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FERTILITY LEVELS, TRENDS AND DIFFERENTIALS IN PAKISTAN: EVIDENCE FROM THE POPULATION, LABOUR FORCE AND MIGRATION SURVEY 1979-80

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PREFACE

The need for 'endogenizing' demographic variables in development planning is now widely recognized. The planners have to spread their analytical net wider to capture in one 'go' both the demographic and socio-economic variables. This requires an explicit recognition of the two-way link between changes in fertility on the one hand and those in labour market, wages, income distribution, consumption, savings, investment and other variables on the other. The research work done so far in Pakistan has inadequately addressed itself to this two-way linkage between demographic and socio-economic phenomena. Researchers, constrained by limitations of both data and analytical framework, have tended to study the demographic phenomenon of fertility in isolation from such related matters as labour force participation, rural-urban migration and income and expenditure patterns. These studies have failed to analyse simultaneously the demographic, production and consumption decisions of households. For instance, high fertility rates are generally attributed to biological determinants alone which can be influenced by large supplies of such clinical devices as contraceptives. Such notions about the fertility behaviour of the households have given birth to ineffective government policies. That the many population planning adventures, taking mostly the form of crash programmes, undertaken so far have foundered should not surprise anyone. Fertility, like love that sustains it, is a many-splendoured thing. It must be seen in a broader socio-economic context.

The nature of the influences of economic forces, both direct and indirect, on fertility behaviour should therefore constitute a major area of concern for social scientists and policy makers. To make a start in

this direction, the inter-linkages between such variables as fertility, labour force participation and migration and their effects on the household income and expenditure behaviour must be studied. Such a study should permit us to understand better the decision-making process of the household, which is the basic unit in both the demographic and economic analyses. Research studies of this genre have already been carried out in many other developing countries and have provided gainful insights into the determinants of household economic-demographic behaviour. However, in Pakistan the present exercise is the first of its kind.

In order to understand better the economic-demographic interface the project entitled "Studies in Population, Labour Force and Migration" has been undertaken by the Pakistan Institute of Development Economics in collaboration with the ILO and UNFPA. The project is a 'four-in-one' venture based on a national sample, the field-work for which was undertaken by the Statistics Division (formerly called Central Statistical Office, or CSO for short) covering 10,288 households. The survey generated a wealth of data on the household decision-making process concerning the behaviour of the connected foursome — viz. fertility, migration, labour force participation and income and expenditure. Every effort has been made to ensure reliability of the data. This study, which is being brought out in the form of a series of seven 'first' reports, would enhance our understanding of the behaviour of households with respect to the various ways in which they go about fulfilling their 'basic needs'. Even more important, it should lay the foundations of economic demography in Pakistan, opening up new areas of multi-disciplinary research that could not be perceived before. This study should also provide the researcher with a sufficient feel for the real world to permit formal economic-demographic modelling exercises. In this respect the present reports are truly pioneering both in intent and in purpose.

Syed Nawab Haider Naqvi

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1. INTRODUCTION

Whilst rates of population growth have declined in a number of East and South-East Asian countries, (Mauldin, 1976), the most recent indication, based on 1981 population census, is that in Pakistan, the population is growing at a rate of around 3 percent per annum (census, 1981). Notwithstanding this somewhat constant population growth rate, few recent studies reported an appreciable change in the nuptiality pattern in the country (Alam and Mehtab,1983). The singulate mean age at marriage (SMAM) rose by nearly 3 years between 1951 and 1981[1]. Since a rise in age at marriage may affect the tempo of fertility in the first few years of married life, which in turn influences both the cohort and the period rates, it deserves a very careful scrutiny. Ryder (1976), for instance, notes that "the later a birth occurs in a woman's life, the smaller is its discounted contribution to annual growth"[2]. A shift of childbearing from early stage of reprodcutive span to later tends to exhibit a decline in period fertility, while a reversal in the time pattern of reproduction generates different indicator - a rise in period

1. It should, however, be recognized that in situation where age at marriage is rising a fast rise in SMAM underestimates the trend.
2. The intrinsic rate of natural increase varies inversely with the length of a generation.

fertility.[3] Sri Lanka is a typical case of a South-East Asian country in which period fertility rates have fallen rapidly during the last 25 years, initially because of changes in marriage patterns (Alam and Cleland, 1981). In Pakistan, analysis of the PFS data has indicated that there was a modest decline in fertility during the 1960-75 period, mainly in response to rising age at marriage (Alam, 1983).

Unlike many of the countries in South Asia, there are very few studies on demographic processes in Pakistan. Alam's finding are based on the results of only one survey, the Pakistan Fertility Survey (PFS), and one cannot rule out the possibility that the observed fertility decline may be an artifact of data even though the detailed evaluation of the data has allayed those fears (Booth and Shah, 1983). Thus the objectives of the present report are twofold: (1) to analyse in some detail the fertility data collected in "Population, Labour Force and Migration" (PLM) Survey of 1979; and (2) to compare its findings, wherever necessary, with those of PFS (particularly for current fertility) and other surveys.

The report is organized into eight sections. Section 2 is a brief review of earlier fertility levels and trends. Discussion of the PLM Survey and its methodology finds its place in section 3. In Section 4, we have discussed the current parity (children ever born to women at the time of

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3. The proportional change in the mean age at child-bearing is converted into an equivalent, but inverse proportional change in ultimate population size (Ryder, 1976).

the survey) by age, marriage duration and age at marriage, as well as differentials in current parity. Early marital fertility is discussed in section 5. The next two sections provide brief accounts of current fertility.

In order to structure our analysis we have identified the women either through their birth cohorts (current age) or their marriage cohorts (years since first marriage). Realizing that the two fundamental aspects of a woman's child bearing life - the number of children she has had and the tempo of her having had them - cannot be fully separated as the results based on one type of measure do not always correspond to those obtained through another. We have, therefore, presented a brief synthesis of various findings in the concluding section.

2. FERTILITY TRENDS

In Pakistan there has been a paucity of reliable statistical information on fertility even though, to some extent, the country has been better off in this respect than many other developing countries. Periodic censuses have been conducted since 1881. A vital registration system has also been in existence since the early part of this century but the data it has yielded are very inadequate. This unavailability of data has been partly overcome since the early Sixties by periodic demographic surveys, the first of which, the Population Growth Estimation (PGE), was conducted in 1962-65. Subsequently, five more surveys, two of them being lognitudinal Population Growth Surveys (PGS) of 1968-71 and 1976-79, and three cross-sectional surveys - the National Impact Survey of 1968-69, the Pakistan Fertility Survey (PFS) of 1975, and the Population, Labour Force and Migration Survey (PLM) of 1979-80 - have been undertaken. Results from some of these surveys with varying details have already been published. All the available estimates of fertility obtained through these surveys are provided in Table 1.

The Population Growth Estimation Project (PGE) was a survey of dual record type. Estimates of fertility and mortality are available from the Cross-Sectional (CS) and Longitudinal Registration (LR) methods of data collection, as well as from the application of the Chandrasekaran - Deming (CD) technique. Because of the under-enumeration of births and deaths in the CS system, the final report of the survey gives

results only for the LR and CD methods. Even the LR estimate of the Total Fertility Rate (TFR) of 6.1 for the 1963-65 period is considered to be an underestimate (Haq, 1974; Planning Commission, 1969; Afzal, 1977). The Chandrasekaran-Deming (CD) estimates have their own limitations because of the considerable variation according to the matching procedure used (PGE, 1971) and non-adjustment for the base population. Thus, published estimate of 8.0 for 1963-65 based on CD is generally considered to be an overestimate. Subsequent researchers (Planning Commission, 1969; Afzal, 1974) have accepted a TFR of 7.0, an average of LR and CD estimate and there appears a consensus upon the plausibility of this estimate.

The second survey, the Population Growth Survey (PGS), undertaken in 1968 continued through 1971. A modified PGE methodology was used. Initially monthly enumeration on a larger number of sample points (64 as against PGE's 12) was envisaged. However, due to cost and respondent fatigue the actual sample size was reduced to half, and monthly enumeration was substituted by quarterly enumeration with an overlapping 3 month period wherein respondents were asked to report births and deaths for the last 6 months, rather than the last year as practiced in PGE. These modifications hardly improved upon the results yielded by PGE (CS) (not shown in Table 1.1) which are generally regarded as underestimates for the 1968-71 period (Afzal, 1974).

The National Impact Survey (NIS), conducted in 1968-69, covered a sample of nearly 3000 ever-married women whose detailed

pregnancy histories were obtained. The quality of the NIS data has not been systematically evaluated and a preliminary analysis using the P/F ratio method[4] indicated very inconclusive results. The restriction of the data to the 10-year period preceding the survey precludes a thorough evaluation.

The Pakistan Fertility Survey (PFS), carried out in 1975 with the WFS assistance, is the most recent cross-sectional survey, for which data are available. The analysis of its maternity history data confirms the findings of the earlier demographic surveys that fertility was very high during the Sixties, a TFR of 7.1. However, for the early Seventies it showed some decline. The TFR for 1970-75 period is estimated to be around 6.3[5]. A decomposition of this decline suggests that nearly 3/4th of it is due to changes in nuptiality, a fact consistent with the observed rise in age at marriage in Pakistan.

The data of the PGS 1976, 1977 and 1978 on the contrary indicate that fertility has not changed and the TFR is still around 7.0. An interesting feature of these data sets is the suggestion that the fertility curve is shifting towards older ages. These data sets are not yet evaluated and it is premature to give any weight to them. But if it is true, then it has wide ranging policy implications.

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4. As the NIS did not collect detailed age, sex and marital status data for the sample households, the age-specific fertility rates and children ever born to all women were calculated by deflating the marital rates and children ever born reported to married women by the proportion married reported in the 1972 Population Census. In order to reduce the probable impact of age and marital status distributions, the exercise was repeated using PGE 1968 data. The results did not change much.

5. As a first reaction, one might suspect that this decline may well be the result of some systematic shifting of births into the past. It is, however, not sustained by the evaluation of the PFS data /Booth & Shah(1983), Lesthaeghe and Shah (1982)/.

A comparison of age specific fertility rates obtained through various surveys shows some interesting pecularities. For the 1960-65 period the PFS rates are generally higher than the PGE (LR) rates and lower than PGE (CD) rates. The substantially lower rates for the 15-19 age group in the PGE are puzzling. Whether this is due to biases in age reporting in the PFS or the PGE or due to under-reporting of births in the PGE is difficult to ascertain. However, in the light of the low age at marriage in early sixties, the PGE rates for 15-19 age group seems to be on the low side. Curiously enough while the LR and CD estimate differ substantially for ages after age 20, they are similar for the 15-19 age group. This similarity of estimates becomes more suspeot in the context of Pakistan where the majority of women return to their mothers' homes for the delivery of their first baby and thus chances of missing these births in the LR system may be very high. In that event the CD rates are expected to be very different from the LR rates.

