Components of Fertility Change in India and is its Major States During 1972-1992

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Introduction

One of the most critical problems of India and of many other developing countries is their rapid population growth. India's population increased from 361 million to 846 million between 1951 and 1991; a 134 per cent increase during the 40 year period. Of the three main components that are responsible for population growth namely, fertility, mortality and migration, fertility is the most crucial and major player.

The impact of a country's fertility on its socioeconomic development is well recognized. Davis and Blake [1] have identified eleven "intermediate variables" through which social and cultural factors affect fertility. In a later study, Bongaarts [2], [3] collapsed these variables into seven factors, and found that only four of them, called "proximate variables" are important for explaining the fertility difference between populations. They are: the proportion of women (of reproductive age) married, proportion of couples (of reproductive age) using contraception, length of lactational infecundability, and extent of induced abortion. Recent research [4], [5] shows that among these four factors, the first two are more important.

Bongaarts [2] has suggested a multiplicative model for the decomposition of the change in fertility attributable to the four proximate variables. Though it is a simple method, paucity of data especially on lactational infecundability and induced abortion limits the application of this method. Recently, Retherford and Rele [6] have used a simple method to decompose the change in total fertility rate (TFR) into two parts; one, that is attributable to changes in nuptiality and the other, to changes in marital fertility. Using this method, an attempt has been made in this paper to study the trend and differentials in the total fertility rates during 1972-92 in India and its major states.

Methodology

Following the usual convention, the total fertility rate (TFR) can be written as.

$$TFR = 5\ S\ (Px * Fx)$$

Where 'Px' is the proportion of women married in each of the five-year age groups 15-19 through 45-49; and 'Fx' is the age-specific marital fertility rate for the same five-year age groups. The change in TFR over a period can then be decomposed into componests according to the formula

$$TFR_2 - TFR_1 = 2.5\ S\ (FX_2 + Fx_1) * (Px_2 - Px_1) +$$

$$2.5\ S\ (Px_2 + Px_1) * (Fx_2 - Fx_1)$$

where the subscripts 1 and 2 refer to the beginning and end points of the analysis period. The first term on the right hand side is the portion of the change in TFR due to changes in nuptiality, and the second is the portion of the change due to changes in marital fertility. Though this method is primarily used to study changes in fertility over time, it can also be used to study changes in fertility between areas. We propose to apply this methodology both ways and try to explain the components of fertility change between all of India and each of its major states for different points in time, as also between India as a whole and in its major states over time periods.

Data

The application of this method requires data on age-specific proportions of women married and age-specific marital fertility rates for two periods or two areas, depending on whether one is interested in studying the trend analysis or differential analysis respectively. If direct estimates of the age specific proportion of women married are not available, they can be obtained indirectly from age-specific fertility rates (ASFRs) and age-specific marital fertility rates (ASMFRs) using the identity: proportion of women married = ASFR/ASMFR.

In India, the sample registration scheme (SRS) is the only source of data on age-specific fertility rates (ASFRs) and age-specific marital fertility rates (ASMFRs) at the state level and for different years, starting from 1968. However, since 1968 data were not available for many states and the 19 69 figures were grossly underestimated, the earliest period for which comparable figures were available, that is 1972, was considered as the starting point for our analysis. Similar sets of SRS data for 1978, 1984 and 1992 were also included. For the time-period analysis, the periods 1972-1984 and 1984-1992 were selected as the 1978 data did not show a systematic declining trend: the figures were lower, and sometimes much lower than even the 1984 figures. Another problem encountered with the SRS data was that the reported ASFRs were higher than the ASMFRs for some age groups in certain states and for different years. As this problem was more

acute in the 45-49 age group, this age group was excluded from the analysis. For the remaining age groups, when the proportion of women married worked out to be greater than 1.0, it was taken as 1.0 itself. Thus, the changes in TFR presented in, this paper are those obtained after making these adjustments and may not tally exacting with the original SRS figures.

Results and Discussion

Trends and differentials in TFR

Table 1 presents the all-India, rural and urban TFRs based on the 15-44 age group (after adjusting for discrepancies in the proportion of women married), for major states for 1972, 1984 and 1992.

