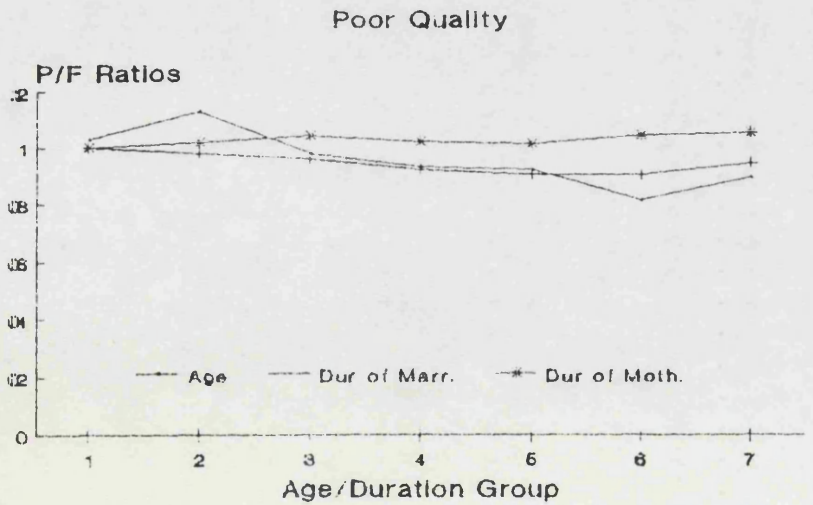
Table 4.1 Ratios Of Successive Cumulative Fertility Within Period For 10-14 Years Before The Survey, Indexed By Age And Durations Of Marriage And Motherhood By Data Quality.

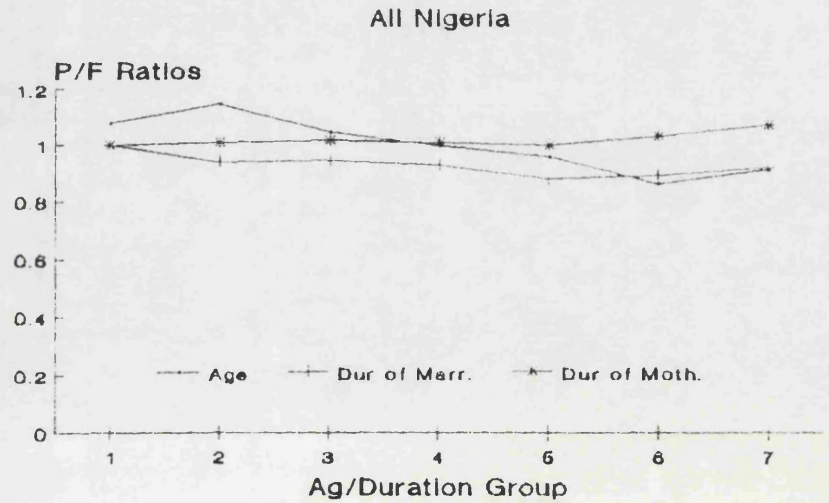
EXPOS. TYPE	Ratios											
	All Nigeria			Good			Fair			Poor		
	0-4	5-9	10-14	0-4	5-9	10-14	0-4	5-9	10-14	0-4	5-9	1-14
Age at Survey												
15-19	1.74	0.83	0.93	2.06	1.08	0.87	1.85	1.01	0.98	1.47	0.69	0.87
20-24	1.17	0.86	0.94	1.24	1.01	0.94	1.22	0.92	0.99	1.09	0.79	0.91
25-29	1.10	0.86	0.93	1.22	0.88	1.00	1.12	0.88	0.96	1.05	0.83	0.91
30-34	1.08	0.86	0.97	1.17	0.82	1.12	1.06	0.92	0.97	1.05	1.05	0.96
Dur of Marr.												
0-4	0.92	0.83	0.88	1.00	0.79	0.94	0.83	0.92	0.96	0.95	0.80	0.82
5-9	0.98	0.87	0.90	1.07	0.88	0.93	0.94	0.90	0.94	0.95	0.87	0.95
10-14	1.01	0.85	0.97	1.09	0.76	1.22	0.97	0.89	0.96	0.94	0.90	0.96
15-19	1.01	0.89	1.00	1.02	0.89	1.12	0.97	0.91	0.98	0.95	0.97	1.00
Dur of Moth.												
0-4	1.03	0.96	1.00	1.04	0.93	1.04	0.93	0.99	1.00	1.05	0.95	0.99
5-9	1.06	0.92	1.04	1.08	0.85	1.08	1.02	0.93	1.04	1.08	0.92	1.04
10-14	1.07	0.90	1.07	1.10	0.78	1.25	1.06	0.93	1.04	1.08	0.92	1.04
15-19	1.06	0.94	1.07	1.01	1.02	1.12	1.04	1.04	0.93	1.08	0.82	1.07

Figure 4.1 P/F Ratios For 0-4 Years Before The Survey, By Age And Duration Of Marriage And Motherhood And Data Quality.









With only three exceptions in the good and fair data groups by age, the ratios of cumulative fertility in successive periods (Table 4.1) indicate higher levels of fertility in the 5-9 years before the survey than in the earlier five-year period. For all Nigeria, the ratios by age and duration of marriage show generally higher levels in the 10-14 years before the survey relative to the preceeding five years whereas the motherhood duration ratios show generally lower levels in the 10-14 than in the 15-19 years before the survey.

From the ratios for the two most recent periods, one gets the impression of a declining trend in fertility at young ages. But a different pattern is observed in the trend at the younger durations for all Nigeria when marriage duration (and by implication ever married status) is directly controlled. The ratios for younger marriages are indicative of rising fertility. However, the ratios by duration of motherhood show a rather stable trend of fertility in the most recent period.

The P/F ratios in the most recent period for all ages and duration groups by data quality are shown in Figure 4.1. Sample fluctuation in the good quality data and omission or shifting of births in the others might have affected the ratios at the oldest age and more distant duration groups. Therefore although all age and duration groups are presented, discussion is limited to 15-34 age range and 0-19 durations.

For the fair data group in Figure 4.1, the P/F ratios display a decreasing trend by age, while for the good data the ratios remain about stable. Secondly, for the two better data groups, the P/F ratios by age are higher than the P/F ratios by durations of marriage or motherhood up to the oldest age or duration group considered. The P/F ratios for the poor data group show a comparatively lower level in the 15-19 age group and from 20-24 age group, declined with increase in age. The gap between P/F ratios

indexed by duration of marriage and motherhood appears to narrow with improvement in data quality.

At the national level, the P/F ratios indexed by motherhood duration show a consistent trend. These ratios indicate no observable change in fertility for all data groups until 30-34 and 15-19 age and duration groups respectively. This evidence strengthens the view that, though some changes might have taken place at the regional level in the 1970s, any such changes in fertility were not widespread enough for all subgroups of women to reflect in the national scenario at the period.

The trends in the P/F ratios by quartiles of age at entry into marriage or motherhood are shown in Figure 4.2. Generally, the ratios for ages at marriage suggest that fertility rose slightly in the 14 years before the survey. The ratios for quartiles of age at motherhood indicate roughly stable fertility in the 0-14 years before the survey. Small differentials exist in fertility trend in the most recent years by quartiles of age at marriage or quartiles of age at motherhood.

In the last three columns of each of the three panels in Table 4.2 are shown the actual age or duration specific fertility rates for three periods before the survey. The rates for 5-9 years before the survey exceed those for 0-4 period before the survey for motherhood durations. But for duration of marriage, there is hardly any changes in duration specific fertility rates in the 0-9 years before the survey, especially after the younger durations.

Although the peak in the 5-9 years tends to persist, control for indexing variables reduces the differences between fertility levels in the 0-4 and 5-9 years before the survey. Ratios indexed by motherhood duration remained fairly stable for the 1970s indicating no significant change in childbearing patterns in the period. Ratios indexed by marriage do not indicate decline in fertility. Ratios indexed by age show some decline at younger ages -

which might be the effects of declining proportion of women marrying at young ages.

4.3 AGE AT ENTRY AND FERTILITY TREND.

The data in Figure 4.2 and Table 4.3 are used to examine any effects of age at entry into marriage or motherhood on the recent trends in fertility. Within the 15-19 years duration, the P/F ratios in the most recent period show very slightly increasing fertility for all quartiles of age at marriage. For the ratios indexed by duration of motherhood, all quartiles of age at motherhood indicate constant fertility although slight increases are observed before the most recent period for women who became mothers before they were 16 years old.

The actual duration-specific fertility rates by quartiles of age at marriage and motherhood (Table 4.2) show that for marriages which have not lasted up to five years, fertility increased with age at marriage in the 0-4 years before the survey. For instance women who married under the age of 14 years had a duration-specific fertility rate of 0.22 in this period, whereas the equivalent rate for those who married at or after age 21 is 0.41.
In contrast, age at marriage shows no fertility differentials for marriages which have lasted for 5-9 years except for a slightly higher rate for those who married at age 16-20. For the older marriages, fertility rates appear to be inversely related to age at marriage in the most recent period (rates = 0.22, 0.18, 0.13 and 0.09 from the youngest to the oldest ages at marriage for 20-24 marriage duration group).

The motherhood duration-specific fertility rates show very high levels for all quartiles of age at motherhood in all periods for those who became mothers most recently although those of them who had their first births under age 16 recorded the lowest rate (0.55) probably because of teenage subfecundity. For the other higher motherhood

TABLE 4.2. COHORT-PERIOD FERTILITY RATES BY AGE AT SURVEY AND DURATIONS OF MARRIAGE AND MOTHERHOOD (BY QUARTILES OF AGE AT ENTRY) FOR THE THREE MOST RECENT FIVE-YEAR PERIODS BEFORE THE SURVEY, ALL NIGERIA.

AGE/DURATION-SPECIFIC FERTILITY RATES.

AGE GROUP	FOR AGE AT SURVEY (ALL WOMEN) YEARS BEFORE THE SURVEY 0-4	5-9	10-14
15-19	.07	.11	.09
20-24	.26	.25	.22
25-29	.29	.30	.26
30-34	.26	.27	.24
35-59	.20	.22	.22

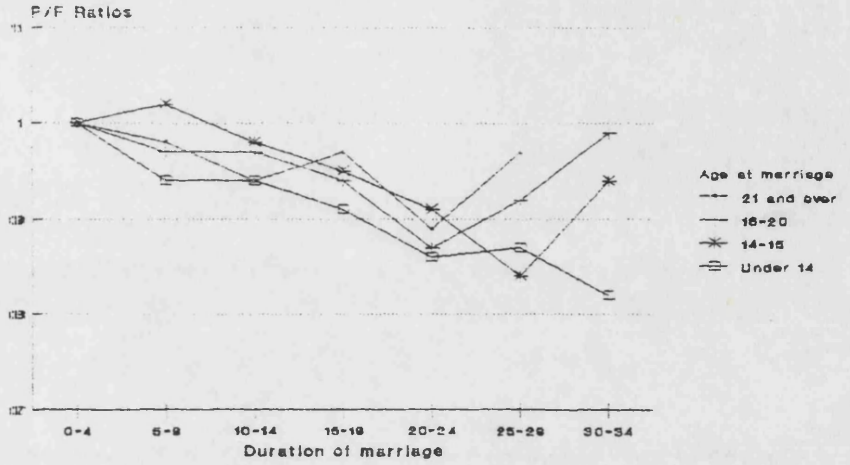
AGE AT MARRIAGE (ALL EVER MARRIED WOMEN)

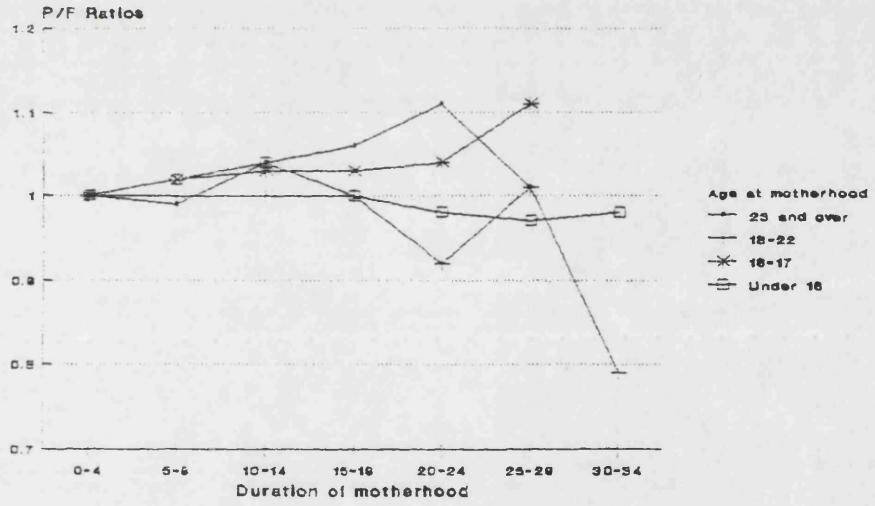
DUR. OF MARR.	UNDER 14			14-15			16-20			21 AND ABOVE			ALL QUARTILES		
PER	0-4	5-9	10-14	0-4	5-9	10-14	0-4	5-9	10-14	0-4	5-9	10-14	0-4	5-9	10-14
0-4	.22	.26	.18	.26	.32	.24	.34	.32	.30	.41	.34	.26	.31	.31	.25
5-9	.29	.31	.27	.29	.31	.27	.33	.33	.30	.29	.29	.28	.31	.31	.28
10-14	.30	.29	.26	.29	.32	.25	.27	.29	.23	.24	.26	.25	.28	.29	.24
15-19	.27	.27	.28	.24	.27	.23	.22	.23	.23	.17	.15	.25	.24	.24	.25
20-24	.22	.23	.19	.18	.17	.18	.13	.16	.22	.09	.16	.00	.16	.19	.19

AGE AT MOTHERHOOD (ALL MOTHERS)

DUR OF MOTH. PER	UNDER 16			16-17			18-22			23 AND ABOVE			ALL QUARTILES		
	0-4	5-9	10-14	0-4	5-9	10-14	0-4	5-9	10-14	0-4	5-9	10-14	0-4	5-9	10-14
0-4	.55	.70	.71	.61	.62	.61	.64	.67	.71	.64	.65	.60	.62	.66	.66
5-9	.32	.37	.31	.31	.34	.30	.33	.35	.31	.26	.29	.32	.31	.34	.31
10-14	.29	.32	.28	.29	.30	.25	.28	.30	.25	.22	.27	.30	.27	.30	.27
15-19	.24	.26	.26	.20	.23	.21	.21	.19	.23	.16	.19	.21	.21	.22	.24
20-24	.17	.19	.19	.15	.14	.22	.09	.13	.09	.11	.07	.00	.13	.15	.17

Figure 4.2 P/F Ratios in the mst recent five years before the survey for quartiles of ages at marriage and motherhood.





durations, in the most recent period, fertility rates tend to decline with increase in age at motherhood as would be expected since fecundability declines with age of women after the peak ages for childbearing. For those who have been mothers for 5-9 years, fertility changed only slightly by age at marriage.

Comparatively small differences in fertility are observed among marriage duration groups within each period after the first five years of motherhood and before the very old duration group (Table 4.2).

Partial total fertility rates were calculated for each quartile of age at marriage or motherhood by data quality as shown in Table 4.3. Although, in general, fertility level is inversely related to ages at marriage or motherhood, some other features can be noticed. First, for all Nigeria, relatively low fertility is observed among those who married at ages of 14 and 15. Teenage sub-fecundity may not be a satisfactory explanation for this since those who married earlier than this group (<14) achieved quite a high fertility level. If the level shown by the poor data group is anything lower than the levels for the other two quality groups, it would be easier to attribute this pattern of differentials to misreporting of events. A similar pattern occurs for women who had their first birth at the age of 16 or 17, but in this case the low fertility level is restricted to the good data category. The source of this phenomenon in not yet clear.

The data in Table 4.3 show that until very late marrying ages, age at marriage has no strong effects on fertility. Even then, it makes a difference of only about 1.7 births whether a woman married before the age of 14 or after the age of 20. For age at motherhood, the comparable difference is about 1.2 births: by the end of their childbearing career, women who had their first birth before the age of 16 would expect to have only about one live birth more than those who started childbearing at or after the age of 23.

TABLE 4.3 CUMULATIVE FERTILITY WITHIN PERIODS (CUMULATED TO DURATION 24 YEARS) FOR QUARTILES OF AGES AT MARRIAGE AND MOTHERHOOD IN THE MOST RECENT PERIOD BEFORE THE SURVEY BY DATA QUALITY, ALL NIGERIA.

DATA	FERTILITY FOR QUARTILES OF:									
QUALITY	AGE AT MARRIAGE (ALL EVER MARRIED)					AGE AT MOTHERHOOD (ALL MOTHERS)				
	<14	14-15	16-20	22 +	ALL	<16	16-17	18-22	23 +	ALL
NIGERIA	6.77	5.51	5.87	4.99	5.78	6.62	6.28	6.31	6.37	6.14
GOOD	7.86	5.60	6.23	4.97	6.60	6.47	6.05	6.47	6.06	6.26
FAIR	6.43	5.31	5.85	4.92	5.62	6.76	6.54	6.32	4.56	6.04
POOR	6.03	5.62	5.55	5.08	5.57	6.63	6.25	6.15	5.49	6.13

TABLE 4.4. MEAN INTERVAL BETWEEN FIRST MARRIAGE AND MOTHERHOOD FOR ALL EVER MARRIED
WOMEN WHO HAVE HAD AT LEAST ONE LIVE BIRTH, BY AGE AT SURVEY, ALL NIGERIA.

AGE GROUP	MEAN INTERVAL (MONTHS)
15-19	18.0
20-24	18.3
24-29	27.2
30-34	30.0
35-39	38.1
40-44	40.3
45-49	48.7
15-49	30.3

TABLE 4.5 FERTILITY RATES BY CURRENT AGE AND AGE AT FIRST BIRTH
FOR WOMEN WHO HAVE HAD A CHILD (EXCLUDING INCOMPLETE EXPOSURES)

CURRENT AGE	AGE AT FIRST BIRTH					
	15-19	20-24	25-29	30-34	35-39	40-44
25-29	.195	.297				
30-34	.187	.292	.277			
35-39	.175	.261	.275	.226		
40-44	.119	.234	.274	.223	.158	
45-49	.122	.216	.260	.243	.173	.109

This weak association between age at entry and completed family size may be due to catch-up related behaviour which should be a subject for further inquiry with the NFS or other data. Women who marry quite late are likely to be more anxious to have a birth soon after marriage. They are also more likely to breastfeed for shorter durations and to desire a subsequent birth. On the other hand, teenage subfecundity and other factors relating to exposure among those who married very early might have checked the tempo of their childbearing.

However, the impact of errors should not be underestimated in these suggestions. The nuptiality data in the NFS are generally of lower quality than the birth histories (see Morah 1985). For instance, the reported interval between first marriage and first birth in Nigeria increased with increase in age, ranging from 12.5 months for the youngest age group to 48.7 months for the oldest age group. (Table 4.4) The later interval is almost unbelievable and must have been affected by misreporting of either of the two events or both.

The NFS data show a high tempo of childbearing for women under the first five years of exposure especially as seen in the motherhood duration-specific rates in Table 4.2. This could be interpreted to reflect the social importance attached to early births soon after marriage. After the first five years of exposure, there is not much change in the tempo of childbearing. For instance, added to the evidence already pointed out in Table 4.2, the fertility rates for age groups by age at motherhood in Table 4.5 show no important shifts in age or cohort experiences. The peak of childbearing remains 25-29 for the three cohorts which have passed this group.

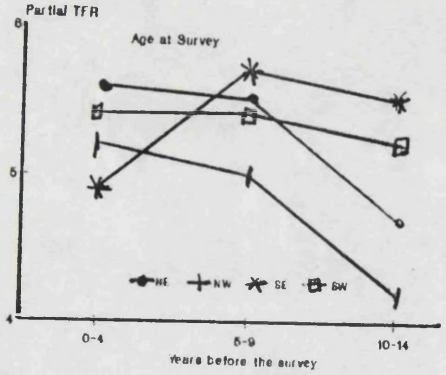
4.4 REGIONAL TRENDS

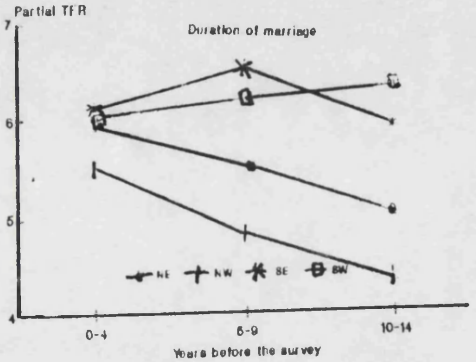
This section examines fertility with rates and P/F ratios indexed by age at survey, duration of marriage and duration of motherhood for the four broad geographical regions to see if these different exposure types affected the observed trends in differentials.

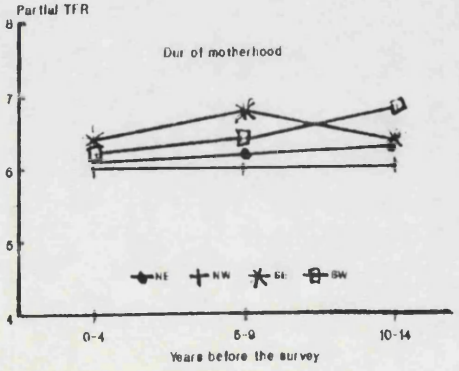
The data in Figure 4.3 show less regional variations in fertility when rates are indexed by duration of motherhood than when indexed by either age at survey or duration of marriage. It is observed that all regions show a more or less stable trend in fertility when indexed by duration of motherhood. It is particularly noticed that for motherhood duration, the two northern regions do not show any rising trend. With effects of single state and non-fertile marriages removed, the fertility of all exposed mothers show a stable trend in both northern and southern regions although slightly lower levels in the north are still observed.

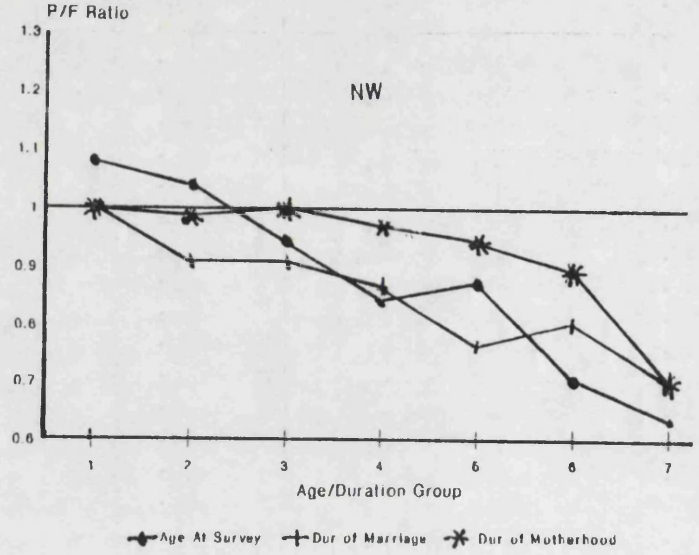
The P/F ratios in Figure 4.3 give insight into fertility trends and error effects at the same time. P/F ratios indexed by motherhood duration show for all regions that fertility trend is more or less constant for younger mothers - those who had their first births in not more than 19 years before the survey. All regions show slight reduction in fertility as is observed in their P/F ratios for the young age or duration groups when fertility is indexed by age. At later ages though, age performs rather poorly as an indexing variable, most probably because of the difficulties which women encountered in reporting both their own ages and the dates of births of their children. An exception to the general trend of fertility by age is for south-east where relatively significant decline is indicated by the P/F ratios for all age groups. Apart from the effects of reporting errors, it appears that the drop in the proportion of women marrying at very young ages the south contributed to the reduction of fertility by age as is reflected in the south-eastern P/F ratios.