A comparison of the age-specific fertility rates for the period 1965-70 as obtained through the PFS with those obtained through the PGS (1968-71), suggests that either the births for younger women in PGS are grossly under-reported or there was systematic over reporting of births in the PFS. In the light of the available evidence , it seems more palusible that the PGS rates are incorrect. The recently released results for the PGS for 1976-78 show exactly the opposite tendency. The estimated TFR of 6.9 is substantially higher than that of the PFS

(6.3) for 1970-75 period. The main divergence in the estimates is for age group 15-19 where the PGS rates are lower and for older ages, 35 and over, where the PFS rates are lower. It seems highly improbable that fertility may have increased at higher ages as implied by a comparison of PGS 1976-78 with the remaining surveys. It appears that the PGS estimates suffer from a severe age exaggeration at higher ages. It should, however, be mentioned that this is a very tentative conclusion and a through analysis is needed to arrive at a definitive conclusion.

The summarize, it appears that fertility levels in Pakistan over the last 20 years have remained more or less unchanged. Some decline in fertility during early Seventies suggested by PFS is not supported by the PGS-II data. Thus, no entirely consistent and clear picture has emerged. As mentioned earlier, one of the aims of this report is to reassess not only fertility levels and trends in Pakistan, but the relative contribution of changes in nuptiality to the overall fertility during the last 15 years.

3. DATA AND METHODOLOGY

The PLM survey is based on a random sample of 11300 households, representing 94 percent of the total population of Pakistan.[6] Selected households were visited in 1979-80 by specially trained female interviewers. The fertility survey being a part of the bigger undertaking[7], the field supervisors were males from the data gathering agency, the Federal Bureau of Statistics. All ever-married women up to the age of 50 years were interviewed from amongst the selected households. In all 10093 eligible females were successfully contacted and interviewed.[8] It may be mentioned that unlike the PFS in which household characteristics were collected along with the detailed individual interviews, the PLM eollected the household data as part of the migration module. To some extent, this change in procedure has made it difficult to directly estimate the fertility measure based on sample, inclusive of all females.

3.1 The Questionnaire

The fertility module used in the PLM is the same as was adopted for the PFS. It is divided into six sections, with a cover sheet which contained such information as identification of the sample household, the number of visits required to obtain the interview, the duration of interview and details about field

6. Close to six percent of the population was excluded from the sample owing to logistic and administrative considerations.

7. For details, see Irfan, 1982.

8. At editing stage, at least 23 questionnaires were found incomplete and were excluded from the data files.

and administrative control, and an end sheet describing interviewer's impressions about the accuracy of the responses and the level of respondent's cooperation. In section 1, information was obtained about five major items of respondents 'background: present residence, type of place in which women lived in their formative years, age, literacy and education. There were two questions relating to the age of the respondent. The respondent was first asked about the month and year of birth. Whether or not this was obtained, the respondent was then asked to give her current age. The interviewers were specially trained to probe in detail wherever it was found necessary (for example, by referring to other events in the respondent's life). This section was followed by a section on marriage history, where, again, special attention was paid to dating of events. If the calendar year of marriage could not be obtained, the respondent was asked to give her age at the time of her marriage. If the year of termination of a marriage could not be obtained, the respondent was asked to give the duration (in completed years) for which she and her husband lived together in that marriage until it was dissolved by divorce, separation or death of her spouse.

Section 3 collected the data on maternity history as well as the following detailed information on:

(1) Live births by sex and date of occurence; incidence of infant and child mortality; pregnancy wastage and current pregnancy status. In order to enhance the accuracy of the responses, two sets of information were collected in this

section on fertility. First, four questions (the number of sons in the households, the number of sons not currently in the household, the number of daughters in the household, and the number of children who died) were asked of all ever married women in the sample. These were to get the total number of children ever born. The advantage of this procedure, of course, is that it maximizes the recall of children who died and of children who left the house, the group of children - which older women with high parity are likely to forget if they are not specifically called to her attention.

(2) A complete birth history of each woman, including information pertaining to dates of all births, their sex and survival status was obtained. Dates of births were collected in terms of the calendar year and the month of birth, but if this could not be recalled by the respondent, she was asked how many years earlier the birth occurred. In order to improve the coverage of births, separate information on non-live births and pregnancy losses was collected. Only a few live births were uncovered through this method. Any discrepancies in the total number of live birth obtained in the two steps were reconciled at the time of editing in the office.

Data on knowledge and use of contraception were collected in Section 4. The respondent was asked to name the contraceptive methods she knew of. She was then asked if she had ever used any or all of the methods named by her. Contrary to the practice followed in other similar surveys, in the PLM if she did not spontaneously mentioned any contraceptive method,

no detailed description of the method was read to her. The next section dealt with detailed probing of fertility regulation and the respondent's exposure to mass media, where information was gathered on the desired number of children, intention of future use of contraception, attitude towards induced abortions, etc.

In Section 6 information on the work history of respondents was collected in two parts. In part one details were obtained on occupational information about respondents' current work or more recent work since marriage. The second part obtained information on the nature of the respondents' work before marriage. In the last section, information was collected regarding the background of the respondents' current (or last) husband in terms of literacy, education and employment.

It should, however, be mentioned that these data sets have not yet been subjected to the most thorough methods of evaluating their quality. On the other hand, measures of fertility, such as birth intervals, duration of lactation, etc, which depend heavily upon a precise dating of the events are not included in this report. The fertility measures discussed in this report are expected to be less affected by the quality of the data.

3.2 The Methodology

Fertility data collected in a cross-sectional survey can be classified according to either (1) age-period, or (2) age-cohort, or (3) period-cohort. We have decided to present the results in terms of the age period and duration (years since first marriage) period rates. One of the major factor influening our

decision was the need to compute rates which are analogous to available estimates (i.e. age-period rates) so that various estimates could be easily and profitably compared. If the critical appraisal of the fertility data however, indicates variable reliability across cohorts, necessitating differential treatment of different cohorts, the future research work will have to deal with the period-cohort rates.

It should be recognized that one of the major drawback of analyzing the fertility trends from a cross-sectional survey of ever married women is the exclusion of those women who had never married by the survey date, a problem of particular importance in Pakistan, where age at marriage is changing rapidly. The problem of the selection of the sample is further complicated when the sample is restricted to ever-married women under 50 years of age. For such data, when classified by age or duration, information becomes progressively less complete at higher age and with the increase in the length of period before the survey; particularly in case of earlier periods of duration specific rates for women marrying at young ages. For example, at duration X for a period of Y Years before the survey, the rates are confined to women who first married before the age 50 - (X + Y). There is no perfect solution to these selection biases except that the analyst has to decide at what point the historical perspectives suffer from data limitation. In this report the main analysis of fertility trends is confined to the past 20 years preceding the survey, which fortunately encompasses the period for which

similar rates are available from other sources as well.

The PLM data, like those from similar surveys suffer from sampling and non-sampling errors. In the analysis of the results, the relative importance of the two types of errors depends upon the size of the sample design and the amount of time spent in training the interviewer, the field control procedures, respondent's cooperations, etc. A critical examination of all these factors will be undertaken by the future users of the data. However, just as a rule of thumb, in a properly designed large scale sample survey with a size of 20,000 or more households or individuals, the non-sampling errors tend to be more important then sampling errors (see Little, 1981). For the sample size of 10,000, however, this generalization may not hold true.

In order to reduce the probable impact of sampling variability and the effect of possible mis-reporting (in terms of time) of births, on the fertility estimates discussed in this report, we have restricted our analysis to five-year reference periods. However, considerable caution is still necessary in the interpretation of results based on small sub-groups of women such as the metropolitan resident, respondent with some schooling, etc.

4. CUMULATIVE FERTILITY

One of the most commonly used measure of fertility is current parity, that is, the mean number of children ever born to women upto the time of the survey. It is measure of quantity of fertility representing accumulation of the number of live births each woman had by the time of the survey and makes no reference to 'tempo', since the number of children ever born is closely associated with the periods of time that females have been exposed to child bearing. In order to control for exposure period, the tables discussed in subsection use either current age or years since first marriage (generally referred to as duration for convenience) as a measure of the length of time for which woman had been exposed. The use of current age as a control variable is based on the fact that, on average, women tend to attain similar fecundity at the same age. One of the drawbacks of current age, in this regard, is that it ignores the fact that there are much wider differences between women in the age at which women marry and hence are exposed to risk of child bearing. For this reason, the year since first marriage is a better control variable for cumulation of fertility than current age in many respects. One advantage of current age, however, is that it gives an indication of the number of remaining years of reproductive life of the women.

It is to be expected that the number of children ever born to women will increase steadily with current age and with years since first marriage. Table 2 shows the percent distribution according to the number of children ever born

and the mean number of children by these two demographic variables. In interpreting the results, however, the above limitations should be kept in mind.

For the sample as a whole the mean parity is 4.0 as against 4.2 PFS 1975.[9] As is expected the mean increases steadily from nearly half a child for women under 20 years of age to close to 7 children for women aged 45-49. The data clearly bring out the fact that fertility in Pakistan is still very high. Those approaching the end of their reproductive life (woman 45-49 years of age), nearly 28 percent have at least 9 children. Even women aged 30-34 at the time of survey, reported that nearly one-third of them had six or more children. This suggests that these women may end up with close to what the older cohort had achieved.

The incidence of childlessness in Pakistan is quite low, only 2 percent of women aged 45-49 have remained childless by the time of the survey. For the sample as a whole 12 percent of the women were without a live birth, the percentage declines from 65 for youngest cohort to nearly 3 to 35-39 years old women, then it remains nearly unchanged.

Roughly similar results are obtained through bivariate classification of current parity and years since marriage. The proportion of childless marriage, however, is somewhat lower in most cases when duration is used as a measure of exposure, and is only one percent for women

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9. The age standarized mean are 4.1 and 4.0 in PLM and PFS, respectively.

married 30 years or more. The mean number of children for those with shortest period of exposure is 0.7, but rises to 6.8 and 7.1, respectively for those first married 25-29 and 30 or more years ago.