Table 1: Rural and urban fertility rates based on 15-44 age groups for India and major states, 1972, 1984 and 1992

State	TFR			% decline in			TFR			% decline in		
	1972	1984	1992	72-92@	72-84*	84-92*	1972	1984	1992	72-92@	72-84*	84-92*
	Rural						Urban					
Uttar Pradesh	7.11	5.80	5.46	23.2	1.65	0.75	5.08	4.63	3.72	26.8	0.74	2.78
Madhya Pradesh	6.93	5.24	4.67	32.6	2.27	1.44	5.27	4.04	2.96	43.8	2.16	3.93
Rajasthan	6.71	5.73	4.65	30.7	1.27	2.66	5.09	4.48	3.28	35.7	1.03	3.98
Bihar	4.93	5.57	4.64	5.8	- 0.97	2.30	3.91	4.71	3.33	14.8	- 1.49	4.44
Haryana	7.21	5.18	4.05	43.8	2.67	3.15	4.89	3.89	2.73	44.0	1.83	4.52
INDIA	**5.58**	**4.67**	**3.85**	**31.1**	**1.43**	**2.45**	**4.23**	**3.50**	**2.58**	**39.0**	**1.52**	**3.89**
Assam	5.66	4.32	3.53	37.7	2.19	2.55	4.04	2.83	2.11	47.7	2.89	3.72
Gujarat	6.32	4.31	3.40	46.2	3.11	3.01	5.15	3.45	2.73	46.9	3.25	2.95
West Bengal	DNA	4.36	3.33	DNA	DNA	3.43	3.57	2.45	1.85	48.3	3.06	3.59
Punjab	5.74	3.97	3.20	44.4	3.00	2.74	4.50	3.27	2.67	40.7	2.58	2.59
Orissa	4.75	4.23	3.18	33.1	0.93	3.65	4.08	3.49	2.29	44.0	1.26	5.43
Karnataka	4.56	4.03	3.13	31.4	1.00	3.21	3.37	3.29	2.42	28.1	0.18	3.92
Maharashtra	4.95	4.10	3.10	37.4	1.53	3.53	3.98	3.28	2.33	41.5	1.56	4.38
Andhra Pradesh	4.73	4.07	2.91	38.4	1.22	4.26	4.30	3.47	2.32	46.1	1.73	5.17
Tamil Nadu	4.43	3.46	2.33	47.4	2.01	5.05	3.23	3.04	1.96	39.4	0.50	5.64
Kerala	4.52	2.43	1.71	62.2	5.08	4.53	4.04	2.42	1.74	56.9	4.19	4.19

DNA = Data not available

@ Overall decline; * Geometric decline per year. TFRs are adjusted for discrepancies in the proportion of women married. The states are arranged according to their rural TFR level in 1992.

The table indicates that between 1972 and 1991, the TFR declined by 31 per cent (from 5.6 to 3.9) in the rural areas and by 39 per cent (from 4.2 to 2.6) in the urban areas. The observed higher rate of decline in the urban TFR was mainly due to a relatively faster decline during 1984-99 (by 3.9 per cent as opposed to 2.4 per cent in rural areas).

In 1972, the estimated rural TFR was between 6.7 and 7.2 in Uttar Pradesh, Madhya Pradesh, Rajasthan and Haryana. It is surprising to note that it was only 4.9 for Bihar, where it is likely to have been underestimated. The other states that were above the national average of 5.6 were Gujarat (6.3), and Punjab and Assam (both 5.7). Tamil Nadu and Kerala had the lowest TFRs of 4.4 and 4.5 respectively. The rural TFR of all the other states was lower than the national erage (4.6-5.0). The urban TFR in 1972 was between 5.1 and 5.3 in Uttar Pradesh, Madhya Pradesh, Rajasthan and Gujarat, followed by Haryana with 4.9. It was as low as 3.2 in Tamil Nadu, 3.4 and 3.6 in Karnataka and West Bengal respectively, and m all the other states. including Kerala, it was around 4.0.

By 1992, Kerala's TFR had declined to 1.7 in both rural and urban areas, followed by Tamil Nadu (urban:2.0; rural:23). States like Assam, Gujarat, West Bengal, Punjab, Orissa, Karnataka and Maharashtra had rural TFRs ranging from 3.1-3.5 and an urban TFR of 2.1-2.7 (except West Bengal - urban TFR below 1.9). On the other hand, Madhya Pradesh, Bihar and Rajasthan had rural TFRs around 4.7 and urban TFRs around 3.0-3.3, with Haryana placed in between Uttar Pradesh was the only state with a rural TFR of 5.5 and an urban TFR of 3.7.

During 1972 and 1992 thus, Kerala recorded declines of 62 and 57 per cent in its rural and urban TFRs respectively (rural: from 4.5 to 1.7; urban: from 4.0 to 1.7). In fact, it was the only Indian state to have a TFR below 2 by 1992 in both rural and urban areas. Haryana, Gujarat, Punjab and Tamil Nadu registered 44-47 per cent declines in their rural TFRs during this period, while Assam, Maharashtra and Andhra Pradesh recorded declines of about 38 per cent, and Madhya Pradesh, Rajasthan, Orissa and Karnataka recorded declines of 30-33 per cent. Bihar was the only state where the rural TFR had not fallen substantially during 1972-92; its TFR had risen from 4.9 in 1972 to 5.6 in 1984 and then decreased to 4.6 by 1992.