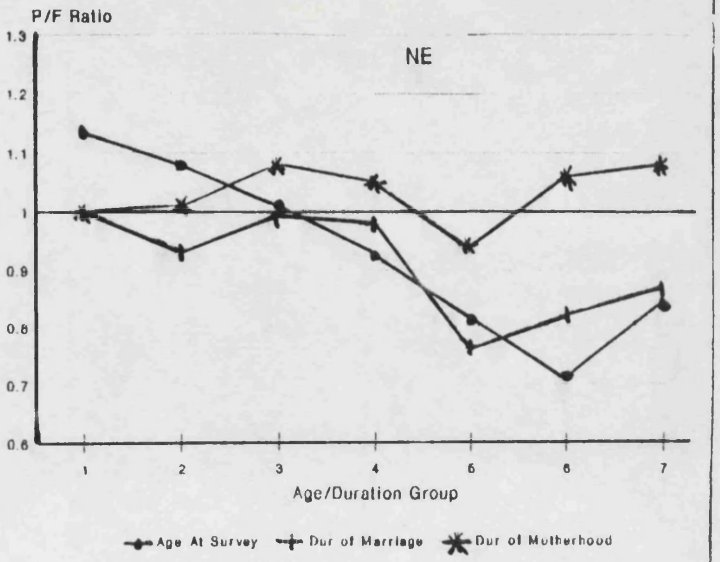
Figure 4.3. Regional Partial Total Fertility Rates and P/F Ratios

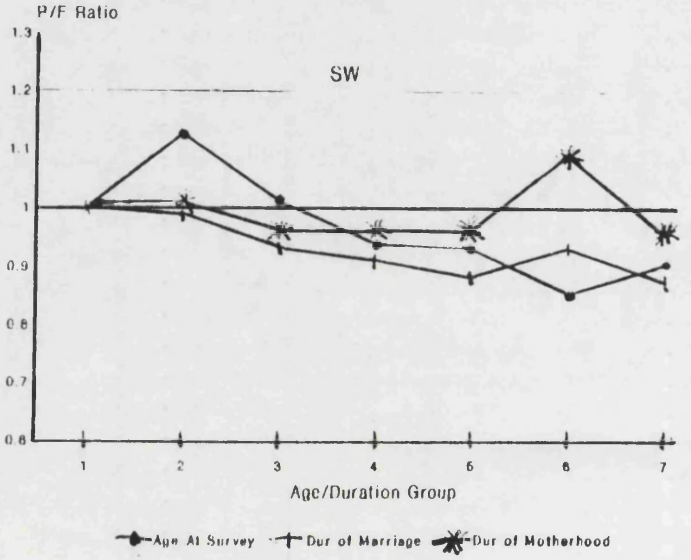


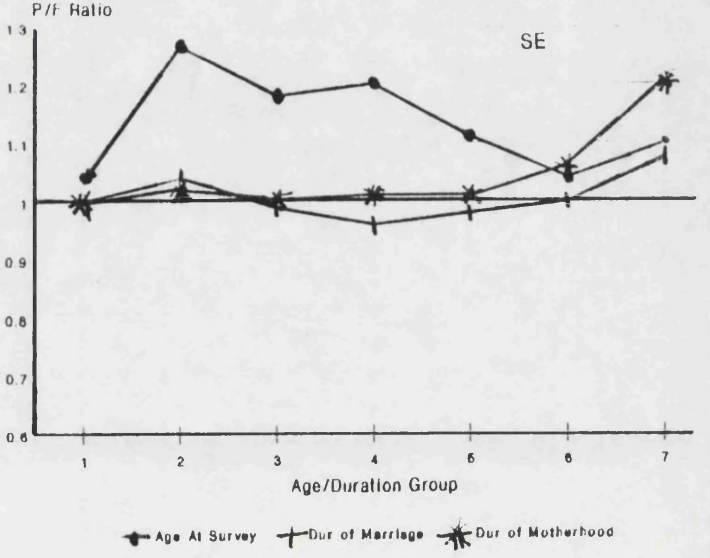






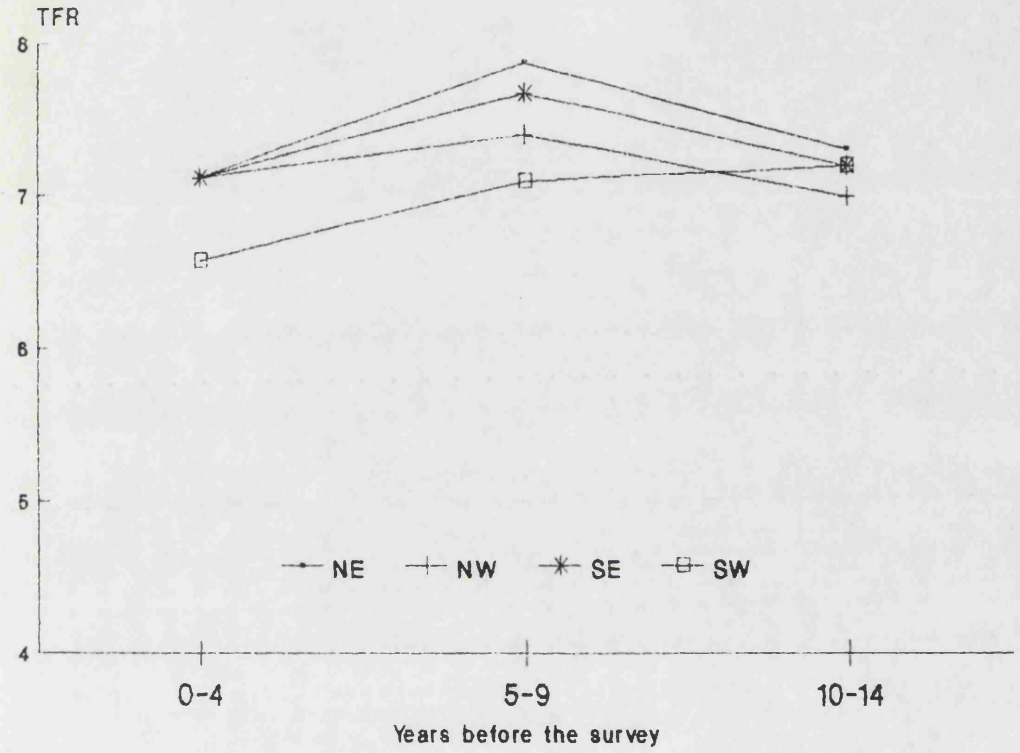






Note: For age groups, I-7 represent the usual 7 five-year age groups.
For duration groups, I-7 represent 7 five-year periods from 0-34 yrs.

Figure 4.4 Regional trend in total fertility rate by duration of motherhood



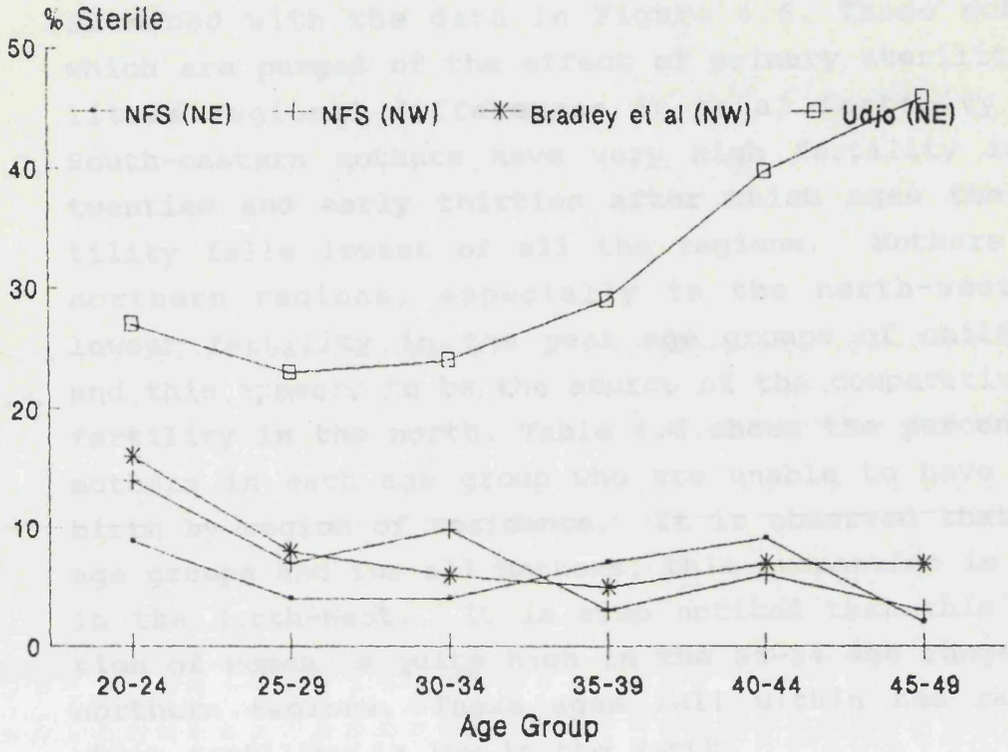
4.5 EFFECTS OF STERILITY.

So far in this analysis, it has been pointed out that the trend shown by fertility in the NFS data should not be interpreted independent of possible effects of reporting errors. In this section, primary and secondary sterility are briefly considered as other likely sources of some of the observed fertility trend in Nigeria.

Two observations were made in chapter 3 with respect to primary sterility; first, that there are more sterile women in the northern regions than in the southern regions, and secondly, that there are no major discernible trends in the proportions sterile by age groups within each region. Information on the prevalence of infertility in Nigeria is scanty and is not yet available in forms which can permit detailed analysis. From the evidence of some more generalized studies (Belsey 1976, Guest 1978, Frank 1983), some of which have found significant proportion of sterility caused by veneral diseases and other physiological pathologies, it cannot be assumed that Nigeria is unaffected in some degrees, since parts of the endemic areas share borders with Nigeria.

The reported prevalence of primary infertility for all of Nigeria is 7.0% (see Table 3.3), a level which would have only a small dampening effect on national total fertility rate. Researchers have made references to infertility as a significant demographic variable, mainly in the northern part of Nigeria (see Miro and colleagues 1982, Varma and Singha 1982, Bradley and colleagues 1982, Udjo 1987). Sterility data for nothern Nigeria in the NFS and two other surveys are shown in Figure 4.5. The two more localized surveys (Bradley et. al. in Katsina State, NW and Udjo in Borno State NE) show generally higher levels of sterility than is recorded in the NFS data. In particular, the survey by Udjo shows a level of sterility for Borno State which is alarmingly high although with a declining trend. This level of sterility can only compare with the

Figure 4.5 Percentage of ever married Northern women who are sterile.

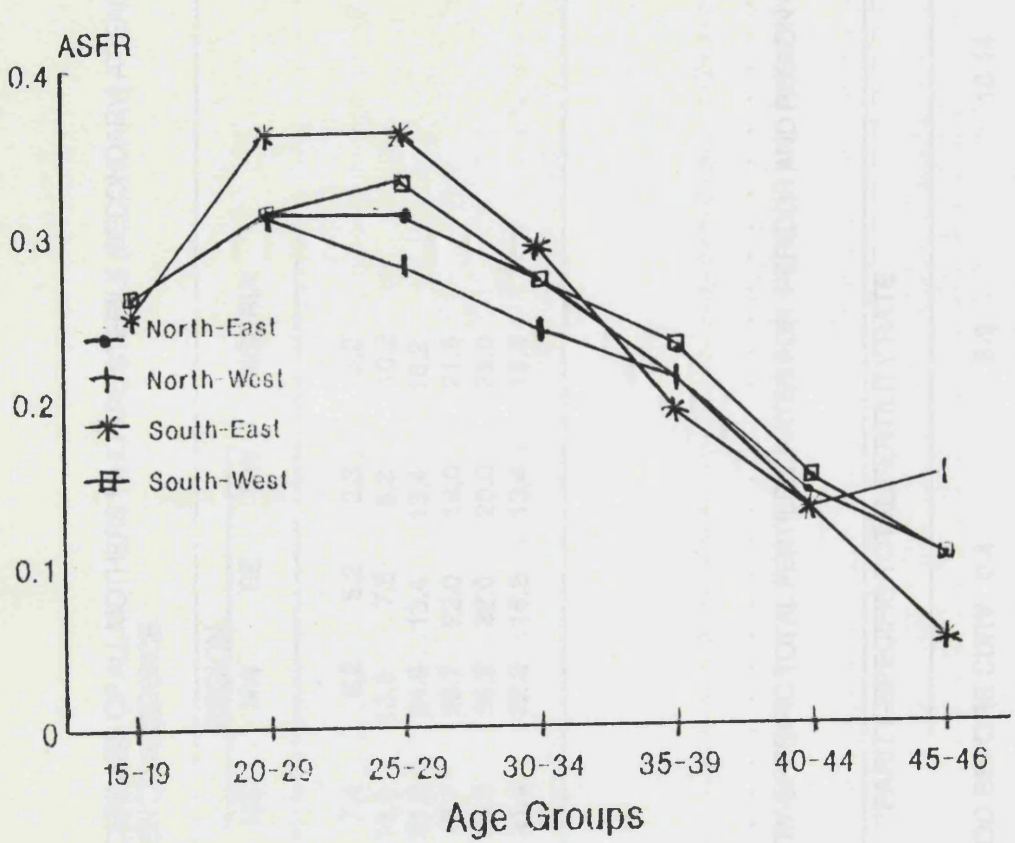


level in Gabon, and to a less extent Chad and Cameroon, the later countries which share geographical boarders with North-Eastern Nigeria.

With reference to secondary infertility, the age patterns of fertility for all women who have had a live birth are examined with the data in Figure 4.6. These schedules which are purged of the effect of primary sterility, show little regional differences in total fertility rates. South-eastern mothers have very high fertility in their twenties and early thirties after which ages their fertility falls lowest of all the regions. Mothers in the northern regions, especially in the north-west, have lowest fertility in the peak age groups of childbearing and this appears to be the source of the comparatively low fertility in the north. Table 4.6 shows the percentage of mothers in each age group who are unable to have another birth by region of residence. It is observed that within age groups and for all mothers, this proportion is highest in the North-West. It is also noticed that this proportion of women is quite high in the 25-34 age range in the northern regions. These ages fall within the range for which fertility is low in the North.

A search for the pathological or socio-cultural explanations for infertility or subfecundity in Nigeria does not lie within the interest of the present analysis. These data are shown only to point out that sterility and secondary infertility might have affected the trends of fertility which are shown in this work. It needs be said though, that more investigation is required to confirm such a high prevalence of sterility which Udjo reported for Borno State. If the trend shown in his results is free of reporting errors, it is capable of explaining much of the rising pattern of fertility which is estimated for the northern regions in the present analysis.

Figure 4.6 Regional Age-specific fertility Rates
And Total Fertility Rates
For All Mothers In The Period 0-4
Years Before The Survey.



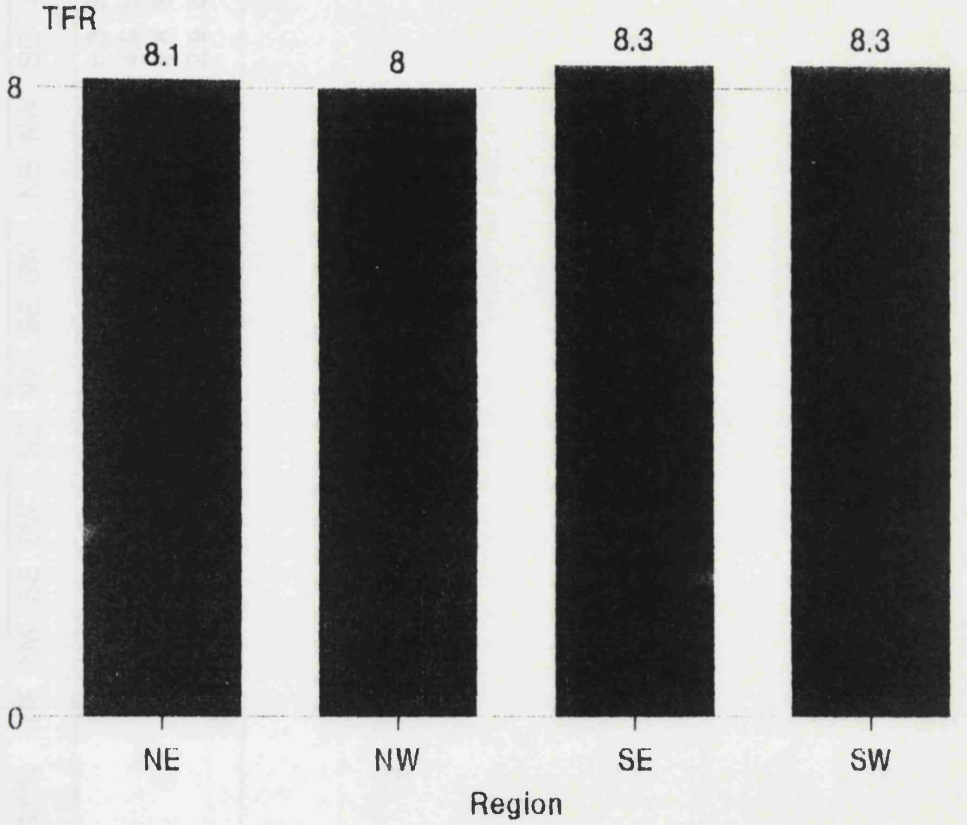


TABLE 4.6. PERCENTAGE OF ALL MOTHERS WHO ARE STERILE (SECONDARY) AT EACH AGE GROUP BY REGION OF RESIDENCE.

AGE GROUP	REGION NE	NW	SE	SW	NIGERIA
15-19	-	-	-	-	-
20-24	7.4	6.2	5.2	2.3	5.2
25-29	13.6	13.8	7.5	6.2	10.2
30-34	21.2	24.9	13.4	13.4	18.2
35-39	18.7	28.7	22.0	18.0	21.8
40-44	28.0	36.2	32.0	20.0	29.0
45-49	21.4	22.2	16.2	13.4	18.3

TABLE 4.7. PARITY-SPECIFIC TOTAL FERTILITY RATES FOR PERIODS AND REGION OF RESIDENCE.

		PARITY-SPECIFIC TOTAL FERTILITY RATE											
	PERIOD BEFORE SURV.	0-4				5-9				10-14			
PARITY	REGION	NE	NW	SE	SW	NE	NW	SE	SW	NE	NW	SE	SW
PAR1		8.1	8.1	8.4	8.4	7.3	6.6	7.8	6.5	5.1	4.8	6.3	5.3
PAR2		5.5	5.9	6.0	6.4	5.4	5.1	6.3	5.7	4.0	3.6	4.8	6.3
PAR3		4.6	4.2	4.8	4.5	4.1	3.4	5.1	4.0	2.4	3.6	4.8	3.9
PAR4		3.8	3.1	4.0	3.4	3.0	2.3	4.1	2.9	1.7	1.5	2.9	2.1

4.6 SUMMARY

The results from analysis of fertility by demographic exposure types in this chapter lend further support to the suggestion already put forward in the previous chapter, that fertility in Nigeria did not experience any major changes in the 1970s.

There is no convincing evidence found in the data presented in this chapter that marital fertility declined from the period 5-9 to the period 0-4 years before the Nigeria Fertility Survey. The cumulative fertility within periods by duration of marriage rather shows a slightly rising trend in fertility in the three most recent periods before the survey. This finding is consistent with the rising trend in marital fertility which was estimated in chapter 3 for both the north and the south, although, as it was suggested earlier, the regional trend may have different causes. The trend in the P/F ratios for the sections of the data or indexing variables which appear less affected by recall or dating errors, suggest that fertility remained fairly stable in the 1970s in Nigeria.

Three other observations were highlighted with the data in this chapter. First, although the evidence may not be entirely free from reporting errors, it is noticed that age at entry into marriage or motherhood has no strong negative effects on fertility level until very late marriage or motherhood ages. Secondly, fertility tends to be very high at younger durations of marriage or motherhood and shows slight increases with ages at marriage or motherhood at those short durations; before the very old durations, fertility is insensitive to differences in both age at marriage and age at motherhood.

Lastly, it is observed that primary and secondary infertility may well have contributed to the observed fertility trend net of the impacts of reporting errors in the data.

Table 4A Estimates Of Various Fertility Measures For All Nigeria And For The Four Regions.

Cohort-period rates, cumulative cohort and period fertility, and P/F ratios, by age at survey

Age group of cohort at end of period	Number of women in cohort	Years prior to survey 0-4	5-9	10-14	15-19	20-24	25-29	30-34
		Cohort-period fertility rates						
10-14	0	0.000	0.005	0.006	0.009	0.004	0.004	0.001
15-19	2101	0.065	0.107	0.088	0.078	0.074	0.037	0.065
20-24	1710	0.245	0.251	0.221	0.212	0.162	0.164	
25-29	1766	0.293	0.304	0.260	0.241	0.238		
30-34	1546	0.257	0.267	0.238	0.256			
35-39	1110	0.199	0.219	0.215				
40-44	904	0.128	0.144					
45-49	591	0.086						
		Cumulative fertility of cohorts at end of period (P)						
10-14		0.000	0.027	0.028	0.045	0.018	0.018	0.003
15-19		0.350	0.564	0.485	0.410	0.388	0.190	0.334
20-24		1.792	1.742	1.516	1.446	0.999	1.153	
25-29		3.209	3.034	2.744	2.201	2.342		
30-34		4.322	4.080	3.390	3.620			
35-39		5.075	4.484	4.697				
40-44		5.126	5.415					
45-49		5.844						
		Cumulative fertility within periods (F)						
10-14		0.000	0.027	0.028	0.045	0.018	0.018	0.003
15-19		0.323	0.563	0.468	0.437	0.388	0.205	0.325
20-24		1.551	1.821	1.575	1.495	1.197	1.025	
25-29		3.017	3.338	2.872	2.697	2.386		
30-34		4.305	4.674	4.061	3.975			
35-39		5.300	5.769	5.138				
40-44		5.941	6.487					
45-49		6.570						
		P/F ratios						
10-14		0.000	1.000	1.000	1.000	1.000	1.000	1.000
15-19		1.083	1.002	1.037	0.938	1.001	0.925	1.025
20-24		1.156	0.957	0.963	0.968	0.835	1.125	
25-29		1.063	0.909	0.955	0.816	0.982		
30-34		1.004	0.873	0.835	0.911			
35-39		0.958	0.777	0.914				
40-44		0.863	0.835					
45-49		0.917						

FERTILITY TRENDS IN NIGERIA

Additional Indicators of Fertility Change
by age at survey

Age group of cohort at end of period	Number of women in cohort	Years prior to survey 0-4	5-9	10-14	15-19	20-24	25-29	30-34
		P/F Ratios Excluding Common Cell						
20-24		1.746	0.860	0.876	0.889	0.489	1.627	
25-29		1.123	0.833	0.918	0.668	0.964		
30-34		1.006	0.822	0.766	0.868			
35-39		0.948	0.725	0.891				
40-44		0.846	0.814					
45-49		0.911						
		Ratios of Successive Rates						
15-19		1.661	0.820	0.890	0.944	0.506	1.726	0.000
20-24		1.024	0.881	0.956	0.765	1.013	0.000	
25-29		1.035	0.855	0.927	0.989	0.000		
30-34		1.038	0.890	1.075	0.000			
35-39		1.100	0.984	0.000				
40-44		1.119	0.000					
45-49		0.000						
		Ratios of Successive Fs						
15-19		1.744	0.830	0.933	0.888	0.529	1.588	0.000
20-24		1.174	0.865	0.949	0.801	0.856	0.000	
25-29		1.106	0.860	0.939	0.834	0.000		
30-34		1.086	0.869	0.979	0.000			
35-39		1.088	0.891	0.000				
40-44		1.092	0.000					
45-49		0.000						
		Ratios of Successive Ps						
15-19		1.613	0.859	0.845	0.947	0.489	1.758	0.000
20-24		0.972	0.871	0.954	0.691	1.155	0.000	
25-29		0.946	0.904	0.802	1.064	0.000		
30-34		0.944	0.831	1.066	0.000			
35-39		0.884	1.048	0.000				
40-44		1.056	0.000					
45-49		0.000						

FERTILITY TRENDS IN NIGERIA

Cohort-period rates, cumulative cohort and period fertility, and P/F ratios, for age at marriage under 14

Marriage duration group of cohort at end of period	Number of women in cohort	Years prior to survey 0-4	5-9	10-14	15-19	20-24	25-29	30-34
		Cohort-period fertility rates						
0- 4	173	0.224	0.262	0.181	0.202	0.196	0.155	0.177
5- 9	385	0.296	0.315	0.278	0.237	0.227	0.199	
10-14	403	0.302	0.296	0.264	0.269	0.227		
15-19	412	0.276	0.273	0.282	0.253			
20-24	261	0.223	0.232	0.196				
25-29	200	0.138	0.169					
30-34	106	0.071						
		Cumulative fertility of cohorts at end of period (P)						
0- 4		0.795	0.659	0.485	0.479	0.440	0.375	0.443
5- 9		2.140	2.062	1.870	1.628	1.509	1.440	
10-14		3.571	3.349	2.946	2.857	2.577		
15-19		4.729	4.309	4.268	3.842			
20-24		5.424	5.426	4.824				
25-29		6.118	5.668					
30-34		6.022						
		Cumulative fertility within periods (F)						
0- 4		0.795	0.659	0.485	0.479	0.440	0.375	0.443
5- 9		2.276	2.235	1.876	1.667	1.575	1.371	
10-14		3.785	3.714	3.194	3.014	2.712		
15-19		5.165	5.077	4.605	4.280			
20-24		6.280	6.235	5.587				
25-29		6.972	7.079					
30-34		7.326						
		P/F ratios						
0- 4		1.000	1.000	1.000	1.000	1.000	1.000	1.000
5- 9		0.940	0.922	0.997	0.977	0.958	1.050	
10-14		0.943	0.902	0.922	0.948	0.950		
15-19		0.915	0.849	0.927	0.898			
20-24		0.864	0.870	0.863				
25-29		0.878	0.801					
30-34		0.822						

Additional Indicators of Fertility Change
for age at marriage under 14

Marriage duration group of cohort at end of period	Number of women in cohort	Years prior to survey 0-4	5-9	10-14	15-19	20-24	25-29	30-34
		P/F Ratios Excluding Common Cell						
5- 9		0.829	0.737	0.988	0.919	0.851	1.183	
10-14		0.906	0.857	0.868	0.905	0.914		
15-19		0.885	0.793	0.894	0.855			
20-24		0.834	0.841	0.834				
25-29		0.864	0.774					
30-34		0.813						
		Ratios of Successive Rates						
0- 4		1.167	0.693	1.115	0.967	0.795	1.141	0.422
5- 9		1.064	0.882	0.854	0.955	0.878	0.619	
10-14		0.980	0.891	1.022	0.844	0.559		
15-19		0.988	1.035	0.897	0.724			
20-24		1.039	0.848	1.094				
25-29		1.219	0.696					
30-34		1.266						
		Ratios of Successive Fs						
0- 4		0.829	0.737	0.988	0.919	0.851	1.183	0.247
5- 9		0.982	0.839	0.888	0.945	0.871	0.773	
10-14		0.981	0.860	0.944	0.900	0.740		
15-19		0.983	0.907	0.929	0.848			
20-24		0.993	0.896	0.958				
25-29		1.015	0.872					
30-34		1.027						
		Ratios of Successive Ps						
0- 4		0.829	0.737	0.988	0.919	0.851	1.183	0.247
5- 9		0.963	0.907	0.870	0.927	0.954	0.504	
10-14		0.938	0.880	0.970	0.902	0.529		
15-19		0.911	0.990	0.900	0.593			
20-24		1.000	0.889	0.695				
25-29		0.926	0.695					
30-34		0.729						

FERTILITY TRENDS IN NIGERIA

Cohort-period rates, cumulative cohort and period fertility, and P/F ratios, for age at marriage 14-15

Marriage duration		Years prior to survey						
group of cohort at end of period	Number of women in cohort	0-4	5-9	10-14	15-19	20-24	25-29	30-34
		Cohort-period fertility rates						
0- 4	356	0.266	0.328	0.243	0.279	0.284	0.229	0.225
5- 9	421	0.294	0.311	0.273	0.248	0.209	0.207	
10-14	508	0.294	0.320	0.252	0.265	0.270		
15-19	384	0.242	0.272	0.235	0.265			
20-24	290	0.180	0.176	0.185				
25-29	170	0.091	0.148					
30-34	97	0.067						
		Cumulative fertility of cohorts at end of period (P)						
0- 4		0.686	0.733	0.529	0.448	0.505	0.358	0.463
5- 9		2.202	2.083	1.815	1.746	1.406	1.499	
10-14		3.551	3.415	3.008	2.733	2.848		
15-19		4.627	4.360	3.910	4.172			
20-24		5.270	4.790	5.099				
25-29		5.244	5.839					
30-34		6.176						
		Cumulative fertility within periods (F)						
0- 4		0.686	0.733	0.529	0.448	0.505	0.358	0.463
5- 9		2.155	2.036	1.896	1.690	1.552	1.394	
10-14		3.624	3.887	3.157	3.017	2.901		
15-19		4.836	5.247	4.334	4.341			
20-24		5.757	6.126	5.260				
25-29		6.191	6.868					
30-34		6.527						
		P/F ratios						
0- 4		1.000	1.000	1.000	1.000	1.000	1.000	1.000
5- 9		1.022	1.011	0.957	1.033	0.905	1.075	
10-14		0.980	0.879	0.953	0.906	0.982		
15-19		0.957	0.832	0.902	0.961			
20-24		0.919	0.782	0.969				
25-29		0.847	0.850					
30-34		0.946						