Another way of describing a women's completed fertility is in terms of parity progression ratios (PPR), i.e. the proportion of women who move from one parity to a higher parity. The PPR of 98 for parity zero in Table 3 means that 98 percent of women had moved from parity zero to parity 1. There is no parity at which the ratios register an abrupt decline, which suggests a more or less natural fertility behaviour and an absence of any fertility control. The decline is rather very gradual and even at parity 8, 69 percent of women will have at least one more birth.

A comparison of the number of children ever born to ever married women with those obtained in the PFS and the 1981 Population Census is presented in Table 4. It is interesting to note that census estimates up to age 30 are in close agreement with those obtained in the PLM, however, at older ages these are substantially lower. This is not surprising. We have already pointed out that the reported completeness of births improves if through separte questions women are reminded of sons and daughters, living in the house, away from home and of dead by the time of the survey, a procedure adopted in the PLM but not in the census, where only one question was asked about the number of children ever born. The young women, because of the recency of the events and because

of the children still living in the household are less likely not to report a live birth than older women, as is obvious in the census data. The differences in average parity increase by age and at ages 45-49 the difference is over one child.

The PFS estimates are, however, always higher than the PLM estimates. There may be two reasons for this: (1) that there may be a systematic under-reporting of births in the PLM or over reporting of births in PFS; and (2) that the rise in age at marriage has reduced the period of exposure to risk of pregnancy and hence led to fewer births in the PLM. The completeness of the two surveys is unlikely to be much different and at ages 45-49, the mean parity in the PFS and the PLM is very close. Thus we are left with the possibility that the rise in the age at marriage might be interacting in a way that it changes the current parity distribution by age. In the following paragraphs we have explored this possibility in some detail.

Data on the mean number of children ever born by age at marriage and duration since first marriage, controlling for current age, are presented in Table 5. The main effects of late marriage, is that females are expected to end up with fewer births because of shortening of exposure to pregnancy period, particularly in a society where birth control practices are not widespread.

In Panel A of table 5, it appears that age at marriage has a significant impact on fertility. The first row of Panel A, those married before age 15, show consistently higher fertility than those in lower rows. For example, for

age group 30-34, those who marry at age under 15 have a mean parity of 5.3 as against 3.9 for those who marry at age 20-21. Even at age 30-35, the contrast is very significant, a difference of nearly 2 births between those who marry very young (15) and those who marry late (after age 22). However, the differences at older ages, 40-49 years, are less striking and are probably indicative of 'catching-up' of late marrying women. If data are to be trusted, then it appears that age at marriage has a very pronounced effect on fertility, those who marry at less than 15 years of age have on an average 4.8 births as against 3.5 for those marrying between ages 22-24. We may add that the last row of the table which relates to those married at age 25 or later, is an open group and their mean parity of 3.0 is somewhat misleading.

Conclusion that one draws immediately after looking at these estimates is that with the rising trend in age at marriage, the fertility is likely to go down irrespective of the family planning programme. However, this is partly true. The possibility of 'catching-up' by later marrying women cannot completely be ruled out and we have already seen that for the oldest cohort, the differences are not that significant. A somewhat clear picture may emerge when we analyze the data for marriage duration cohorts, presented in Panel B of the said table.

The mean parity rises from 0.7 births for those married less than 5 years to 7.1 for those married for 30 years and more. The most fertile cohorts are 10-14 and 15-19 years since marriage, a period of peak fecundity. It appears that age at marriage in itself has little impact on fertility at shorter

marriage durations. In the first column, the data suggest that teen-age marriages are relatively less fertile, at the initial phases of the reproductive span. However, they end up with more births because of longer exposure period. The decline in fertility due to delayed marriage is observed for those females who are either in their late thirties or early forties which is plausible owing to onset of the decline in fecundity by that age.

A synthesis of the data presented in Panel A and B, clearly shows that the large differences in CEB associated with age at marriage in Panel A are due to differences in marital exposure. Once we control for this, the differences between early and late marriage cohorts narrow down considerably.

4.1 Differentials in Cumulative Fertility

Differentials in the fertility of the women of ages 45-49, who have essentially completed their family size, suggest that these women in their span of reproduction on an average have produced 6.8 children (Table 6). The unadjusted figures reveal that fertility in urban areas is higher than in rural areas; that NWFP has the highest fertility and the Baluchistan has the lowest; that women with some education have low fertility; and that women who are in labour force both before and after marriage are relatively more fertile. However, these differentials change substantially when we look at standarized means (standarized for age composition). The urban fertility is lower than rural; there are no differences between educated and uneducated women. In order to further

clarify the differentials, in the following paragraphs we present the results based on a regression exercise.

Multiple regressions (O.L.S) were run seperately for Pakistan and rural as well as urban areas. Furthermore, in order to reckon with the cohort or vintage effect, if any, sub-classification of the sample according to broad age groups of female was made. Few major demographic and other variables - female age, age at marriage, female and male education, mortality experience and contraceptive use - served as independent variables while Children Ever Born (CEB) being the dependent variable. Variables are defined in Appendix Table A2.

Results reported in Appendix Tables No. A3-A5 indicate that despite the limited number of explanatory variables, the model explains more than half of the variance. Proportion of the explained variance, however, declines when estimation is confined to a specific age cohort. Given the cross-sectional nature of the data, R^2 is adequate in all the estimated equations. Direction of the association between independent variable and dependent variable is generally plausible and in most cases the coefficients retain their signs in different equations. A brief discussion pertaining to each variable is provided below.

Female Age: A non-linear relationship between age and Children Ever Born (CEB) is obtained for Pakistan, rural and urban areas for all females. This result simply indicates female adolescent sterility at the young age and fecundity impairment at the older ages. In case of cohort specific

regression equations, the relationship is not significant in some cases for rural and urban areas. At the Pakistan level the variables are, however, significant across different female age cohorts except for the young (less than 25). The sign of the age squared coefficient turns positive, suggesting that CEB is an increasing function of age, a fact consistent with the earlier evidence that peak fertility is observed for females of ages 25-34.

Age at Marriage: Female age at marriage consistently emerged as negatively associated with the cumulative fertility, indicating the effect of curtailment in reproductive span through rise in age at marriage. It retains the significance and direction of association in all the equations. A perusal of the results for different age cohorts suggest that the size of the coefficient diminishes as one moves from the younger to the older cohorts. For instance, the coefficient for age group of 45-49 is roughly half of that of less than 25 years. This is reflective of catching up phenomenon as discussed earlier. The tendency appears to be higher in the rural areas as compared to the urban.

Female Schooling and Education: Two seperate variables, school attendence and the level of education (primary and higher) were used to assess the relationship between fertility and female educational attainment. Both the variables, of schooling and education, failed to qualify the customary significance level, a finding contrary to what we have observed in the bivariate analysis for the cohort 45-49.

However, for the age cohort of 25-34 the female schooling is negatively associated for Pakistan and urban areas. No such relationship is found for rural areas.

Female Labour Force Participation: Whether female work participation yields any influence on fertility was assessed by incorporating a seperate variable in the regression equation. Female labour participation according to the results hardly carries any effect on her reproductive behaviour. Given the pervasive self-employment of females in the family based enterprises, where child rearing and work can be attended simultaneously, such a result is hardly surprising.

Husband's Schooling and Education: Husband's education is often assumed a proxy of the socio-economic status and income of the household. Relationship between husband's education and fertility is expected to be positive. In the estimating equations two binary variables EM_1 (below matric) and EM_2 (matric and higher) and a school attendance variable were specified. The results indicate that higher level of husband's education (EM_2) is significantly negatively associated for Pakistan and for the urban areas for the sample as a whole. The other two variables (school attendence and EM_1) hardly exhibit any significant relationship. For rural areas none of the variable pertaining to husband's education or school attendance reflected any significant association. At sub-group level the negative relationship between husband's education and fertility is significant only for female belonging to age

groups of 35-44 for Pakistan and for Urban areas. For the remaining age groups the coefficients are in-significant. The inverse relationship between higher level of education of husband: and cumulative fertility presumably is reflective of substitution of quality for quantity of children. The inter-relationship between parental investment in child quality, and fertility level are, however, explored in detail in a companion paper (Irfan and Farooq, 1983).

Husband's Work Status: Husband's work status influences the fertility outcome through the value of children. If father can employ his children at younger ages the economic value of the child is enhanced for the family. The regression results are indicative of a positive association between self-employed and fertility. The relationship is, however, significant for Pakistan and rural areas only. The results are plausible, because self-employment in rural areas is mostly in the agriculture sector where children can be easily absorbed .

Infant - Child Mortality: A variable IM, proportion children died, is specified in the estimating equations for determining the influence of infant mortality on CEB. The variable is positively associated and is significant in all the equations. The size of the coefficient increases for the older age cohort suggestting that longer reproductive span permits higher level of replacement. It must be mentioned that this variable is not independent of the dependent variable. Hence estimation procedure suffers from simultaneity problem.

Contraceptive Use: The variable (EUF) indicating the use of the contraceptive turned out to be significantly positively associated with CEB in all the equations. Similar results are observed in many other developing countries including Pakistan (Detray., 1976) and it is observed that females resort to contraception once they achieve their desired family size. Thus it suggest that the causation is running from CEB to contraceptive use. To that extent the estimation procedure is up against the simultaneity bias.

Regional Differences: For sample, as a whole a binary variable indicating the rural, urban residence is specified. This variable emerged to be significantly positively associated with fertility. The finding that fertility levels are higher in urban areas than the rural areas is consistent with earlier studies on Pakistan(Sathar, 1978 and Alam, 1983) . The reasons for these fertility outcomes are obscure, though very often they are rationalized by changing lactational practices and more sexual freedom in urban areas.

Provincial dummies are also tried to infer the fertility differentials across provinces. The provinces of the NWFP and the Baluchistan appear to have significantly higher level of fertility than the Punjab and the Sind. It is difficult to provide a full explanation of this phenomenon. The two provinces associated with higher level of fertility are, however, relatively under-developed in comparison to the other two .

5. EARLY MARITAL FERTILITY

In this section we have examined the tempo of child-bearing in the first five years of the married life. The analysis is restricted to women who have had at least five years of marital exposure. Three indicators of early marital fertility are considered: (1) the incidence of childlessness; (2) the interval between first marriage and first birth; and (3) the mean number of children born in the first five years of marriage. It should be noted that the analysis of the first birth interval is complicated by the fact that the calendar month was not reported for nearly 90 percent of first births and had to be randomly imputed. Further, the calendar year of first marriage was not reported in 60 percent of cases and had to be indirectly ascertained from answers to a question on age at first marriage. This lack of precision reduces the analytical power of this measure and a cautious approach is therefore needed.