In many states, the rate of decline in the rural TFR was higher during 1984-92 than during 1972-84 (Table 1). The trend in the decline of the urban TFR was more or less similar to that of the rural TFR though in many states except Punjab, Karnataka, Tamil Naidu and Kerala, the decline in the TFR during 1972-92 was greater in urban than in rural areas.

Components of Fertility Difference

Table 2 presents the total difference in TFR between each state and India as a whole, and the relative (percentage) difference in TFR due to differences in marital fertility, separarely for rural and urban areas of the states for the years 1972, 1984 and 1992. The relative difference in TFR due to changes in the proportion of women married is a complement of the difference in TFRs due to the difference in marital fertility and can easily be derived from the table. In the following paragraphs, 'difference' is taken to mean the difference in rates or values (of TFRs, proportions of women married, or marital fertility rates) between the state in question and India as a whole.

Table 2: Difference in TFR between each state and all-India and relative difference in TFR to differences in marital fertility (MF), for rural and urban areas, 1972- 1984 and 1992

State	1972		1984		1992		1972		1984		1992	
	Diff. In TFR	% diff. Due to MF	Diff. In TFR	% diff. Due to MF	Diff. In TFR	% diff. Due to MF	Diff. In TFR	% diff. Due to MF	Diff. In TFR	% diff. Due to MF	Diff. In TFR	% diff. Due to MF
	RURAL						URBAN					
Uttar Pradesh	1.53	69.4	1.13	68.6	1.62	77.2	0.86	73.2	1.14	93.8	1.14	100.0
Madhya Pradesh	1.36	55.5	0.57	20.6	0.83	42.7	1.05	42.7	0.54	40.9	0.39	17.5
Rajasthan	1.13	71.8	1.07	53.2	0.80	45.4	0.87	19.2	0.98	55.9	0.70	31.0
Bihar	- 0.65	133.9	0.90	76.0	0.80	70.9	- 0.32	291.3	1.21	74.9	0.75	69.5
Haryana	1.63	75.9	0.52	40.9	0.20	- 26.6	0.66	62.2	0.40	40.5	0.16	- 62.7
Assam	0.08	515.9	- 0.35	- 150.0	0.32	-219.0	- 0.19	271.1	- 0.67	- 56.2	- 0.47	- 61.2
Gujarat	0.74	117.4	- 0.36	36.4	- 0.45	85.8	0.92	20.7	- 0.05	154.3	0.15	68.3
West Bengal	DNA	DNA	- 0.31	36.7	- 0.52	77.3	- 0.65	82.6	- 1.05	69.6	- 0.73	77.0
Punjab	0.17	296.2	- 0.70	38.6	- 0.65	24.1	0.27	94.2	- 0.22	55.9	0.09	112.0
Orissa	- 0.82	105.4	-	90.6	0.67	53.2	- 0.14	455.4	- 0.01	259.1	- 0.29	32.4

			0.43									
Karnataka	- 1.02	85.1	- 0.64	60.2	- 0.72	66.8	- 0.86	113.8	- 0.21	50.6	- 0.16	61.8
Maharashtra	- 0.62	121.3	- 0.57	121.8	- 0.74	88.2	- 0.24	125.9	- 0.22	117.9	- 0.25	83.9
Andhra Pradesh	- 0.85	126.8	- 0.60	128.9	- 0.94	114.0	0.08	- 1134.0	- 0.03	1207.0	- 0.26	215.0
Tamil Nadu	- 1.15	74.6	- 1.21	61.6	- 1.51	67.9	- 0.99	77.1	- 0.46	92.5	- 0.62	81.0
Kerala	- 1.06	- 1.3	- 2.24	56.4	- 2.14	58.9	- 0.18	- 174.0	- 1.08	47.6	- 0.83	50.1

DNA = Data not available

"Diff. In TFR" means difference in the total fertility rate between the state and all of India; a negative sign indicates that the TFR of the state is lower than that of the all-India level.

"% diff. Due to MF" means the amount of difference in TFR that is explained by the difference in marital fertility; a negative sign indicates that the amount of difference explained is in the opposite direction.

In 1972, in states with a rural TFR which was at least one point higher than the national average of 5.6, the difference in the proportion of women married between each state and all-India and the difference in marital fertility were responsible for the high TFR levels, the contribution of the marital fertility component being slightly higher at 55-75 per cent of the difference in the TFR. That is, in these states, both marital fertility and the proportion of women married were higher than the national average. The latter may be due to the low age at marriage, while the former may, to a larger extent, be due to the low contraceptive use in these states. Uttar Pradesh, Madhya Pradesh, Rajasthan and Haryana with rural TFRs in the range of 6.7-7.2 fell in this group.