Additional Indicators of Fertility Change
for age at marriage 14-15

Marriage duration group of cohort at end of period	Number of women in cohort	Years prior to survey 0-4	5-9	10-14	15-19	20-24	25-29	30-34
		P/F Ratios Excluding Common Cell						
5- 9		1.068	0.722	0.847	1.127	0.709	1.292	
10-14		0.966	0.794	0.921	0.832	0.966		
15-19		0.942	0.774	0.866	0.944			
20-24		0.903	0.745	0.963				
25-29		0.835	0.832					
30-34		0.943						
		Ratios of Successive Rates						
0- 4		1.230	0.742	1.148	1.015	0.806	0.982	0.000
5- 9		1.057	0.880	0.908	0.844	0.989	1.196	
10-14		1.090	0.786	1.052	1.016	0.859		
15-19		1.123	0.865	1.126	1.246			
20-24		0.977	1.052	0.696				
25-29		1.632	0.607					
30-34		1.215						
		Ratios of Successive Fs						
0- 4		1.068	0.722	0.847	1.127	0.709	1.292	0.000
5- 9		1.061	0.829	0.891	0.919	0.898	1.221	
10-14		1.072	0.812	0.956	0.962	0.830		
15-19		1.085	0.906	1.002	1.049			
20-24		1.068	0.858	0.945				
25-29		1.109	0.891					
30-34		1.115						
		Ratios of Successive Ps						
0- 4		1.068	0.722	0.847	1.127	0.709	1.292	0.000
5- 9		0.948	0.871	0.962	0.805	1.066	0.827	
10-14		0.962	0.891	0.909	1.042	0.842		
15-19		0.944	0.895	1.067	0.970			
20-24		0.909	1.064	0.920				
25-29		1.114	0.891					
30-34		0.893						

FERTILITY TRENDS IN NIGERIA

Cohort-period rates, cumulative cohort and period fertility, and P/F ratios, for age at marriage 16-20

Marriage duration group of cohort at end of period	Number of women in cohort	Years prior to survey 0-4	5-9	10-14	15-19	20-24	25-29	30-34
		Cohort-period fertility rates						
0- 4	624	0.343	0.320	0.307	0.266	0.291	0.237	0.367
5- 9	586	0.336	0.331	0.302	0.282	0.271	0.258	
10-14	692	0.278	0.292	0.231	0.281	0.307		
15-19	409	0.228	0.234	0.234	0.296			
20-24	440	0.136	0.162	0.220				
25-29	179	0.085	0.056					
30-34	74	0.017						
		Cumulative fertility of cohorts at end of period (P)						
0- 4		0.860	0.797	0.761	0.666	0.637	0.540	0.478
5- 9		2.475	2.418	2.178	2.045	1.898	1.767	
10-14		3.806	3.640	3.202	3.302	3.301		
15-19		4.781	4.370	4.474	4.782			
20-24		5.049	5.286	5.883				
25-29		5.711	6.163					
30-34		6.247						
		Cumulative fertility within periods (F)						
0- 4		0.860	0.797	0.761	0.666	0.637	0.540	0.478
5- 9		2.537	2.453	2.273	2.075	1.994	1.830	
10-14		3.926	3.915	3.429	3.479	3.528		
15-19		5.067	5.083	4.601	4.960			
20-24		5.746	5.295	5.701				
25-29		6.172	6.175					
30-34		6.256						
		P/F ratios						
0- 4		1.000	1.000	1.000	1.000	1.000	1.000	1.000
5- 9		0.975	0.985	0.958	0.986	0.952	0.966	
10-14		0.970	0.930	0.934	0.949	0.936		
15-19		0.944	0.860	0.972	0.964			
20-24		0.879	0.997	1.032				
25-29		0.925	0.998					
30-34		0.999						

Additional Indicators of Fertility Change
for age at marriage 16-20

Marriage duration group of cohort at end of period	Number of women in cohort	Years prior to survey 0-4	5-9	10-14	15-19	20-24	25-29	30-34
		P/F Ratios Excluding Common Cell						
5- 9		0.927	0.955	0.875	0.955	0.849	0.885	
10-14		0.953	0.888	0.900	0.914	0.886		
15-19		0.927	0.815	0.963	0.949			
20-24		0.862	0.880	1.039				
25-29		0.920	0.998					
30-34		0.999						
		Ratios of Successive Rates						
0- 4		0.934	0.959	0.866	1.094	0.813	1.552	0.000
5- 9		0.987	0.912	0.932	0.963	0.950	0.000	
10-14		1.053	0.791	1.214	1.097	0.000		
15-19		1.022	1.004	1.264	0.000			
20-24		1.196	1.355	0.000				
25-29		0.658	0.000					
30-34		0.000						
		Ratios of Successive Ps						
0- 4		0.927	0.955	0.875	0.955	0.849	0.885	0.000
5- 9		0.967	0.926	0.913	0.961	0.918	0.261	
10-14		0.997	0.876	1.015	1.014	0.519		
15-19		1.003	0.905	1.078	0.711			
20-24		1.026	0.967	0.970				
25-29		1.001	0.933					
30-34		0.987						
		Ratios of Successive Ps						
0- 4		0.927	0.955	0.875	0.955	0.849	0.885	0.000
5- 9		0.977	0.901	0.939	0.928	0.931	0.000	
10-14		0.956	0.950	1.071	1.000	0.000		
15-19		0.914	1.024	1.069	0.000			
20-24		1.047	1.113	0.000				
25-29		1.079	0.000					
30-34		0.000						

FERTILITY TRENDS IN NIGERIA

Cohort-period rates, cumulative cohort and period fertility, and P/F ratios, for age at marriage 21+

Marriage duration group of cohort at end of period	Number of women in cohort	Years prior to survey 0-4	5-9	10-14	15-19	20-24	25-29	30-34
		Cohort-period fertility rates						
0- 4	278	0.419	0.345	0.260	0.352	0.293	0.148	0.000
5- 9	193	0.296	0.295	0.282	0.262	0.285	0.000	
10-14	170	0.246	0.267	0.259	0.230	0.000		
15-19	137	0.178	0.151	0.255	0.000			
20-24	96	0.098	0.162	0.000				
25-29	33	0.131	0.000					
30-34	0	0.000						
		Cumulative fertility of cohorts at end of period (P)						
0- 4		0.967	0.931	0.787	0.810	0.663	0.231	0.000
5- 9		2.411	2.260	2.221	1.972	1.656	0.000	
10-14		3.438	3.556	3.266	2.804	0.000		
15-19		4.444	4.019	4.079	0.000			
20-24		4.508	4.836	0.000				
25-29		5.542	0.000					
30-34		0.000						
		Cumulative fertility within periods (F)						
0- 4		0.967	0.931	0.787	0.810	0.663	0.231	0.000
5- 9		2.447	2.405	2.198	2.119	2.088	0.231	
10-14		3.675	3.740	3.492	3.267	2.088		
15-19		4.583	4.492	4.767	3.267			
20-24		5.052	5.300	4.767				
25-29		5.707	5.300					
30-34		5.707						
		P/F ratios						
0- 4		1.000	1.000	1.000	1.000	1.000	1.000	0.000
5- 9		0.985	0.940	1.010	0.931	0.792	0.000	
10-14		0.949	0.951	0.935	0.858	0.000		
15-19		0.974	0.895	0.956	0.000			
20-24		0.892	0.912	0.000				
25-29		0.971	0.000					
30-34		0.000						

Additional Indicators of Fertility Change
for age at marriage 21+

Marriage duration group of cohort at end of period	Number of women in cohort	Years prior to survey 0-4	5-9	10-14	15-19	20-24	25-29	30-34
		P/F Ratios Excluding Common Cell						
5- 9		0.963	0.845	1.029	0.819	0.348	0.000	
10-14		0.924	0.924	0.897	0.781	0.000		
15-19		0.968	0.873	0.803	0.000			
20-24		0.881	0.908	0.000				
25-29		0.967	0.000					
30-34		0.000						
		Ratios of Successive Rates						
0- 4		0.824	0.754	1.354	0.851	0.505	0.000	0.000
5- 9		0.996	0.958	0.928	1.088	0.000	0.000	
10-14		1.087	0.969	0.837	0.000	0.000		
15-19		0.847	1.694	0.000	0.000			
20-24		1.651	0.000	0.000				
25-29		0.000	0.000					
30-34		0.000						
		Ratios of Successive Ps						
0- 4		0.963	0.845	1.029	0.819	0.348	0.000	0.000
5- 9		0.983	0.914	0.964	0.985	0.110	0.000	
10-14		1.018	0.934	0.935	0.629	0.110		
15-19		0.935	1.061	0.635	0.639			
20-24		1.049	0.900	0.695				
25-29		0.939	0.900					
30-34		0.929						
		Ratios of Successive Ps						
0- 4		0.963	0.845	1.029	0.819	0.348	0.000	0.000
5- 9		0.937	0.993	0.898	0.898	0.000	0.000	
10-14		1.019	0.919	0.858	0.000	0.000		
15-19		0.904	1.015	0.000	0.000			
20-24		1.084	0.000	0.000				
25-29		0.000	0.000					
30-34		0.000						

FERTILITY TRENDS IN NIGERIA

Cohort-period rates, cumulative cohort and period fertility, and P/F ratios, by duration of marriage

Marriage duration group of cohort at end of period	Number of women in cohort	Years prior to survey 0-4	5-9	10-14	15-19	20-24	25-29	30-34
		Cohort-period fertility rates						
0- 4	1430	0.318	0.311	0.255	0.257	0.265	0.199	0.227
5- 9	1586	0.310	0.318	0.285	0.260	0.239	0.218	
10-14	1774	0.285	0.299	0.247	0.270	0.263		
15-19	1341	0.242	0.246	0.252	0.269			
20-24	1088	0.165	0.190	0.199				
25-29	582	0.108	0.131					
30-34	277	0.055						
		Cumulative fertility of cohorts at end of period (P)						
0- 4		0.829	0.763	0.635	0.561	0.557	0.413	0.459
5- 9		2.313	2.226	1.984	1.859	1.607	1.548	
10-14		3.649	3.478	3.094	2.954	2.865		
15-19		4.687	4.324	4.216	4.209			
20-24		5.150	5.167	5.203				
25-29		5.705	5.860					
30-34		6.136						
		Cumulative fertility within periods (F)						
0- 4		0.829	0.763	0.635	0.561	0.557	0.413	0.459
5- 9		2.380	2.354	2.057	1.863	1.751	1.501	
10-14		3.803	3.648	3.293	3.211	3.068		
15-19		5.012	5.077	4.554	4.505			
20-24		5.839	6.028	5.548				
25-29		6.377	6.695					
30-34		6.653						
		P/F ratios						
0- 4		1.000	1.000	1.000	1.000	1.000	1.000	1.000
5- 9		0.972	0.946	0.964	0.998	0.918	1.031	
10-14		0.959	0.954	0.940	0.920	0.934		
15-19		0.935	0.852	0.926	0.934			
20-24		0.882	0.857	0.958				
25-29		0.895	0.877					
30-34		0.922						

FERTILITY TRENDS IN NIGERIA

Additional Indicators of Fertility Change
by duration of marriage

Marriage duration group of cohort at end of period	Number of women in cohort	Years prior to survey						
		0-4	5-9	10-14	15-19	20-24	25-29	30-34
		P/F Ratios Excluding Common Cell						
5- 9		0.920	0.832	0.884	0.992	0.741	1.114	
10-14		0.935	0.843	0.904	0.862	0.884		
15-19		0.914	0.804	0.897	0.892			
20-24		0.863	0.830	0.924				
25-29		0.895	0.863					
30-34		0.919						
		Ratios of Successive Rates						
0- 4		0.978	0.020	1.007	1.032	0.750	1.142	0.320
5- 9		1.026	0.894	0.915	0.917	0.911	0.662	
10-14		1.049	0.827	1.091	0.978	0.549		
15-19		1.017	1.026	1.065	0.774			
20-24		1.151	1.046	1.008				
25-29		1.220	0.859					
30-34		1.602						
		Ratios of Successive Fs						
0- 4		0.920	0.832	0.884	0.992	0.741	1.114	0.198
5- 9		0.989	0.874	0.906	0.940	0.857	0.787	
10-14		1.012	0.956	0.975	0.956	0.725		
15-19		1.013	0.897	1.000	0.902			
20-24		1.032	0.920	1.002				
25-29		1.048	0.914					
30-34		1.071						
		Ratios of Successive Ps						
0- 4		0.920	0.832	0.884	0.992	0.741	1.114	0.198
5- 9		0.962	0.891	0.937	0.864	0.963	0.525	
10-14		0.950	0.890	0.955	0.970	0.536		
15-19		0.920	0.975	0.998	0.612			
20-24		1.003	1.007	0.688				
25-29		1.007	0.707					
30-34		0.747						

Cohort-period rates, cumulative conort and period fertility, and P/F ratios, for age at motherhood <16

Motherhood duration group of cohort at end of period	Number of women in cohort	Years prior to survey 0-4	5-9	10-14	15-19	20-24	25-29	30-34
		Cohort-period fertility rates						
0- 4	245	0.553	0.705	0.710	0.812	0.902	0.760	0.897
5- 9	433	0.329	0.371	0.315	0.342	0.293	0.309	
10-14	402	0.292	0.326	0.289	0.303	0.283		
15-19	392	0.248	0.264	0.268	0.225			
20-24	223	0.171	0.193	0.168				
25-29	129	0.093	0.151					
30-34	68	0.075						
		Cumulative fertility of cohorts at end of period (P)						
0- 4		1.563	1.685	1.587	1.462	1.356	1.268	1.419
5- 9		3.329	3.443	3.039	3.067	2.735	2.963	
10-14		4.905	4.669	4.512	4.350	4.376		
15-19		5.907	5.830	5.592	5.503			
20-24		6.683	6.556	6.341				
25-29		7.022	7.004					
30-34		7.468						
		Cumulative fertility within periods (F)						
0- 4		1.563	1.685	1.587	1.462	1.356	1.268	1.419
5- 9		3.207	3.541	3.163	3.174	2.823	2.812	
10-14		4.669	5.171	4.608	4.689	4.236		
15-19		5.907	6.490	5.850	5.815			
20-24		6.759	7.454	6.738				
25-29		7.225	8.207					
30-34		7.598						
		P/F ratios						
0- 4		1.000	1.000	1.000	1.000	1.000	1.000	1.000
5- 9		1.038	0.972	0.961	0.966	0.969	1.054	
10-14		1.050	0.903	0.979	0.926	1.033		
15-19		1.000	0.898	0.960	0.946			
20-24		0.989	0.880	0.934				
25-29		0.972	0.864					
30-34		0.983						

Additional Indicators of Fertility Change
for age at motherhood <16

Motherhood duration group of cohort at end of period	Number of women in cohort	Years prior to survey 0-4	5-9	10-14	15-19	20-24	25-29	30-34
		P/F Ratios Excluding Common Cell						
5- 9		1.078	0.942	0.921	0.927	0.935	1.119	
10-14		1.073	0.858	0.969	0.862	1.050		
15-19		1.000	0.872	0.922	0.933			
20-24		0.987	0.862	0.925				
25-29		0.970	0.851					
30-34		0.982						
		Ratios of Successive Rates						
0- 4		1.276	1.006	1.144	1.111	0.843	1.181	1.185
5- 9		1.129	0.849	1.036	0.857	1.053	1.494	
10-14		1.115	0.886	1.049	0.933	1.163		
15-19		1.065	1.018	0.839	1.018			
20-24		1.131	0.869	0.861				
25-29		1.619	1.266					
30-34		0.350						
		Ratios of Successive Fs						
0- 4		1.078	0.942	0.921	0.927	0.935	1.119	0.769
5- 9		1.104	0.893	1.003	0.839	0.996	1.325	
10-14		1.108	0.891	1.018	0.903	1.052		
15-19		1.099	0.917	0.977	0.926			
20-24		1.103	0.911	0.963				
25-29		1.136	0.940					
30-34		1.097						
		Ratios of Successive Ps						
0- 4		1.078	0.942	0.921	0.927	0.935	1.119	0.769
5- 9		1.034	0.983	1.000	0.892	1.083	1.147	
10-14		0.950	0.966	0.942	1.030	1.152		
15-19		0.987	0.958	0.984	1.125			
20-24		0.981	0.967	1.000				
25-29		1.010	1.109					
30-34		1.071						

FERTILITY TRENDS IN NIGERIA

Cohort-period rates, cumulative cohort and period fertility, and P/F ratios, for age at motherhood 16-17

Motherhood duration group of cohort at end of period	Number of women in cohort	Years prior to survey 0-4	5-9	10-14	15-19	20-24	25-29	30-34
		Cohort-period fertility rates						
0- 4	387	0.613	0.625	0.615	0.610	0.689	0.686	0.861
5- 9	333	0.318	0.349	0.306	0.341	0.370	0.408	
10-14	322	0.290	0.300	0.257	0.354	0.425		
15-19	188	0.207	0.232	0.215	0.368			
20-24	164	0.153	0.143	0.229				
25-29	59	0.060	0.071					
30-34	41	0.002						
		Cumulative fertility of cohorts at end of period (P)						
0- 4		1.589	1.707	1.621	1.763	1.775	1.747	1.248
5- 9		3.295	3.365	3.293	3.478	3.598	3.288	
10-14		4.815	4.793	4.761	5.371	5.415		
15-19		5.826	5.921	6.444	7.253			
20-24		6.684	7.160	8.400				
25-29		7.461	8.753					
30-34		8.764						
		Cumulative fertility within periods (F)						
0- 4		1.589	1.707	1.621	1.763	1.775	1.747	1.248
5- 9		3.176	3.451	3.152	3.466	3.626	3.788	
10-14		4.626	4.952	4.434	5.239	5.755		
15-19		5.658	6.111	5.508	7.077			
20-24		6.422	6.828	6.654				
25-29		6.722	7.181					
30-34		6.734						
		P/F ratios						
0- 4		1.000	1.000	1.000	1.000	1.000	1.000	1.000
5- 9		1.037	0.975	1.045	1.003	0.992	0.868	
10-14		1.041	0.968	1.074	1.025	0.941		
15-19		1.030	0.969	1.170	1.025			
20-24		1.041	1.049	1.262				
25-29		1.110	1.219					
30-34		1.302						

FERTILITY TRENDS IN NIGERIA

Additional Indicators of Fertility Change
for age at motherhood 16-17

Motherhood duration group of cohort at end of period	Number of women in cohort	Years prior to survey 0-4	5-9	10-14	15-19	20-24	25-29	30-34
		P/F Ratios Excluding Common Cell						
5- 9		1.075	0.950	1.087	1.007	0.985	0.714	
10-14		1.060	0.954	1.104	1.038	0.907		
15-19		1.036	0.962	1.211	1.034			
20-24		1.046	1.054	1.317				
25-29		1.115	1.230					
30-34		1.302						
		Ratios of Successive Rates						
0- 4		1.019	0.985	0.992	1.128	0.996	1.255	0.000
5- 9		1.098	0.877	1.113	1.087	1.102	0.000	
10-14		1.035	0.855	1.332	1.200	0.000		
15-19		1.123	0.925	1.712	0.000			
20-24		0.938	1.601	0.000				
25-29		1.175	0.000					
30-34		0.000						
		Ratios of Successive Fs						
0- 4		1.075	0.950	1.087	1.007	0.985	0.714	0.000
5- 9		1.087	0.913	1.100	1.046	1.045	0.330	
10-14		1.070	0.896	1.191	1.098	0.658		
15-19		1.080	0.901	1.285	0.913			
20-24		1.063	0.975	1.063				
25-29		1.068	0.927					
30-34		1.066						
		Ratios of Successive Ps						
0- 4		1.075	0.950	1.087	1.007	0.985	0.714	0.000
5- 9		1.021	0.978	1.056	1.035	0.914	0.000	
10-14		0.996	0.992	1.126	1.000	0.000		
15-19		1.018	1.088	1.126	0.000			
20-24		1.071	1.177	0.000				
25-29		1.173	0.000					
30-34		0.000						

FERTILITY TRENDS IN NIGERIA

Cohort-period rates, cumulative cohort and period fertility, and P/F ratios, for age at motherhood 22-18

Motherhood duration group of cohort at end of period	Number of women in cohort	Years prior to survey 0-4	5-9	10-14	15-19	20-24	25-29	30-34
Cohort-period fertility rates								
0- 4	632	0.640	0.676	0.716	0.673	0.871	0.704	2.038
5- 9	661	0.336	0.357	0.313	0.336	0.330	0.248	
10-14	572	0.289	0.308	0.255	0.305	0.246		
15-19	345	0.217	0.198	0.238	0.189			
20-24	298	0.094	0.137	0.092				
25-29	124	0.069	0.028					
30-34	28	0.077						
Cumulative fertility of cohorts at end of period (P)								
0- 4		1.530	1.546	1.455	1.563	1.304	1.291	1.135
5- 9		3.228	3.242	3.127	2.982	2.939	2.374	
10-14		4.689	4.667	4.258	4.462	3.605		
15-19		5.753	5.249	5.654	4.548			
20-24		5.718	6.341	5.010				
25-29		6.686	5.148					
30-34		5.532						
Cumulative fertility within periods (F)								
0- 4		1.530	1.546	1.455	1.563	1.304	1.291	1.135
5- 9		3.211	3.333	3.020	3.241	2.952	2.530	
10-14		4.658	4.874	4.296	4.764	4.183		
15-19		5.743	5.864	5.487	5.707			
20-24		6.212	6.551	5.949				
25-29		6.537	5.689					
30-34		6.941						
P/F ratios								
0- 4		1.000	1.000	1.000	1.000	1.000	1.000	1.000
5- 9		1.005	0.973	1.036	0.920	0.996	0.938	
10-14		1.007	0.958	0.991	0.936	0.862		
15-19		1.002	0.895	1.030	0.797			
20-24		0.920	0.968	0.842				
25-29		1.020	0.770					
30-34		0.797						

FERTILITY TRENDS IN NIGERIA

Additional Indicators of Fertility Change
for age at motherhood 22-18

Motherhood duration group of cohort at end of period	Number of women in cohort	Years prior to survey 0-4	5-9	10-14	15-19	20-24	25-29	30-34
		P/F Ratios Excluding Common Cell						
5- 9		1.011	0.941	1.074	0.834	0.990	0.879	
10-14		1.010	0.938	0.988	0.907	0.804		
15-19		1.002	0.874	1.039	0.757			
20-24		0.914	0.964	0.829				
25-29		1.021	0.765					
30-34		0.785						
		Ratios of Successive Rates						
0- 4		1.056	1.059	0.940	1.293	0.808	2.897	0.000
5- 9		1.063	0.875	1.073	0.982	0.752	0.000	
10-14		1.065	0.828	1.193	0.808	0.000		
15-19		0.912	1.203	0.791	0.000			
20-24		1.465	0.672	0.000				
25-29		0.401	0.000					
30-34		0.000						
		Ratios of Successive Fs						
0- 4		1.011	0.941	1.074	0.834	0.990	0.879	0.000
5- 9		1.038	0.906	1.073	0.911	0.857	0.449	
10-14		1.046	0.881	1.109	0.878	0.605		
15-19		1.021	0.936	1.040	0.700			
20-24		1.055	0.908	0.959				
25-29		1.020	0.889					
30-34		0.954						
		Ratios of Successive Ps						
0- 4		1.011	0.941	1.074	0.834	0.990	0.879	0.000
5- 9		1.004	0.954	0.954	0.985	0.808	0.000	
10-14		0.995	0.912	1.048	0.808	0.000		
15-19		0.912	1.077	0.804	0.000			
20-24		1.109	0.790	0.000				
25-29		0.770	0.000					
30-34		0.000						

FERTILITY TRENDS IN NIGERIA

Cohort-period rates, cumulative cohort and period fertility, and P/F ratios, for age at motherhood 23+

Motherhood duration group of cohort at end of period	Number of women in cohort	Years prior to survey 0-4	5-9	10-14	15-19	20-24	25-29	30-34
		Cohort-period fertility rates						
0- 4	322	0.648	0.655	0.609	0.750	0.728	1.585	0.000
5- 9	328	0.268	0.293	0.320	0.329	0.280	0.000	
10-14	270	0.225	0.274	0.300	0.331	0.000		
15-19	163	0.160	0.199	0.212	0.000			
20-24	111	0.114	0.070	0.000				
25-29	15	0.044	0.000					
30-34	0	0.000						
		Cumulative fertility of cohorts at end of period (P)						
0- 4		1.533	1.525	1.437	1.350	1.301	1.000	0.000
5- 9		2.866	2.902	2.948	2.945	2.402	0.000	
10-14		4.029	4.316	4.444	4.056	0.000		
15-19		5.114	5.437	5.114	0.000			
20-24		6.006	5.463	0.000				
25-29		5.685	0.000					
30-34		0.000						
		Cumulative fertility within periods (F)						
0- 4		1.533	1.525	1.437	1.350	1.301	1.000	0.000
5- 9		2.874	2.990	3.036	2.993	2.704	1.000	
10-14		4.000	4.358	4.535	4.647	2.704		
15-19		4.798	5.351	5.592	4.647			
20-24		5.367	5.700	5.592				
25-29		5.588	5.700					
30-34		5.388						
		P/F ratios						
0- 4		1.000	1.000	1.000	1.000	1.000	1.000	0.000
5- 9		0.997	0.971	0.971	0.984	0.889	0.000	
10-14		1.007	0.990	0.980	0.873	0.000		
15-19		1.066	1.016	0.914	0.000			
20-24		1.119	0.958	0.000				
25-29		1.017	0.000					
30-34		0.000						

FERTILITY TRENDS IN NIGERIA

Additional Indicators of Fertility Change
for age at motherhhood 23+

Motherhood duration group of cohort at end of period	Number of women in cohort	Years prior to survey 0-4	5-9	10-14	15-19	20-24	25-29	30-34
		P/F Ratios Excluding Common Cell						
5- 9		0.994	0.942	0.939	0.964	0.769	0.000	
10-14		1.010	0.986	0.970	0.803	0.000		
15-19		1.079	1.020	0.894	0.000			
20-24		1.133	0.956	0.000				
25-29		1.018	0.000					
30-34		0.000						
		Ratios of Successive Rates						
0- 4		1.010	0.931	1.231	0.971	2.176	0.000	0.000
5- 9		1.093	1.091	1.025	0.553	0.000	0.000	
10-14		1.215	1.096	1.103	0.000	0.000		
15-19		1.245	1.065	0.000	0.000			
20-24		0.614	0.000	0.000				
25-29		0.000	0.000					
30-34		0.000						
		Ratios of Successive Fs						
0- 4		0.994	0.942	0.939	0.964	0.769	0.000	0.000
5- 9		1.040	1.013	0.986	0.903	0.370	0.000	
10-14		1.089	1.041	1.025	0.582	0.370		
15-19		1.115	1.045	0.831	0.582			
20-24		1.062	0.981	0.831				
25-29		1.000	0.981					
30-34		1.020						
		Ratios of Successive Ps						
0- 4		0.994	0.942	0.939	0.964	0.769	0.000	0.000
5- 9		1.013	1.016	0.998	0.816	0.000	0.000	
10-14		1.072	1.030	0.913	0.000	0.000		
15-19		1.063	0.941	0.000	0.000			
20-24		0.910	0.000	0.000				
25-29		0.000	0.000					
30-34		0.000						

