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An Indirect View of the Fertility Changes in Pakistan

MOHAMMAD AFZAL, M. FRAMURZ K. KAYANI and ALI MOHAMMAD

1. INTRODUCTION

An effort has been made in this paper to arrive at some indirect assessment of the levels of birth rates from the same survey data sources. The basis for this approach is the internal consistency of the relevant data.[1] Ideally, in a series of repeated surveys the variations in the estimated yearly rates should be only due to the sampling and non-sampling errors and not due to changes in the numerator or the denominator resulting from variations in the procedures of measurement. In other words, such changes if any, should not result in any erratic variations between the estimates of one series to the other, otherwise they may lead to some erroneous inference about the levels and trends. Let us now have a look at the crude birth and death rates for Pakistan, as reported from different surveys. From Table 1 it is clearly evident that the crude birth rate as reported from yearly repeated surveys (PGE, PGS and PDS series), show erratic up and down movements over the years 1962–65 through 1988, with the level of the rate remaining over 40 [Farooqui and Farooq (1971); Government of Pakistan (1973, 1973a, 1974, 1974a, 1981, 1983, 1983a, 1984, 1984a, 1990)]. The corresponding crude death rates also show year to year variations but in their case a net decline of 4.1 is evident over the same period. Table 1 also shows that the estimates of Crude Birth Rate (CBR) reported by 1975 Pakistan Fertility Survey (PFS), 1984-85 Pakistan Contraceptive Prevalence Survey (PCPS) and 1990-91 Pakistan Demographic and Health Survey (PDHS) show a declining trend [Government of Pakistan (1976, 1986); NIPS (1992)]. Moreover the levels of CBR given by these types of one-time surveys are reported to be lower than the rates reported for the nearest years by the series of yearly repeated surveys. Conducted by Pakistan Federal Bureau of Statistics.

2. EVIDENCE OF FERTILITY DECLINE

Among the approaches to assess fertility changes the one which is relatively simple, and perhaps, more robust under conditions of varied methodologies, is the

Mohammad Afzal is Joint Director, M. Framurz K. Kayani is Research Demographer and Ali Mohammad is Staff Demographer at the Pakistan Institute of Development Economics, Islamabad.

[1]Since the main objective for an efficient data collection system aimed at providing national demographic parameters, should be to provide a realistic ratio of births (occurring in a year) and the population, a system placing more emphasis on a better coverage of births and relatively less or no correspondingly emphasis on the coverage of the population (or vice versa) would generate a rate which is inconsistent with the true ratio of the births and population, and hence would be biased.

mean number of children ever born to a woman, provided such data are made available. This measure though not sensitive to directly reflect the current fertility level by calendar years, is nevertheless an indicator of cumulative fertility

Table 1

Reported Estimates of Crude Birth and Death Rates from Different Surveys in Pakistan

Year	Name of Survey	Birth Rate	Death Rate
Yearly Repeated Surveys			
1962–65 Average	PGE (LR)	42.0	15.0
1968	PGS	37.0	12.0
1969	PGS	38.8	11.5
1970	PGS	37.0	10.5
1971	PGS	38.0	10.6
1968–71 Average	PGS	37.5	11.4
1976	PGS	42.8	11.5
1977	PGS	40.6	10.7
1978	PGS	40.9	10.0
1979	PGS	41.6	9.6
1976–79 Average	PGS	41.5	10.5
1984	PDS	43.3	11.8
1985	PDS	43.3	11.5
1986	PDS	43.3	10.1
1987	PDS	43.3	10.5
1988	PDS	40.5	10.8
1984–88 Average	PDS	42.7	10.9
One Time Retrospective Surveys			
1975	PFS	40.5	N.A.
1984-85	PCPS	36.6	N.A.
1990-91	PDHS	35.0	N.A.

for the women of different ages. In Table 2, which provides the estimates of mean number of children ever born per woman from the one-time surveys as well as the PDS surveys for the years 1984 and 1988, there seems to be a clear indication (for both the currently married and all women) of fertility decline in Pakistan, especially for those in the ages between 20 to 40. Also, there is little evidence to support the 'zig-zag' variations among the levels of birth rate shown by the reported crude birth rates (Table 1) for different repeated surveys (PGE 1962–65, PGS 1968–71, PGS 1976–79 and PDS 1984–88).