In states where the rural TFR was higher than the all-India average but the difference was less than one point, the contribution of the difference in marital fertility was more than 100 per cent. That is, in these states, the proportion-of-women-married 'component tended to depress the TFR below the national average, but their marital fertility rates were so high that their actual TFRs stood above the national average. States like Assam, Gujarat and Punjab fell in this category. Similarly, in states with 1972 rural TFRs lower but close to the national average (Bihar, Orissa, Maharashtra and Andhra Pradesh), the proportion of women married tended to increase the TFR above the national average. However, the marital fertility rates of these states were so low that they not only offset this escalating effect but also kept the TFR below the national average, that

is, in these states, marital fertility was lower and the proportion of women married was higher than (or close to) the all-India level. In Karnataka and Tamil Nadu, however, the difference in both these components contributed to the low TFR, with the difference in marital fertility being higher at 75-85 per cent of the total difference in TFR. In Kerala, the pattern was surprising - rural marital fertility was almost equal to the, national average, while the low TFR (4.5) was explained by the low proportion of women married as compared to the all-India level.

In 1972, the urban areas, showed a slightly different pattern. In states with TFRs higher than the national average, the contribution of the difference in marital fertility (towards increasing the TFR) was only 20-40 per cent in Madhya Pradesh, Rajasthan and Gujarat, 60-70 per cent in Uttar Pradesh and Haryana, and negative (tending to reduce TFR) in Andhra Pradesh. On the other hand, in states where it was lower than the national average, except Keralla to a great extent and Tamil Nadu to some extent, the difference in the proportion of women married tended to increase the urban TFR while the observed low TFR level was due to the low marital fertility as compared to that of all-India; the difference in marital fertility for the low TFR was more than 100 per cent. For Tamil Nadu, the difference in marital fertility explained 77 per; cent of the difference in TFR and for Kerala, it was negative (tended to increase TFR). It appears that in both rural and urban areas of Kerala, the low TFR in 1972 was due to the low proportion of married women, even while its marital fertility was high as that of the country as a whole.

In 1984, the contribution of the difference in proportion of women married between each state and all-India and difference marital fertility to the difference in TFR were more or less equal with respect to high or low TFRs for most states. In both rural and urban areas, in states with TFRs higher than the national average, 40-70 per cent of the difference in the TFR was attributable to the difference in marital fertility except in rural Madhya Pradesh where its contribution was only 21 percent and in urban Uttar Pradesh it was as high as 94 per cent. On the other hand, in states with TFRs below the national average, including Kerala but excluding Andhra Pradesh, Maharashtra, Orissa and Assam, only 35-60 per cent of the difference in the TFR was attributable to the difference in marital fertility, while the rest of it was contributed by the difference in proportion of women married. In Maharashtra, Andhra Pradesh and Orissa, the entire contribution was due to the difference in marital fertility, while in Assam, it was due to the difference in proportion of women married.

The pattern was almost the same in the urban areas but with a few more exceptions like Gujarat and Tamil Nadu where the entire difference in TFR was due to the difference in marital fertility. In general, in 1984, in both rural and

urban areas of most states, the difference in the TFR between each state and all-India was explained more or less equally by the differences in the proportion of women married and marital fertility though in some states, the contribution the latter was relatively higher. It is important to note that even in Kerala and Tamil Nadu, the difference in TFR due to the difference proportion of women married was very close to that due to the difference in martial fertility, except in urban Tamil Nadu, where it was only about ten per cent.

In 1992, in respect of rural areas, as already mentioned, only a few states namely Uttar Pradesh, Madhya Pradesh, Bihar, Rajasthan and Haryana had a TFR above the national average of 3.9. In all these states except in Haryana, the difference in the proportion of women married and marital fertility contributed to the high TFR, more or less equally. On the other hand, in states where it was below the national average, the latter contributed slightly more (60-85 per cent of the total difference in TFR) than the former. The exceptions were Punjab (25 per cent), Andhra Pradesh (114 percent) and Assam where the difference in marital fertility increased the TFR and the difference the proportion of women married lowered it.

The urban TFR in 1992 stood above the rational average of 2.8 in all northern states, including Gujarat and Punjab. As in rural areas, the difference in the urban TFR of these states due more or less equally to the difference in the proportion of women married and marital fertility. The effect of the latter was 100 per cent in Uttar Pradesh, only 18 per cent in Madhya Pradesh and negative (tending to decrease TFR) in Haryana. That is, in Uttar Pradesh, the proportion of women married was the same as that of all-India and its TFR which was higher than the all-India average was due to its high marital fertility. In Madhya Pradesh, the high TFR was largely due to its higher proportion of married women though its marital fertility was also slightly higher than the national average. In Haryana, the TFR was due to the high proportion of married women and the marital fertility was lower than the national average. The pattern was just the opposite for the states with TFRs below the national average. Here, differences in both the proportion of women married and marital fertility contributed to the low TFR.