5. 1 Childlessness in the First 5 Years

The incidence of childlessness by the end of the fifth year of marriage was 19 percent (Table 7). A distinct pattern emerges when childlessness is analyzed by age at first marriage. About 28 percent of women who married very early, i.e. when they were less than 15 years of age, were still childless after 5 years of marriage. This percentage is higher than for any other age-at-marriage group, and is nearly twice that of those who married between age group 20-24, who as a group have the lowest percentage of childlessness.

In the late marrying women (30+), one in every four is childless after five years of marriage.

The incidence of childlessness at younger ages is not surprising because women who marry very early are more likely to experience a delayed first birth because of adolescent sub-fecundity while those who marry late are more exposed to decline in fecundity associated with increasing age. Surprising is the fact that nearly one in every five women is childless at the end of the 5 years continuous exposure. Similarly high (18%) incidence of childlessness were observed in PFS. Part of this may be explained by the errors in data reporting.

5.2 First Birth Interval

The mean birth interval between marriage and first birth is over 25 months. The modal interval is 12-23 months (35 percent) followed by interval of 24-35 months. Of the women who had a first birth within the first 5 years of marriage, 12 percent had delivered by the end of the first year, 55 percent by the end of the second year, and 80 percent by the end of the third year.

Except for the very young (less than 15) and the very old (25+) marriage cohorts, the mean length of birth interval is not very different by age at first marriage.

5.3 Number of Births in the First Five Years

The third indicator of early marital fertility used here is the mean number of children born in the first 5 years of

marriage. These means are classified by marriage cohorts and age at marriage in Table 8. The mean parity rises by age at marriage up to age 18, then it remains unchanged. In terms of time, women who married 5-9 years prior to the survey reported 1.7 births as compared to 1.3 for those married 20+ years ago, indicating a decrease of nearly 24 percent. The difference persists within each age at marriage category and therefore can not be attributed to a declining proportion of those who marry at very young ages. Possibly the 'tempo' of early marital fertility has genuinely increased in response to a decline in the length of breastfeeding (Khan and Irfan, n.d.). The possibility of mis-reporting of dates of marriage and early births by older cohorts can not also be ruled out.

6. RECENT AND CURRENT FERTILITY

In the previous sections we have discussed the cummulative fertility and the fertility behaviour within the first years of marriage. In this section current fertility is examined. Its importance in the case of Pakistan is enhanced by the fact that in PFS we have observed some recent indication of fertility decline and therefore, retrospective measures based on the behaviour of the last 30 years are no longer indicative of the present situation or future prospects. In this section we consider three measures of recent fertility. These are: (1) the mean number of children born in the last five years; (2) the proportion currently pregnant; and (3) age and duration-specific fertility rates.

6.1 Recent Marital Fertility

The mean number of live births in the past five years to women who were continuously married during those five years is shown in Table 9. Essentially, this is analagous to the measure of early marital fertility, except that the interval is dated backwards from the date of interview, rather than forward from the date of first marriage. However, the date of interview varies from woman to woman, as the fieldwork was conducted over a period of nine months, thus blurring the time interval at the end points. The criterion for this indicator of recent fertility that the woman be continuously married during the past five years, means that any particular woman will contribute either for full five years or not at all. The advantage

of the measure lies in the ease of computation, but its disadvantage is that, among young age groups, it makes a systematic selection of women who married young.

The overall mean number of live births in the past 5 years is 1.3, corresponding to about 260 births a year per 1,000 married women during that period. The mean gradually declines with the number of living children the woman had had at the beginning of the period. Thus, the mean number of children born in the past five years was 1.6 for women with one living child; and 1.5 for women who were childless or who had 2 living children. The mean declines considerably to 0.8 for those women who had 6 or more children at the beginning of the interval. A similar pattern is maintained by age and by duration of marriage. As previously mentioned, the mean number of children ever born to all ever married women is 4.0. Thus, women who were continuously in a married state during the past 5 years contributed during that interval about one-third of the average fertility of all women in the sample.

Age at first marriage does not seem, however, to have a clear effect on the level of fertility in the past 5 years (Table 10). What seems important is the number of living children the respondent had at the beginning of the 5-year interval. As may be seen from Table 10, fertility in the past 5 years was highest when the number of living children was low and declines gradually with rising parity even if one controls for age and age at marriage.

6.2 Proportion of Women Reporting a Current Pregnancy

The percentage of women reporting a current pregnancy is, in a sense, the most "current" measure of fertility since it actually anticipates the fertility of the next few months. However, the proportion of women currently pregnant is subject to inaccurate reporting owing to uncertainty, specially during the first trimester of pregnancy, and to deliberate concealment out of shyness, particularly among older women. There is also a smaller bias in the opposite direction: some reported pregnancies will terminate in non-live births.

As a measure of current marital fertility, the proportion currently pregnant is computed for currently married women; and is shown in Table 11 classified by current age, for both the PLM and the PFS. Overall, about 14 percent of these women stated that they believed themselves to be pregnant in the PLM as against 16 percent in the PFS. Nearly 1 in every 4 women below the age of 25 was reported pregnant in the PLM. After age 25, the percentage declines rapidly and only 1.5 percent of those aged 45-49 were pregnant in the PLM.

6.3 Current Fertility

In the following paragraph we briefly discuss the pattern and level of current fertility. Three measures of fertility are employed: (1) age-specific fertility rates, (2) the age-specific marital fertility rates, and (3) duration-specific marital fertility rates.

The age-specific fertility rate (ASFR)[10] is the ratio of (a) births in an age group with a specified interval of time to (b) the total number of women-years spent in that age group in that period of time. That is, the births in the numerator are classified according to the age of the mother at the time of childbirth, and the women-years of exposure, the denominator, do not depend on the women's marital status. The sum of these ratios across the ages is the Total Fertility Rate (TFR), which may be interpreted as the mean number of births that a woman would have if she survived the entire reproductive span and experienced the fertility schedule prevailing in a given time.

In the PLM, as mentioned earlier, two sets of data have been collected, one relating to ever-married individual respondents in the fertility module and the other relating to household members as part of the migration module. The calculation of the ASFRs requires information from both data sets - the numerator (number of births) from the individual data, and the denominator (number of women) from the household data. The approach adopted here is to use as the denominator

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[10]Age-specific marital fertility rate (ASMFRs) and duration specific marital fertility rates are similar to ASFRs except that the denominator consists of exposure (1) <u>since</u> marriage, or (2) <u>within</u> marriage and the data are tabulated either by age of mother at the time of birth or years since first marriage. In the first case, all births following date of marriage are included in the numerator, while in the second case, births occuring in periods of separation, divorce, or widowhood are excluded. In societies like Pakistan, where all births occur within marriage or where incidence of divorce or widowhood are negligible, the distribution between since marriage and <u>within</u> marriage rates, is not very important at aggregate level (see Alam, 1983), and as such all rates presented in this report are based on since first marriage exposure.

for age-specific fertility rates the number of ever-married women from the individual survey divided by the proportion of ever-married for each age at the time of the survey (from the household survey), thus allowing for women who were not married at the time of the survey. This procedure works very well in situations where the information for both the numerator and the denominator is collected at the same time and in the same module (for details see Alam and Cleland, 1981). However, in the PLM, where the two data sets were collected in separate modules, and the timing of the data collection may have varied somewhat, it is debatable whether this is the best way of handling the problem. This procedure is likely to bias the estimates somewhat although the magnitude of this bias is, however, difficult to ascertain.

In order to find the probable impact of the proportion married on our estimates in a very crude way, we have calculated the all women rates from the PLM data using the proportion married reported in the PFS. The two sets of rates are presented in Table 12. As is obvious, the two sets of ratios are not exactly comparable, however, the magnitude of the difference is very negligible, except for 15-19 age group, where the PLM estimates based on the PFS proportion are higher. This is probably a reflection of the rising age at marriage. Thus, in our analysis whenever we have presented ASFRs we have used the proportions from the PLM migration module.

The ASFRs from the PLM and the PFS are shown in Table 12. The two sets of rates agree with each other except for age groups 15-19 and 45-49. The disagreement between the two sets at younger ages is not surprising in the light of the rising trends

in age at marriage. However, for older ages (45-49) the PLM values are on higher side. This may have been a result of age mis-reporting in the PLM or possibly in the PFS. The TFR is 6.5 for 1975-79 and 6.3 for 1970-75. The TFRs are however, very close if we exclude ASFRs for age group 45-49. Close agreement between the PLM and the PFS rates gives further weight to our earlier contention that the PGS 1976-78 rates are on a considerably higher side.

It may, however, be recognized that by aggregating the rates for 5-year periods and 5-year age groups, we are actually dealing with a 10-year span and thus the PFS and the PLM rates are to some extent overlapping. This constraint makes it really difficult for us to compare the exact period rates and what one needs to do is to look at cohort-period[11] estimates. The ASFRs obtained in the PLM show considerable fluctuation (Appendix Table 6). Truncation precludes estimation of rates at older ages back in time. At younger ages, 15-19, reduction in fertility is however, very obvious; ASFRs have declined from around 125 in 1950-55 to less than 100 in 1975-80. Undoubtedly, rising age at marriage is the major cause of this trend. The higher rate at age group 20-24 for 1970-75 can also partly be attributed to this rising trend. It may be pointed out that in the PFS a similar trend was also observed (Alam, 1983).

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11. This is being attempted in separate studies, the results of which are expected to be available by early 1984.

The ASMRs and DSMRs, averaged for the last 5 years from the PLM and the PFS are presented in Table 13. The peak marital fertility in both the surveys is observed for the age group 20-24 and for duration 5-9 years. Then it declines monotonically. Summing of these rates provides measures of total marital fertility analogous to the total fertility rate. These summed rates imply that if fertility remains at the level of the 5-years prior to the survey, a woman marrying at age 15 and remaining married until age 50 will bear a total of 8.0 children according to the PFS estimates and 8.1 children according to the PLM estimates. Similarly, the duration specific rate implies that nearly 6 births will be achieved in the 20 years following marriage and a total of 7 births in a 30 year marriage span.

6.4 Age at Marriage and Fertility

We have mentioned earlier that the most important factor in the slight decline of fertility in Pakistan is the rising age at marriage. In recent years, the Sri Lankan transition has become the classical example of the relationship between fertility and rising age at marriage (Alam and Cleland, 1981). However, the underlying causes of nuptiality trend are little understood. There are those who will associate it with the changing norms of the society due to overall environmental changes (such as emancipation of woman, urbanization, rise in female labour force participation, education, etc.). Other will associate it with the changing economic structure of the society and a desire to control fertility. In Pakistan, where

premarital sex is nearly non-existent and marriage is almost wholly confined to married life and reported contraceptive use is negligible, any postponement will logically reduce the period for which women are exposed to conception and hence is expected to lead to reduction in achieved fertility.