Table 2

Comparative View of Mean Number of Children Ever Born per (a) Currently Married Woman, and (b) per Woman from Surveys taken in Pakistan from 1975 to 1990-91

Age of Women	PFS 1975	PCPS 1984-85	PDS 1984	PDS 1988	PDHS 1990-91
Mean Children Ever Born per Currently Married Woman					
15–19	0.6	0.6	0.5	0.6	0.6
20–24	1.9	1.8	1.6	1.7	1.6
25–29	3.4	3.4	3.2	3.2	3.1
30–34	5.2	5.0	4.6	4.7	4.6
35–39	6.4	6.1	5.8	5.7	5.7
40–44	7.5	7.0	6.5	6.3	6.5
45–49	7.4	7.5	6.5	6.5	6.6
All Ages	4.3	4.3	4.0	4.0	4.1
Mean Children Ever Born per Woman					
15–19	0.2	–	0.2	0.1	0.2
20–24	1.5	–	1.2	1.2	1.0
25–29	3.1	–	2.9	2.9	2.6
30–34	5.0	–	4.4	4.5	4.3
35–39	7.1	–	5.6	5.5	5.5
40–44	7.0	–	6.2	6.0	6.3
45–49	7.0	–	6.3	6.3	6.4
All Ages	3.4	–	3.0	3.0	3.1

3. INDIRECT ESTIMATES OF BIRTH RATES

In looking for an approach to indirectly estimate the birth rate on the basis of internal consistency of input data, the main objective of this paper has been to provide independent estimates of the number of births and CBR. In doing so the two main considerations were that the CBR so estimated should be consistent with the corresponding mortality risks and also with the proportions of children aged 0–4 years as reported in the population from the same source. For a source where no data base on mortality is available such estimates have been worked out from a survey which is nearest in time to the data source from which the proportions of children in population is to be taken.

In each of the repeated survey series (*viz*, PGE, PGS and PDS) information is available on the age distribution of population and also on age-specific mortality. Age-specific mortality rates were used to work out the corresponding life tables by imputing the reported infant mortality rate as the probability of death from birth to age one. The estimate of crude birth rate was then obtained as follows:

$$CBR = \frac{P_{0-4}}{{}_{t-2.5}P_{all}} \times \frac{l_0}{{}_4L_0}$$

Where as:

P_{0-4} = the number of persons in ages 0 to 4 years at time 't'

${}_{t-2.5}P_{all}$ = population in all ages at time $t-2.5$

t = is the year of survey/census

l_0 = Radix of the life table (100,000)

${}_4L_0$ = Person-years of population 0 to 4 years.

The estimated average number of births per year during 5 years preceding the survey/census enumeration, worked out by multiplying proportions of population in ages 0–4 years and the life table–based ratios $l_0/{}_4L_0$, when divided by estimated population at time $t-2.5$, yielded the indirectly estimated CBR, for different sources. The estimates of CBR for different surveys, so made, are described in Table 3, under column (4). Table 3 shows that in comparison to the reported crude birth rates the estimated rates provided under column (4) show a clear declining trend from 1962–65 to 1979, but from 1984 the rate at once jumps up and then shows a slight decline. In view of all other evidence to the contrary this sudden jump shown by the indirect estimates of the birth rate for PDS 1984 to 1988, seems to be an unrealistic elevation as compared to the corresponding indirect estimates for PGS 1976 to 1979, implying that in the PDS series there are some serious problems in the PDS series, which not only resulted in the pushing up of the reported birth rate but also affected the other segments of data which were used in this study as a basis for arriving at the indirect estimates. If there is no independent evidence to support this upward lift of the crude birth rate then the problem must lie in one or more of the basic inputs used for arriving at the indirect estimates of the CBR.

Before proceeding further it seems appropriate that the validity of the clear declining trend shown by the indirect estimates of CBR from 1962–65 to 1979, may also be established. To do so another set of indirect estimates of birth rates has been worked out by using the same approach on the proportions of population in ages 0 to 4 years as reported by the 1961, 1972 and 1981 censuses [Government of Pakistan (1985)]. Since the censuses did not collect any data to reflect mortality we have applied to each of these census-based proportion, the life table based ratios $l_0/{}_4L_0$ from the nearest in time PGE/PGS survey. As observed from Table 3 even

these three estimates (from the three censuses) imply a declining trend in the birth rate over the period 1961 to 1981. A further evidence to decline in fertility is shown in Table 3 by the estimates of the CBR reported by the three one-time surveys–1975 Pakistan Fertility Survey (PFS), 1984-85 Pakistan Contraceptive Prevalence Survey (PCPS) and 1990-91 Pakistan Demographic and Health Survey (PDHS).