FERTILITY TRENDS IN NIGERIA

Cohort-period rates, cumulative cohort and period fertility, and P/F ratios, by duration of motherhood

Motherhood duration group of cohort at end of period	Number of women in cohort	Years prior to survey 0-4	5-9	10-14	15-19	20-24	25-29	30-34
		Cohort-period fertility rates						
0- 4	1585	0.620	0.668	0.671	0.710	0.803	0.733	0.982
5- 9	1755	0.318	0.348	0.314	0.338	0.320	0.326	
10-14	1567	0.279	0.308	0.271	0.314	0.318		
15-19	1088	0.218	0.224	0.245	0.260			
20-24	795	0.130	0.157	0.171				
25-29	326	0.076	0.102					
30-34	137	0.053						
		Cumulative fertility of cohorts at end of period (P)						
0- 4		1.550	1.607	1.520	1.529	1.415	1.350	1.310
5- 9		3.198	3.260	3.097	3.103	2.952	2.941	
10-14		4.656	4.637	4.459	4.522	4.532		
15-19		5.725	5.576	5.746	5.834			
20-24		6.227	6.532	6.689				
25-29		6.911	7.198					
30-34		7.465						
		Cumulative fertility within periods (F)						
0- 4		1.550	1.607	1.520	1.529	1.415	1.350	1.310
5- 9		3.141	3.347	3.088	3.217	3.016	2.981	
10-14		4.537	4.887	4.444	4.780	4.607		
15-19		5.625	6.005	5.667	6.091			
20-24		6.276	6.791	6.522				
25-29		6.655	7.300					
30-34		6.922						
		P/F ratios						
0- 4		1.000	1.000	1.000	1.000	1.000	1.000	1.000
5- 9		1.018	0.974	1.003	0.964	0.979	0.987	
10-14		1.026	0.949	1.000	0.945	0.984		
15-19		1.018	0.929	1.014	0.958			
20-24		0.992	0.962	1.026				
25-29		1.039	0.986					
30-34		1.079						

Additional Indicators of Fertility Change
by duration of motherhood

Motherhood duration group of cohort at end of period	Number of women in cohort	Years prior to survey 0-4	5-9	10-14	15-19	20-24	25-29	30-34
		P/F Ratios Excluding Common Cell						
5- 9		1.037	0.946	1.006	0.925	0.954	0.970	
10-14		1.038	0.935	1.005	0.917	0.975		
15-19		1.022	0.912	1.018	0.946			
20-24		0.991	0.957	1.029				
25-29		1.041	0.985					
30-34		1.062						
		Ratios of Successive Rates						
0- 4		1.079	1.004	1.058	1.131	0.913	1.339	1.084
5- 9		1.094	0.901	1.077	0.949	1.019	1.415	
10-14		1.103	0.880	1.159	1.013	1.034		
15-19		1.027	1.095	1.064	0.880			
20-24		1.207	1.087	0.845				
25-29		1.343	1.974					
30-34		0.489						
		Ratios of Successive Fs						
0- 4		1.037	0.946	1.006	0.925	0.954	0.970	0.833
5- 9		1.066	0.932	1.042	0.930	0.988	1.213	
10-14		1.077	0.909	1.078	0.962	1.004		
15-19		1.068	0.944	1.075	0.945			
20-24		1.032	0.960	1.045				
25-29		1.097	1.024					
30-34		1.074						
		Ratios of Successive Fs						
0- 4		1.037	0.946	1.006	0.929	0.954	0.970	0.833
5- 9		1.019	0.950	1.002	0.951	0.996	1.155	
10-14		0.996	0.962	1.014	1.002	1.113		
15-19		0.974	1.030	1.015	1.061			
20-24		1.049	1.024	1.033				
25-29		1.041	1.093					
30-34		1.071						

Cohort-period fertility rates by quartiles of age at marriage

Marriage duration group of cohort at end of period	Number of women in cohort	Years prior to survey 0-4	5-9	10-14	15-19	20-24	25-29	30-34
for age at marriage under 14								
0- 4	173	0.224	0.262	0.181	0.202	0.196	0.155	0.177
5- 9	385	0.296	0.315	0.278	0.237	0.227	0.199	
10-14	403	0.302	0.296	0.264	0.269	0.227		
15-19	412	0.276	0.273	0.282	0.253			
20-24	261	0.223	0.232	0.196				
25-29	200	0.138	0.169					
30-34	106	0.071						
for age at marriage 14-15								
0- 4	356	0.266	0.328	0.243	0.279	0.284	0.229	0.225
5- 9	421	0.294	0.311	0.273	0.248	0.209	0.207	
10-14	508	0.294	0.320	0.252	0.265	0.270		
15-19	384	0.242	0.272	0.235	0.265			
20-24	290	0.180	0.176	0.185				
25-29	170	0.091	0.148					
30-34	97	0.067						
for age at marriage 16-20								
0- 4	624	0.343	0.320	0.307	0.266	0.291	0.237	0.367
5- 9	586	0.336	0.301	0.302	0.282	0.271	0.258	
10-14	692	0.278	0.292	0.231	0.281	0.307		
15-19	409	0.228	0.234	0.234	0.296			
20-24	440	0.176	0.162	0.220				
25-29	179	0.083	0.056					
30-34	74	0.017						
for age at marriage 21+								
0- 4	278	0.419	0.348	0.260	0.302	0.293	0.148	0.000
5- 9	193	0.296	0.295	0.282	0.262	0.285	0.000	
10-14	170	0.346	0.267	0.259	0.230	0.000		
15-19	137	0.178	0.151	0.255	0.000			
20-24	96	0.098	0.162	0.000				
25-29	33	0.121	0.000					
30-34	0	0.000						

Cohort-period fertility rates by quartiles of age at motherhood

Motherhood duration group of cohort at end of period	Number of women in cohort	Years prior to survey 0-4	5-9	10-14	15-19	20-24	25-29	30-34
		for age at motherhood <16						
0- 4	245	0.553	0.705	0.710	0.812	0.902	0.760	0.897
5- 9	433	0.329	0.371	0.315	0.342	0.293	0.309	
10-14	402	0.292	0.326	0.289	0.303	0.283		
15-19	392	0.248	0.264	0.268	0.225			
20-24	223	0.171	0.193	0.168				
25-29	129	0.093	0.151					
30-34	68	0.075						
		for age at motherhood 16-17						
0- 4	387	0.613	0.625	0.615	0.610	0.689	0.686	0.861
5- 9	333	0.318	0.349	0.306	0.341	0.370	0.408	
10-14	322	0.290	0.300	0.257	0.354	0.425		
15-19	188	0.207	0.232	0.215	0.368			
20-24	164	0.153	0.143	0.229				
25-29	59	0.060	0.071					
30-34	41	0.002						
		for age at motherhood 18-19						
0- 4	632	0.640	0.676	0.716	0.673	0.871	0.704	2.038
5- 9	661	0.336	0.357	0.313	0.336	0.330	0.248	
10-14	572	0.289	0.308	0.255	0.305	0.246		
15-19	345	0.217	0.198	0.238	0.189			
20-24	298	0.094	0.127	0.092				
25-29	124	0.069	0.028					
30-34	28	0.077						
		for age at motherhood 20+						
0- 4	322	0.648	0.655	0.609	0.750	0.728	1.585	0.000
5- 9	328	0.268	0.293	0.320	0.329	0.280	0.000	
10-14	270	0.225	0.274	0.300	0.301	0.000		
15-19	167	0.160	0.199	0.211	0.000			
20-24	111	0.114	0.070	0.000				
25-29	15	0.044	0.000					
30-34	0	0.000						

FERT TREND IN THE NORTH-EAST

Cohort-period rates, by age at survey

Age group of cohort at end of period	Number of women in cohort	Years prior to survey: 0-4	5-9	10-14
		Cohort-period fertilit		
10-14	0	0.000	0.014	0.008
15-19	435	0.109	0.133	0.103
20-24	417	0.273	0.275	0.232
25-29	475	0.290	0.307	0.213
30-34	406	0.255	0.265	0.201
35-39	326	0.194	0.169	0.167
40-44	185	0.119	0.150	
45-49	99	0.092		

Cohort-period rates by duration of marriage

Marriage duration group of cohort at end of period	Number of women in cohort	Years prior to survey: 0-4	5-9	10-14
		Cohort-period fertili		
0- 4	373	0.272	0.266	0.238
5- 9	453	0.275	0.312	0.292
10-14	528	0.237	0.329	0.207
15-19	322	0.260	0.239	0.231
20-24	299	0.176	0.197	0.153
25-29	132	0.123	0.137	
30-34	74	0.079		

Cohort-period rates, by duration of motherhood

Motherhood duration group of cohort at end of period	Number of women in cohort	Years prior to survey: 0-4	5-9	10-14
		Cohort-period fertilit		
0- 4	438	0.625	0.674	0.711
5- 9	510	0.251	0.358	0.307
10-14	490	0.288	[illegible]	0.247
15-19	326	0.231	[illegible]	0.213
20-24	185	[illegible]	[illegible]	0.145
25-29	88	[illegible]	0.152	
30-34	33	0.100		

FERT TREND IN THE NORTH-EAST

Cohort-period fertility rates by quartiles of age at marriage

Marriage duration group of cohort at end of period	Number of women in cohort	Years prior to survey 0-4	5-9	10-14	15-19	20-24	25-29
		for age at marriage under 14					
0-4	69	0.193	0.263	0.189	0.206	0.152	0.099
5-9	156	0.293	0.329	0.342	0.195	0.230	0.262
10-14	154	0.316	0.361	0.259	0.273	0.225	
15-19	118	0.235	0.290	0.274	0.173		
20-24	89	0.236	0.245	0.109			
25-29	77	0.159	0.166				
30-34	33	0.097					
		for age at marriage 14-15					
0-4	123	0.225	0.301	0.251	0.184	0.214	0.075
5-9	142	0.253	0.305	0.251	0.125	0.153	0.175
10-14	142	0.279	0.322	0.203	0.181	0.235	
15-19	113	0.244	0.282	0.170	0.301		
20-24	97	0.200	0.059	0.138			
25-29	29	0.070	0.140				
30-34	22	0.075					
		for age at marriage 16-20					
0-4	153	0.329	0.222	0.273	0.169	0.243	0.191
5-9	123	0.277	0.312	0.291	0.236	0.237	0.250
10-14	201	0.265	0.288	0.161	0.131	0.236	
15-19	84	0.245	0.153	0.192	0.315		
20-24	106	0.105	0.205	0.217			
25-29	19	0.031	0.055				
30-34	14	0.036					
		for age at marriage 21+					
0-4	28	0.332	0.285	0.218	0.200	0.148	0.208
5-9	32	0.247	0.257	0.205	0.269	0.308	0.000
10-14	30	0.217	0.391	0.333	0.216	0.000	
15-19	11	0.236	0.169	0.125	0.000		
20-24	7	0.170	0.099	0.000			
25-29	7	0.075	0.000				
30-34	0	0.000					

FERT TREND IN THE NORTH-EAST

Cohort-period fertility rates by quartiles of age at motherhood

Motherhood duration group of cohort at end of period	Number of women in cohort	Years prior to survey 0-4	5-9	10-14	15-19	20-24	25-29
		for age at motherhood <16					
0- 4	70	0.514	0.777	0.721	0.753	0.937	0.805
5- 9	143	0.305	0.406	0.352	0.328	0.420	0.423
10-14	113	0.339	0.381	0.310	0.412	0.291	
15-19	105	0.253	0.239	0.307	0.159		
20-24	66	0.149	0.164	0.155			
25-29	24	0.115	0.212				
30-34	21	0.142					
		for age at motherhood 16-17					
0- 4	135	0.633	0.531	0.608	0.542	0.745	0.496
5- 9	101	0.255	0.346	0.274	0.331	0.342	0.321
10-14	103	0.265	0.313	0.250	0.236	0.352	
15-19	40	0.210	0.279	0.101	0.393		
20-24	29	0.246	0.079	0.195			
25-29	3	0.047	0.022				
30-34	5	0.000					
		for age at motherhood 18-22					
0- 4	175	0.626	0.635	0.810	0.662	0.951	0.803
5- 9	149	0.328	0.362	0.255	0.310	0.345	0.345
10-14	107	0.304	0.334	0.202	0.294	0.165	
15-19	63	0.231	0.153	0.111	0.051		
20-24	72	0.099	0.126	0.037			
25-29	15	0.033	0.036				
30-34	4	0.000					
		for age at motherhood 23+					
0- 4	53	0.601	0.644	0.701	0.747	0.877	1.560
5- 9	117	0.259	0.293	0.306	0.250	0.210	0.000
10-14	78	0.209	0.210	0.173	0.442	0.000	
15-19	13	0.144	0.149	0.241	0.000		
20-24	14	0.070	0.086	0.000			
25-29	5	0.060	0.000				
30-34	0	0.000					

FERT TREND IN THE NORTH-WEST

Cohort-period rates,
by age at survey

Age group of cohort at end of period	Number of women in cohort	Years prior to survey 0-4	5-9	10-14
		Cohort-period fertilit		
10-14	0	0.000	0.009	0.003
15-19	409	0.125	0.135	0.094
20-24	400	0.253	0.245	0.181
25-29	461	0.253	0.245	0.227
30-34	403	0.221	0.229	0.191
35-39	224	0.192	0.154	0.161
40-44	200	0.110	0.123	
45-49	124	0.134		

Cohort-period rates,
by duration of marriage

Marriage duration group of cohort at end of period	Number of women in cohort	Years prior to survey 0-4	5-9	10-14
		Cohort-period fertilit		
0- 4	369	0.252	0.217	0.166
5- 9	419	0.262	0.235	0.214
10-14	487	0.246	0.243	0.180
15-19	383	0.227	0.221	0.202
20-24	227	0.155	0.155	0.252
25-29	102	0.114	0.145	
30-34	70	0.093		

Cohort-period rates,
by duration of motherhood

Motherhood duration group of cohort at end of period	Number of women in cohort	Years prior to survey 0-4	5-9	10-14
		Cohort-period fertilit		
0- 4	425	0.257	0.263	0.263
5- 9	425	0.304	0.318	0.291
10-14	394	0.263	0.251	0.244
15-19	312	0.203	0.169	0.203
20-24	170	0.118	0.161	0.152
25-29	94	0.106	0.115	
30-34	59	0.114		

FERT TREND IN THE NORTH-WEST

Cohort-period fertility rates by quartiles of age at marriage

Marriage duration group of cohort at end of period	Number of women in cohort	Years prior to survey 0-4	5-9	10-14	15-19	20-24	25-29
		for age at marriage under 14					
0- 4	87	0.223	0.215	0.121	0.133	0.147	0.154
5- 9	159	0.230	0.255	0.200	0.214	0.156	0.053
10-14	160	0.253	0.224	0.206	0.184	0.130	
15-19	163	0.250	0.237	0.234	0.122		
20-24	90	0.235	0.189	0.190			
25-29	75	0.115	0.159				
30-34	29	0.076					
		for age at marriage 14-15					
0- 4	162	0.255	0.210	0.168	0.232	0.192	0.113
5- 9	137	0.237	0.269	0.220	0.195	0.107	0.143
10-14	195	0.257	0.238	0.188	0.161	0.158	
15-19	137	0.203	0.206	0.186	0.137		
20-24	75	0.158	0.153	0.187			
25-29	56	0.069	0.145				
30-34	34	0.112					
		for age at marriage 16-20					
0- 4	112	0.272	0.229	0.204	0.166	0.075	0.091
5- 9	103	0.265	0.231	0.211	0.113	0.080	0.091
10-14	104	0.254	0.283	0.140	0.139	0.300	
15-19	63	0.192	0.221	0.152	0.224		
20-24	59	0.138	0.129	0.320			
25-29	31	0.195	0.088				
30-34	7	0.059					
		for age at marriage 21+					
0- 4	9	0.274	0.170	0.242	0.207	0.236	0.000
5- 9	11	0.294	0.215	0.303	0.142	0.000	0.000
10-14	28	0.199	0.148	0.000	0.055	0.055	
15-19	14	0.054	0.043	0.000	0.000		
20-24	2	0.000	0.000	0.000			
25-29	5	0.000	0.000				
30-34	3	0.000					

PERT TREND IN THE NORTH-WEST

Cohort-period fertility rates by quartiles of age at motherhood

Motherhood duration group of cohort at end of period	Number of women in cohort	Years prior to survey 0-4	5-9	10-14	15-19	20-24	25-29
for age at motherhood <16							
0- 4	123	0.555	0.694	0.723	0.880	1.015	0.805
5- 9	161	0.319	0.353	0.259	0.271	0.224	0.166
10-14	127	0.242	0.239	0.202	0.203	0.121	
15-19	114	0.175	0.220	0.194	0.165		
20-24	59	0.209	0.181	0.149			
25-29	56	0.101	0.156				
30-34	18	0.051					
for age at motherhood 16-17							
0- 4	113	0.599	0.560	0.594	0.675	0.677	0.861
5- 9	71	0.327	0.305	0.328	0.253	0.361	0.237
10-14	72	0.237	0.295	0.274	0.351	0.112	
15-19	35	0.255	0.202	0.146	0.237		
20-24	25	0.168	0.137	0.287			
25-29	7	0.029	0.337				
30-34	1	0.075					
for age at motherhood 18-22							
0- 4	114	0.576	0.644	0.713	0.704	1.049	0.760
5- 9	173	0.273	0.359	0.320	0.258	0.137	0.050
10-14	113	0.349	0.265	0.270	0.147	0.112	
15-19	55	0.229	0.175	0.250	0.031		
20-24	41	0.051	0.149	0.050			
25-29	18	0.139	0.052				
30-34	5	0.345					

FERT TREND IN THE SOUTH-EAST

Cohort-period rates
by age at survey

Age group of cohort at end of period	Number of women in cohort	Years prior to survey 0-4	5-9	10-14
		Cohort-period fertilit		
10-14	0	0.000	0.002	0.003
15-19	820	0.039	0.095	0.094
20-24	548	0.225	0.256	0.274
25-29	502	0.318	0.372	0.312
30-34	414	0.287	0.293	0.273
35-39	346	0.190	0.253	0.242
40-44	275	0.131	0.134	
45-49	234	0.050		

FERT TREND IN THE SOUTH-EAST

Cohort-period rates
by duration of marriage

Marriage duration group of cohort at end of period	Number of women in cohort	Years prior to survey 0-4	5-9	10-14
		Cohort-period fertili		
0- 4	346	0.330	0.393	0.333
5- 9	389	0.343	0.386	0.338
10-14	468	0.318	0.333	0.310
15-19	390	0.279	0.281	0.287
20-24	334	0.138	0.209	0.232
25-29	188	0.100	0.114	
30-34	103	0.022		

FERT TREND IN THE SOUTH-EAST

Cohort-period rates
by duration of motherhood

Motherhood duration group of cohort at end of period	Number of women in cohort	Years prior to survey 0-4	5-9	10-14
		Cohort-period fertili		
0- 4	375	0.710	0.703	0.652
5- 9	415	0.465	0.353	0.349
10-14	437	0.299	0.339	0.295
15-19	379	0.194	0.257	0.242
20-24	295	0.115	0.155	0.205
25-29	119	0.036	0.058	
30-34	64	0.000		

FERT TREND IN THE SOUTH-EAST

Cohort-period fertility rates by quartiles of age at marriage

Marriage duration group of cohort at end of period	Number of women in cohort	Years prior to survey 0-4	5-9	10-14	15-19	20-24	25-29
		for age at marriage under 14					
0- 4	10	0.321	0.350	0.298	0.311	0.325	0.233
5- 9	47	0.341	0.401	0.335	0.323	0.304	0.270
10-14	65	0.357	0.335	0.352	0.410	0.327	
15-19	100	0.350	0.297	0.361	0.478		
20-24	62	0.149	0.271	0.308			
25-29	34	0.156	0.189				
30-34	33	0.045					
		for age at marriage 14-15					
0- 4	40	0.352	0.450	0.354	0.399	0.338	0.335
5- 9	95	0.407	0.370	0.359	0.435	0.329	0.292
10-14	114	0.332	0.422	0.325	0.396	0.373	
15-19	82	0.292	0.326	0.275	0.382		
20-24	85	0.153	0.236	0.194			
25-29	62	0.117	0.127				
30-34	30	0.020					
		for age at marriage 16-20					
0- 4	183	0.355	0.390	0.358	0.313	0.415	0.303
5- 9	184	0.394	0.400	0.340	0.373	0.340	0.307
10-14	219	0.318	0.311	0.300	0.330	0.348	
15-19	156	0.246	0.287	0.260	0.317		
20-24	153	0.140	0.160	0.195			
25-29	75	0.050	0.042				
30-34	40	0.004					
		for age at marriage 21+					
0- 4	109	0.452	0.373	0.237	0.378	0.356	0.099
5- 9	59	0.310	0.362	0.306	0.354	0.284	0.000
10-14	48	0.221	0.260	0.339	0.226	0.000	
15-19	52	0.222	0.105	0.301	0.000		
20-24	33	0.252	0.199	0.000			
25-29	16	0.120	0.000				
30-34	0	0.000					

FERTILITY TRENDS IN THE SOUTH-EAST

Cohort-period fertility rates by quartiles of age at motherhood

Motherhood duration group of cohort at end of period	Number of women in cohort	Years prior to survey 0-4	5-9	10-14	15-19	20-24	25-29
for age at motherhood <16							
0- 4	30	0.695	0.673	0.701	0.815	0.862	0.691
5- 9	94	0.384	0.370	0.333	0.381	0.379	0.325
10-14	119	0.297	0.359	0.314	0.371	0.421	
15-19	117	0.329	0.313	0.283	0.359		
20-24	74	0.148	0.230	0.179			
25-29	26	0.092	0.120				
30-34	22	0.019					
for age at motherhood 16-17							
0- 4	85	0.657	0.729	0.645	0.618	0.727	0.723
5- 9	93	0.377	0.397	0.319	0.380	0.381	0.463
10-14	97	0.314	0.293	0.243	0.385	0.434	
15-19	76	0.194	0.231	0.232	0.392		
20-24	82	0.119	0.139	0.268			
25-29	34	0.065	0.049				
30-34	28	0.000					
for age at motherhood 18-22							
0- 4	177	0.691	0.707	0.678	0.699	0.809	0.624
5- 9	179	0.378	0.411	0.362	0.406	0.379	0.324
10-14	162	0.308	0.345	0.301	0.361	0.307	
15-19	133	0.222	0.239	0.239	0.277		
20-24	98	0.157	0.138	0.107			
25-29	57	0.049	0.023				
30-34	13	0.000					
for age at motherhood 23+							
0- 4	80	0.779	0.709	0.518	0.789	0.548	0.906
5- 9	45	0.305	0.525	0.384	0.369	0.326	0.000
10-14	58	0.238	0.275	0.345	0.349	0.550	
15-19	55	0.151	0.275	0.118	0.000		
20-24	41	0.132	0.065	0.000			
25-29	3	0.000	0.000				
30-34	0	0.000					

FERT TREND IN THE SOUTH-WEST

Cohort-period rates,
by age at survey

Age group of cohort at end of period	Number of women in cohort	Years prior to survey 0-4	5-9	10-14
		Cohort-period fertili		
10-14	0	0.000	0.000	0.003
15-19	437	0.029	0.062	0.049
20-24	345	0.235	0.218	0.191
25-29	323	0.312	0.292	0.272
30-34	324	0.268	0.262	0.264
35-39	213	0.228	0.245	0.255
40-44	245	0.142	0.173	
45-49	133	0.099		

FERT TREND IN THE SOUTH-WEST

Cohort-period rates,
by duration of marriage

Marriage duration group of cohort at end of period	Number of women in cohort	Years prior to survey 0-4	5-9	10-14
		Cohort-period fertili		
0- 4	342	0.393	0.351	0.327
5- 9	329	0.338	0.327	0.299
10-14	314	0.293	0.290	0.273
15-19	247	0.212	0.233	0.228
20-24	227	0.162	0.187	0.192
25-29	100	0.091	0.145	
30-34	30	0.024		

FERT TREND IN THE SOUTH-WEST

Cohort-period rates,
by duration of motherhood

Motherhood duration group of cohort at end of period	Number of women in cohort	Years prior to survey 0-4	5-9	10-14
		Cohort-period fertilit		
0- 4	343	0.619	0.551	0.649
5- 9	337	0.338	0.319	0.297
10-14	300	0.277	0.294	0.280
15-19	253	0.201	0.213	0.225
20-24	173	0.113	0.145	0.154
25-29	71	0.055	0.101	
30-34	13	0.014		

FERT TREND IN THE SOUTH-WEST

Cohort-period fertility rates by quartiles of age at marriage

Marriage duration group of cohort at end of period	Number of women in cohort	Years prior to survey 0-4	5-9	10-14	15-19	20-24	25-29
		for age at marriage under 14					
0- 4	7	0.331	0.423	0.267	0.200	0.236	0.293
5- 9	14	0.390	0.327	0.231	0.243	0.233	0.141
10-14	25	0.375	0.319	0.267	0.363	0.177	
15-19	29	0.254	0.231	0.392	0.149		
20-24	19	0.347	0.292	0.179			
25-29	14	0.112	0.125				
30-34	5	0.022					
		for age at marriage 14-15					
0- 4	31	0.336	0.391	0.257	0.373	0.355	0.323
5- 9	47	0.323	0.360	0.329	0.243	0.199	0.231
10-14	56	0.331	0.318	0.355	0.270	0.234	
15-19	52	0.253	0.256	0.331	0.262		
20-24	33	0.229	0.179	0.152			
25-29	23	0.103	0.226				
30-34	11	0.044					
		for age at marriage 16-20					
0- 4	171	0.372	0.322	0.367	0.324	0.336	0.294
5- 9	177	0.356	0.326	0.304	0.237	0.299	0.210
10-14	163	0.266	0.275	0.250	0.331	0.262	
15-19	106	0.210	0.243	0.262	0.251		
20-24	121	0.132	0.170	0.234			
25-29	53	0.057	0.083				
30-34	13	0.006					
		for age at marriage 21+					
0- 4	132	0.417	0.369	0.309	0.367	0.275	0.176
5- 9	92	0.334	0.299	0.272	0.269	0.270	0.000
10-14	64	0.298	0.278	0.277	0.245	0.000	
15-19	59	0.148	0.180	0.276	0.000		
20-24	54	0.121	0.143	0.000			
25-29	10	0.255	0.000				
30-34	0	0.000					

FERT TREND IN THE SOUTH-WEST

Cohort-period fertility rates by quartiles of age at motherhood

Motherhood duration group of cohort at end of period	Number of women in cohort	Years prior to survey 0-4	5-9	10-14	15-19	20-24	25-29
		for age at motherhood <16					
0- 4	22	0.514	0.595	0.659	0.805	0.777	0.709
5- 9	34	0.339	0.336	0.323	0.439	0.232	0.267
10-14	43	0.306	0.331	0.371	0.343	0.237	
15-19	56	0.213	0.289	0.392	0.158		
20-24	24	0.203	0.211	0.218			
25-29	23	0.053	0.102				
30-34	7	0.034					
		for age at motherhood 16-17					
0- 4	51	0.531	0.644	0.595	0.620	0.531	0.597
5- 9	63	0.318	0.325	0.294	0.313	0.364	0.272
10-14	51	0.297	0.305	0.288	0.351	0.292	
15-19	37	0.229	0.211	0.299	0.273		
20-24	28	0.142	0.240	0.082			
25-29	10	0.074	0.144				
30-34	7	0.000					
		for age at motherhood 18-22					
0- 4	165	0.649	0.666	0.672	0.626	0.817	0.810
5- 9	160	0.364	0.327	0.279	0.310	0.316	0.203
10-14	131	0.232	0.266	0.241	0.300	0.329	
15-19	97	0.197	0.211	0.291	0.269		
20-24	87	0.090	0.144	0.164			
25-29	34	0.078	0.028				
30-34	4	0.000					
		for age at motherhood 23+					
0- 4	110	0.657	0.705	0.642	0.690	0.805	0.954
5- 9	75	0.302	0.291	0.303	0.271	0.248	0.000
10-14	74	0.238	0.298	0.308	0.296	0.000	
15-19	63	0.179	0.165	0.287	0.000		
20-24	34	0.108	0.151	0.000			
25-29	4	0.019	0.000				
30-34	0	0.000					

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CHAPTER FIVE

DETERMINANTS OF FERTILITY.