In order to gain some insight into the effect of age at marriage on fertility, in Table 14 the duration-specific rates by marriage categories are provided. We may mention here that rates at higher durations for the more distant parts are increasingly confined to early marrying women. For example, women who married between age 20 and 24 are coming from younger cohorts in comparison to those who married below the age of 15.

Contrary to what one would expect and to what was observed in the PFS-that the fertility of women marrying at very young ages should decline at 0-4 duration owing to higher incidence of adolescent sterility - in the PLM we find that it is higher than for those marrying at ages 15-17. One possible explanation may be that with the rise in age at marriage, the proportion of women marrying before menarche has declined and that now they marry at ages when adolescent sterility is no more a problem. Overall, fertility in the first 5 years is positively related to age at marriage. For achieving maximum fertility the ideal age for marriage is 18 or 19. The number of children born in the first 20 years-of-marriage are the same for various age at marriage groups except for women marrying at ages 18-19. The women who marry below 18 years of age, though, start childbearing at a slower pace as than those who marry

late (18+), but they sustain the pace for longer duration and by the end of their reproductive period end up with more children.

Though this analysis has confirmed our previous observations, the results still need to be interpreted with caution. It should be mentioned that in Pakistan women marrying at later ages belong to a special group of the society (upper middle class, urban, educated) and therefore do not allow one to draw firm conclusions regarding the relationship between age at marriage and fertility. However, the recently observed slight decline seems to be real in the light of these rates. In the PLM only 2 percent of women reported being married before age 13, as against 18 percent in the PFS.

The foregoing analysis has suggested that in Pakistan the fertility levels are still very high and marital fertility has remained unchanged over the years. However, due to changes in the nuptiality pattern, there are indications of some recent downward trends in fertility which need to be further investigated.

6.5 Differentials in Current Fertility

Fertility rates at the sub-national level are presented in a sequence determined by the availability of the information. Rates are presented for three variables: (1) place of residence, (2) region of residence, and (3) education of the respondents. Since information regarding these variables are available from the household schedule (migration module), it enables us to calculate all-women rates (ASFRs and TFRs). However, these give only a partial picture of the differentials in fertility,

and in order to overcome this limitation in the last section we have summarized the findings in a regression model, where we have used nearly all the relevant determinants available to us. The discussion of differentials in current fertility is restricted to fertility rates averaged for the most recent point (five years prior to the survey).

Place of Residence: According to the 1981 population census, nearly 28 percent of the population was living in urban areas. For the survey, the urban areas were over-sampled with a fixed urban-rural ratio of 40:60, resulting in more women being interviewed in urban areas.

Due to lack of comprehensive evidence, little is known about residential differentials in fertility. Sathar (1979), using PFS data, has observed a slightly higher marital fertility in urban areas - a finding contrary to the generally held view that there is a negative association between urbanization and fertility in the Indo-Pakistan subcontinent (Davis, 1955). Alam (1983) has argued that higher marital fertility in urban areas as observed in the PFS, is the manifestation of the changing fertility behaviour, a transition from the traditional to 'modern' urban mentality. However, he found that higher marital fertility in the urban areas is compensated by late age at marriage and the negative association hypothesis is still valid.

In the PLM, the residential differentials are very conspicuous. Women living in urban areas have nearly half a

child less than those living in rural areas (Table 15). As one would expect, the fertility of urban women is lower at ages 15-19 and at ages 35+ - at younger ages probably due to age-at-marriage differential and at higher ages due to some fertility control. The trends in marital fertility, however, are reversed (Table 16). The MTFRs are higher for urban women - 8.1 as against 7.8 for rural residents. The duration specific rates (Table 17) follow the same pattern as age specific marital rates. Up to durations 20, the rates are higher in urban areas than in rural areas and after that duration, urban rates are lower. This is probably a reflection of shortened breastfeeding, less sexual taboos at younger ages and relatively more use of contraception at older ages (longer durations).

Region of Residence

The four provinces of Pakistan show considerable regional variation in population characteristics. They vary greatly in population and land size. Baluchistan is biggest in land area but smallest in population size (5 percent). The Punjab has nearly 60 percent of the population. Sind and the NWFP carry 20 and 15 percent of the total population, respectively. The sample sizes for each region are proportionate to the population size so that the number of women interviewed in Baluchistan was very small and the Baluchistan results should thus be interpreted with caution.

The age-specific fertility pattern in the 1975-80 period varied considerably between the provinces, though the peak

ertility is at ages 25-29 in all the provinces (Table 15, Figure 2). The current fertility level is highest for the NWFP (TFR = 7.0), followed by those of Baluchistan and the Punjab (TFR = 6.5), and lowest for Sind (TRF = 6.1). These results are consistent with the changing nuptiality patterns in the provinces. Sind is the most urbanized province. The Punjab's age-specific pattern is very close to the national average. The NWFP pattern is very different. This is probably due to the slow pace of changes in the nuptiality pattern of the province.

Regional differences in age-specific marital fertility rates are given in Table 16 and Figure 5. The overall pattern is similar to that of age-specific rates. Duration-specific rates distinctly suggest that Sind has the lowest fertility and the NWFP the highest. The synthetic summary of marital fertility, births in the first 20 years of marriage, suggests 5.6 births in Sind, 5.9 in the Punjab and 6.4 in the NWFP.

Education of Respondents

Education seems to exert the strongest influence on current fertility. Women with no schooling had a TRF of 6.8 as against 5.7 for those with some schooling.[12] The age pattern is also very different (Table 15, Figure 3). Women with some schooling had consistently lower fertility than those with no schooling. The differences are so consistent and large that it leads one to conclude that female education has a strong negative influence on fertility, because of its influence on both age at marriage (which depresses rates at younger age)

12. A more refined categorization is not possible owing to a small number of women reported as formally educated in the PLM.

and control of fertility within marriage (which affects rates at higher ages).

A similar, though less conspicuous, pattern is observed for marital fertility rates. The MTFRs are 7.7 and 8.1 for some education and no-education groups. At younger ages, however, the differences are reversed. Thus at ages 15-24, the urban marital fertility is higher than its rural counterpart. These rates for younger women are not easy to interpret because of different marriage patterns whereby much smaller proportions of the educated, mostly urban, women are married at ages 15-19 and 20-24 than of the uneducated, mostly rural women. The duration-specific rates show more or less a similar pattern as the marital fertility rates, except that fertility is only higher for very young durations (0-4).

Obviously, the bivariate analysis, restricts our understanding of the differentials, particularly for variables such as education, contraceptive use, etc. In order to get a more clearer picture, in the following paragraph we have presented results based on multivariate analysis, the dependent variable still being the births during last five years. This, to a great extent, avoids the contradictions between the temporal reference of the data yielded by a cross-sectional survey like the PLM and cumulative fertility measure wherein the majority of the independent variables refer to current status while the dependent variable (CEB) being the product of-life cycle experience.

Births during the five years preceding the survey (current fertility)are analysed using multiple (O.L.S) regression. All the variables used as independent variable in case of

cumulative fertility (CEB) are also incorporated in this case too. In addition similar regressions are also run for the PFS 1975 data. This is done to compare and assess the stability of association between independent and dependent variable as reflected by two cross-sectional surveys conducted within a span of five years. Equations for Pakistan, rural and urban as well as age cohort specific are estimated.

6.6 REGRESSION RESULTS

Results reported in Appendix Table No. A8 suggest that the variance explained as a percentage of total, ranges between 20 to 30 for Pakistan and for rural and urban areas, for both the PLM and the PFS data. The R^2 pertaining to the age cohort specific equations are very low, and in most cases associated F values hardly qualify the desirable level of significance. These are not, therefore, reported in the appendix table though we have discussed in the text. A comparison of the results of the two surveys reflects a stability of association between independent and dependent variables. Most of the variables display a plausible relationship. A brief discussion pertaining to each variable is provided below:

Age of Female

A curvilinear relationship between age and current fertility is obtained for Pakistan and for the rural and urban areas. Results for the PFS 1975 are similar to that of the PLM 1979. This relationship between female age and current fertility, however, fails to sustain across various age cohort equations.

For the younger age females (less than 25 and 25-34) a curvilinear relationship is traceable, while for the oldest age cohort (45-49) the direction of the association changes, wherein age has a negative influence. The results are plausible because of the adolescent sterility at lower end and fecundity attrition at the upper end of the female age distribution.

Age at Marriage

Female age at marriage has a positive association with the current fertility of the female. The results are significant for both the data sets (the PLM and the PFS for Pakistan, and for the rural and urban areas). The positive relationship between age at marriage and current fertility is replicated by various cohort-specific equations, except for the youngest age group (less than 25). A positive association between age at marriage and current fertility even for the oldest cohort (45-49), supports our earlier contention regarding the 'catching up' phenomenon, a finding suggesting that the fertility curve is shifting towards older ages in Pakistan, which needs to be probed more thoroughly. In addition, to the extent the influence of rise in age at marriage is counterbalanced by shorter birth interval, as reflected by the regression equations, the relevance of age at marriage for fertility regulation is impaired though the period rates for more recent years will show a decline.

Female Schooling/Education

Female school attendance is negatively associated with current fertility. The relationship is statistically significant

only in case of the PLM data for Pakistan and for the urban areas. This relation is significant only for females of age group 35-44 in the PLM. Variable reflecting female education (primary pass and higher) hardly yields any significant relationship with current fertility in any equation, a result not consistent with the findings of the bivariate cross-tabulations, discussed earlier.

Husband's School Attendence and Education

Both the variables representing husband's schooling (SM) and educational level less than matric (EM_1) fail to have any significant or consistent relationship. However, EM_2 (husband's educational level matric and higher) shows a negative association for Pakistan and the urban areas, though the relationship is not statistically significant.

Female Labour Force Participation:

Female work participation appears negatively associated with current fertility in the PLM, though the coefficients are not statistically significant. In case of the PFS, female labour force participation does not display any consistent relationship, the sign of the coefficient being negative for the urban areas and positive for Pakistan (total) and for the rural areas, which is also significant. The female reported activity rates suffer from many conceptual and measurement problems. Besides role incompatibility withers away due to pervasive self-employment. These factors together explain the insignificance of the relationship between female work participation and current fertility.