Table 3

Comparative View of Indirectly Estimated (Unadjusted), Estimated (Adjusted for PDS 1984 to 1988) and Reported CBR for Pakistan from Different Surveys: PGE 1962–65 to PDS 1988; Estimated CBR for 1961, 1972 and 1981 Censuses; and Reported CBR from 1975 PFS, 1984-85 PCPS and 1990-91 PDHS

Year	Life Table Used for the Ratio $l_0 / {}_4L_0$	Population Used	Estimated CBR		Reported CBR
			Unadjusted	Adjusted for 1984–88	
(1)	(2)	(3)	(4)	(5)	(6)
1962–65	1962–65 PGE	Same	41.91	–	42.0
1968	1968 PGS	Same	39.90	–	37.0
1969	1969 PGS	Same	39.79	–	38.0
1970	1970 PGS	Same	39.79	–	37.0
1971	1971 PGS	Same	39.52	–	38.0
1968–71	1968–71 PGS	Same	39.75	–	37.5
1976	1976 PGS	Same	36.98	–	42.8
1977	1977 PGS	Same	37.61	–	40.6
1978	1978 PGS	Same	37.39	–	40.9
1979	1979 PGS	Same	37.16	–	41.6
1976–79	1976–79 PGS	Same	37.29	–	41.5
1984	1984 PDS	Same	40.88	37.1	43.3
1985	1985 PDS	Same	40.87	36.7	43.3
1986	1986 PDS	Same	39.93	37.2	43.3
1987	1987 PDS	Same	40.39	37.2	43.3
1988	1988 PDS	Same	40.06	37.1	40.5
1984–88	1984–88 PDS	Same	40.42	37.1	42.7
1961	1962–65 PGE	Census	42.64	–	–
1972	1968–71 PGS	Census	37.51	–	–
1981	1976–79 PGS	Census	37.07	–	–
1975	–	PFS	–	–	40.5
1984-85	–	PCPS	–	–	36.6
1990-91	–	PDHS	–	–	35.0

4. A LOOK AT THE INFANT AND CHILD MORTALITY RISKS

In an effort to look for the root cause of this problem in the indirect estimates of the birth rate from 1984 to 1988, and to find some corrective measures, we have examined the levels and trends of the mortality risks (for the respective survey source) from age 0 to 1, and from age 1 to 4, which are the main determinants of the reverse survival ratio ($l_0/_4L_0$) used from each life table. A description of these estimates is provided in Table 4. It is observed from Table 4 that the infant

Table 4

Estimates of Infant Mortality Risks ($_1Q_0$) Based on Reported Data (also with those from 1984 to 1988, Based on Regression Estimates); and Child Mortality Risks ($_4Q_1$) from Sample Surveys for Pakistan from Different Surveys: 1962 to 1991

		$_1Q_0$		
Year	Survey	Reported	Adjusted for* PDS 1984–1988	$_4Q_1$
(1)	(2)	(3)	(4)	(5)
Repeated Surveys				
1962–65	PGS LR	.142	–	.086
1968	PGS	.117	–	.065
1969	PGS	.107	–	.084
1970	PGS	.110	–	.052
1971	PGS	.104	–	.066
1968–71	PGS	.109	–	.067
1976	PGS	.087	–	.054
1977	PGS	.100	–	.048
1978	PGS	.095	–	.034
1979	PGS	.094	–	.034
1976–79	PGS	.094	–	.042
1984	PDS	.127	.092	.033
1985	PDS	.116	.088	.034
1986	PDS	.106	.092	.028
1987	PDS	.104	.092	.035
1988	PDS	.107	.091	.035
1984–88	PDS	.112	.091	.033
One-time Surveys				
1984-85	PCPS	.106	–	–
1990-91	PDHS	.091	–	–

mortality risks ($_1Q_0$) as well as the child mortality risks from age 1 to 4 years ($_4Q_1$) show clear declining trends from 1962–65 through 1979, after which the level of infant mortality risk is indicated from PDS 1984 to elevate once again and then decline slightly but remain relatively higher even till PDS 1988, in comparison to the previously attained lower level reported by PGS 1979. Considering the fact that levels of child mortality risks given by the same (corresponding) survey sources continue to show a declining trend, the sudden elevation of the infant mortality risks seems to be an artifact of data, identical to the sudden jump from the previous levels observed in the estimates of CBR from PDS 1984 to 1988. It may, however, be noted from Table 4, that an independent indication of the declining trend (over this period) in infant mortality risks is also provided by the reported estimates in the 1984-85 PCPS and the 1990-91 PDHS.