It is interesting to note that the very low TFR of Kerala was more or less equally due to the differences in the proportion of women married and in marital fertility. In Tamil Nadu, however, 81 per cent of the difference in the urban TFR was due to the latter. The lower (than all-India) TFR of Assam was due to its lower (than all-India) proportion-married component while that of Andhra Pradesh was due to its below national level marital fertility.

Components of Fertility Change

Table 3 presents a summary of the outcome of the decomposition of fertility change for the periods 1972-84, 1984-912 and 1972-92 which include, for rural and urban areas state-wise, the total change in TFR during each period and the relative (percentage) change in TFR due to changes in marital fertility. It may be noted that the relative change in TFR due to changes in the proportion of women married can easily be derived from the table and hence, has not been presented.

Table 3: Total change in rural and urban TFR during 1972-84, 1972-92, and the relative (%) change in TFR due to changes in marital fertility (MF) for India and major states.

State	1972-84		1984-92		1972-94	
	Change in TFR	% change due to MF	Change in TFR	% change due to MF	Change in TFR	% change due to MF
Rural						
Uttar Pradesh	1.31	91.1	0.34	66.5	1.65	85.6
Madhya Pradesh	1.70	92.1	0.57	71.5	2.26	84.7
Rajasthan	0.98	116.6	1.09	81.2	2.06	97.4
Bihar	- 0.64	108.6	0.93	88.9	0.29	43.1
Haryana	2.02	95.7	1.14	86.0	3.16	91.8
INDIA	**0.91**	**91.9**	**0.82**	**83.3**	**1.73**	**86.6**
Assam	1.35	48.0	0.79	54.3	2.13	50.4
Gujarat	2.01	90.2	0.91	100.1	2.92	94.2
West Bengal	DNA	DNA	1.03	93.1	DNA	DNA
Punjab	1.78	93.3	0.77	83.4	2.55	88.7
Orissa	0.52	65.7	1.05	63.8	1.58	62.9
Karnataka	0.53	62.4	0.90	83.5	1.43	75.3
Maharashtra	0.86	89.7	0.99	66.5	1.85	68.1
Andhra Pradesh	0.66	73.3	1.15	81.3	1.82	74.8
Tamil Nadu	0.97	76.0	1.13	84.9	2.10	81.1
Kerala	2.09	93.4	0.73	88.4	2.81	91.5
Urban						
Uttar Pradesh	0.45	98.8	0.91	63.1	1.36	74.5
Madhya Pradesh	1.24	91.1	1.07	77.0	2.31	82.3
Rajasthan	0.61	77.6	1.20	86.5	1.82	83.5
Bihar	- 0.80	130.4	1.38	78.4	0.58	19.1
Haryana	0.99	116.7	1.16	83.5	2.15	98.1
INDIA	**0.73**	**113.1**	**0.92**	**71.4**	**1.65**	**88.4**
Assam	1.21	- 3.3	0.72	84.1	1.92	33.7
Gujarat	1.70	69.7	0.72	69.2	2.41	69.2
West Bengal	1.12	86.2	0.60	80.2	1.72	83.9

Punjab	1.23	106.3	0.60	71.5	1.83	93.4
Orissa	0.59	30.1	1.20	59.3	1.80	51.3
Karnataka	0.08	- 74.4	0.87	73.0	0.95	61.8
Maharashtra	0.70	109.1	0.95	62.1	1.65	83.3
Andhra Pradesh	0.83	36.5	1.15	77.1	1.98	63.8
Tamil Nadu.20	228.0	1.08	67.7	1.27	91.1	
Kerala	1.62	96.2	0.68	74.0	2.30	89.9

DNA = Data not available.

During 1972-92, for rural India, as much as 1.5 points (or 87 per cent) of the total decline of 1.7 points in the TFR was due to marital fertility and only 0.2 points (or just 13 percent) to the proportion of women married. In states like Bihar, Assam and Orissa, the change in rural TFR attributable to marital fertility was less than 65 per cent; in all the other states it was more than 75 per cent. In other words, in most states, only 10-25 per cent of the change in rural TFR during 1972-92 is attributable to the proportion of women married; even in Kerala, it was below 10 per cent.

In urban areas, during 1972-92, the change in TFR due to marital fertility was almost the same as that observed for rural areas. However, in states like Bihar and Assam, less that one-third of the change in the urban TFRs was attributable to marital fertility: 50-60 per cent in Orissa, Karnataka and Andhra Pradesh, 70-75 per cent in Gujarat and Uttar Pradesh, and 80-95 per cent in all other states.