5.1 INTRODUCTION.

This chapter is concerned with the measurement and analysis of the impacts of the major proximate determinants on fertility and how socio-economic factors operate through the proximate determinants to affect fertility levels. Tabular and regression techniques are used to assess these interrelationships and the extent to which they have affected trends in the reproductive performance of Nigerian women. The focus is to identify the most important determinants of fertility and to infer from that knowledge which of the three possible trends discussed in chapter 3 (stable, rising or falling fertility) was most likely in the period of interest.

5.2. FERTILITY EXPOSURE ANALYSIS (FEA).

Fertility Exposure Analysis (FEA) is the method used in this chapter. As the focus of this work is on substantive results, elaborate discussion of methodological issues is not pursued. Such analyses can be found in Hobcraft and Little (1984), Little and Hobcraft (1984), Pullum (1987) and Pullum et. al. (1987). A short description and illustration of the basic ideas is given below to aid understanding and assessment of the results which follow.

FEA decomposes overall fertility of an individual woman into its proximate determinants or their quantifiable surrogates within a defined time interval. A woman is as-

signed to a given state or states each month in the interval under observation using a defined hierarchy among the states. Hobcraft and Little (1984) identified 18 exposure states to which a fecund woman could be allocated. It is not usually possible to have sufficient information needed to incorporate all the 18 states into a single analysis. In a given interval, a woman could be identified in any of the following states;

Pregnant (p),
Never married (m),
Not in union (u),
Post partum infecund (non-lactational) (i),
Infecund (lactational) (l),
Contracepting (C) or,
Fecund (r).

The contribution of a particular state for each woman in the reference period is derived by dividing the sum of the proportion of the time interval spent in each state by the length of the reference period. The sum of fractional exposures in different states must be equal to unity.

The additive form of the model is give as,

$$F=d(p)/(d(p)+d(i)+d(r)).(1-d(m)-d(u)-d(c)-d(l))....(1)$$

where m, u, c, l and r are a set of states representing never in union, not currently in union, contracepting, lactating and currently exposed. F=potential fertility. d(p)/(d(p)+d(i)+d(r)=observed fertility net of the reducing effects of the proximate determinants or states m, u, c and l. d(m), d(u), d(c) and d(l) are the reductions due to individual states.

The model can also be applied multiplicatively as follows,

$$F=d(p)/(d(p)+d(i)+d(r)).C(m)C(u/m)C(c/mu)C(l/muc)..(2)$$

where C(m) = reducing effect of marriage,
C(u/m) = reducing effect of union instability,
C(c/mu) = reducing effect of contraception, and,
C(l/muc)= reducing effect of breastfeeding on fertility.

Small variations, only due to biological fecundity, in potential fertility would be observed if all the proximate determinants were includedhe model and accurately measured.

The observed fertility for each individual is,

$$f=(12/9).d(p).....(3)$$

where f = observed fertility and d (p) the proportion of time spent pregnant in the observation interval. 12/9 is a factor which converts the proportion of time spent pregnant into a measure of births per year (only one birth is required to yield a fertility rate of 1.0 and a fertile pregnancy usually lasts for 9 months).

The potential fertility of a woman, or her fertility net the effects of the proximate determinants, is calculated as the ratio of the time spent pregnant to the time spent unprotected by any of the identified proximate determinants;

$$F = 12/9(d(p)/d(p)+d(i)+d(r))...(4)$$

where F is potential fertility.

For regression analysis, the mean "fs" and "Fs" in (3) and (4) for the reproductive ages (15-49) are often multiplied by the length of the reproductive age range (usually 35) to produce an approximate measure of the observed and potential total fertility rates.

Calculations of exposure status allocation and the fertility rates for a hypothetical woman are illustrated as in Table 5.1. Eight exposure states are identified in an observation interval of three years before the survey. The woman was pregnant in the 36th-31st, and in the 15th-7th months prior to the survey, thus spending a total of 15 of the 36 months in the pregnancy state (p). In the hierarchy, pregnancy was allowed to dominate other states. While she was pregnant, exposure in the other states was zero. She gave birth in the 30th month prior to the survey. The approximate monthly probabilities of protection due to non-lactational infecundity taken from Table 5.5 were applied from the month of birth to the 21st month prior to the survey for the first birth and from the 6th to the first month prior to the survey for the second birth. The time she spent amenorrhoeic (i) thus summed to 4.7 months or 13.0% of the interval.

She breastfed the earlier child for 16 months and had breastfed the most recent child for 6 months when her experience was censored by the observation window (not necessarily by the interview). In all, she was in the breastfeeding state for 34% of the interval.

She resumed sexual relations in the 14th month after her earlier birth, relied on coitus interruptus as a method of contraception but found that she was pregnant again only two months later. A month after her second birth, she decided to have an insertion of an IUD.

The importance of hierarchy is seen in the allocation into an abstinence state. Abstaining from sexual relations should offer a total protection against pregnancy. But in the hierarchy stated, infecundity (lactational and non-

Table 5.1 Exposure Status Allocation in a 3 year Interval For a Hypothetical Woman.

Exposure States	Months before the survey																																					% of time spen in sta
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	sum	
Pregnant (P)	←			0.0		→	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	←							0.0							→	1.0	1.0	1.0	1.0	1.0	1.0	15.00	41.6
Nev. Married (M)	←																0.0																			→	0.00	00.0
Seperated (U)		←															0.0																			→	0.00	00.0
Ammenorrhic (I)	.05	.10	.15	.40	.70	.90	←						0.0							→	.01	.02	.03	.04	.05	10	.15	.40	.70	.90	←		0.0			→	4.70	13.0
Breastfeeding(L)	.80	.80	.75	.50	.20	.10	←					0.0			→	.55	.55	.55	.65	65	.65	.80	.80	.80	.80	.75	.75	.50	.20	.10	←		0.0			→	12.25	34.0
Abstaining (A)	←									0.0						→		.45	.35	.35	.34	.18	.17	.16	.15	.15	.10	.10	.10	←			0.0			→	2.60	7.0
Contracepting(C) (Withdr./IUD)	.142	.095	095	.095	←					0.0					→	.27	.27	←									0.0									→	0.97	2.6
Fecund (R)	.008	.005	.005	.005	←					0.0					→	.18	.18	←									0.0									→	0.48	1.3
Total	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	36.0	100

Applying equations 3 and 4 (see text) an age- or other subgroup of women whose average experience is the same as in the last two columns would have an observed fertility rate of .553 (=1.33 x .416), and a potential fertility rate of .989 (=.416/(.416+.13+.013)).

lactational) dominated abstinence. Therefore for each month, only the fraction of her exposure to the risk of becoming pregnant which was not covered by amenorrhea and breastfeeding was assigned to abstinence for the period she abstained. If abstinence was allowed to dominate infecundity, a value of 1 (assuming no reporting errors) would be assigned to abstinence for each month, leaving the protection due to amenorrhoea and breastfeeding redundant; hence zero would be assigned to the later two states. In that case, the protection due to breastfeeding which was assessed would be only for the two months which she breastfed beyond abstinence. This would have assigned 22.2% of the interval to abstinence instead of 7.2% obtained when assessed after infecundity.

5.3. SOME ADAPTATIONS TO NIGERIAN DATA.

(a) Allocation of contraceptive efficacies.

Measurement of contraceptive efficacies of methods can be anything but precise, especially in societies where use rates are low alow and data are of a poor quality.

In the present analysis, the post-partum non-susceptible period was broken into lactational and non-lactational components. The assumed probabilities of protection due to non-lactational post-partum infecundity for each month since the previous birth was taken directly from Hobcraft and Little (1984). Since this variable is biological, it should show a small variation across the population.

The efficacies of different methods of contraception were allocated as in Hobcraft and Little. Herbs and "other" methods were allocated values of 0.3 each as their probable degree of protection from conception. This appears to be a generous allocation. It was considered that what might have been recorded as herbs and "others" in the survey could have included a variety of mildly effective

folk methods such as concoctions prepared by local medicine men (see Bradley and Gille 1981).

Little and Hobcraft (1985) proposed ways of deriving internal estimates of probabilities of protection for each method which are preferable to the use of external schedules. There are not enough data of sufficient quality in the NFS to estimate internally the probability of protection by method accurately. Apart from sterilization and IUD whose efficacies are not dependent on accurate application on the part of the user, it is possible that the probabilities in Table 5.05 overstated protection from the risk of pregnancy due to contraception.

For lack of detailed information on contraceptive use on a monthly basis, it is assumed that current users used the current method throughout the open interval.

(c) For breastfeeding, probabilities were allocated to each month since birth. The proportion of women who never breastfed in the NFS data is too small to allow the estimates of probabilities to be made endogenously with the examination of the relationship between the duration of post-partum amenorrhoea and breastfeeding duration. Some past applications of FEA have used a schedule from the Philippines. Recent analyses (Guz and Hobcraft forthcoming) found greater reduction in conception rates due to breastfeeding effects in African countries than for example, in the Philippines. In a society like Nigeria where duration of breastfeeding is more intensive and longer, the Philippine model would be inappropriate. Another schedule was produced with Egyptian data (see Nawar and Hobcraft 1983). This model was slightly adjusted upwards at very long durations for Nigeria based on the comparison of breastfeeding habits between Egyptian and Nigerian women, and following suggestions that fertility-inhibiting effects of breastfeeding beyond menstruation might have been under estimated in past studies (see Guz and Hobcraft loc. cit). The adjusted schedule for Nigeria is shown in Table 5.05.

(d) Treatment of Post-Partum Sexual Abstinence.

In the NFS, the information on abstinence came from two sources. The length of abstinence in months was collected for the last two closed birth intervals as well as for the open birth interval. With these records, abstinence can be integrated into FEA using any of the alternative procedures recommended by Little and Hobcraft (1984). Some measurement problems which arise are highlighted below.

First is the problem of quality of reports. Like breastfeeding and other variables which involve records of monthly occurrence, abstinence durations are subject to reporting errors. Women could forget the actual length, or they could simply report a length which sounds impressive to the interviewer (as was reported by Bradley and Gill 1981, for the northern state of Katsina), or they could report an ideal rather than the duration they actually practiced, especially given the cultural significance of the practice in many Nigerian communities. These sorts of error are bound to affect measurement and there are no easy ways of detecting their occurrence in reports. The single year distribution of months of abstinence (see NFS Volume 2 Table 6.4.1-1 p.338) shows considerable heaping on months which are multiples of six. The extent to which this reflects errors or adherence to the socially acceptable duration in practice is an issue which is still subject to different opinions (see Caldwell 1981, Page 1981).

Several factors - cultural, ethnic, linguistic and religious - can affect the quality of reports collected from a simple question such as "Are you currently abstaining?" or "For how long did you abstain after your last birth?". Ware (1977) illustrated some of such difficulties in a study of Cameroon, and conclas follows (in the specific case of abstinence):

> "Whether it is more polite to ask a woman whether she is abstaining from sexual relations with her husband or whether she

> is now having sexual relations varied from language to language. This is a fact for which careful and express provision will have to be made in the coding instructions. Although many languages have a euphemistic form equivalent to 'sleeping with' this should not be used as it is insufficiently explicit. True Fulfulde [linguistic/ethnic group] has the advantage of an explicit but perfectly polite vocabulary in this area drawn from Islamic law. These terms, however, will not be known to non-Fulbe Fulfulde speakers with whom a coarser formulation will have to be employed. 'C'etais combien de temps apres votre dernier naissance que vous avez repris les rapports sexuels avec votre mari?' is a fairly complex formulation even in French; careful attention should be paid to the back-translation to ensure that the correct idea has been transmitted even if not in exactly the same form..." p39.

For Nigeria, which has similar cultural and linguistic differences, these problems would definitely be in existence and might have affected, in one form or the other, the reports collected and coded in the NFS on abstinence practice and durations.

Another problem in the measurement of abstinence is that it overlaps with other states, namely, post-partum infecundity and breastfeeding. It has been noted that FEA handles the problem of overlaps by specifying hierarchies explicitly.

Thirdly, the reported duration of abstinence in the NFS can only be an approximation of the true duration of the practice. This is because several non-volitional factors can lead to prolonged abstinence. If a woman developed complications during or after childbirth, it is likely that she would abstain from sexual relation longer than she would have done under normal circumstances. Sickness of a spouse, temporary migration and new living arrangements are some other factors which can cause prolonged abstinence. Unfortunately, the information on abstinence in the NFS was not collected in such a form as to permit the identification of the reasons for abstaining. Women were asked, "How many months after the birth of this child

did you resume sexual relations?" Only in the case of open birth interval was another question, "Why not?" extended to women who reported that they never expected to resume sexual relations. This open-ended question was probably designed to establish terminal abstinence status. It would have been useful for our purposes here if direct information was collected on the use of abstinence for contraceptive purposes in the open interval.

However, abstinence was listed as one of the methods of contraception. This make makes it more explicit when a woman was abstaining in order to avoid getting pregnant. Although this is progress in measurement precision, there are still some problems. One is that monthly information was not collected on the use of any contraceptive method including abstinence (where specified as a method). Another problem is that respondents and interviewers might have confused the differences between abstinence and rhythm as methods of contraception. It is suspected that this is partially the reason why rhythm was recorded as the second most widely used method next to abstinence (see Table 5.04). What was recorded as rhythm might be abstinence in some cases and vice versa. Although the framing of the questions did not confuse these two methods, one only need reflect on the level of literacy and care needed to use rhythm efficiently, and also on the problem of translating the difference between rhythm and abstinence in local languages which do not usually make explicit references to sexual relations, in order to appreciate our suspicion that the two methods were confused to some degree. Consider the questions from which information on abstinence and rhythm were collected:

for rhythm,

> "some couples avoid having sex on
> particular days of the month between
> menstrual periods when the woman is
> most able to become pregnant. This is
> the safe period or rhythm method.....
> Did you (and your husband) ever do this?",

and for abstinence,

> "Another way (of contraception)
> is to go without sex for several months
> or longer to avoid getting pregnant...
> Have you ever done this to avoid getting
> pregnant?"

However clearly the difference between the two might have been successfully brought out in the local language translations of the questionnaires, it would still have required great interviewing ability to maintain that difference in the fieldwork where the respondents were not generally very literate.

In view of emerging interest in the measurement of the contraceptive efficacies of traditional methods (see Laing 1987, Caldwell and colleagues 1987, and the work of DHS staff, 1989), it is important to stress the need to maintain the difference between post-partum sexual abstinence and periodic abstinence. The former variable is the more important proximate determinant of fertility in Africa but can easily be confused with rhythm (periodic abstinence) in analyses.

In summary, three broad difficulties encountered in the integration of post-partum abstinence in the measurement and analysis of proximate determinant of fertility with the Nigeria Fertility Survey data are as follow:

1. In the question on abstinence where duration was recorded, several factors within the entire post-partum period could lead to spurious (most likely overstated) effects of abstinence on fertility.

2. Where abstinence was recorded as a method of contraception, duration of use was not recorded.

3. The line of difference between abstinence and rhythm methods of contraception is

uncomfortably thin and
any misallocation in the two variables might overstate or understate the effects of abstinence on fertility.

For abstinence, it should be noted that although data from the two sources in the NFS refer to the same concept, they measure somewhat different things. One is only a subset of the other. Abstinence reported as a contraceptive method measures its prevalence and effectiveness as a deliberate choice. Abstinence duration as a post-partum variable might not necessarily have been used for family planning purposes although it obviously has that effect. There is uncertainty in the analysis of this variable regarding the extent to which the interviewers made such a distinction and how clear it stayed on a respondent's mind and influenced her response.

The data in Table 5.07 indicate that only very few women reported that they used abstinence as a form of contraception. As would be expected, the duration of abstinence was generally longer for women who used abstinence as a form of contraception than for those who did not. On the average however, the difference in duration of abstinence for the two categories of women was only three months. Strictly speaking, it is this length of time (3.3 months on the average) which should be measured for its reducing impact on fertility in an assessment of the use of abstinence as a contraceptive method in Nigeria. Apparently, this duration would effect very little reduction in fertility. Hence it would appear that the fertility-reducing impact of post-partum abstinence in Nigeria is largely an unintended function.

Using the additive model of FEA, equation (1) was restated with a separate effect of post-partum abstinence as,

$$F=d(p)/(d(p)+d(i)+d(r)).(1-d(m)-d(u)-d(c)-d(l)-d(a))..(5)$$

where d(a)= the reduction in fertility due to post-partum abstinence. All abstinence durations for the three

most recent births which fall within the observation window are included in the analysis. For the women who were still abstaining at the time of the interview, the number of months since the last birth is assigned for abstinence in the open birth interval. As was illustrated in the hypothetical example, the impact of abstinence is assessed after those of all other post-partum states. In the Nigerian context and given the problems already highlighted, this appears to be the most justified hierarchy to adopt. An implication of this choice which needs to be pointed out is that the level of fertility reduction due to abstinence which is presented in the results cannot be an overestimation.

The choice of exposure window.

Some previous applications of FEA have indicated that results are sensitive to the chosen interval of observation. Intervals which are too long or too short are not recommended because of errors which might be introduced by changes in fertility or dating errors (see Little and Hobcraft 1985). Pullum and colleagues (1987) used a 30 month window partially to avoid heaping errors which usually occur at completed years. In the present application, many intervals were tried before 1-36 months before the survey was chosen. Intervals which are shorter or longer than three years were found to produce lower or excessively higher estimates of potential fertility rates than are shown in the results, and also generated implausible estimates of mean waiting time to conceive by young fertile women.

(g) Treatment of Sterility.

A woman is assumed to be sterile if she was fully exposed to the risk of conception in the 3 years of observation but had no pregnancy. This operational definition of sterility makes it unsatisfactory to use very short or long intervals since these would overestimate or under-

state sterility in the population. Elaborate stratification which measures fecundity by the fertility performance of a woman within a given interval in the past is possible but is not carried out because it has been found to make only small differences in results. (See Hobcraft and Little 1984).

Apart from the minor adaptations discussed above, the features of FEA as proposed by Hobcraft and Little were maintained in this analysis. Pullum and colleagues (1987) suggested and applied a change in the procedure for counting births. In Hobcraft and Little, reported pregnancies in the chosen interval were used to estimate fertility. This is likely to underestimate fertility because pregnancies, especially at early duratiorations, are often underreported. (See for instance Goldman and Westoff 1980 for more discussion of this). Since, in the Hobcraft and Little model, pregnancies are converted into births before their outcomes are known, this is likely to overstate fertility because not all the pregnancies will end up in live births. Hence, the possible downward bias introduced by any omission of pregnancies is likely to be compensated for by the absence of adjustment for pregnancy wastage in the analysis. The present analysis followed the Hobcraft and Little approach.

Lastly on method, the notations used in this chapter differ slightly from the ones used in the two original papers by Hobcraft and Little. The symbol A was used to denote abortion in Little and Hobcraft while here it denoted abstinence. The residual state was designated f in Hobcraft and Little but was represented with r in the present analysis. Any confusion caused by these and similar differences is regretted. The symbols used here were decided on in pursuit of uniformity with a recently developed manual for FEA (FERTEX, 1988).

5.4 THE FERTILITY DETERMINANTS ANALYSED

The proximate determinants of fertility which are relevant to the analysis in this chapter include, proportion of women ever married, proportion of women currently married, post-partum amenorrhoea, post-partum abstinence, lactational infecundity, contraception, induced and spontaneous abortions, natural and pathological sterility and frequency of intercourse. However because of data limitations, not all of these variables are measured for their direct effects on fertility levels. Below is a brief description of those which are explicitly measured.

The percentage distribution of women still single by age-group (Table 5.02) shows that marriage is early and universal in Nigeria. By the age of 24 years, the majority of women have been married. First marriages are relatively stable especially at shorter durations (Table 5.03). Divorce or separation became very visible for the older marital duration groups, although at the oldest duration, death of a husband was the main cause of marital dissolution. The relatively low remarriage in the youngest duration of marriage might be a censorship effect, and more women in this group would remarry with time. Taken together, these data show that once married, only a small proportion of time is spent subsequently outside marriage by women.

Women abstained for an average of 14.1 months in the last closed birth interval. (Table 5.04) The length of abstinence tended to be inversely related to the current age of women although a relatively shorter duration was recorded for 35-39 age group. Duration of abstinence has been found to vary widely across countries of sub-saharan Africa (see Shoenmakers and colleagues 1981) and even within a subgroup in a country, there is no homogeneity in the length of of abstinence (see Adeokun 1985). Evidence is emerging recently on a trend towards reduction in the average duration of abstinence. The traditional institutions such as polygyny and strong extended family links

TABLE 5.02 PERCENTAGE DISTRIBUTION OF WOMEN STILL SINGLE AT EACH CHILDBEARING AGE GROUP, ALL NIGERIA

AGE GROUP OF WOMEN	% STILL SINGLE	
15-19	59.7	(40.3)
20-24	15.2	(84.8)
25-29	3.2	(96.8)
30-34	1.0	(99.0)
35-39	0.9	(99.1)
40-44	1.0	(99.0)
45-49	0.6	(99.4)
ALL	16.5	(83.5)

Figures in brackets are the % ever married in each age group.

TABLE 5.03 STATUS OF FIRST MARRIAGE BY DURATION OF MARRIAGE FOR ALL EVER MARRIED WOMEN, ALL NIGERIA.

DURATION OF MARRIAGE	FIRST MARRIAGE			
	UNDISS.	DISSOLVED BY,		%
		HUS.DEAD	DIVORCE/SEP.	REMARRIED
UNDER 5	96.1	0.4	3.4	59.0
5-9	89.6	2.7	7.8	77.1
10-14	88.0	3.6	8.4	80.3
15-19	82.5	5.0	12.4	76.9
20-24	75.5	9.2	15.3	67.1
25-29	71.6	13.2	5.2	65.5
30 +	63.7	20.1	16.2	61.9
A	85.0	5.2	9.8	71.6

which facilitate long abstinence appear to be weakening. Also as African populations become more aware of the truths about processes in a woman's reproductive cycle, myths and taboos about sexual relations are gradually being discarded. For instance, women in the past abstained in the belief that sexual relations pollute the milk of a lactating mother or as part of post-natal purification rituals, but not as many would do so today. In northern and part of south-western Nigeria, the Islamic rule of 40 days of abstinence after birth is more likely to discourage any further lengthy abstinence. This situation is more probable with the recent rise of Islamic fundamentalism in Nigeria.

Although data on breastfeeding show some regional and rural/urban variations (see NFS Vol. 1 Table 8.6 p.177), at theonal level no significant age effect is observed on the duration of breastfeeding. For instance the very young and the very old mothers breastfed their penultimate children for the same length of time. For the entire population the mean duration of breastfeeding was 16.3 months as shown in Table 5.03.
A more complex issue is the interaction of breastfeeding and abstinence in relation to fertility. The direction of the differential between post-partum abstinence and breastfeeding durations has important implications for the measurement and interpretation of the data on their individual contributions to fertility level. A recent survey of urban Ilorin in south-western Nigeria (Oni 1987) produced estimates of mean durations of post-partum abstinence and breastfeeding of 17.9 and 16.2 months respectively. In the same region, Adeokun (1984) reported a mean duration of 9 months for post-partum abstinence and 20 months for breasfeeding among the Ikale-Yoruba, while among the Ekiti-Yoruba, the mean durations of post-partum abstinence and breastfeeding were reported as 30 and 24 months respectively.

The data for Ilorin and Ekiti-Yoruba show values for breastfeeding which were on average shorter than the mean

duration of post-partum abstinence. In contrast, the mean duration of abstinence in the NFS data (Table 5.03) and among the Ikale-Yoruba were shorter than the mean duration of breastfeeding. Where the duration of breastfeeding is shorter than, or roughly equal to the duration of abstinence, the data could be interpreted to mean that women abstained in order to breastfeed to a desired duration. This would also strengthen the idea that women believed that sexual intercourse pollutes breastmilk. If however, the evidence shows duration of abstinence which is substantially longer than duration of breastfeeding, the relationship between the two variables and the intentions of the women for abstaining become less obvious. One explanation could be that where for any reasons, the breastfeeding duration was not long enough to ensure the socially approved birth interval, abstinence is used as a complement. Hence, it would appear that whether in the situation where the abstinence duration is longer or shorter than the breastfeeding duration, women abstain as much to breastfeed as to achieve a latent family planning objective, namelyamely, to maintain a prevailing child-spacing pattern.