In order to examine the extent to which the variations in the infant mortality risks are associated with the variations in child mortality risks an Ordinary Least Square (OLS) regression equation was fitted for the reported estimates from 1962–65 PGE and 1979 PGS by taking infant mortality risks as the dependent variable and child mortality as the independent variable. A high degree of association between the two is indicated by the coefficient of determination (R^2) which indicated that more than 50 percent of the variations in infant mortality risks is explained by the variations in child mortality risks.[2] By using this regression equation a set of adjusted values which are consistent with the variations of both infant mortality and child mortality risks (from 1962–65) were estimated for the years 1984 to 1988. These estimates are given under column (4) of Table 4. The Table shows that for 1981 the adjusted estimate of the infant mortality rate (or risk) was 91 per thousand births, which incidentally is the same as given by the 1990-91 PDHS.

5. ADJUSTMENT OF CRUDE BIRTH RATES FROM PDS 1984 TO 1988

Keeping in view the observed consistency between the levels and trends of infant mortality risks with that of child mortality risks over the period 1962–65 till 1979, and that the reverse survival ratios (used) were based on these risks it seems logical that the indirect estimates of the crude birth rates (provided in Table 3) must be consistent with child mortality risks.[3] In order to examine the significance of the association between the child mortality risks and the estimates of crude birth rates over the same period another OLS regression equation was fitted between the two, and it was observed (from the value of R^2) that about 70 percent of the variations in

[2]The regression equation to estimate the values of infant mortality risks on the basis of child mortality risks was as follows: $_1Q_0 = .0711 + .0605\ _4Q_1$. The value of '*t*' for the coefficient comes to be 2.70, which is significant at the 5 percent level.

[3]This is because the estimates of child mortality risks, by showing a clear declining trend since 1962–65, have proved to be more robust than infant mortality risks, even to the methodological changes between PGE 1962–65, PGS 1968–71, PGS 1976–79 and PDS 1984–88. This phenomenon was also mentioned in an earlier study [Afzal *et al.* (1988)].

the values of CBR are explained by the variations in child mortality risks.[4] On the basis of this relationship the adjusted estimates of crude birth rates for the year 1984 to 1988 were made, which are provided in Table 2, under column (5).

From Table 2 it seems that some thing was seriously wrong with even the indirect estimates of the CBR worked out (refer Section 3 of this paper) on the basis of the infant and child mortality risks, and the proportion of children in ages 0 to 4 years. The analysis done in the previous section implied that the reported estimates of infant mortality rates (risks) from PDS 1984 to 1988 were erroneously elevated, while the levels of child mortality (from age one to four years) remained practically consistent throughout the period from 1962–65 to 1988. Therefore, one of the factors contributing to the sudden rise in the indirectly estimated crude birth rates for the years 1984 through 1988 was the elevated infant mortality risks.

Let us now examine the variation over time in the levels of the other contributory factor used for indirect estimation of the CBR namely the proportions of population in age group 0 to 4 years, reported by different survey sources (given under column (4) of Table 2).

Table 5 shows that even in these proportions there is an over all declining trend from 1962–65 to 1979, and then from PDS 1984 their level suddenly goes up with only a slight dip in 1988. A similar pattern over time is also observed for the proportions of population in ages 1 to 4 years. The declining trend in these two proportions is also independently confirmed from the corresponding estimates based on 1961, 1972 and 1981 population censuses. For the years 1984-85 and 1987-88, it was independently observed from the age distributions of population given by the Labour Force Surveys [Government of Pakistan (1986a, 1988)] that the proportions in ages 0–4 and 1–4 years were not as high as reported by the PDS for years 1984 and 1988. In order to eliminate the effect of higher proportions of population in ages 0–4 and higher infant mortality risks, on the indirect estimates of the crude birth rates from the PDS, we have tried various other combinations of these measures to get adjusted estimates for the CBR from PDS 1984 and 1988, so that the validity of the estimated adjusted rates reported in Table 2 under column (5) can be confirmed. The estimates of crude birth rates for the years 1984 and 1988, by using these combinations are shown in Table 6.