The pattern of change in the TFR due to he proportion of women married and marital fertility during 1972-84 was less clear in urban areas; in the rural areas, the pattern was almost the same as that observed during 1972-92. For urban areas, in some states, the change in the proportion of women married was negative (i.e. the change in TFR due to the change in marital fertility was more than 100 per cent), which means the change in proportion of women married tended to increase the TFR. States like Punjab showed only a marginal negative effect and Tamil Nadu showed a very high negative effect probably due to the fact that the TFR had declined by only 0.2 point during this period. On the other hand, in Andhra Pradesh and Orissa, the change in TFR due to marital fertility was 30 to 36 per cent. For Assam and Karnataka, it was negative, which means that in these states, the observed decline in the TFR was contributed wholly by the change in the proportion of women married.

For the most recent period, that is for 1984-92, the pattern observed for most states was consistent and systematic: probably the SRS data for 1984 and 1992 are more reliable and comparable than the data for the earlier years. During 1984-92, the all-India TFR declined by about 0.82 point in the rural areas and 0.92 point in

the urban areas. About 83 per cent and 71 per cent of this decline in rural and urban areas respectively is attributable to marital fertility. In the states of Uttar Pradesh, Assam, Orissa and Maharashtra, only up to 65 per cent of the decline in the rural TFR was due to marital fertility. That is, in these states, more than 35 per cent of the change in TFR was attributable to the change in the proportion of women married. In the urban areas of the states of Uttar Pradesh, Gujarat, Orissa, Maharashtra and Tamil Nadu, more than 30 per cent of the change in TFR was attributable to the proportion of women married; it was 15-23 per cent in all other states. Generally, one would expect the contribution of the marital fertility component to the TFR to be higher for the recent period than for earlier periods mainly because of the more concerted family planning program activities in the recent past. But our findings do not confirm this; they only add to the suspicion that the TFR estimates for 1972 are less reliable than those for 1984 and 1992.

Tables 4 and Table 5 present the results of the decomposition of the changes in TFR due to changes in the proportion of women married (Table 4) and in marital fertility (Table 5), during 1972-92 for each age group.

Table 4: Change in TFR during 1972-92 due to changes in the proportion of women married (PWM) and % change attributable to each 5-year age group

State	Total change in PWM	% Change due to proportion of women married					
		15-19	20-24	25-29	30-34	35-39	40-44
Rural, 1972-92							
Uttar Pradesh	0.24	51.5	42.9	10.9	- 2.0	- 2.7	- 0.6
Madhya Pradesh	0.35	72.5	28.5	1.4	4.2	- 0.9	- 5.6
Rajasthan	0.05	70.9	151.9	- 20.1	- 31.8	- 53.9	-16.8
Bihar	0.16	65.3	74.0	7.8	- 16.6	- 15.1	15.4
Haryana	0.26	46.9	51.9	2.6	- 3.6	2.7	- 0.6
INDIA	**0.23**	**58.0**	**57.5**	**9.7**	**- 11.6**	**- 11.0**	**- 2.6**
Assam	1.06	32.2	36.3	26.8	8.2	- 1.2	- 2.2
Gujarat	0.17	7.9	111.5	20.5	- 7.3	- 19.4	- 13.2
West Bengal	DNA	DNA	DNA	DNA	DNA	DNA	DNA
Punjab	0.29	13.2	38.6	37.3	5.4	6.6	- 1.1
Orissa	0.58	52.8	44.2	13.4	- 3.6	- 2.8	- 4.0
Karnataka	0.35	54.9	34.0	11.3	4.3	- 1.9	- 2.6
Maharashtra	0.59	10.2	19.8	4.6	- 1.8	68.4	- 1.2
Andhra Pradesh	0.46	69.8	29.5	6.9	- 0.5	- 2.4	- 3.2
Tamil Nadu	0.40	24.5	55.4	18.4	- 0.5	- 2.5	4.7
Kerala	0.24	32.6	49.5	24.0	2.8	- 4.8	- 4.1

Urban, 1972-92							
Uttar Pradesh	0.35	40.8	56.0	14.7	- 2.6	- 5.7	- 3.2
Madhya Pradesh	0.41	29.6	60.7	11.2	2.6	- 2.7	- 1.4
Rajasthan	0.30	36.4	74.1	9.5	- 6.3	- 4.8	- 8.9
Bihar	0.47	45.9	55.1	5.6	- 2.0	- 4.3	- 0.4
Haryana	0.04	62.8	151.7	- 96.8	- 17.0	5.4	- 6.0
INDIA	**0.19**	**55.3**	**73.6**	**7.7**	**- 21.2**	**- 9.6**	**- 5.9**
Assam	1.28	16.3	42.6	25.6	9.4	4.9	1.2
Gujarat	0.74	27.6	37.7	20.8	6.7	4.4	2.8
West Bengal	0.28	29.8	54.7	14.9	6.4	- 4.3	- 1.5
Punjab	0.12	26.9	- 3.6	66.3	15.8	- 1.2	- 4.0
Orissa	0.87	37.6	50.9	13.9	0.6	- 0.6	- 2.4
Karnataka	0.36	40.7	51.7	11.1	0.4	- 0.2	- 3.8
Maharashtra	0.28	43.2	54.1	8.8	- 1.1	2.3	- 2.8
Andhra Pradesh	0.72	30.9	48.0	15.6	5.4	0.0	0.1
Tamil Nadu	0.11	79.6	38.7	15.3	- 13.0	- 15.5	- 5.1
Kerala	0.23	46.7	53.2	12.3	1.7	- 6.4	- 7.5