Table 5.04 shows that only 14.2% of all ever married women have ever used contraception. Current use among married fecund women who were not pregnant at the time of the survey (see NFS Volume 1 Table 7.10) was at 6.2%. Preliminary results of the Demographic and Health Survey for Ondo State(1987) showed an equally low prevalence rate of 6.1% (for currently married current users). These data confirm that the use of modern contraception is not yet widespread in Nigeria. As observed in Table 5.04 the most popular form of contraception is abstinence, followed by rhythm. The pill showed a comparatively significant prevalence among all age groups.

Post-partum amenorrhoea shows a small variation by age group except for slightly lower values at the two young age groups where fertility rates are usually highest. On the average, women are amenorrhoeic for 10.4 months after a penultimate birth (Table 5.03).

TABLE 5.04 MEAN DURATION OF POST-PARTUM AMENORRHOEA, ABSTINENCE AND BREASTFEEDING IN THE LAST CLOSED BIRTH INTERVAL FOR EVER MARRIED WOMEN WHO HAVE HAD AT LEAST TWO LIVE BIRTHS BY CURRENT AGE-GROUP, ALL NIGERIA

AGE GROUP	MEAN DURATION			
	PP. Amen.	PP. Abst.	Breast-Feeding	No of Women
15-19	10.7	12.0	17.3	148
20-24	9.8	13.0	15.7	890
25-29	9.9	13.6	16.0	1390
30-34	10.8	14.4	16.1	1360
35-39	10.7	13.8	16.2	970
40-44	10.9	15.1	17.1	772
45-59	10.4	15.7	17.3	517
ALL	10.4	14.1	16.3	6048

The background variables which were analysed with the proximate determinants are age of the respondent, region of residence, type of place of current residence, educational status of the respondent and her husband's education. For age, the usual seven groups were used. Regional classification comprises the four geographical regions of North-East, North-West, South-East and South-West. Type of place of residence, respondent's education and the education of her husband are classified as they are shown in the The Principal Report of the NFS (Vol. I). The choice of these variables was based on their importance for fertility levels as has been demonstrated in past studies (e.g, in Cleland and Rodriguez 1980, Nawar and Hobcraft 1983, Ashurst and others 1984), and on availability within the NFS. Other variables which were tried are type of place of childhood residence and religion. No important differentials in either fertility or its proximate determinants were in evidence to necessitate their inclusion into the results and analysis.

TABLE 5.05 PERCENTAGE OF ALL EVER MARRIED WOMEN WHO HAVE EVER USED TYPES OF CONTRACEPTION BY AGE GROUP

TYPE OF CONTRACEPTION	AGE GROUP 15-19	20-24	25-29	30-34	35-39	40-44	45-49	ALL
N	846	1450	1710	1532	1100	868	854	8120
NEVER USED	91.1	82.1	86.6	83.3	86.8	85.4	84.6	85.8
PILL	0.6	2.2	1.0	1.0	1.2	1.4	1.6	1.3
IUD	0.0	0.1	0.1	0.1	0.3	0.5	1.3	0.3
FEMALE SC.	0.1	0.2	0.1	0.0	0.0	0.0	1.0	0.1
DOUCHE	0.8	0.9	0.2	0.7	0.4	0.6	1.2	0.7
CONDOM	0.2	0.8	0.5	0.6	0.4	0.6	1.4	0.6
RYTHM	2.0	4.7	3.0	2.8	3.2	3.0	1.0	3.0
ABSTINENCE	7.5	14.2	11.2	12.7	9.8	11.3	14.1	11.6
WITHDRAWAL	0.9	2.1	1.5	1.3	1.4	1.2	0.4	1.4
STER.	0.0	0.0	0.1	0.0	0.1	0.1	0.3	0.1
INJECTION	0.5	0.8	0.2	0.6	0.3	0.2	1.2	0.5
HERBS	0.0	0.2	0.1	0.1	0.1	0.4	0.2	0.1
OTHER	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0
ALL TYPES	8.9	17.9	13.4	14.7	13.2	14.6	15.4	14.2

Note: The figures may add to slightly higher or lower totals for all women or all contraceptive types due to rounding errors.

TABLE 5.06 ASSUMED PROBABILITIES OF PROTECTION DUE TO AMENORRHOEA, BREASTFEEDING AND CONTRACEPTION (by type)

Month since Last Birth	Post-Part. Amen.	B/F	Contraceptive Method	
1	0.9	0.10	Pill	0.90
2	0.7	0.20	IUD	0.95
3	0.4	0.50	Fem Sc.	0.80
4	0.15	0.75	Douche	0.60
5	0.10	0.75	Condom	0.80
6	0.05	0.80	Rythm	0.60
7	0.40	0.80	Withdr.	0.60
8	0.03	0.80	Abst.	1.00
9	0.02	0.80	Sterl.	1.00
10	0.01	0.65	Inject.	0.90
11		0.65	Herb	0.30
12		0.65	Other	0.30
13-18		0.55		
19-24		0.50		
25-30		0.45		
31-36		0.35		
37 and above		0.25		

TABLE 5.07. MEAN DURATION OF POST-PARTUM ABSTINENCE FOR CURRENTLY MARRIED WOMEN WITH AT LEAST A CLOSED BIRTH INTERVAL ACCORDING TO USE AND NON-USE OF ABSTINENCE FOR CONTRACEPTIVE PURPOSES.

	Mean Reported Post-Partum Abstinence (months)		
AGE GROUP	Using Abstinence as a contraceptive	Not Using any method of contraception	Diff.
15-19	19.5 (9)	12.0 (108)	+ 7.5
20-24	13.5 (58)	13.2 (696)	+ 0.2
25-29	16.3 (76)	13.6 (1134)	+ 2.7
30-34	16.1 (57)	14.5 (1026)	+ 1.6
35-39	23.8 (20)	13.8 (713)	+10.0
40-44	14.1 (17)	15.2 (560)	- 1.1
45-49	18.0 (22)	15.7 (314)	+ 2.3
15-49	17.3 (258)	14.0 (4453)	+ 3.3

Note: Diff. (last column) = col.1 - col.2.

5.5 RESULTS.

The results of applying FEA for Fertility Exposure Analysis to Nigerian data are shown in Tables 5.08 through 5.13. Estimates shown in these tables refer to the three most recent years before the survey and are for 'sterile stratification' as defined in a previous section. Data for all 9727 cases in the Standard Recode file of the NFS are used; hence the number of cases for each variable and/or category in the tables are reasonably large even in instances where analysis is restricted to particular exposure types (e.g. in Table 5.12 where results are shown for ever married 'non-sterile' women).

It was mentioned at the beginning of this chapter that its aim is primarily to identify the key (proximate) determinants and to infer any possible patterns of fertility from this knowledge. This aim guided the quantity and type of data which are shown and the level of analysis which follow. Although results for FEA provide very good information for full analysis of fertility determinants, this task does not fall within the the scope ot the present work. The presentation here only barely goes beyond quantifying the contibution of the measured determinants to fertility reduction in Nigeria. Future applications of the method are expected to deal in greater detail with the very important concerns of fertility determinants and the methodological issues which arise with particular reference to sub-saharan Africa in general.

(a) Observed and Potential Total Fertility Rates.

A total fertility rate of 5.9 is estimated for all Nigeria in the 1-36 months before the survey (see Table 5.08). This fertility level is lower than the level estimated for the second half of the 1970s and for 1980 (in Chapter 3). The difference may probably be related to reporting errors which are known to have depressing effects on reports of births and pregnancies for the most recent years of retrospective surveys.

The potential fertility for a group of women is a hypothetical estimate of TFR if the cohort was married at age 15, experienced no marital dissolution, did not breastfeed, never used any form of contraception and experienced current age-specific fertility rates throughout their reproductive career. A potential total fertility rate of 14.2 is estimated for Nigeria. This is 1.1 lower than the value which is usually assumed in the Bongaarts' model. (See Bongaarts 1978, Adeokun 1985). The potential TFR depends on the level of fertility in the exposure interval as well as on how completely and accurately the proximate determinants were measured. It is possible that if the information on say, induced abortion was included in this case, the potential TFR would have been higher. Secondly, the use of 1-36 months before the survey as the observation window might have contributed to lower the potential TFR estimate, since, as it was mentioned earlier, reports for this interval usually suffer from omission of pregnancies and births. However, this interval proved to be the ideal for a good accounting of the proximate determinants in the details required for FEA, hence its choice in this analysis.

In past applications of FEA, varied levels of potential TFRs have been estimated which generally tend to be lower than Bongaarts' value. For the Dominican Republic (Hobcraft and Little 1984) estimated a value of 15.1

without the inclusion of induced abortion as a proximate determinant, and for The Republic of Korea, Little and Hobcraft 1985 estimated a value of 14.5 with the inclusion of this variable. A value of 12.6 was estimated for Egypt without inclusion of abortion. In any application, adjustments for underreporting of events and for the unmeasured variables might raise estimates of potential TFR. The estimated potential TFR for Nigeria appear reasonable considering the problems of data quality in the NFS data.

TABLEE 5.08: OBSERVED AND POTENTIAL FERTILITY RATES AND THE REDUCING EFFECTS OF THE PROXIMATE DETERMINANTS BY AGE, ALL NIGERIA.

Age Group	Obs. Fert	Percentage Reduction due to, M	U	C	L	A	MUCLA	Potential Fertility
15-19	.093	73.2	0.4	0.1	4.3	7.5	85.5	.641
20-24	.269	22.9	1.5	0.6	18.0	13.7	56.7	.621
25-29	.282	6.4	2.5	0.3	22.0	14.9	46.1	.523
30-34	.227	1.6	3.7	0.8	22.0	15.0	43.1	.399
35-39	.169	1.7	9.0	1.1	20.4	13.2	45.4	.310
40-44	.097	2.1	14.5	1.7	18.4	14.2	50.9	.198
45-49	.048	1.4	38.7	3.4	12.5	12.2	68.2	.151
Total	5.9	24.4	4.4	0.6	15.8	13.3	58.5	14.2

Notes: M=Never married state
U=Not 'currently in union'
L=Breastfeeding
C=Contracepting
A=Abstaining (post-partum)
MULCA=all measured proximate determinants.

TABLE 5.09 DIFFERENTIALS IN THE REDUCTION OF FERTILITY DUE TO THE PROXIMATE DETERMINANTS, BY SELECTED BACKGROUND CHARACTERISTICS, ALL NIGERIA.

VARIABLE & CATEGORY	OBS. TFR	Percentage Reduction in Fertility Due to, M	U	C	L	A	MUCLA	POT. TFR
REGION								
N-E	6.0	12.1	4.2	0.0	17.2	14.2	47.7	11.5
N-W	5.9	10.1	2.6	0.3	21.9	14.0	48.9	11.5
S-E	5.7	34.6	7.9	0.9	12.0	11.1	66.5	17.0
S-W	6.2	26.8	2.9	1.2	17.2	14.4	62.5	16.5
TYPE OF PLACE OF RESIDENCE								
Rural	5.9	20.3	5.7	0.5	17.0	14.0	57.5	13.9
Urban	5.7	24.8	4.7	1.7	15.8	11.2	58.2	13.6
EDUCATION								
No Ed.	6.1	11.5	6.0	0.5	18.5	14.7	51.2	12.7
Koranic.	6.3	8.4	3.7	0.2	22.1	11.4	45.8	11.6
Inc.Prim.	6.7	24.3	4.3	1.2	15.9	12.4	58.1	16.0
Primary	7.1	27.7	5.5	1.6	14.8	10.0	59.6	17.5
Sec +	4.3	47.8	1.6	6.2	8.8	7.6	72.0	15.4

Note: MUCLA as defined in Table 5.08

(b) Fertility Reduction by the Proximate Determinants.

The data in Table 5.08 show the percentage reduction of potential age-specific and total fertility rates due to each proximate determinant using the additive model. In total, fertility in Nigeria is reduced by 58.5% from its potential level by the proximate factors which are measured in the present analysis. Exposure reduction due to being outside marriage is the single most important determinant of fertility level. Never married state accounts for 24.4% of all reduction in fertility for all women. Before age 25, being unmarried is clearly the major determinant of fertility level. From age 25 when many women have entered into union, the reducing impacts of other variables become more visible.

Breastfeeding is the second most important proximate deteminant following marriage. It accounts for a 15.8% reduction in fertility. The effects of breastfeeding are low in the teens and twenties but tend to remain more or less constant thereafter until just before the oldest age group. The third important proximate determinant of fertility in Nigeria is post-partum sexual abstinence which contributes a 13.3% reduction in fertility. The other two proximate determinants (marital instability and contraception) are of relatively minor consequence for fertility level once the impacts of marriage, breastfeeding and abstinence have been assessed. Instability of unions contribute only 4.4% of the reduction in fertility while contraception contributes just 0.6%. It is observed though, that the impact of marital instability is high at older ages. This situation would be expected since a factor like, say, spousal mortality is positively correlated with age (see Table 5.04).

The contribution of contraceptive use to fertility reduc-

tion becomes significant only at old ages. This suggests that most women who use contraception might be doing so in order to stop, rather than to space childbearing. A cultural impetus for such a practice may be the desirability of cessation of chilbearing after a woman has reached a particular social age (e.g., on becoming a grandmother). The observed pattern may not be entirely free of errors, especially since the data relate to information about very old women.

At the peak and other important childbearing age groups, breastfeeding and post-partum abstinence - the two dominant determinants of marital fertility - show quite strong and seemingly unabating effects. No large differentials are observed in the age-pattern of marital fertility reduction due to these two proximate determimants until the last childbearing age group.

(c) Differentials in Fertility Reduction Due to the Proximate Determinants.

Variations in the impacts of the proximate determinants on fertility are shown for region of residence, type of place of current residence and educational status of the respondent in Table 5.09. Levels of potential, but not observed, TFR show a clear regional pattern, with the two northern regions having equal levels which are lower than the levels for the two southern regions. Not being married and contraception reduce fertility more in the South than in the North of the country. The percentage reduction in fertility due to never married state is quite low in the northern regions.

Breastfeeding reduces fertility more in the North than in the South. There is a fairly uniform pattern of fertility reduction due to post-partum sexual abstinence in all regions except in the South-East for which a relatively lower impact of this variable on fertility is observed.

The depressing impact of marital instability on fertility is greatest in the South-Eastern region.

The tendency towards convergence of rural and urban fertility in Nigeria shows in the observed total fertility rates by type of place of residence. Unexpectedly, the estimate of potential total fertility rate is lower in the urban than in the rural areas. Possible causes of this pattern are suggested later.
The most obvious rural-urban differentials in fertility reduction by the proximate determinants are for marriage and abstinence effects although contraception shows significantly more fertility reducing impact in the urban areas.

Observed fertility rises with increasing education up to secondary or higher levels (Table 5.09). The negative effect of being unmarried on fertility increases with formal educational achievement. Marriage disruption contributes more to fertility reduction among the uneducated than among any other educational group although its impact among women with any primary education is relatively high. The observed reduction in fertility by this variable is appreciably low among the most educated, which may be, among other things, due to relatively younger durations of the marriages of the very educated.

Contraception shows comparatively stronger reducing effects on fertility among the most educated group. The negative impact of breastfeeding on fertility shows small differences between the educated and those with only koranic education. Beyond Koranic level of education, the power of breastfeeding to reduce fertilty declines with increase in educational status of women. The fertility reducing effects of post partum abstinence shows a generally inverse relationship with formal education. Potential fertility does not show a pronounced trend by education although women who have only any level of primary education record very high levels.

(d) Estimates of Mean Waiting Time to Conceive and Proportion of Women Sterile.

Two other sets of measures were estimated which throw more light on the determinants of variations in Nigerian fertility. These are (1) the proportion of women who are sterile in the selected interval, which only approximately measures fecundability, and (2) the mean waiting time to conceive by women who are not sterile.
The mean waiting time time to conceive (in months) for fecund women for a given age group or other variable groups is estimated as,

$$9d(r)/d(p) \quad \ldots\ldots\ldots\ldots\ldots\ldots (6)$$

where,
d(r)=the proportion of months at risk, and
d(p)=proportion of months in which
there was a conception.

The mean waiting times to conceive are presented in Table 5.10 for each age group by selected background variables. They show considerable variations. The mean waits for the older age groups should be viewed cautiously. Although it would be expected that older women would wait longer to conceive due to aging effects on the reproductive system, there is a risk of overstating their waiting
time to conceive because of the difficulty of identifying sterile women among those who had no full exposure (Hobcraft and Little 1984). Also the waiting time to conceive by the teenage group might have been overstated due to natural subfecundity. Comments on the estimates are therefore limited to women in 20-29 age range.

TABLE 5.10. MEAN WAITING TIME (IN MONTHS) TO CONCEIVE FOR NON-STERILE* WOMEN BY AGE GROUP AND BACKGROUND CHARACTERISTICS.

AGE GROUP VARIABLE	15-19	20-24	25-29	30-34	35-39	40-44	45-49
REGION							
N-E	20.8	16.4	15.9	19.1	17.8	28.5	57.2
N-W	18.1	16.0	17.4	19.9	19.0	33.8	31.0
S-E	8.6	9.0	12.0	15.4	19.0	33.8	31.0
S-W	14.0	11.6	13.6	16.4	20.9	26.8	60.8
PLACE OF RESIDENCE							
Rural	16.7	13.1	14.6	17.9	18.4	28.1	37.5
Urban	17.6	12.5	14.3	16.2	21.6	34.9	40.0
EDUCATION							
No Ed.	19.3	15.1	16.1	19.1	19.9	31.1	39.2
Koranic	19.1	17.1	15.3	16.6	15.9	35.2	31.6
Inc. Prim.	10.3	9.1	12.1	16.0	15.7	25.7	-
Primary	9.9	10.3	11.0	14.6	19.4	18.2	28.7
Sec. +	16.0	8.8	11.6	20.6	24.4	30.1	17.2
NIGERIA	16.9	13.0	14.5	17.7	19.1	29.4	37.9

* see text for definition.

TABLE 5.11. ESTIMATED PERCENTAGE STERILE* IN EACH AGE GROUP BY BACKGROUND VARIABLES.

	AGE GROUPS						
VARIABLE	15-19	20-24	25-29	30-34	35-39	40-44	45-49
REGION							
N-E	4.8	13.4	15.4	28.6	45.4	51.7	63.0
N-W	7.2	17.3	18.9	29.1	41.4	58.5	58.4
S-E	0.7	3.7	7.4	18.9	33.7	44.0	49.4
S-W	0.4	2.3	3.8	17.2	23.6	40.3	58.4
PLACE OF RESIDENCE							
Rural	2.8	9.9	13.1	24.5	38.8	48.2	54.5
Urban	2.6	6.1	7.9	20.6	28.5	46.2	60.8
EDUCATION							
No Ed.	5.2	14.4	14.3	23.5	37.6	49.2	53.2
Koranic	8.2	8.0	16.0	33.4	31.4	55.5	72.0
Inc. Prim.	1.7	4.8	5.4	14.6	40.7	30.3	72.2
Primary	1.2	3.7	1.6	13.3	29.1	15.0	43.0
Sec. +	0.0	0.8	6.1	26.7	8.9	25.0	80.0
NIGERIA	2.7	8.9	11.9	23.8	36.8	47.8	55.6

* see text for definition

It can observed from Table 5.10 that Northern fecund women wait for more time to conceive than those in the south of Nigeria. This is related to the observation made in chapter 4 that mothers in the northern regions have comparatively low fertility in the peak age groups of childbearing. There is a tendency for women who have had formal education to wait for fewer months to conceive than those with Koranic or no education. Only small differentials exist in the mean waiting time to conceive by type of place of current residence, which is an indication of absence of important differentials in the overall fertility performances of rural and urban Nigerian women in the recent times. For all Nigeria, women in the 20-24 and 25-29 age groups waited on the average for just over a year and 14.5 months respectively to conceive. These periods seem quite high and are longer than the estimates for Dominican Republic (8.2 and 10.1 months for 20-24 and 25-29 age groups respectively) and for the Republic of Korea (7.2 and 7.0 months respectively for the 20-24 and 25-29 age groups repectively) (see Hobcraft and Little 1984 and Little and Hobcraft 1985). More research is needed to establish the causes of variations in the mean waiting time to conceive among national and sub-national populations.

The percentages of women who are sterile in each age group for categories of selected background variables are shown in Table 5.11. It should be recalled that sterility here is operationally defined as absence of a conception for any woman who was fully exposed to the risk of pregnancy throughout the three year interval. Although it was demonstrated that this length of time is about ideal, some women might well go on to conceive after three years. Therefore these results in Table 5.11 do not show, in absolute certainty, the levels and patterns of primary sterility, especially in the older age groups. The picture which these results present are probably not misleading especially when viewed together with the evidence in chapter 4 on primary and secondary sterility. The estimates of sterility for the older age groups are bound to

be high due to the natural age pattern of the onset of secondary infertility (Johnson-Ascadi 1986, UN 1986)

The data in Table 5.11 indicate that for women under the age of 30, there are more sterile women in the Northern regions than in the Southern regions. More women are sterile in rural than in urban areas, and education achievement shows an inverse relationships with level of sterility. For women under the age of 30, there is a wide gap between the level for those who have incomplete or complete primary education and those who have none.
The estimates for women aged 30 years or older appear too high for all categories of the background variables and ought not be rigidly interpreted.

(e) Regression Analysis of Fertility and Its Determinants

The last concern in this chapter is to examine how the selected background variables operate through the various proximate determinants to affect fertility in Nigeria. Age is also included in the analysis as a categorical variable. An additional variable, namely, husband's education is included in an attempt to capture any possible effects of a husband's socio-economic status on a woman's fertility. Educational achievement defines to a large extent, a man's social class, type of economic activity, income, values and attitudes, all of which are likely to affect the fertility of his wife. Husband's education, although an indirect measure of social status, is preferred here because it has more precise categories than husband's or own occupation, and for that reason is less susceptible to misclassification by the interviewers or respondents. By choosing a husband's characteristic, the analysis necessarily excludes never married women. Exclusion of never married women does not have much adverse effects on results since these group of women would make insignificant contributions to other post-marital states. There could be some risk of understating differentials by such exclusion since marriage is later for the very educated

groups.

The dependent variable in Table 5.12 (for the proximate determinants) is the percentage reduction in fertility.

TABLE 5.12 ADJUSTED EFFECTS FROM MULTIPLE CLASSIFICATION ANALYSIS OF PERCENTAGE REDUCTION IN EVER-MARRIED AND POTENTIAL FERTILITY, AND PROXIMATE DETERMINANTS BY BACKGROUND VARIABLES.

Variable and Category	N	FERTILITY Ever-Mar.	FERTILITY Pot-ential	PROXIMATE DETERMINANTS U	L	C	A	ULCA
Age								
15-19	752	-0.91	0.13	-2.58	-5.92	-0.36	-5.89	-14.76
20-24	1221	0.91	1.31	-2.79	1.90	-0.40	0.97	-0.31
25-29	1435	1.19	1.32	-2.27	2.74	-0.35	1.75	1.87
30-34	1131	0.22	-0.14	-1.12	0.73	-0.05	1.37	0.95
35-39	695	-0.02	0.15	1.37	0.01	0.79	-0.39	1.78
40-44	533	-1.87	-2.69	5.93	-1.88	0.41	0.07	4.54
45-49	331	-4.18	-6.35	17.44	-4.93	1.62	-1.84	12.29
Region								
N-East	1586	0.40	-0.49	-1.07	-0.78	-0.31	0.44	-1.70
N-West	1530	-0.12	-0.35	-3.21	3.20	-0.07	0.83	0.90
S-East	1668	0.42	1.49	6.84	-2.42	0.61	-2.96	2.07
S-West	1315	-0.88	-0.89	-3.66	0.25	-0.48	2.26	-1.63
Pl. of Res.								
Rural	4697	0.15	0.08	-0.36	0.39	-0.09	0.68	0.60
Urban	1402	-0.50	-0.28	1.21	-1.28	0.31	-2.26	-2.02
Education								
None	2930	-0.23	-0.57	0.02	0.31	-0.05	0.73	1.02
Koran.	653	0.64	0.93	1.61	0.58	-0.29	-1.77	0.14
Pr.Inc.	688	1.04	1.60	-2.04	0.83	-0.13	-0.17	-1.17
Primary	563	-0.09	0.86	1.47	-2.02	-0.24	-1.33	-2.21
Sec. +	264	-0.64	0.13	-2.18	-3.95	2.34	-4.08	-7.87
Husband's Ed.								
None	2894	-0.07	0.03	0.9	0.47	-0.41	0.80	1.84
Koran	1105	-0.42	-0.43	-0.37	1.11	-0.17	-0.39	0.17
Inc.Pr.	585	0.12	0.20	-1.19	-1.23	0.14	-0.32	-2.59
Primary	882	0.40	0.24	-1.84	-0.52	0.72	-0.71	-2.34
Sec. +	632	0.37	0.09	-0.18	-2.21	1.02	-1.70	-3.07
GRAND MEAN		9.6	14.3	5.25	18.80	0.64	13.37	38.08
R2		.054	.048	.106	.072	.031	.050	.087

Note: U=not currently in union
L=breastfeeding
A=post-partum abstaining
C=contracepting
ULAC=all four proximate determinants.

TABLE 5.12 (CONTD.) ACTUAL PERCENTAGE REDUCTION OF FERTILITY BY THE PROXIMATE DETERMINANTS FOR VARIOUS BACKGROUND VARIABLES.

VARIABLE/ CATEGORY	NOT IN UNION	BREAST-FEEDING	CONTRA CEPTION	ABST-INENCE
Age				
15-19	2.7	12.9	0.3	7.5
20-24	2.5	20.7	0.2	14.3
25-29	3.0	21.5	0.3	15.1
30-34	4.1	19.5	0.6	14.7
35-39	6.6	18.8	1.4	13.0
40-44	11.2	16.9	1.1	13.4
45-49	22.7	13.9	2.2	11.5
Region				
North-East	4.2	18.0	0.3	13.8
North-West	2.0	22.0	0.2	14.2
South-East	12.1	16.4	1.3	10.4
South-West	1.6	19.0	0.2	15.6
Place of Res.				
Rural	4.9	19.2	0.5	14.0
Urban	6.5	17.5	1.0	11.1
Education				
None	5.2	19.1	0.6	14.1
Koranic only	6.8	19.4	0.4	11.6
Primary Inc.	3.2	19.6	0.5	13.2
Primary	6.7	16.8	0.4	12.0
Sec. +	3.1	14.8	3.0	9.3
Husband Educ.				
None	6.2	19.2	0.2	14.1
Koranic only	4.9	19.9	0.5	13.0
Primary Inc.	4.1	17.6	0.7	13.1
Primary	3.4	18.3	1.3	12.7
Sec. +	5.1	16.6	1.6	11.7

The result of multiple classification analysis is presented in Table 5.12. All effects shown for each variable are adjusted for all other variables. The results exclude time spent in the never-married state in the interval considered.