In *Set 1*, the life table prepared from age-specific mortality rates for 1984 PDS was modified by substituting IMR (or ${}_1Q_0$) from 1984-85 PCPS, and for 1988 PDS, the 1990-91 PDHS IMR was taken to represent mortality risks from birth till age 1. These changes alone reduced the estimated rate for 1984 by 3.3 and for 1988 by 1.1.

[4]The regression equation to estimate the values of crude birth rate (CBR) for the years 1984 to 1988, on the basis of estimates of CBR and child mortality risks from 1962–65 to 1979 was as follows: CBR = .03465 + .07323 ${}_4Q_1$. The value of '*t*' for the coefficient comes to be 3.97, which is highly significant at 5 percent level.

In *set 2*, the further substitutions of relatively lower proportions in ages 0–4 from the nearest labour force survey indicate that the CBR for the two years could be further low. Among the other three sets the one where proportion in 0–4 years from 1979 PGS age distribution was used for 1984 and 1988, yielded the lowest values of the crude birth rates.

The results from this exercise along with the other independent estimates indicate that the level of the crude birth rate in Pakistan has been steadily declining, and that current estimates of the rate may even be lower than 37 per thousand. The results of the study clearly suggest that the PDS series, apart from providing unduly elevated birth rates for the years 1984 through 1988, also failed to yield estimates of

Table 5

Proportions of Children Aged 1 to 4 Years, and Aged 0 to 4 Years in the Total Population, as Reported in Different Censuses and Surveys Series of Pakistan

		Reported Proportion in Total Population	
Years	Source	1–4/A11	0–4/A11
1961	Census	.1343	.1637
1972	Census	.1249	.1507
1981	Census	.1242	.1532
1962–65	PGE	.1289	.1609
1968	PGS	.1344	.1592
1969	PGS	.1276	.1587
1970	PGS	.1304	.1611
1971	PGS	.1304	.1598
1968–71	PGS	.1307	.1597
1976	PGS	.1268	.1525
1977	PGS	.1292	.1542
1978	PGS	.1206	.1553
1979	PGS	.1250	.1544
1976–79	PGS	.1276	.1541
1984	PDS	.1353	.1643
1985	PDS	.1364	.1661
1986	PDS	.1384	.1646
1987	PDS	.1393	.1661
1988	PDS	.1362	.1641
1984–88	PDS	.1371	.1650
1984-85	LFS	–	.1590
1987-88	LFS	–	.1574

Table 6

Comparative View of Reported and Indirectly Estimated Crude Birth Rates for 1984 PDS and 1988 PDS, using Proportions in Ages 0–4 Years, from the Respective Surveys, from 1981 Census, from Labour Force Surveys, and from 1979 PGS, Substituting for ${}_1Q_0$ the Infant Mortality Rate Given by the Nearest One-time Survey for Preparing the Life Table

Year	Life Table used for the Ratio $l_0 / {}_4L_0$	Source of ${}_1Q_0$ used in Life Table	Population used for Proportions (0–4/A11)	Estimated CBR	Reported CBR
Set 1					
1984	1984 PDS	1984-85 PCPS	1984 PDS	40.0	43.3
1988	1988 PDS	1990-91 PDHS	1988 PDS	39.4	40.5
Set 2					
1984	1984 PDS	1984-85 PCPS	1984-85 LFS	38.8	43.3
1988	1988 PDS	1990-91 PDHS	1987-88 LFS	37.8	40.5
Set 3					
1984	1984 PDS	1984 PDS	1981 Census	38.1	43.3
1988	1988 PDS	1988 PDS	1981 Census	37.4	40.5
Set 4					
1984	1984 PDS	1984-85 PCPS	1981 Census	37.3	43.3
1988	1988 PDS	1990-91 PDHS	1981 Census	36.7	40.5
Set 5					
1984	1984 PDS	1984-85 PCPS	1979 PGS	37.6	43.3
1988	1988 PDS	1990-91 PDHS	1979 PGS	37.1	40.5

infant mortality rates and proportions of population in ages 0–4 years, which could be comparable in level of accuracy (in these respects) achieved by the previous series, namely PGE 1962–65, PGS 1968–71 and PGS 1976–79. The only exception where the PDS series also yielded somewhat consistent and robust estimates were found to be the child mortality risks. And these estimates have provided a realistic basis for a linkage of the PDS series with the previous series, which, along with other independent evidence, has been used for drawing a meaningful inference about fertility changes in Pakistan.