DNA = Data not available

Table 5: Change in TFR during 1972-92 due to changes in marital fertility (MF) and % change attributable to each 5-year age group

State	**Total change in PWM**	**% Change due to proportion of women married**					
		15-19	**20-24**	**25-29**	**30-34**	**35-39**	**40-44**
Rural, 1972-92							
Uttar Pradesh	1.41	- 2.9	0.9	28.3	32.5	24.3	16.9
Madhya Pradesh	1.92	1.4	- 8.7	23.2	34.0	28.4	21.6
Rajasthan	2.01	- 4.3	- 3.5	35.9	27.6	25.4	18.8
Bihar	0.12	- 65.4	- 115.9	- 51.7	240.9	59.0	33.3
Haryana	2.90	- 3.1	6.5	25.4	35.3	21.9	14.0
INDIA	**1.50**	**- 4.2**	**- 0.9**	**26.0**	**35.8**	**27.0**	**16.2**
Assam	1.08	- 11.7	- 4.6	23.3	42.8	34.9	15.4
Gujarat	2.75	6.7	6.3	21.0	26.8	24.2	15.1
West Bengal	DNA	DNA	DNA	DNA	DNA	DNA	DNA
Punjab	2.26	- 0.7	- 6.9	22.4	41.3	29.9	14.0
Orissa	0.99	- 11.3	- 19.4	37.4	34.6	32.7	25.9
Karnataka	1.08	- 17.9	- 17.6	28.6	42.5	36.4	28.0
Maharashtra	1.26	- 8.5	- 7.3	36.4	45.0	18.4	16.0
Andhra Pradesh	1.36	- 19.3	10.1	31.0	37.6	29.7	11.0

Tamil Nadu	1.71	- 5.2	3.9	28.9	36.4	23.6	12.3
Kerala	2.57	- 0.4	8.7	26.4	30.2	23.8	11.3
Urban, 1972-92							
Uttar Pradesh	1.04	- 6.9	1.4	31.5	29.0	36.1	8.9
Madhya Pradesh	1.90	- 7.0	5.0	43.9	40.3	14.9	3.0
Rajasthan	1.52	- 4.6	11.0	28.7	30.3	21.1	13.6
Bihar	0.11	18.7	- 399.0	83.1	137.1	183.6	76.5
Haryana	2.11	- 1.3	6.6	33.4	31.3	18.4	11.6
INDIA	**1.46**	**- 3.9**	**1.0**	**30.5**	**36.3**	**26.2**	**9.9**
Assam	0.65	- 27.9	- 12.6	42.2	37.7	43.3	17.3
Gujarat	1.67	- 7.4	- 1.9	35.3	35.9	24.0	14.2
West Bengal	1.45	0.0	16.7	28.6	24.0	23.4	7.2
Punjab	1.71	2.5	- 3.3	21.3	42	24.2	12.9
Orissa	0.92	- 9.0	- 23.6	38.8	45.8	31.5	16.5
Karnataka	0.58	- 18.5	- 44.4	- 0.7	52.5	63.3	48.0
Maharashtra	1.38	- 8.7	- 3.3	26.5	47.1	28.6	9.9
Andhra Pradesh	1.27	- 10.9	- 12.0	41.4	35.4	39.1	6.9
Tamil Nadu	1.16	- 7.1	- 6.2	33.8	37.8	35.7	6.1
Kerala	2.07	- 1.4	7.3	24.2	36.2	19.8	13.9

DNA = Data not available

Of the total change in TFR during 1972-92 which was due to changes in the proportion of women married, the major contribution was made by women in the 15-19 and 20-24 age groups. The 25-29 age group also made a substantial contribution in all the states except in rural Rajasthan and urban Haryana where its contribution was negative. On the other hand, in both rural and urban areas, the change in proportion of women married in the 30-34, 35-39 and 40-44 age groups tended to increase the TFR, though marginally. The pattern was almost the same in most states. This may be due to the fact that the proportion of women married in these age groups increased due to the reduction in the extent of marital dissolution.