The age-pattern of fertility shows no deviation from expected patterns. Marital fertility is low for teenagers, highest for the 25-29 age-group and declines thereafter. Adjusted marital fertility is highest in the south-eastern

region and lowest in the South-West. It is noticed that with adjustment for age, rural/urban residence and education, marital fertility is not higher in South-West than in the northern regions. (Refer to Chapter 3 for an initial discussion of this). The net effect of type of place of residence on marital fertilty is small although rural fertility level is higher.

No strong dampening effect of education on fertility is observed below secondary schooling. As would be expected, marital fertility is lowest for women with secondary or higher education. Women with incomplete primary education have the highest level of marital fertility.

Marital fertility is lowest for women whose husband's had only Koranic education and low for those with uneducated husbands. There is only a slight difference between the marital fertility for women whose husbands have either primary education only and secondary or higher education. The interesting point here is that these two high husband education categories (primary, sec.+) show levels of marital fertility levels which suggest that husband's education may not necessarily be acting in the same direction as a woman's own education does on marital fertility.

Variations in potential fertility should be small in the absence of errors and if all the proximate determinants were included in the model. With the exception of South-East, the regional variations in potential fertility are not large. As was observed earlier, it is surprising that potential fertility is slightly lower in urban areas. This could be reflecting the omission of some other proximate determinants of urban fertility. A reason which immediately comes to mind is reduced coital frequency arising from spousal separation due to working or schooling patterns of couples. Another reason for the observed lower urban potential fertility might lie in possible omission of induced abortion, the practice of which is likely to be more widespread in urban areas.

Potential fertility rose with educational level, recording highest value for women with incomplete primary education. Women whose husbands had any primary education had a similar level of potential fertility.

It is difficult to know precisely whether the observed variations in potential fertility for categories of each variable in Table 5.12 arise from measurement errors or from omission of other proximate determinants. Variation in potential fertility within a homogenous subgroup or a national population should be a subject of further research especially in Sub-Saharan Africa where more insight is needed for better modelling of fertility.

The data in the last five columns in Table 5.12 are the adjusted deviations from the mean percentage reductions in marital fertility due to the four measured proximate determinants and their totals. For ease of interpretation, the actual percentage reductions in marital fertility due to each proximate determinant are also shown for each category of the background variables.

The effect of marital instability on marital fertility is fairly stable under the age of 30 years; it rises thereafter recording a 22.7% reduction in fertility at the last childbearing age group. The South-East and, to a less extent, the North-East are the only regions where marital instability has a sizeable reducing impact on fertility (12.1% for the South-East and 4.2% for the North-East). For categories of type of place of residence and education, marital disruption shows small variations in its impact on marital fertility.

Breastfeeding depresses marital fertility most for women in their twenties. In the 30-44 age range, the impact of breastfeeding on marital fertility does not deviate very much from the mean (between 0.7 and -1.9). At both extremes of childbearing age groups, breastfeedings shows a relatviely weaker impact. For women in their teens, this could be both a reflection of possible changes in

reproductive behavioural and the fact that they might have just a few births to breastfeed within the interval of interest. The latter reason may be wholly responsible for the phenomenon among the oldest age group.

Breastfeeding does not show large deviations from the mean among and within the other background variables. The greatest depressing impact of breastfeeding on marital fertility is observed for the North-Western region (22%). The negative effect of breasfeeding marital fertility is weakest for women with secondary or higher education (14.8%).

The overall effect of contraception on marital fertility is still very small in Nigeria. Its fertility reducing impact is less than 1% for women under the age of 35 years. The greatest observed impact of contraception on marital fertility is among the most educated women (3.0%).

Post-partum sexual abstinence depresses marital fertility least for teenage mothers (7.5%) and most for women at the peak of childbearing age group (15.1%). Of the four regions, the South-West records the highest negative impact of post-partum abstinence. As would be expected, post partum abstinence has a more depressing impact on rural than urban fertilty. For all background variables, the impact of post partum abstinence on marital fertility is weakest for the most educated women.

With the data in Table 5.12, it is easier to see the proximate causes of socio-economic variations in fertility. With respect to age, it is observed that, at the peak of chilbearing group (25-29), abstinence and breastfeeding have strong negative impacts on fertility (15.1% and 21.5% respectively) while contraception has the least negative impact (only 0.3%). Should the durations of breastfeeding and abstinence decline, however slightly, the fertility reaction is most likely to be a rise. The very low marital fertility at the oldest age group appears to be a result of a high rate of marital disruption

(possibly due to spousal death) and quite substantial use of contraception to terminate (rather than to space) childbearing. For this older age group, the implications of the operations of the proximate determinants are not too important anyway since the impact of menopause is decisive.

Relatively, the only apparent check of marital fertility in North-East is post-partum sexual abstinence. Both post-partum abstinence and breastfeeding are strong depressants of marital fertility in the North-West. (14.2% and 22.0% respectively). Abstinence and breastfeeding have the least impact on fertility in the South-East; in this region, marital instability has quite a high dampening effect on fertility, and it appears that women are increasing subtituting traditional norms of childbearing with the use of modern contraception. For the South-West, both breastfeeding and abstinence still show relatively strong impacts on marital fertility.

It is clearer from these results (in Table 5.12) why small differentials exist between rural and urban marital fertility in Nigeria. In the urban area fertility would tend to rise due to relatively weak impacts of breastfeeding and abstinence. On the other hand marital disruption and contraception appear to depress fertility more in the urban areas. The exact opposite of this pattern is observed for the rural areas: breastfeeding and abstinence depress fertility more while the negative impacts of marital disruption and contraception are small. These patterns would have some cancelling effects on the overall rural and urban fertility differential in Nigeria. Hovever, it seem that the depressing effects on urban fertility are weaker on the balance, hence the tendency for it to rise and produce the current pattern of (near) convergence with rural fertility (see Table 5.09)

The erosion of traditional norms of childbearing in Nigeria is apparent in the pattern of the proximate determinants among the educational categories. The impact of

post-partum abstinence is low and shows an inverse relationship with formal (i.e. excepting Koranic) education. Breastfeeding impact on fertility is also inversely related to formal education. The impact of contraception clearly increased with a respondent's education. As would be expected, the reducting effects of contraception show a positive relationship with husband eduction. Abstinence, breastfeeding and marital instability show the expected inverse relationship with husband's education although with less consistency than is observed with regard to the respondent's own education. In particular, the fertility reducing effect of marital instability is lower for women with the most educated husbands than for those whow husbands have primary education.

As would be expected, socio-economic variables and age have recognizable impacts on the patterns of effects of the proximate determinants of fertility in Nigeria. In contexts where fertility shows outstanding differentials (e.g. in South-East and very educated women in Table 5.12), equally distinct patterns emerge in the proximate determinants which explain the fertility situation to a large extent.

Much attention has been paid in the literature to the relationship between breastfeeding and post-partum abstinence and their joint impacts on fertility level. The results of the present analysis confirm their dominant impact on fertility as could be seen in Table 5.12. Furthermore, the size of the difference between their individual impacts on fertility suggest that breastfeeding and abstinence might have had roughly equal depressing effects on fertility in the past. Reduction in their durations has only just begun, probably a phenomenon of the later part of the 1970s (see Page and Adegbola 1981), and as yet restricted to a small sub-group of Nigerian women. This would suggest that universal destabilization of traditional fertility norms has not yet occurred in Nigeria. Hence, fertility is likely to remain in a fairly stable state in the near future. However, the tendency

towards reduction in both breastfeeding and abstinence duration is strong in contemporary Nigerian society. Both practices are under increasing pressures to adapt to modernization. Significant reduction in either or both of these proximate determinants will result in rises in fertility unless contraceptive use prevails at equal degree.

(f) Comparing potential fertility estimates from FEA and Bongaarts' model.

An elaborate comparison of estimates of fertility and its proximate determinants using the FEA and other models has not been carried for many countries. Existing works have only produced estimates for countries using the Bongaarts model (Casterline et. al. 1984, Cochrane and Farid 1989). It would be interesting to see how the substantive results from these two models compare, and the nature of the measurement issues which each or both raise for many countries.

The extent to which important proximate determinants are identified and adequately measured by any model would reflect in the estimated potential fertility level. If important fertility determinants are omitted or poorly measured, the potential fertility rate would tend to be low.

A good comparison of the indices of proximate determinants estimated using the two models would require a detailed discussion of the assumptions of each model since these affect any adjustments made and the results. Secondly, clarifications would be needed about the exact number and the criteria for the combination of proximate variables whose effects are to be quantified. For instance, the Bongaarts' model usually estimates a single effect of post partum non susceptible period while FEA attempts to decomposes its effect into those of as many measurable post partum variables as possible (e.g. the impacts of two post partum states, breastfeeding and abstinence are separately measured here). These and other measurement issues which would arise in a comparison of the two models are not the major concern of the present chapter and therefore are not pursued.

A marriage index of .862 estimated with the Bongaarts' approach (Cochrane and Farid, 1989) suggests a less depressing impact of marriage on Nigerian fertility than the figure of .756 estimated with the FEA.

Indices of contraception from FEA and the other model are .992 and .968 respectively. The difference in these values could have arisen from a possible overstatement of contraceptive prevalence in the Bongaarts' model. In the NFS abstinence was categorised as a method of contraception if a woman reported that she abstained to avoid a pregnancy (see pp. 190-195). This information which has been in several calculations of contraceptive prevalence from the NFS was not used in the estimation of the impact of contraception on fertility in the FEA results shown.
For post partum infecudability, the estimated index using the Bongaarts' model is .637. With the FEA results, a value of .649 was estimated by treating breastfeeding and abstinence effects as components of the post partum infecundity effect. The two estimate do not differ widely.

The Nigerian potential fertility estimate already discussed is presented below with four other country estimates from FEA and Bongaarts' model. Athough many FEA results are required for us to be more exact about the magnitude of the differences, potential fertility rates from the Bongaarts' model are generally lower for the countries shown. It is only for Northern Sudan that the FEA estimate shows a slightly lower value. These differences are significant enough to stimulate a closer examination (which does not lie within the compass of the present work). Sources of any observed differences in potential fertility estimates from the two models are likely to include, among other things, (a) the capacity of each model to incorporate more than the principal proximate determinants, and (b) assuptions which each model makes about the efficacies of specific contraceptive methods in particular socio-economic groups or across countries.

COUNTRY	ESTIMATE OF POTENTIAL TFR USING	
	FEA	BONGAARTS' MODEL.++
Kenya	15.3*	14.3
Dominican Rep.	15.1**	13.2
Korea, Rep.	14.5+	13.5
Nigeria	14.2*	11.9
Sudan (North)	11.7*	11.8

Sources:
* original computation from country SR Files
** Little and Hobcraft (1984)
\+ Hobcraft and Little (1985)
++ Cochrane and Farid (1989)

5.6 SUMMARY

Although the quantification of fertility determinants is very important in its own right and deserves more attention than is given here, the aim of the analysis in this chapter has been to search for fertility change from the knowledge of the impacts of the proximate determinants.

Exposure to the risk of childbearing through first marriage is found to be the most important proximate determinant of fertility in Nigeria. Being in the never-married state contributes 41.7% (see Table 5.08) of all reduction in fertilty by the proximate determinants. Subsequent to marriage, fertility is determined mainly by breastfeeding and post-partum abstinence. The effect of marital instability on fertility is small: that of contraception is negligible.

If it could be proved that over the recent past there has been little or no changes in these these identified dominant proximate determinants for all of Nigeria, then it could be said with confidence that fertility remained more or less constant in the same period. There is no strong evidence so far at the national level of a very sharp increase in age at marriage. Any rise in age at marriage which might have occurred among sections of the population (eg. those with very high educational achievement) could not have been pervasive enough to generate a significant change in national fertility levels (see Chapter 3 and Chapter 4).

For breastfeeding and post-partum abstinence, there is some evidence of slight reduction of durations among sub-groups of Nigerian population although this does not show very much for all the total sample by age (Table 5.03). Changes in breastfeeding and abstinence durations, as have been identified by some smaller surveys are more likely to be downward, generating slight rises in fertility but certainly not any declines in the absence of increased use of contraception.

Evidence of slight rises in fertility, possibly as a result of reduction in both breastfeeding and abstinence durations is available mainly among some young and educated women (see chapter 3). Otherwise, it is more probable that for the Nigerian population as a whole, no changes in the major proximate determinants have occurred to extents which could have resulted in remarkable decline in fertility by the early years of the decade of the 1980s.

A casual comparison of estimates from FEA and the model proposed by Bongaarts indicated sizeable differences, especially with respect to potential fertility level, which are worth detailed investigations in an effort to improve the existing techniques for measuring fertility and its proximate determinants.

CHAPTER SIX

THE MAJOR FINDINGS AND SOME OF THEIR POLICY IMPLICATIONS

6.1 A Summary Of The Major Findings.

The summary of the major findings below touches on the level and trend of fertility and any early signs of fertility change, with discussion revolving only around the stated aim of this analysis. This does not by any means under-value other substantive and methodological issues raised at points in the thesis, especially in chapter 5 where fertility determinants were analysed.

(a) Fertility Levels and Trend

The results of the present analysis show that fertility was high in Nigeria in the period considered, recording an average total fertility rate of 6.8 in the decade of the 1970s. For the most recent five-year period (from 1976 to 1980), the estimated total fertility rate is 6.9. These levels place Nigeria among the high fertility countries of the world. When compared with the fertility levels for other 38 developing countries surveyed in the WFS (UN 1987), Nigeria ranks as the 8th highest fertility country, exceeded only by Republic of Yemen, Kenya, Syria, Jordan, Cote D'Ivoire, Senegal and Republic of Benin.

The estimates of national fertility produced in this work made no upward adjustment for underreporting of births. The national fertility level in the period of analysis might well have been higher if it were possible for the effects of birth omission to be completely eliminated. An indication of this is seen in the levels of fertility among southern women who gave a comparatively more complete account of their birth histories. For every year in the period of analysis, fertility level was quite high in these southern regions.

The results produced in this analysis indicate a fairly stable national fertility in the past decade before the survey (1970s). Evidence from other external sources (see Figure 3.4) suggests a similar trend further back in the 1960s and 1950s. However, for the recent times, there exist regional differentials which should qualify any observations at the national level. In the two southern regions, the NFS data show that fertility was stable while in the two northern regions, a slightly rising trend is observed. In the analysis, attention was drawn to several factors which might have contributed to this trend in the North. Of these factors, age and birth history misreporting appear to be the most significant. Decline in primary and secondary infertility might have contributed to raise fertility in the northern region although it is difficult to separate this effect from the effect of misreporting of events in the available data.

(b) Early signs of fertility change.

On the whole, there was no strong indication at any point in the analysis that fertility had started declining at the national level by the end of the 1970s. Detailed examination of types of exposure to childbearing revealed little change in patterns. In effect, both social norms and individual behaviour which regulate childbearing had not significantly altered in Nigeria by the beginning of the 1980s.

Further analysis of the background and proximate determinants of fertility provided enough evidence for us to believe that fertility was stable in the 1970s. Of the background factors examined, only very high levels of education (secondary or higher levels) showed a clear association with lower fertility. It was pointed out in Chapter 1 that the distribution of the very educated cases in the NFS is highly skewed in favour of young ages. This could mean that lower fertility for the very educated

women was caused by lack, or short duration of, exposure to childbearing as opposed to any deliberate commitment to limit family size. The issue at stake in this regard is the exact mechanism through which education determines fertility - an issue which awaits more purpose-designed investigations.

Analysis of key proximate determinants gave further support to the suggestion that fertility was generally stable for all of Nigeria in the period of analysis. Being unmarried for the first time reduced fertility most. Both marriage prevalence and age at marriage showed showed little or no changes in the period (see chapters 3 and 4, and also NFS Vol.1, Morah 1985). Some decline in the proportion of women who got married below the age of 18 was observed for southern region. But any effects on fertility of this slight upward trend in age at marriage in the southern regions were likely to have been balanced by the effects of an observed decline in age at marriage in the northern regions. Within marriage, fertility level was determined principally by breastfeeding and post-partum abstinence and the prevalence of both these variables remained unchanged at the critical childbearing age range in the period of study. Only a small proportion of women who were exposed to the risk of pregnancy used modern contraception, which implies an insignificant reducing effect of contraception on fertility at any time in the period of interest.

Marital instability could not be, as yet, counted as an important proximate determinant of fertility in Nigeria. This is because marriage disruption is usually followed by remarriage, especially for a woman who is still in the reproductive age range. Women who reported not being in union at the time of the survey, or even throughout the interval of observation (see Chapter 5), might get remarried later. By the very late childbearing ages where marital disruption showed a sizeable effect on fertility (see chapter 5), women already had high fertility and many might have reached menopause. In all, for the

period considered, the contribution of loss of exposure due to marital disruption would be small.

In this analysis, no evidence was found of a widespread deliberate effort of couples to control their fertility in any direction. This leaves the trend observed for northern fertility to be explained, in the most proximate terms as either a result of data errors or improving fecundability of northern women. Indeed it was suggested that these two factors might have jointly operated to produce the observed trend in fertility in the northern region, although not much concrete evidence is available on trend in fecundability.

Were there any early signs of fertility change in Nigeria by the beginning of the 1980s? The answer should be a qualified affirmation. In the analysis, it was found that differentials in fertility and its proximate determinants, more or less appeared to be following familiar patterns for categories of the more remote variables. Rise in almost all indicators of economic and social development showed an inverse relationship with fertility levels. In addition to being signs of early fertility change, this rough regularity encourages us to make a further speculation about the geography of fertility decline in Nigeria. Like economic development, fertility decline is likely to follow a geographical pattern in Nigeria. If this happens, then the southern regions are likely to experience fertility decline before the northern regions.
But with respect to timing of fertility decline, the patterns of fertility observed for some categories of background variables (e.g., type of place of current residence) should temper any assumptions which we hold.

In summary, this work confirmed that fertility was high by global standard in Nigeria in the 1970s; with the evidence on fertility determinants and differentials, it argued for a roughly stable trend in fertility in the 1970s, a trend which probably existed in Nigeria since the 1950s.

6.2 Implications for Research in Nigerian Fertility.

Data from the NFS have added to the existing materials to provide, for the first time, a comprehensive view of fertility in Nigeria. With the evidence in the NFS data and other sources brought together in the present work, investigation of advanced issues in Nigerian fertility can be pursued with greater confidence than ever before that we have a good picture of the trends in the recent past. It is fairly certain that by the end of the 1970s, Nigeria was still a predominantly natural fertility population. This stage of demographic transition presents opportunities for researchers to continue monitoring changes in fertility in Nigeria. There are several important areas in which research is needed in order to understand fertility and its dynamics in the Nigerian society.

First is the traditional perception of large family size. Much research has been carried out on the assumption that traditional African societies desire large families because of the economic roles of children. This assumption needs to be reassessed in the light of recent observations that desired family size appears to be insensitive to social class differentials and mobility. Why is it, for instance that as recent as in 1987, (see Caldwell J. and P. Caldwell, 1988) the highly educated, urban and white collar classes in Nigeria still want a large number of children? Could it rather be the case that preference for large family is a deeper cultural phenomenon which is more easily expressed merely in economic terms by respondents during interviews?

In Nigeria, control of the tempo of fertility has been part of reproductive norms. Why was the quantum of fertility usually left 'up to God'? Could it be because the traditional society was unable to conceive of any folk technology with which to terminate childbearing or could it be that it saw no utility in doing so? Although these questions touch on historical demography (for which there

are no accurate data in Nigeria), attempts to answer them might provide us with further insights into the persistent preference for large families independent of the economic circumstances.

The NFS data indicate that Nigeria is still one of the countries of the world in which desired family size is very high at a national average of 8.3 in 1982. It is important to investigate prevailing attitudes to family size. If preference for large family is a rational calculus in a context of high infant and child mortality, is there any evidence of change in attitude following recent improvement in the survival chances of infant and children? Are couples beginning to prefer small family size in the confidence that their children would survive? If 'up to God' indicated a passive resignation in the face of inability to control fertility, are Nigerian couples since the 1980s being encouraged by developments in contraceptive technology to change their attitude about family size?

Another area of investigation which will increase the understanding of fertility in Nigeria is the context of fertility decision in Nigeria with reference to the relationship between community and the reproductive behaviour of individual women. Unfortunately, in the scope of the present analysis, community variables were not introduced. The KAP surveys of the 1970s and many subsequent works focused attention on the individual's preferences on family size. Little or no investigation was carried out into the influence of group and peer pressures on a woman's preferred or actual family size. It is important to clarify for Nigeria, the extent to which decision about family size has (or has not) become individualized by the 1980s. Such studies should also search for any measurable links between fertility and extended family network. Apart from the theoretical interest in these issues, the knowledge will prove a useful guide for information, education and communication (IEC) of family planning in Nigeria.

The relationship between education and fertility needs to be pursued by further research. Concern in this area ought to go beyond description to the search for how, the exact mechanism through which, education determines fertility. In this task, it is insufficient to use the aggregate number of years of education which a woman has, or less sufficient still, the widespread categories of levels of education achieve (no ed., primary, etc.). Educational history of respondents needs to be collected together with her birth history so that we know at what stage of her reproductive life she acquires what level of education, and what impacts any levels of education has on her postpartum fertility related behaviour. These sorts of details will yield better knowledge about the relationship between fertility and education in Nigeria and other developing countries where it is not uncommon for a woman to break up schooling for economic or other reasons and return later, usually at a very advanced age, to complete her education.

Recent suggestions about the shape of transition curve (T. Dyson and M. Murphy 1986) require validation in the case of Nigeria. It was seen in the present work that fertility showed some rising patterns among some subgroups of the sample. In investigating the 'pre-decline rise' thesis for Nigeria, much effort should be made to remove the effects of reporting errors from fertility trend. There is also the need to allow for the impact of reduction of natural or secondary sterility, unless of course these variables are treated as part of the evidence for or against any point of view taken in the debate.

Since family planning is an important component of fertility levels and trend in any society, research into this variable needs to be intensified. The cultural diversity in Nigeria creates a good environment for the analysis of how culture encourages or discourages family planning. It is particularly important for Nigeria that improved methodologies be sought for the analysis of the impacts of government policies on the prevalence of contraceptive

use. This is because only recently (1988) the Nigerian government abandoned a laisse-faire policy for one of an active commitment to achieve fertility reduction through family planning and other less direct means.

The current national population policy needs to be examined not only in an effort to measure its success or failure but also on its own right, to determine its implications for human rights and self-determination, in accordance with a recommendation of an expert group on fertility and family planning (UN 1984).

Another important area of research is to attempt a full account of the proximate determinants of birth intervals in the context of little or no use of modern contraception and how these determinants actually operate to cause variations or homogeneity in the observed and potential fertility. Future analyses of the 1980s, if the data become available, will do well to decompose any observed changes into the key proximate and remote determinants with the aim of discovering the optimum mix of demographic, economic and cultural conditions for sustained declines in national fertility. For Nigeria good examination of these issues would necessarily require data of higher quality than anything which is currently in existence.

Ethnic fertility differentials in Nigeria is an area which demographers expected would give further insights into fertility patterns (see Lucas 1982). Although the ethnic variable was not accessible in the NFS data file, we can make an intelligent guess about fertility by ethnic group, at least for the major ethnic groups in the country, from the pattern in other variables. Nevertheless, future fertility research in Nigeria needs to address this issue very directly.

In the realm of micro demography, it would be useful to know how changes in intra-familial relationships (sibling/sibling, sibling/parents and husband/wife) affect

the fertility performance and aspiration of Nigerian women. Equally, the directions of wealth and authority flow within the nuclear family needs to be studied in the search of familial influences on fertility.

With the wide geographical, cultural, economic and social development differentials in Nigeria, it can be expected that government policies on family, agriculture, trade and other areas would affect specific groups differentially. Studies which evaluate the fertility impacts of such government policies and other large-scale development project might produce important results on impacts of contextual variations on fertility decisions and performances.

With the advances which demographic analysis made during the 1970s and 1980s, data requirements for good investigation of reproductive behaviour are becoming more complex, even for the developing countries. Simple cross-sectional surveys are no longer proving capable of handling the sorts of questions which many fertility analysts ask. Maternity histories, patterned after the WFS or the Demographic and Health Survey (DHS) provide more scope for detailed analysis. In Nigeria, the Nigeria Fertility Survey set a good standard in this regard. It is important that future national surveys aim to maintain and to improve on the WFS standard in the nature and details of information collected.

Before the NFS, most accounts of Nigerian fertility referred to data from the southern part of the country, especially from the South-West. In the effort to understand fertility in Nigeria, positive steps need to be taken to correct this regional imbalance in demographic knowledge. Universities, statistical offices and individuals should be encouraged to carry out localized fertility research at State, LGA and community levels, the results of which shall provide richer materials for future comparative analyses.

Perhaps the greatest advance which demographic research in Nigeria needs to make is in the area of data quality. Despite the expertise and financial resources invested into the NFS, the results came out not really as good as was expected. There are limits to what an analyst can do with a poor set of data. Given the bad history of demographic data collection in the country, there is need for more research designed to explore ways of improving the quality of Nigerian surveys. This is where government can make an important though indirect contribution to the progress of demographic research in Nigeria. Policies should be made to desensitise any factors which tend to encourage falsification of demographic reports. Similarly, the impact of population size on the life chances of individuals or groups of people need to be de-emphasised in the Nigerian society. Hopefully, such measures might discourage deliberate distortions of demographic data during censuses or surveys. In the scientific circle, it may not be an over-emphasis to say that, because of the level of misreporting of demographic events in Nigeria, any demographic research or report which does not take data quality very seriously stands a chance of being discredited.

From the issues raised, it is obvious that work on fertility in Nigeria has only just begun in seriousness with the NFS. Generally, the NFS has provided a base for further analysis in as many aspects of fertility as possible. Since, for lack of data, little progress was made before the NFS in fertility research, it is hoped that investigations will be mounted to pursue any suggestions made here, or to test some of the conclusions reached in the present analysis, using the NFS or other data.

6.3 Some Observations on the fertility target of the 1988 National Population Policy In the Light of the Findings.

It is the target of the 1988 National Policy on population to reduce total fertility rate to 4.0 by the year 2000 (Federal Republic of Nigeria 1988). This represents a 42.0 per cent reduction of the total fertility rate recorded in the 1978-1980 period (TFR=6.9). In this final section, the possibility of achieving this target reduction in TFR is briefly considered in the light of some results of the present analysis. A full appraisal of the details of the Policy which includes its basis, principles, other objectives, targets and implementation strategy, is not pursued. Discussion is limited to how fertility might be affected towards meeting the TFR target by any changes in the key background and proximate determinants.