Husband's Employment Status

Self employed fathers are associated with higher level of current fertility. The relationship is statistically significant for the rural areas in the PLM 1979 and in urban areas in the PFS 1975. A perusal of the age cohort equations indicate that the difference is significant only for the youngest cohort (less than 25) in rural areas for both the surveys. In urban areas there is no significant relationship across various age cohorts. The significance of self-employment in case of rural areas (mostly farming) is explicable, however, the association of differential behaviour for the youngest age cohort is interesting. To the extent self-employed fathers can easily turn their children into producers at younger ages, this positive relationship appears plausible. It must be noted, that various other factors like wealth status, assets of the household bear upon the value of children, which are not controlled in these estimating equations.

Contraceptive Use

Estimations based on the PLM 1979 do not reflect any significant association between current fertility and contraceptive use, though in [illegible] cases the sign of the coefficient is negative. In contrast in the PFS contraception is positively associated with current fertility for all Pakistan and urban areas, the relationship is statistically significant. Across the age cohorts, the relationship is significant only for the two younger groups (less than 25 and 25-34 in the PFS). A positive association between contraceptive use and cumulative

fertility is often explained by the female's contraceptive use after attainment of their desired family size. The application of this argument for the younger cohorts hardly appears convincing because very few females amongst these groups really achieve their desired family size. Given the very low level of contraceptive use reported in both the surveys, it is difficult to probe deeper.

Infant and Child Mortality

Infant-child mortality experienced by females is significantly associated with current fertility in both the PLM and the PFS. Cohort specific equations indicate that this relationship is not significant for older females (45-49) suggesting that due to decline in fecundity these females can not replace the dead children to the extent that the young mother can do.

Rural-Urban Residence

Both the surveys reflect a significantly higher fertility in urban areas than the rural areas. A further examination of equations pertaining to various age cohorts reveal that the current fertility differentials are significant only in case of two younger age cohorts (less than 25 and 25-34). For the remaining two groups the rural-urban differentials are not significant. Whether the behaviour of younger females in urban areas is due to changing lactation practices, is difficult to ascertain, because we have not controlled for the duration of breastfeeding in the equations.

Provincial Differentials

Provincial differences are inferred only for all Pakistan and for the rural areas. The regression results of the PLM indicate that NWFP and Baluchistan have higher level of current fertility than Punjab and Sind province. In case of the PFS no such significant differential emerged. Since the size of the sample in the PFS being little less than half of that of the PLM, a part of the discrepency in the results may be due to few cases in Baluchistan and NWFP in the PFS. Equations for age cohorts of the PLM indicate that the differentials due to province of residence is significant only for younger cohorts (upto age 35).

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7. CONCLUDING REMARKS

There are four major limitations of the analysis of fertility levels and trends from a single-round survey of the PLM type. They are: (1) the sensitivity of estimates to reporting errors in data, particularly misdating of births; (2) the limitation imposed by the failure to collect detailed household data in the fertility module and limiting the data to ever-married women only; (3) the relatively small size of sub-samples leading to appreciable variability of the sample estimates, particularly for sub-groups in multivariate analysis; and (4) the restriction of the sample to women under 50 years of age.

The first problem is the most serious and we have suggested that one should look at the quality of data in detail. It may be worth while to mention that a similar exercise undertaken for the PFS suggested some distortion in the reported dates and omissions of births in the distant past (20 years or more prior to the survey).

The restriction imposed by not collecting the household data in the fertility module apparently seems to have little impact on our results (Table 12). Still the nagging feeling remains that even though at aggregate level, the impact is negligible, the sub-national estimates may be biased, the magnitude of which may remain unknown.

While the first problem concerned non-sampling errors, the third relates to sampling errors, or fluctuation, associated with all sampling data. We did not attempt any estimation of

the magnitude of the sampling errors. However, by citing other similar work, we have suggested that a sample size of about 10,000 women is large enough to contain such errors in the managable limits. Still, an awareness of this problem considerably limited the scope of our analysis at sub-national level. In order to minimize the problem, in presenting our findings, we attempted to describe the general pattern of results rather than to focus on details. The last problem, truncation of sample women under 50, constituted a major limitation and restricts the depth of historical perspective to the more recent past, 15 years preceding the survey.

We now turn to a summary of substantive results. The average parity for ever-married women is four children and for the oldest cohort (45-49) it is 6.8. There is great deal of dispersion in mean parities by age, even for the oldest cohort, in which one-sixth of women have less than 4 children and more than one-fourth have 9 or more children. Completed fertility for the oldest cohort is lowest (6.0) in Baluchistan and highest (6.8) in the NWFP. The Punjab and Sind have mean values of 6.7 and 6.5, respectively. The urban woman, on an average, endup with 6.9 children in comparison with 6.6 children for rural women. No major differentials are observed by education. However, women who work after marriage endup with relatively fewer (6.4) children.

Some of these differentials are affected by variations in total marital exposure, resulting mainly from differentials in age at first marriage. When this is taken into account,

we pass from differences in the completed (quantity) of fertility to differential in the rate of childbearing (tempo). Achieving this standarization by multivariate analysis, we find that the highest tempo of childbearing (per year of marriage) and current age is in the NWFP and for those who experienced high level of infant and child mortality.

The evidence from the survey concerning fertility trends is generally consistent with the analysis of the PFS data and the PGE data. A modest decline in TFR has been observed beginning in the late Sixties and early Seventees, mainly in response to the rising age at marriage. The marital fertility, however, has remained unchanged. This implies that government efforts to provide family planning information, advice and supplies have had no impact yet on the level of childbearing.

While we have augmented previous evidence regarding the fertility trends at the national level more important contribution of the present study has been in describing the fertility levels and trends at sub-national level, about which less was known. Consistent with the earlier findings, the marital fertility in urban areas has been observed to be higher than in rural areas.

The higher marital fertility in urban areas is most probably the manifestation of the changing fertility norms, a transition from traditional 'agrarian' to the 'modern' urban behaviour. However, the negative association of age-specific fertility rates with urban residence is still valid because in urban areas the higher marital fertility is compensated by

late age at marriage.

There are substantial regional variations in fertility. The marital fertility is highest in the NWFP and lowest in Sind. The age-specific rates follow similar pattern. It seems that in the NWFP, where a very strong pro-natalist and early marriage tradition continues to pervail, the fertility remains high. In Sind, where nearly half of the population lives in urban areas (the majority in metropolitan areas like Karachi, Hyderabad and Sukkur), the urban fertility norms are more prevalent.

The contradictory findings with regard to female education in bivariate and multivariate analysis is somewhat puzzling. In our view, the strong negative impact of education, as evident in the bivariate analysis, is mostly due to age-at-marriage differentials in the two groups and once we adjust for them and for the residential patterns, the differentials nearly disappear. Similarly, husband's education (less than matric) has no relationship with fertility. It is only beyond matric that education shows some impact. This suggests that education itself is not a very important variable as far as fertility is concerned. More important are variables, like age at marriage, urban residence, etc., to which the educated group belongs, and thus education just reflects a socio-economic status of the couple and nothing more.

In summing up one can sefely conclude that fertility levels are still very high (TFR = 6.5) in Pakistan. The slight decline observed since the late Sixtees is not likely to be sustained over time, as female age at marriage is reaching a level beyond which it is unlikely to rise.

Table 1

AGE SPECIFIC FERTILITY RATES BY SOURCE OF ESTIMATE, PAKISTAN 1963-78

Age Group	SOURCE OF ESTIMATE AND PERIOD					
	PGE (1963-65)[a] (LR-CD Average)	PGS (1968-71)[a]	PFS (1975)			PGS (1976-78)[a]
			1960-65	1965-70	1970-75	
15-19	120	58	170	159	131	55
20-24	264	223	303	318	275	264
25-29	332	261	326	329	315	332
30-34	318	252	282	288	259	288
35-39	218	200	222[b]	197	188	221
40-44	96	124		112[b]	77	132
45-49	54	85			11[b]	79
TFR(15-49)	7.0	6.0			6.3	6.9
(15-44)	6.7	5.6			6.2	6.5

[a] Births reported to women <15 years and over 49 were included in the 15-19 and 45-49 age groups respectively, without any similar adjustment to the denominator.

[b] Truncated cohorts.

Table 2

PERCENT DISTRIBUTION OF EVER MARRIED WOMEN ACCORDING TO NUMBER OF CHILDREN EVER BORN, BY (A) CURRENT AGE AND BY (B) YEARS SINCE FIRST MARRIAGE, PLM 1979-80

Current Age and Years since first marriage	NUMBER OF CHILDREN EVER BORN					Mean Number of Children	No. of Women
	0	1-2	3-5	6-8	9+		
Current Age							
<20	64.6	33.6	1.8		-	0.5	764
20-24	23.5	56.3	20.0	(0.2)	-	1.5	1773
25-29	8.3	32.3	52.5	6.5	(0.4)	3.0	1993
30-34	5.4	13.8	49.6	27.8	3.4	4.5	1758
35-39	3.5	9.6	32.9	42.3	11.7	5.6	1565
40-44	4.5	7.6	26.6	41.1	21.2	6.4	1315
45-49	2.3	6.5	24.3	38.8	28.1	6.8	1320
Years since First Marriage							
<5	46.2	51.9	1.8	(0.1)	-	0.7	1966
5-9	8.6	42.7	47.6	1.0	(0.1)	2.5	2032
10-14	4.1	12.7	61.1	21.1	1.0	4.2	1824
15-19	4.2	9.8	37.2	41.0	7.8	5.3	1616
20-24	3.6	6.7	26.0	43.7	20.0	6.3	1360
25-29	2.0	6.5	23.8	41.7	25.7	6.8	978
30+	1.2	5.9	23.1	37.4	32.4	7.1	711

Table 3

PERCENT DISTRIBUTION OF WOMEN AGED 45-49 ACCORDING TO NUMBER OF CHILDREN EVER BORN AND PARITY PROGRESSION RATIO (PPR), PLM 1979-80

	MEAN NUMBER OF CHILDREN EVER BORN										
	0	1	2	3	4	5	6	7	8	9+	Mean
Percent Distribution	2.3	2.5	4.0	6.1	8.1	10.1	12.6	13.6	12.6	28.1	6.8
PPR	98	97	96	92	91	87	81	75	69	-	