6. SUMMARY AND CONCLUSIONS

Keeping in view the general concern about the reliability and incompatibility of the birth rates provided by the PGE, the PGS and the PDS series, an effort has been made in this paper to provide some indirect estimates of this important demographic measure from each of these data sources. The issue of reliability became more conspicuous with the PDS for 1984 showing a curious lift in the level of the birth rate which was reported to be unchanged even up to a decimal point (43.3) for four consecutive years. This upward lift in the reported birth rate was contrary to the other evidence of declining fertility, including that from the cumulative fertility estimates given by the PDS itself and other surveys. While the unrealistic elevation of the CBR calls for a thorough investigation of the PDS data, the indirect estimates made in this paper also show a clear declining trend.[5] In doing this exercise the estimates of child mortality risks provided a useful basis for estimating the crude birth rates. However, the trend in the component of child mortality risk relating to the time between birth and age one (infant mortality risk) was observed to be consistent with the trend in child mortality risks (from age one to four years) from 1962–65 PGE to 1979 PGS only, and then there was a conspicuous inconsistency due to the sudden elevation of the infant mortality rates given by PDS 1984 to 1988. However, it was confirmed from the 1984 PCPS and the 1988 PDHS that the level of infant mortality rates was much lower than that reported by the PDS series. The PDS data showed an unexpected hump in the proportions of population aged 0–4 years, which was similar to those observed for the CBR and the infant mortality rate. Although the declining trend in CBR was also evident from the indirect estimates made on the basis proportions of 1961, 1972 and 1981 census populations in ages 0–4, the use of independent estimates of infant mortality risks and proportions in ages 0–4 from other sources including the 1984-85 and 1987-88 Labour Force Surveys supported a continuation of a declining trend in the birth rate beyond 1979. According to the analysis presented in this paper the present estimate of the crude birth rate in Pakistan may be less than 37

[5]A partial evaluation report of the PDS prepared by Pullum *et al.* (1989) also points towards the problems peculiar to PDS and of the incomparability of the PGE, PGS and PDS series. The report also gives a minimum level of overestimation of the birth rate by the PDS.

per thousand, and the rate of natural increase may be lower than 2.7 percent per annum.

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Comments on
"An Indirect View of the Fertility Changes in Pakistan"

Pakistan is known as one of those countries which have a high level of fertility and consequently its rate of population growth is also among the highest. The question is how high is high?

The estimates made from various sources of data and using different techniques have varied widely.

We heard from Nancy Birdsall in the first plenary session quoting 6.6 as the total fertility rate (TFR) of Pakistan. The source for this estimate is perhaps, the *1991 World Population Data Sheet* of the population Reference Bureau. This source also provides an estimate of rate of population growth of 3.0 percent per annum.

Another source, the United Nations *World Population Chart, 1990* shows that the estimated TFR of Pakistan for 1985–1990, was 6.5 and rate of population growth was 3.4 percent per annum. Another estimate of TFR shown in the *1992 World Population Data Sheet* is 6.1 and rate of population growth of 3.1 percent per annum. Still another source, the *1991 ESCAP Population Data Sheet,* shows an estimated TFR of 5.4 and a rate of growth of 2.84 percent per annum.

More recently after reviewing various estimates made from the national population surveys and those made by the international agencies and the analysis done at the National Institute of Population Studies, the inter-ministerial committee arrived at a crude birth rate of 39, crude death rate of 10 and a rate of natural increase of 2.9 percent per annum for 1990.

Viewing the duration of the family planning programme which was made an integral part of the Development Plans since 1960 and the socio-economic changes which have occurred in the meanwhile, the TFR of 6.6 or 6.5 and the population growth rate of 3.4 percent or 3.1 percent seem to be too high.

This reminds me of the reaction of an elder of a village (which was chosen as one of the sample areas for the 1962–1965 Pakistan Growth Estimation (PGE) project). He got annoyed with the project enumerator who was visiting the village every three months and told him: "Do you think we have machines to produce babies?" The authors of the article under discussion have shown that the elder was right and the level of fertility is not as high as is being estimated and that it is declining.