With respect to age-specific changes in marital fertility, women aged 25 years and more, in both rural and urban areas, contributed to the TFR decline in most states. On the other hand, in all the states and in both rural and urban areas, the change in marital fertility of the two lower age groups, namely 15-19 and 20-24, tended to increase the TFR, though only marginally. For most states, each of the age groups 25-29, 30-34 and 35-39 contributed 25-40 per cent of the change in TFR that was attributable to the change in marital fertility; the age group 40-44 years contributed marginally. For some states, the contribution of some age groups was even higher. The analysis indicates that marital fertility had declined

substantially among women aged 25 or more years in both rural and urban areas in most states of India.

Summary and Conclusion

In this paper an attempt has been made to study the trend and differentials in TFR during 1972-92 for all-India and for its major states. For this purpose, the change in TFR over period was decomposed into two proportions; one to the change in proportion of women married and the other, to the change in marital fertility. This exercise was done separately for the rural and urban areas of all-India and of each major state for the periods 1972-84, 1984-92 and 1972-92. Similarly, for all these years, the difference in TFR between each major state and all-India was also decomposed. The needed data were obtained from the sample registration scheme of the Registrar General of India.

At all-India level, the rural TFR declined from 5.6 in 1972 to 3.9 in 1992 and the urban TFR declined from 4.2 to 2.6 during the same period. In 1992, the TFR was as high as 5.5 in the rural and 3.7 in the urban areas of Uttar Pradesh, and around 4.7 and 3.2, respectively, in Madhya Pradesh, Bihar and Rajasthan. It was only 1.7 in both rural and urban areas of Kerala and 2.0 in the urban and 2.3 in the rural areas of Tamil Nadu. For all other states, the rate was in between. During 1972-92, Kerala and Tamil Nadu had experienced rapid decline in their TFR level, while in the states of Uttar Pradesh, Madhya Pradesh, Bihar and Rajasthan, the decline was very small or only marginal, and in the other states, it was moderate. A decomposition of the difference in TFR between each state and all-India for 1972, 1984 and 1992 showed that, in states where the TFR level was much higher than the national average, both the proportion of women married and marital fertility levels were also higher than the national average. The states of Uttar Pradesh, Madhya Pradesh, Bihar and Rajasthan fell in this group. On the other hand, in states where the TFR level was much lower than the national average, both the proportion of women married and marital fertility levels were also lower than the national average. The states of Kerala and Tamil Nadu were in this category. However, in both groups of states, the difference in marital fertility was relatively higher than the difference in proportion of women married for the higher or lower TFR. In states where the TFR level was just above the national average, the proportion of women married tended to reduce the TFR level but the marital fertility was so high that the observed TFR level stood above the national average. The states of Gujarat, Assam and Punjab fell in the group, Similarly, in states where the TFR level was just below the national average, the proportion of women married tended to increase the TFR level but their marital fertility was so low that their observed TFRs stood below the national average. The states of Maharashtra, Bihar, Orissa and Andhra Pradesh were in this category.

The trend analysis of decomposition for the period 1972-92 showed that in most states and in both rural and urban areas, about 75-90 per cent of the change in TFR was attributable to the change in marital fertility, and 10-25 per cent of the change in TFR was attributable to the change in proportion of women married. Though the trend for the recent period (for 1984-92) was largely similar, in many states, the change in TFR due the change in proportion of women married was relatively higher during 1984-92 than during 1972-84. The decrease in proportion of women married in the age groups 15-19 and 20-24 and the decrease in the marital fertility of women in the age groups 25-29, 30-34 and 35-39 had made the maximum contribution to the change in proportion of women married and to the change in marital fertility, respectively. On the other hand, the proportion of women married in the older age groups especially in the 30+ age the marital fertility in the younger age groups (15-19 and 20-24) increased, though marginally. The substantial decrease in the proportion of women married in the younger age groups might be due to the gradual increase in the age at marriage of females, while the small increase in the proportion of women married in the older ages would be mainly due to the decrease in marital dissolution especially widowhood. Similarly, the decline in the marital fertility of older women might be attributable largely to the decrease in the desired family size and the wider use of family planning methods especially sterilization.

A comparison of the two sets of results indicates that over the years, the change in marital fertility has been much faster than the change in the proportion of women married in many states. However, the change in marital fertility is contributed by older women (25-39 age group) than by younger women (15-24 age group). In fact, the marital fertility of the younger age group has rather increased, though only marginally. The pattern was the same in both rural and urban areas of most states. The findings indicate that for a faster and sustained decline in the TFR, there is a need to reduce the high fertility of young women and also to reduce the proportion of women married in different age groups. This means that the family planning program should attach more importance to younger women using spacing methods and the social welfare programs should ensure a substantial increase in the female age at marriage.

Source of data

For 1972: Fertility Differentials in India 1972 (published in 1976); for 1984: Fertility Differentials in India 1984 (published in 1989); and for 1992: Sample Registration System 1992 (published in 1995), by Vital Statistics Division, Office of Registrar General of India, Ministry of Home Affairs, New Delhi.

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