(a) Socio-Economic Development and Fertility Decline.

A fact which emerges from this analysis is that fertility did not show any declining trend in the 1970s. This is despite the economic prosperity which Nigeria experienced in the same period. The argument that development is the best contraceptive appears to have stumbled in this instance. It seems probable in Nigeria, like in many other developing countries, that in addition to independent effects of 'development', significant fertility declines require some sort of stimulus in the form of (i) specific national policies for population control, (ii) a change in attitude towards preference of small family and (111) availability of modern and effective contraceptive method which enables couples to translate their preferences into practice. Usually, these three conditions do not operate in exclusion of one another. In many instances, government policy creates an environment in which changes in attitudes to family size and accessibility of contraceptives do or do not occur. Thus while socio-economic indicators are undeniably related to the pattern, intensity and ef-

ficiency of contraceptive use within a population, there is weak empirical evidence that left on their own, they can initiate and sustain fertility decline on the scale desired by the 1988 Policy.

Furthermore, socio-economic variables in the NFS do not show large fertility differentials net of data errors, which can form bases of a fertility reduction policy. High level of education is about the only background variable which shows a significant and stable inverse relationship with fertility. Even then, formal education cannot be a good instrument for a policy aimed at reducing fertility in Nigeria. For instance, it has been observed in this and other studies that any education which is lower than secondary level actually tends to be associated with rising fertility. To aim at providing universal secondary education with the hope of depressing fertility would incur great financial burden for the Nigerian government. Besides, such a policy might produce results only after several decades. The fertility of the bulk of women who are currently in childbearing ages may not be affected. Similarly, although urban residence is generally associated with lower fertility, this relationship is not yet established in Nigeria. The present situation is that both rural and urban fertility levels appear to be converging. Even where it is proved that urban fertility is substantially lower than rural fertility, government cannot be expected to encourage migration into urban areas as a policy option. On the other hand, intensified rural development programmes, like the pursuit of increased secondary education, is worthwhile but, represents nothing new from what past and present governments identified as one of the areas of their commitment.

Therefore, education and other development indices alone may not serve as effective policy instruments in the short run, for the achievement of the national fertility reduction target as contained in the 1988 Policy.

(b) Proximate Determinants and Fertility Decline.

Marriage

Only an insignificant number of births occur to women outside a socially recognized union in Nigeria. Given the strong effect which never married state has on fertility (see Chapter 5), the age at which women enter into first union is of much importance to fertility level in Nigeria. Recognizing this, the 1988 Policy set as one of its targets,

> "to reduce the proportion of women who get married before the age of 18 years by 50 per cent by 1995, and by 80 percent by the year 2000" (4.3.1)

Presently (as in the NFS data), 60 per cent of women who marry do so before the age of 18 years. This means that the nuptiality target of the Policy is to have the proportion of women who marry below the age of 18 years reduced to 30 percent by 1995 and to just 12 per cent by the year 2000. There are several questions which this nuptiality target raise which will not be pursued here. The key questions include the possibility of achieving this target and what structure that were, or are being set up in pursuit of the target. Will legal instruments be used or will other broad social and economic policies including increase in higher educational opportunities for women be trusted to raise the mean age at marriage Nigeria? It was stated in the Policy that,

> "In view of of current low mean age at first marriage for females, national programmes, especially in education, shall aim at raising the age at first marriage to at least 18 years" (5.13)

as one of the strategies for achieving the targets. Whether legal or other instruments are allowed to raise the mean age of marriage, problems will arise on the human rights, economic and cultural implications. The issues of individual self-determination, cost of bringing up a child, post-primary and post-secondary employment oppor-

tunities for girls and preservation of virginity are all relevant in considering the possibility of manipulating age at first marriage in Nigeria.T he more important question in the context of this analysis is the actual power of high age at marriage to effect large fertility declines in the short run in Nigeria. The results of the analysis in chapter 4 indicated that any age at marriage below 21 years for women did not make significant changes in their total achieved fertility. Other studies have made a similar observation (see MacDonald and others, 1981, UN 1986). Raising the national mean age at marriage to, say 18 years for girls, may contribute only a little towards achieving the fertility target of the 1988 Policy. Nevertheless, it seem desirable to raise the mean age at marriage since, in addition to its fertility dampening effects, this will protect many women from physiological and psychological problems of early motherhood.

It is a target of the Policy to achieve a 'spacing of a minimum of two or more years interval in at least 50 per cent of married or child bearing age by 1995 and by 80 per cent by the year 2000" (4.3.1.1) There is evidence in the literature that the probability of infant survival increases when births do not follow too closely (see Hobcraft and colleagues 1984, Hobcraft 1987.) This evidence provides support for the policy objective of reducing the birth interval. The means through which the stated national target of "2 or more years interval for 80 per cent of married women of childbearing age" will be achieved are not yet clear. Often opinions are expressed in popular and some scientific literature that recourse to the traditional practice of prolonged post-partum abstinence might be a way of maintaining good birth intervals. This view ignores the fact that the nature of spouse relationship and family arrangement, including polygyny, which made long post-partum abstinence possible, have changed considerably. In the past, many women abstained primarily to breastfeed for a socially-acceptable duration, since it was believed that sexual relations spoilt the milk of a lactating mother and for

that reason, was harmful to the child. Such beliefs are being discarded at the present time, and there may not be many reasons (apart from sickness) for a married couple to abstain from sexual relation for a very long time.

Promotion of a long period of abstinence in a family planning programme should be carefully handled in the efforts to communicate the benefits of good child spacing in Nigeria. The moral side to post-partum abstinence need not be overlooked. Observance of long post-partum sexual abstinence might lead to marital infidelity if only one partner is obliged to abstain. This may create a prejudiced impression of family planning to the disadvantaged partner and make it more difficult for the couple to adopt more effective modern methods of contraception.

Breastfeeding

It was found that this variable is the principal check on marital fertility. There is evidence in other studies that breastfeeding is inversely related to ovulation and conception rates (see for instance, Jain and colleagues 1979, Guz and Hobcraft forthcoming) Based on what is presently known, breastfeeding should be encouraged from the point of view of both fertility reduction and maternal and child health. Although the Policy has no specified target for breastfeeding, it is necessary to mention that encouraging longer birth intervals and breastfeeding in isolation may not yield the desired national fertility reduction objective. It was noticed in this analysis that prolonged breastfeeding and post-partum abstinence were practised with little or no contraceptive intent. Their substantial negative impact on fertility is merely a side-effect. By implication, programmes which lay emphasis only on a return to traditional child-spacing patterns (using breastfeeding and post-partum abstinence as means) may not be working towards encouraging the practice of modern contraception in Nigeria.

Breastfeeding calls for delicate handling in education,

information and communication (IEC) of family planning. The traditional reasons for long breastfeeding coincide with the recommendations of modern science. This is a contrast with post-partum abstinence the practice of which has been supported partly by myths and partly by assumed lack of alternative means of ensuring child survival. If IEC succeeds in showing better ways of achieving child survival, couples may abandon the practice of long post-partum abstinence in preference to modern contraception. But for breastfeeding, no programme can possibly recommend reduction in breastfeeding duration as a way of creating increased demand for modern family planning techniques. However, the process of shortening duration of breastfeeding appear to have been set in motion by agents of modernization which have no obvious links with family planning activities in Nigeria. In practice,the younger generation prefer to breastfeed for a short period in order to maintain the shape of their breasts. They take advantage of substitute baby food to reduce the intensity of their breastfeeding. Reduction in the duration breastfeeding and post-partum abstinence for whatever reasons, will increase the risk of a woman being pregnant too soon after a birth. This risk, which many women dread, will in turn create higher demand for modern methods of contraception in Nigeria. However beneficial the role of reduction in breastfeeding may be in creating demand for modern contraception, programmes need to project a positive picture of breastfeeding in other to avoid conflict with entrenched cultural patterns. In any case, it appears that other facets of modernization are already serving the sensitive purpose of reducing breastfeeding duration which in turn might possibly create increased demand for efficient contraceptives among couples.

Contraception.

Finally, the effectiveness of an increase in the prevalence of contraceptive use cannot be rivalled by any other means of achieving the national fertility target. Although other factors can have significant impacts on

fertility, evidence from the experiences of other contemporary populations show that increase in contraceptive use is a most powerful precondition for sustained fertility decline in the contemporary developing countries (see Bongaarts 1986).

A contraceptive prevalence of 46.5% is estimated here as the minimum condition required to reduce total fertility rate in Nigeria to 4.0 by the year 2000. (For details of the method used in the estimation, see Population Council Working Paper No. 130). The difference between this percentage and the current prevalence rate of 6.0% shows the scale of efforts which need to be expended in all aspects of family planning activities in Nigeria in the decade of the 1990s if the national fertility target is to be achieved.

The targets of the Policy on family planning are,

> "to extend the coverage of family planning service 50 per cent of women of childbearing age by 1995 and 80 per cent by the year 2000" (4.3.2),
>
> "to direct a significant proportion of the family planning programme in terms of family life education and appropriate family planning service at all adult males by the year 2000" (4.3.3),

and,

> "to make available suitable family life education, family planning information and services to all adolescents by 2000 to enable them assume responsible parenthood" (4.3.6).

It is too early to assess what the central and state governments and the private sector are doing toward meeting these family planning targets. There are two primary tasks which should occupy programme officers at this stage. One is the need to change the perception of people on the ideal family size. It appears improper to ignore

the empirical evidence (from desired family size figures) and assume that the average Nigerian couple has a latent desire for small family size. Surveys indicate that large family is still the norm. Through family life education, couples should be encouraged to adjust their reproductive rationality in the face of changing economic and social conditions. With progress made on this area, there is the other need to remove cultural, religious and ideological objections to family planning. One of the greatest challenges facing family planning programmes in Nigeria is how to fit modern concept and practice of family planning into a society which, to a large extent is still community-oriented and theocentric. Development of communication materials which aim to overcome any problems which these conditions might create should be the priority of programmes in Nigeria, especially at this early stage.

Data on the success of governmental and non-governmental agencies in recruiting family users are not easily accessible. It is however obvious that non-governmental organizations have contributed more to increase public awareness of the benefits of family planning long before governmental agencies became outspoken on the issue. In particular, the Planned Parenthood Federation of Nigeria has played a major role. Since the 1970s, it has expanded to be the leading family planning organization with branch offices in all the 21 States of Nigeria. Data from the southern region which are available to this investigator indicate that the PPFN made impressive progress in recruiting new acceptors despite little encouragement from successive governments before the 1980s. (These data cannot be shown because permission to publish them is still being awaited from the PPFN). Similarly, results from an experiment in Community Based Distribution of contraception (CBD) started in 1979 in Oyo State show some success (see Table 6.1), indicating that prevalence of contraceptive use might rise if there is adequate supply and efficient network of committed local distributors.

Recent popularization of family planning in the media with

government endorsement could reshape couples' perception of an ideal family size. It may well be that the average desired family size in Nigeria has declined from what it used to be by 1980 (8.3 children), thus increasing the unmet need of couples for contraception. Data to test this hypothesis at the national level are not yet available but the figures in Table 6.2 gives some insight. For all currently married women in the South-West, only 9.2 per cent did not want any more children in 1981/1982 (NFS) whereas five years later 1986/87 (DHS, Ondo State) 27.6 per cent did not want any more children. Notwithstanding the rough nature of the comparison (- parity-specific figures would have been better indicators of preference, but are not yet available for the DHS), the data suggest a shift towards preference for a smaller family.

If the stated intention is matched with practice, then there are indications that use rates of contraception will increase in the near future in Nigeria. However, the actual prevalence rates show that for the same region (SW), the percentage of married women using contraception declined slightly in 1987 from what it was in 1982, although survey differences and reporting problems might account for this slight differential.

It is hard to see any other route for a substantial reduction of fertility in Nigeria apart from increased and efficient use of modern contraception by couples. However, great care and sensitivity are needed at all stages of programme design and implementation. For instance, the facts that in the community-based distribution programme in Oyo State, many acceptors were unmarried girls who use contraception for premarital sex, and that many married women acceptors do so secretly without the knowledge of their husbands (see Aboderin 1987) are potential dangers for the future success of the programme. Such statistics could make it more difficult to convince skeptics that family planning programmes do not encourage sexual permisiveness and infidelity.

Table 6.1 Percentage Of All Currently Married Women Who Do Not Want More Children By Current Age, And The Prevalence Of Contraception In The NFS (SW) And The DHS (Ondo State, SW).

	% NOT WANTING MORE CHILDREN		NUMBER OF CASES	
AGE GROUP	NFS	DHS	NFS	DHS
15-24	1.0	0.5	358	442
25-34	2.5	6.9	618	1045
35-44	9.1	32.0	391	921
45 +	24.0	71.0	84	424
ALL AGES	9.2	27.6	1451	2832
PREVALENCE OF CONTRACEPTION	7.6	6.1	1451	2832

Table 6.2 Family Planning Acceptors In The Oyo State Community Based Distribution Project.

Method	1981	1982	1983	1984	1985
Pill	38.083 (82.5%)	41.969 (82.3%)	97.934 (87.5%)	62.195 (66.8%)	73.639 (76.1%)
I.U.D.	2.757 (6%)	2.279 (4.3%)	1.323 (1.2%)	2.626 (2.8%)	1.577 (1.6%)
Condom	2.193 (4.8%)	3.643 (7.0%)	9.439 (8.5%)	26.764 (28.7%)	20.104 (20.8%)
Jellies and Foam	949 (2%)	2.004 (3.7%)	2.885 (2.6%)	1.400 (1.5%)	1.398 (1.4%)
Sterilization	25 (0.1%)	18 (0.1%)	70 (0.1%)	105 (0.1%)	105 (0.1%)
Depoprovera	2.147 (4.6%)	964 (1.7%)	36 (0.1%)	64 (0.1%)	–
Total Acceptors	46.154	50.877	111.687	93.154	96.823

Source: Aboderin (1987).

By the 1990s, individual demand for contraception is likely to increase in the urban areas, and probably more in the south than in the north. At the group level though, the effects of ethnic, political and religious interests on the trend of contraceptive prevalence are less predictable. For instance, a campaign to increase public awareness of population problems which was carried out in 1985 and 1986 showed that important sections of the Nigerian people are still resistant to the idea of checking excessive population growth (see Olusanya 1986, UN. 1988). The cost notwithstanding, it is necessary that programme officers from governmental and non-government agencies in Nigeria collaborate with research institutions to monitor changes in the 'group-level' factors, in order to ensure that the type of materials for information, education and communication (IEC) in Nigeria reflects sensitivity to them.

Although policies and activities to affect other socio-economic and proximate determinants of fertility are desirable and recommended, effort aimed at achieving the target of 4.0 total fertility rate by the year 2000 should be concentrated in family planning programmes. Government and private sector agencies which are involved in family planning need to develop dynamic information, education and communication programmes to deal with the fears and objections of the people. The present study highlighted subgroups of people who are making increasing use of contraception (see Chapter 5). More research on the characteristics of these people are needed in order to have insights into possible variables which could be introduced into programmes.

In conclusion, it would have been surprising if in the present thesis, national fertility was found to be falling in the decade of the 1970s given the very low prevalence of modern contraception in Nigeria in that period. There are no markedly unique patterns of fertility in Nigeria to suggest that fertility will remain resistant to efficient family planning programmes. Hence, the course of fertility

in Nigeria will depend on how much practical commitment is given to the family planning components of the 1988 Policy. Although details of the means of achieving the fertility target of the Policy are stated, it is too early to evaluate its performance. If properly implemented fertility target of the policy can be achieved.

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APPENDIX

COMPUTATION OF FERTILITY MEASURES.

(a) Cohort, Age and Period Fertility Rates.

For the computation of fertility rates, the age of a woman is measured in years at the time of the survey. Period is measured in completed years from the time of the survey. Three alternative basic fertility rates which can be computed from maternity histories by age of women and period are as follows;

(i) Cohort-Age rates, which are computed with births classified in terms of women's cohort and their ages when they had the births, viz,

$$p(c,a) = b(c,a)/n(c) \quad \ldots\ldots\ldots\ldots (1)$$

where p(c,a) is the fertility rate for a cohort c at age a, b(c,a) is the number of births occurring to cohort c at age a and n(c) is the total number of women in cohort c. The rates can be cumulated to the end of age a to give the mean parity P(c,a) achieved by a cohort from the beginning of childbearing age a(o) to age a, thus,

$$P(c,a) = \sum_{a'=a(o)}^{a} p(c,a') \quad \ldots\ldots\ldots\ldots\ldots (2)$$

(ii) Cohort-Period rates are computed with births which are classified in terms of the cohort of women and the period in which the births occurred, or

$$f(c,p) = b(c,p)/n(c) \quad \ldots\ldots\ldots\ldots\ldots (3)$$

where b is the number of births which occured to a cohort c in the period p, and there are n number of women in the cohort.

The rates can also be cumulated as,

$$F(c,p) = \sum_{p'=p}^{c-a(o)} f(c,p') \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots (4)$$

where F is the cumulative fertility of a cohort c by the end of period p, c-a(o) is any period of beginning of fertility following age a(o) which is the starting age of childbearing.

(iii) Age-Period rates are computed with births which are classified by period of occurence and age of women at the time of the births, or,

$$f(a,p) = b(a,p)/e(a,p) \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots (5)$$

where f(a,p) is the fertility rate for age a in period p. e is the person-years lived by the women

aged a in the period p. Cumulative age-period fertility R is given as,

$$R = \sum_{a'=a(o)}^{a} r(a,p) \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots (6)$$

These three measures involve a rearrangement of basically the same information and they produce results which are not too dissimilar numerically although one may be preferred in a particular analysis depending on the analytical objective. Cumulative cohort-age rates (equation 2) are a better control for age at childbearing

and therefore are more suitable in the examination of age patterns of fertility for real cohorts. Age-period rates are essentially the same as the conventional age-specific fertility rates. For an analysis of trends, the cumulative fertility for a synthetic cohort (equation 6) is preferable. (In practice though, analysts have no consensus of opinions on this last point. Ryder (1982) for instance prefers analysis based on cohort experiences, while others, eg Hobcraft and colleagues (1982) prefer to examine data by cohort and period. These preferences do not show any fundamental disagreement over method but reflect a recognition of, and attempts to handle one of the problems in demographic analysis, namely the disturbances introduced by period effects on cohort measures, and vice versa.)

The ratio of the reported cohort fertility (P) to the reported period fertility (F) which are cumulated to the same age from arrays of cohort-period fertility rates is a very important measure for the analysis of trend as well as for assessment of data errors. This measure, the P/F ratio is given as,

$$P/F\ Ratio(p,a) = P(a,p)/F(a,p) \quad .....(7)$$

The P/F ratios computed with equation (7) would include rates in cells which are shared by both Ps and Fs and these tend to pull the results towards unity (See Hobcraft and colleagues 1982). If the common cells are excluded, this slightly restates equation (7) as,

$$P/F\ Ratio\ (p,a) = ((Pp+1,a)/(Fp,a-1) \quad ....(8)$$

where Ppa is cumulative cohort fertility to age a and period p, and Fpa is cumulative period fertility in period p to age a.

The P/F ratios presented in this chapter were computed

with the common cells included in order to maintain easy comparability with the majority of WFS results and especially the First Country and evaluation reports for Nigeria.

These measures are illustrated with the six lexis diagrams in Figure 3.1. Diagrams 1 and 3 are rotated into 2 and 4 respectively and show cumulative rates for synthetic (2) and real (4) cohorts. The lifetime fertility of say, the women aged 45-49 at the survey would be given by the cumulative fertility in the following cells in diagram 4;

P8,1 when aged 45-49 (0-4 years prior to the survey)
P8,2 when aged 40-44 (5-9 years prior to the survey)
P8,3 when aged 35-39 (10-14 yrs prior to the survey)
P8,4 when aged 30-34 (15-19 yrs prior to the survey)
P8,5 when aged 25-29 (20-24 yrs prior to the survey)
P8,6 when aged 20-24 (25-29 yrs prior to the survey)
P8,7 when aged 15-19 (30-34 yrs prior to the survey)
P8,8 when aged 10-14 (35-39 yrs prior to the survey)

Similarly, the cumulative fertility experience of a synthetic cohort which has completed childbearing in the most recent five years would include the value in the cells given below:

Age groups of Women At Survey	Cumulative Period Fertility	
10-14	F1,1	<< should be zero because in the NFS only the women age 15-49 at the time of the survey were selected for the individual interview)
15-19	F2,1	
20-24	F3,1	
25-29	F4,1	
30-34	F5,1	
35-39	F6,1	
40-44	F7,1	
45-49	F8,1	

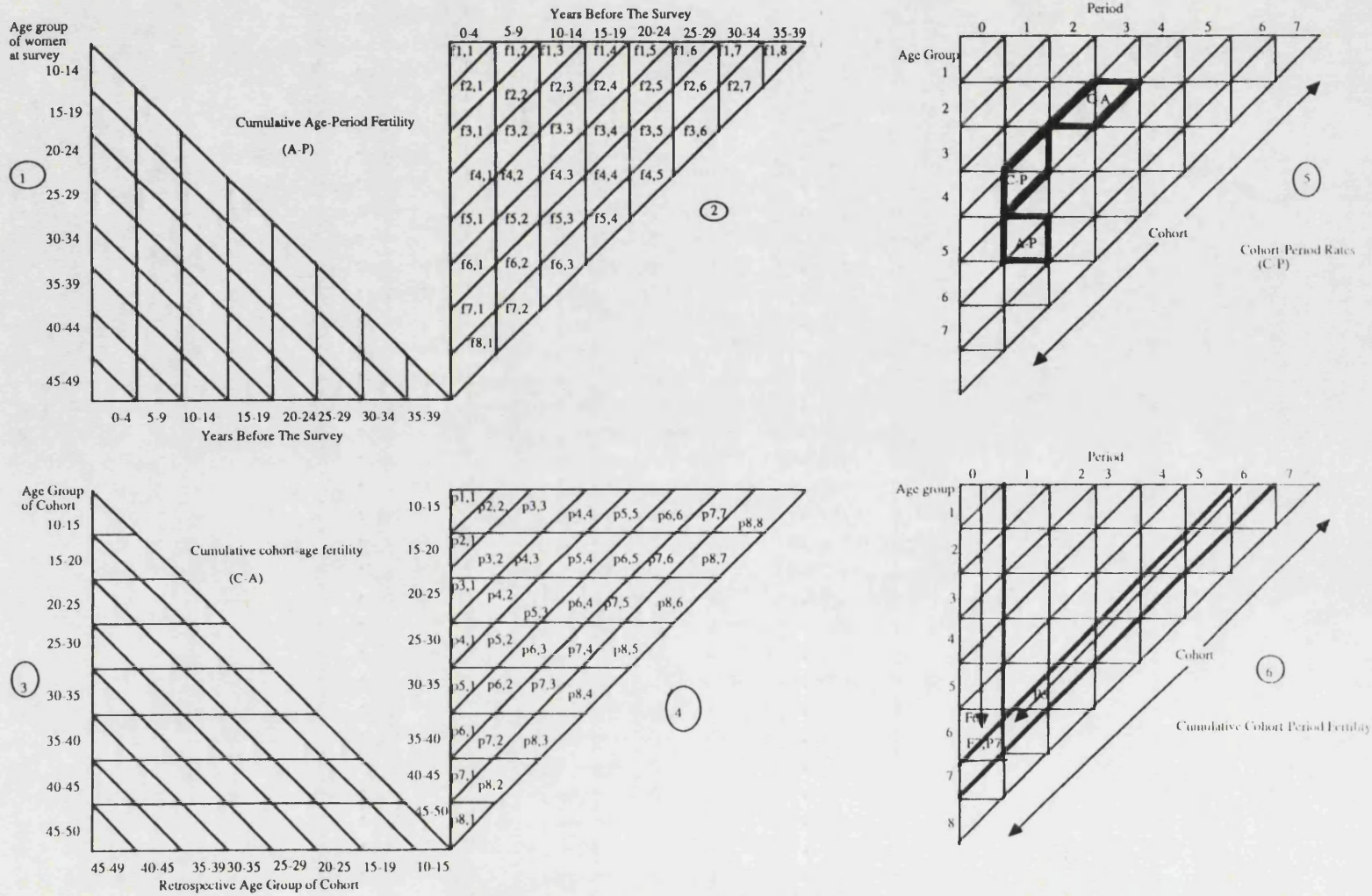

Figure 3A Lexis Representations Of Age-Period, Cohort-Age And Cohort-Period Fertility And P/F Ratios In 5-year Age Group And 5-year Intervals Before The Survey.

The positions of the cells in the arrays of cohort-period fertility rates for the three different rates are illustrated with diagram 5.

The cohort-period fertility rate for age-group 30-34 in 5-9 years prior to the survey would be computed with the number of births and woman-years of exposure in the fractions of cells enclosed as C-P. Similarly, the cohort age rate for women aged 30-34 at the survey when they were aged 15-19 and the age-period fertility rate for women aged 30-34 in the 5-9 years prior to the survey are computed with values in the area enclosed by C-A and A-P respectively.

The P/F ratios are calculated as shown in diagram 6. For example the P/F ratio (including the common cell) in the 0-4 years prior to the survey at age group 40-44 equals P7/F7 from cumulative cohort-period arrays. To exclude the common cell from the calculation, the P/F ratio would equal P6/F6 in diagram 6.

Discussion of problems such as selection and truncation are not pursued (see Hobcraft and colleagues 1982, Ryder 1982 and also Hobcraft and Murphy 1986) However, specific assumptions are made as a way of overcoming some of the difficulties which arise in computations. These assupmtions are discussed in the text.

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Graph points for Figure 3.2. Regional trends in age at marriage. 1960-1979. (% marrying at each group of age at marriage)

Age at marriage	YR	NE	NW	SE	SW
Under 14 Yrs	1975-79	28.3	30.0	5.0	2.0
	1970-74	25.2	29.8	10.1	4.8
	1965-69	30.1	30.1	20.2	9.0
	1960-64	26.4	30.1	15.0	6.1
Age at marriage					
14-15 years	1975-79	29.0	36.2	21.0	8.0
	1970-74	27.4	36.1	23.1	11.2
	1965-69	29.6	38.2	21.0	15.8
	1960-64	32.1	32.1	24.5	13.6
Age at marriage					
16-20years	1975-79	33.0	28.0	51.0	54.6
	1970-74	35.8	34.2	50.0	54.4
	1965-69	29.6	35.0	40.0	39.8
	1960-64	31.3	30.0	43.2	51.0
Age at marriage					
21 yrs and older	1975-79	9.9	2.5	24.0	34.4
	1970-74	7.0	4.8	13.8	26.3
	1965-69	6.1	4.9	15.1	33.0
	1960-64	5.0	0.4	11.0	22.4

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