However, more recent figures quoted by the United Nations for 1990–1995 are more realistic. These are:

TFR = 5.9

GR = 2.9

In fact in most of the cases the sources of data for the UN figures are the Governments and it is possible that the high rates were based on the 1984–1987 Pakistan Demographic Survey adjusted data. The adjustment procedure used seemed to have an upward bias.

The authors have indicated that several attempts have been made to estimate vital rates, starting with PGE in 1962 and the latest Pakistan Demographic and Health Survey (PDHS) in 1990-1991. Thus a great deal of data exist to determine more plausible vital rates.

In summary there are several series of data from which fertility levels have been estimated.

(i) Three series of PGE 1962–1965: Longitudal Registration (LR); Cross Sectional Survey (CS); Chandra-Deming (CD).
The authors have selected LR, out of 3 series which has been considered more reliable than others.
(ii) Population Growth Survey (PGS) 1968–1971.
(iii) Population Growth Survey (PGS) 1976–1979.
(iv) Pakistan Demographic Survey 1984–1988 + 1989.
(v) Population Fertility Survey, 1974-1975, Pakistan Contraceptive Prevalence Survey 1984-1985, and Pakistan Demographic and Health Survey 1990-1991.

As is shown in the article under discussion, each series produced varying estimates which may be attributed to one or more reason of different magnitude: for example, the difference in the enumerator's age, sex, level of education, training and biases would have a varying effect on the quality of data produced by each series. Also the respondents' ignorance and biases due to the prevalence of mass scale illiteracy would account for a considerable variation.

Other factors, affecting the reliability and comparability include design effect, sampling bias and error and time effect. These and other factors not only restrict, the comparability between series but also within each series.

These generic problems restrict the scope of inter-survey comparison. But in many developing countries in which data are deficient, there is no alternative, but to make the best use of the data which are available. However, the results should be interpreted and used with caution.

These limitations apart, the authors have been able to produce plausible results indicating a declining trend in the level of fertility. This trend is consistent with the changing demographic and socio-economic situation in the country:

(i) Age at marriage of female has risen to over 21 years (PDHS 1990-91).
(ii) Contraceptive prevalence rate (CPR) has also risen. PDHS showed that 11.8 percent of the currently married women 15–49 years of age were users as against 7.6 percent according to 1984-1985 PCPS and there are

indications that there were shy users in both PCPS and PDHS, who did not report that they were using contraception.

(iii) Per capita income has risen to over US $400.

(iv) Female literacy and educational levels have also risen though modestly.

(v) 1990-1991 PDHS shows that the level of TFR was in the range of 5.2–5.4.

Although PDS data for 1984 to 1987 showed a sudden upsurge in the CBR which generated a great deal of controversy, the authors by comparing the mean of children ever born (CEB) obtained from the PDS series have clarified the situation and have confirmed that the decline in the level of fertility has continued.

The main thrust of the paper, is on the construction of a life table using the age-specific mortality rates and its application to the age composition of the population, both obtained from the same survey, to estimate CBRs independent of the birth data.

This innovative device developed by the authors has also produced plausible CBRs which are shown along with the reported CBRs in Table 3 of the article. The declining trends with minor exceptions are again quite obvious. Also, as noted from Table 4 of the article, estimated values of q_0 and q_1 show a declining trend which was expected.

Although all results generated by using the life tables are plausible, the problem of reliability of input data to construct q_x values still remains. Data for ages under 5 years which is the major input often suffer from reporting errors and the reliability of these data is a basic requirement for the construction of life tables. Other data on births, deaths and population should also be of usable quality. Evaluation and smoothing of data before constructing a life table is done which may eliminate true variation.

Thus I would conclude with the note that there is no substitute for reliable data to obtain true or statisfactory values of population as well as social and economic variables. However, the authors of the article under discussion have tried to make best use of the existing data to prove the hypothesis of a declining trend in the level of fertility. This shows that inspite of limitations, the existing data are adequate to, at least, throw light on the declining fertility level.

I wish to mention here that NIPS is embarking on a PGE-type project with the object of obtaining better quality data for obtaining more reliable birth rates, death rates and contraceptive prevalence rates by using the dual system of data collection.

Sultan S. Hashmi

National Institute of Population
Studies (NIPS),
Islamabad.