Table 4

MEAN NUMBER OF CHILDREN EVER BORN TO EVER-MARRIED WOMEN IN PFS, PLM AND 1981 POPULATION CENSUS

Age Group of Ever-Married Women	MEAN NO. OF CHILDREN EVER BORN ACCORDING TO		
	PFS (1975)	PLM (1979-80)	Census 1981
<20	0.6	0.5	0.5
20-24	1.9	1.5	1.5
25-29	3.4	3.0	2.8
30-34	5.0	4.6	4.0
35-39	6.0	5.7	4.9
40-44	7.0	6.5	5.4
45-49	6.9	6.8	5.7
Total	4.2	4.1	3.5

Table 5

MEAN NUMBER OF CHILDREN EVERBORN TO EVER MARRIED WOMEN BY AGE AT FIRST MARRIAGE AND (A) CURRENT AGE AND (B) YEARS SINCE FIRST MARRIAGE, PLM 1979-80

Age at First Marriage	PANEL A							PANEL B							
	<20	20-24	25-29	30-34	35-39	40-44	45-49	<5	5-9	10-14	15-19	20-24	25-29	30+	All
<15	0.8	2.6	3.9	5.3	6.3	6.8	7.2	0.6	2.3	3.8	5.0	6.3	6.7	7.2	4.8
15-17	0.4	1.7	3.4	5.1	6.1	6.8	6.9	0.7	2.4	4.3	5.4	6.4	6.9	6.9	4.1
18-19	0.1	1.1	2.8	2.8	4.4	5.7	6.4	0.7	2.6	4.2	5.5	6.5	6.6	(7.2)	3.8
20-21	-	0.5	2.0	3.9	5.1	5.9	6.8	0.8	2.7	4.4	5.4	6.2	6.6	-	3.8
22-24	-	(0.2)	1.2	2.9	4.3	5.7	5.8	0.8	2.5	4.3	5.3	5.7	(7.6)	-	3.5
25+	-	-	(0.6)	1.4	3.0	4.3	5.4	1.0	2.5	3.9	(4.9)	(5.7)	-	-	3.0
All	0.5	1.5	3.0	4.5	5.6	6.4	6.8	0.7	2.5	4.2	5.6	6.3	6.8	7.1	4.0

Table 6

MEAN NUMBER OF CHILDREN EVER-BORN TO EVER-MARRIED WOMEN AGED 45-49, BY BACKGROUND CHARACTERISTICS PLM 1979-80

	Unstandardized Mean	Standardized Mean	Number of Women
Type of Residence			
Urban	6.9	6.5	329
Rural	6.6	6.6	991
Region of Residence			
Punjab	6.7	6.7	853
Sind	6.5	6.4	274
NWFP	6.8	7.0	145
Baluchistan	6.0	6.4	48
Level of Education			
No schooling	6.7	6.7	1257
Some schooling	6.6	6.7	63
Pattern of work*			
Before and after marriage	6.8	7.0	59
After marriage only	6.4	6.6	120
Never worked	6.7	6.7	1129
Total	6.8	6.8	1320

*Excludes 12 women who reported work before marriage and since marriage but are not currently working.

Table 7

PERCENT DISTRIBUTION OF WOMEN WHO MARRIED AT LEAST 5 YEARS AGO ACCORDING TO INTERVAL BETWEEN FIRST MARRIAGE AND FIRST BIRTH (IN MONTHS) BY AGE AT FIRST MARRIAGE, PLM 1979-80

Age at First Marriage	Length of Interval in Months						Percent Childless	All	Mean Length of Interval	Number of Women
	<8	8-11	12-23	24-35	36-47	48-59				
<15	1.1	6.5	29.6	16.5	10.9	7.2	28.2	100	26.2	1622
15-17	1.1	7.8	34.3	20.1	11.0	6.4	19.1	100	25.3	3142
18-19	1.2	9.6	41.2	19.1	8.8	5.3	14.6	100	23.7	1509
20-21	1.1	7.8	37.4	23.3	10.3	5.0	15.0	100	24.7	938
22-24	2.1	10.6	38.6	21.6	7.7	6.3	13.0	100	24.1	464
25-29	6.1	9.4	27.9	21.4	11.9	7.6	15.7	100	27.7	200
30+	11.1	4.3	24.7	15.4	19.8	-	24.7	100	26.3	28
All	1.3	8.1	35.1	19.7	10.4	6.2	19.2	100	25.5	7903

Table 8

MEAN NUMBER OF CHILDREN EVER BORN WITHIN FIRST 5 YEARS OF MARRIAGE BY AGE AT FIRST MARRIAGE AND BY YEARS SINCE FIRST MARRIAGE, CONFINED TO WOMEN WHO FIRST MARRIED AT LEAST 5 YEARS AGO, PLM 1979-80

Years since First Marriage	AGE AT FIRST MARRIAGE						All
	<15	15-17	18-19	20-21	22-24	25-29	
5-9	1.5	1.5	1.7	1.7	1.7	1.7	1.7
10-19	1.3	1.5	1.6	1.7	1.7	1.6	1.5
20+	1.2	1.4	1.5	1.5	1.3	1.4	1.3
All	1.3	1.5	1.6	1.6	1.6	1.6	1.6

Table 9

MEAN NUMBER OF LIVE BIRTHS DURING THE PAST 5 YEARS TO WOMEN CONTINUOUSLY MARRIED DURING THE INTERVAL ACCORDING TO (A) CURRENT AGE, (B) YEARS SINCE FIRST MARRIAGE, AND (C) NUMBER OF LIVING CHILDREN AT THE BEGINNING OF THE 5 YEAR PERIOD, PLM 1979-80

Panel A			Panel B		Panel C	
Age 5 Years Ago	Current Age	Mean No. of Births	Years since 1st Marriage	Mean No. of Births	Number of Living Children	Mean No. of Births
<15	<20	1.4	<10	1.8	0	1.5
15-19	20-24	1.8	10-14	1.7	1	1.6
20-24	25-29	1.7	15-19	1.3	2	1.5
25-29	30-34	1.6	20-24	1.0	3	1.3
30-34	35-39	1.3	25-29	0.6	4	1.2
35-39	40-44	0.9	30+	0.3	5	1.0
40-44	45-49	0.4			6	0.9
					7	0.8
					8	0.7
Overall Mean 1.3					9+	0.5

Table 10

MEAN NUMBER OF CHILDREN BORN DURING LAST 5 YEARS TO WOMEN WHO HAVE BEEN CONTINUOUSLY IN THE MARRIED SATE DURING THAT INTERVAL BY AGE AT FIRST MARRIAGE AND NUMBER OF LIVING CHILDREN AT THE START OF THE INTERVAL, PLM 1979-80

Age at First Marriage	Number of Living Children 5 Years Ago								Mean (All Parities)
	0	1	2	3	4	5	6	7	
<15	1.4	1.5	1.3	1.2	1.1	0.9	0.7	0.6	1.1
15-17	1.5	1.6	1.4	1.3	1.2	1.1	0.8	-	1.3
18-19	1.7	1.6	1.6	1.4	1.3	1.0	-	-	1.4
20-21	1.4	1.5	1.7	1.3	1.4	1.2	-	-	1.4
22-24	1.4	1.5	1.4	1.5	1.5	1.1	-	-	1.4
25-29	1.3	1.3	0.9	1.4	-	-	-	-	1.2
30+	0.9	1.6	1.5	-	-	-	-	-	1.2

(-) Number of women less than 30.

Table 11

PERCENTAGE OF CURRENTLY-MARRIED WOMEN REPORTING A CURRENT PREGNANCY BY AGE, PLM 1979-80 AND PFS 1975

Current Age	PLM (1979)	PFS (1975)
<20	21.9	20.3
20-24	21.3	22.7
25-29	18.0	23.3
30-34	15.3	18.2
35-39	10.1	10.7
40-44	5.5	6.3
45-49	1.6	0.5
All	13.6	16.0

Table 12

AGE-SPECIFIC FERTILITY RATES, AVERAGED OVER THE 5 YEAR PERIOD PRECEEDING THE PLM 1979-80 (FERTILITY) AND PFS 1975

Age at Birth	AGE-SPECIFIC FERTILITY RATES		
	PLM Proportion Married in		PFS
	PLM	PFS	
15-19	99	116	131
20-24	283	281	275
25-29	313	310	315
30-34	263	260	259
35-39	188	189	188
40-44	101	103	77
45-49	48+	49+	11+
TFR			
15-49	6.5	6.5	6.3
15-44	6.2	6.2	6.1

+ truncated cohorts

Table 13

AGE-SPECIFIC AND DURATION-SPECIFIC MARITAL FERTILITY RATES, PLM 1979-80 AND PFS 1975

Age Group	ASMFR PLM 1975-80	ASMFR PFS 1970-75	Duration Since First Marriage	DSMFR PLM 1975-80	DSMFR PFS 1970-75
15-19	284	310	0-4	318	305
20-24	353	349	5-9	345	344
25-29	335	348	10-14	299	315
30-34	278	279	15-19	222	250
35-39	200	205	20-24	154	175
40-44	108	86	25-29	70	70
45-49	53	11	30+	28	11
MTFR	8.1	8.0	Births in first 20 years of married life	5.9	6.1

Table 14

DURATION-SPECFIC MARITAL FERTILITY RATES BY AGE AT FIRST MARRIAGE, PLM 1975-80

Years since First Marriage	AGE AT FIRST MARRIAGE			
	<15	15-17	18-19	20-24
0-4	309	297	347	337
5-9	328	343	359	353
10-14	304	315	290	286
15-19	243	229	214	199
20-24	167	167	138	132
25-29	78	61	85	(57)
30+	28	(28)	-	-
Births in First 20 Years of Married Life				
PLM	5.9	5.9	6.1	5.9
PFS	6.0	6.3	6.8	5.7

( ) Women year of exposure between 100-250

Table 14

DURATION-SPECFIC MARITAL FERTILITY RATES BY AGE AT FIRST MARRIAGE, PLM 1975-80

Years since First Marriage	AGE AT FIRST MARRIAGE			
	<15	15-17	18-19	20-24
0-4	309	297	347	337
5-9	328	343	359	353
10-14	304	315	290	286
15-19	243	229	214	199
20-24	167	167	138	132
25-29	78	61	85	(57)
30+	28	(28)	-	-
Births in First 20 Years of Married Life				
PLM	5.9	5.9	6.1	5.9
PFS	6.0	6.3	6.8	5.7

( ) Women year of exposure between 100-250

Table 15

AGE SPECIFIC FERTILITY RATES, AVERAGED OVER THE FIVE YEARS PRECEDING THE FERTILITY SURVEY BY BACKGROUND CHARACTERISTICS OF THE RESPONDENTS, ACCORDING TO SELECTED CHARACTERISTICS, PLM 1975-80

Background Characteristics	AGE AT BIRTH							
	15-19	20-24	25-29	30-34	35-39	40-44	45-49	TFR's
Place of Residence								
Urban	78	287	324	264	179	74	42	6.2
Rural	112	280	309	265	194	116	53	6.6
Region of Residence								
Panjub	92	278	314	268	187	107	46	6.5
Sind	97	250	304	251	189	89	(40)	6.1
NWFP	93	295	334	284	208	124	(61)	7.0
Baluchistan	45	305	331	(266)	(213)	(93)	*	6.6
Education of Mother								
No Education	118	294	322	269	195	107	50	6.8
Some Education	48	242	273	234	119	(52)	(42)	5.1

*Women year of exposure less than 100
( ) Women year of exposure between 100-250

Table 16

AGE-SPECIFIC MARITAL FERTILITY RATES, AVERAGED OVER THE FIVE YEARS PRECEEDING THE FERTILITY SURVEY, ACCORDING TO SELECTED BACKGROUND CHARACTERISTICS, PLM 1975-80

Background Characteristics	AGE AT BIRTH							
	<20	20-24	25-29	30-34	35-39	40-44	45-49	MTFR's
Place of Residence								
Urban	311	389	345	271	182	75	42	8.1
Rural	274	332	324	271	196	117	53	7.8
Region of Residence								
Punjab	292	347	329	274	189	107	46	7.9
Sind	266	331	320	252	189	88	(40)	7.4
NWFP	286	392	362	298	210	124	(61)	8.7
Baluchistan	287	377	338	(266)	(213)	(93)	*	8.2
Education of Mother								
No Education	276	344	339	282	206	112	53	8.1
Some Education	344	411	309	254	121	(49)	(43)	7.7

*Women year of exposure less than 100

( ) Women year of exposure between 100-250

Table 17

DURATION-SPECIFIC MARITAL FERTILITY RATES, AVERAGED OVER THE FIRST YEAR PRECEEDING THE FERTILITY SURVEY, ACCORDING TO SELECTED BACKGROUND CHARACTERISTICS, PLM 1975-80

Background Characteristics	DURATION AT Birth							Births in First 20 Years of Marriage
	0-4	5-9	10-14	15-19	20-24	25-29	30+	
Place of Residence								
Urban	352	369	310	223	134	51	28	6.3
Rural	304	335	294	221	162	79	29	5.8
Region of Residence								
Punjab	324	340	297	222	152	66	27	5.9
Sind	289	338	290	211	165	74	(30)	5.6
NWFP	336	392	319	246	153	(83)	(23)	6.4
Baluchistan	344	352	(317)	(219)	(142)	(75)	*	6.2
Education of Mother								
No education	306	346	304	228	160	72	30	5.9
Some Education	383	340	251	135	(55)	(32)	-	5.5

*Women year of exposure less than 100

( ) Women year of exposure between 100-250

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Appendix Table A-1

DISTRIBUTION OF SAMPLED HOUSEHOLDS, ENUMERATED HOUSEHOLDS, HOUSEHOLDS WITH ELIGIBLE WOMEN AND THE NUMBER OF ELIGIBLE WOMEN, PAKISTAN, URBAN-RURAL AND PROVINCIAL, PLM 1979-80

Area/ Provinces	Sampled H.holds	Enumerated H.Holds	All male H.holds	H.Holds with no eligible women	H.Holds with eligible women**	Enumerated H.Holds of eligible Women	No. of eligible women actually enumerated
Pakistan	11288	10244	300	1030	8884	8397	10093**
Urban	4613	3902	155	345	3402	3216	3830
Rural	6675	6342	175	685	5482	5181	6263
Punjab	6475	6290	183	739	5368	5128	5985
Urban	2388	2036	72	213	1751	1653	1915
Rural	4087	4254	111	526	3617	3475	4070
Sind	2625	2278	91	160	2027	1953	2500
Urban	1425	1269	55	95	1119	1075	1313
Rural	1200	1009	36	65	908	878	1187
NWFP	1375	1201	43	102	1056	942	1134
Urban	500	385	21	27	337	320	381
Rural	875	816	22	75	719	622	753
Baluchistan	813	475	13	29	433	374	474
Urban	300	212	7	10	195	168	221
Rural	513	263	6	19	238	206	253

*All ever married upto age 50
**Includes 3.5 percent women aged 50 year at the time of enumeration.

APPENDIX TABLE A-2

Regression Results of Cumulative Fertility (CEB) Pakistan
PLM 1979-80

Variables	All Ages	Age < 25 Years	Age 25-34	Age 35-44	Age 45-49
AF	0.66427*	0.18123*	0.98723*	1.77543*	9.49463
AFSQ	-0.00665*	0.00482*	-0.01134*	-0.02098*	-0.10123
AM	-0.21588*	-0.31797*	-0.27969*	-0.16817*	-0.10993*
IM	1.18252*	0.30965*	0.85083*	2.01871*	2.71949*
SF	-0.18754	-0.04722	-0.55830*	-0.37825	1.27785
SM	0.17372	0.24905*	-0.09038	0.41891	0.66289
EF	-0.12116	0.11218	0.35814	-0.23435	-1.70548
EM_1	-0.11954	-0.14672	0.18952	-0.47842	-0.38166
EM_2	-0.39027*	-0.09186	-0.12069	-0.93005*	-0.83973
P	-0.01680	0.06316	-0.16756	0.17789	-0.10351
K	0.11256*	0.08658*	0.09122	0.07922	0.32516*
EUF	0.84387*	0.62714*	0.57199*	0.89657*	1.24827*
U	0.45871*	0.15679*	0.54474*	0.69774*	0.45514*
R_1	-0.15472	0.04581	0.00062	-0.48480*	-0.73216*
R_3	0.13095*	0.08102*	0.16294*	0.12772	0.22554
R_4	0.51267*	0.16731*	0.51380*	0.75813*	0.53467*
Constant	-6.50470	0.43068	-10.80008	-28.84464	-214.87292
DF	9399	DF 2276	DF 3421	DF 2518	DF 1133
F	788.90477	F 186.74434	F 145.39943	F 30.02063	F 7.08248
$\bar{R}$	0.57246	$\bar{R}$ 0.56721	$\bar{R}$ 0.40199	$\bar{R}$ 0.15486	$\bar{R}$ 0.07809

APPENDIX TABLE A 3

Regression Results of Cumulative Fertility (CEB)
For Pakistan Urban, PLM 1979 -80

Variables	All Ages	Age < 25 Years	Age 25-34	Age 35-44	Age 45-49
AF	0.76102*	0.31520	1.13071*	2.83414*	16.08751*
AFSQ	-0.00809*	0.00225	-0.01366*	-0.03455*	-0.17160*
AM	-0.25833*	-0.34066*	-0.32138*	-0.19781*	-0.17046*
IM	1.30002*	0.27763*	1.04334*	1.74292*	3.06972*
SF	-0.45198	-0.18401	-0.75421*	-0.70405	0.60838
SM	0.24344	0.67099*	-0.18043	0.67110	0.55794
EF	0.14762	0.19351	0.54434	0.13076	-0.98373
EM_1	-0.26745	-0.50731*	0.34591	-0.98399	-0.60156
EM_2	-0.50039*	-0.44352	0.05174	-1.35899*	-0.89247
P	-0.09185	0.34143	-0.08930	-0.04737	-0.38308
K	0.10070	0.00162	0.00957	0.10754	0.46111*
EUF	0.72858*	0.43332*	0.52915*	0.69587*	1.41281*
Constant	-6.66850	-0.61408	-11.60649	-47.86225	-367.51721
DF	3587	DF 800	DF 1356	DF 948	DF 444
F	436.35032	F 95.35333	F 96.48914	F 19.21058	F 5.39389
$\bar{R}$	0.59210	$\bar{R}$ 0.58236	$\bar{R}$ 0.45582	$\bar{R}$ 0.18542	$\bar{R}$ 0.10364

APPENDIX TABLE A 4

Regression Results of Cumulative Fertility (CEB)
For Pakistan Rural, PLM 1979-80

Variables	All Ages	Age < 25 Years	Age 25-34	Age 35-44	Age 45-49
AF	0.61023*	0.14870	0.89230*	1.17699*	2.36435
AFSQ	-0.00584*	0.00520	-0.00982*	-0.01330	-0.02482
AM	-0.19130*	-0.30511*	-0.25203*	-0.15621*	-0.07409*
IM	1.11589*	0.32503*	0.77397*	2.08794*	2.42850*
SF	0.09551	0.00632	-0.18397	-0.12118	3.88192
SM	0.15931	0.16384	-0.04255	0.37672	0.95361
EF	-0.20766	0.16634	0.12422	-0.23782	-3.94689
EM_1	-0.05251	-0.08402	0.11235	-0.28746	-0.39407
EM_2	-0.11369	-0.02491	-0.05089	-0.39214	-0.37206
P	0.04606	0.00516	-0.17705	0.37818	0.05171
K	0.14922*	0.14663*	0.17435*	0.06513	0.25857
EUF	1.09803*	1.21494*	0.70418*	1.26106*	1.22568*
R_1	0.8381	0.01622	0.21546	-0.23740	0.42246
R_3	0.19246*	0.09862*	0.16135*	0.30908*	0.51759*
R_4	0.66417*	0.17594*	0.63465*	1.01213*	1.03132*
Constant	-6.21454	0.67076	-9.89858	-17.70391	-49.58737
DF	5800	DF 1464	DF 2053	DF 1558	DF 677
F	490.12452	F 125.60711	F 75.22171	F 16.09399	F 3.53431
$\bar{R}$	0.55786	$\bar{R}$ 0.55826	$\bar{R}$ 0.34996	$\bar{R}$ 0.12582	$\bar{R}$ 0.05207

Appendix Table A.5

Age-Specific Fertility Rates
For Pakistan, PLM 1945-80

Age at Birth	PERIOD						
	1975-80	1970-75	1965-70	1960-65	1955-60	1950-55	1945-50
15-19	99	116	120	129	121	124	107+
20-24	283	309	279	285	266	268+	
25-29	313	331	321	299	309+		
30-34	263	281	273	270+			
35-39	188	203	213+				
40-44	101	133+					
45-49	48+						
TFR*							
(15-49)	6.5	6.9	6.7				
(15-44)	6.2	6.7	6.5				

+ Truncated cohorts

*TFRs are reconstructed from date of complete age-specific schedule in the past.