Has the Age Pattern of Marriage in India Impacted on Recent Fertility Decline? - Evidences from Decomposition Analysis using State level Data

Introduction

Fertility has declined in India substantially over the past several years and the country is in the state of demographic transition. The total fertility rate declined from 3.4 (NFHS1) to 2.68 (NFHS3) during the period of 12 years (1992-93 to 2005-06). The NFHS-3 data revealed that at current fertility levels an woman in India will have an average of 2.68 children in her life time if she experiences the current age specific fertility rate. However, the states at present are at different stages of fertility decline. The fertility rates are at or below the replacement level of 2.1 children per woman in about 10 states whereas in another 6 states TFR levels are close to replacement level (TFR 2.4). In contrast in several other states including the more populous states like Bihar, Uttar Pradesh, Madhya Pradesh and Rajasthan fertility rates are still much higher.

Objectives

The study has been commissioned with a view to identifying:
(a) Contribution of intermediate fertility variables in understanding the declining of fertility in India and states;
(b) Comparison of the results obtained for the different variables and an analysis of the probable reasons for whatever differences are found to exist.

Data Sources

The appropriate data for present analyses have been extracted from the three rounds of National Family and Health Survey (NFHS). The NFHS survey was conducted in 1992-93 (round-I), 1998-99 (round-II) and the latest in 2005-06 (round-III); and it comprises almost entire country. The main objectives of these NFHS surveys were to provide state and national level estimates of fertility, practice of family planning, infant and child mortality, and the utilization of health services provided to mothers and children.

The major analysis has been carried out to assess the impact of four intermediate fertility variables for the years 2005-06 (NFHS-3). In order to assess the change in the level of intermediate fertility variables, a comparison has been presented for the analysis of NFHS 1 data by Visaria[1] L, 1999; and John Stover[2], 1997.

Methods of Estimation: Decomposition of a Change in Fertility

Any change in a population fertility level can be the result of a change in one or more of the proximate determinants. Thus, it is possible to say that the decomposition of a trend in the TFR is based on the following equation, which links the TFR to the fertility-inhibiting effects of the four principal proximate variables:

TFR= Cm*Cc*Ca*Ci*TF

[1] Visaria L, 1999, "Proximate Determinants of Fertility in India – An Exploration of NFHS Data" Economic and Political Weekly (EPW), 3033-3041
[2] John Stover, 1997, "Revising the Proximate Determinants of Fertility Framework: What have we learned in the past 20 years"

Considering 2005 and 1992 as the first and last years of the time period for which decomposition is required. A change in the TFR from TFR_{1992} in the year 1992 to TFR_{2005} in the year 2005 and with simultaneous changes in the indexes from Cm_{1992} to $Cm_{2005,}$ from Cc_{1992} to $Cc_{2005,}$ from Ca_{1992} to $Ca_{2005,}$ from Ci_{1992} to Ci_{2005} and from TF_{1992} to TF_{2005} between the years 1992 and 2005, the ratio TFR_{2005}/TFR_{1992} can be expressed as,

$$\mathbf{TFR_{2005}/TFR_{1992} = Cm_{2005}/Cm_{1992} * Cc_{2005}/Cc_{1992} * Ca_{2005}/Ca_{1992} * Ci_{2005}/Ci_{1992} * TF_{2005}/TF_{1992}}$$

Proportional change in TFR between the years 1992 and 2005

$$P_f = \frac{TFR2005 - TFR1992}{TFR1992}$$

Proportional change in TFR due to a change in the index of marriage between the years 1992 and 2005

$$P_m = \frac{Cm2005 - Cm1992}{Cm1992}$$

Proportional change in TFR due to a change in the index of contraception between the years 1992 and 2005

$$P_c = \frac{Cc2005 - Cc1992}{Cc1992}$$

Proportional change in TFR due to a change in the index of induced abortion between the years 1992 and 2005

$$P_a = \frac{Ca2005 - Ca1992}{Ca1992}$$

Proportional change in TFR due to a change in the index of postpartum infecundibility between the years 1992 and 2005

$$P_i = \frac{Ci2005 - Ci1992}{Ci1992}$$

Proportional change in TFR due to a change in the remaining proximate variables- natural infecundibility, spontaneous intrauterine mortality, and permanent sterility- between the years 1992 and 2005

$$P_r = \frac{TF2005 - TF1992}{TF1992}$$

Therefore,

$$P_f = P_m + P_c + P_a + P_i + P_r + I$$

Where, I is the interaction factor

5.0 Results and Discussion

The values for the major states of India are shown in Table 1.1. The value of C(m) measures the effect of age at marriage on fertility and increases with an increase in the age at marriage. In other words, C(m) expresses the effect of non-marriage in terms of a reduction in fertility per woman. The level of fertility has been impacted mostly in the states of Uttrakhand and Odisha among the EAG states as these states has shown lowest level of index of marriage. Overall the increasing age at marriage has impacted the fertility reduction the states of Tamil Nadu and Uttarakhand by about two and half births which is maximum observed effect. There has been least impact of age at marriage in the decline of fertility in Bihar, Jharkhand and Rajasthan. As is evident, the interstate variations in TFR ranged between a low of 2.4 for Odisha to the level of 4.0 for Bihar.

Table 1.1: Value of Intermediate Fertility Indices, India and selected States, 2005-06

	TFR	Cm	Cc	Ca	Ci	TF
India	2.68	0.61	0.49	0.99	0.69	13.10
Bihar	4.00	0.79	0.70	0.99	0.61	11.90
Chhattisgarh	2.62	0.59	0.48	0.99	0.63	14.80
Jharkhand	3.31	0.76	0.67	0.99	0.61	10.80
Madhya Pradesh	3.12	0.66	0.44	0.99	0.63	17.20
Odisha	2.37	0.56	0.53	0.99	0.62	13.00
Rajasthan	3.21	0.7	0.53	0.99	0.68	12.90
Uttrakhand	2.55	0.5	0.44	0.99	0.66	17.80
Uttar Pradesh	3.82	0.68	0.70	0.99	0.66	12.40
Andhra Pradesh	1.79	0.56	0.28	0.99	0.65	17.70
Tamil Nadu	1.80	0.41	0.36	0.94	0.71	18.20
NFHS1	3.4	0.71	0.61	0.99	0.56	11.51

As is evident in the table the values of C(a) in all the states with the sole exception of Tamil Nadu are greater than 0.98. We have therefore not considered the insignificant fertility inhibiting effect of abortion in the model discussed here. The analysis of proximate determinants shows that the use of contraception has been the most important intermediate variable which signifies the variation at the level of fertility among the EAG and Non-EAG states. The overall variation in the levels Total Fertility Rate, Total Marital Fertility Rate, Total Natural Marital Fertility Rate and Total Fecundity Rate has been presented in Table1.2.

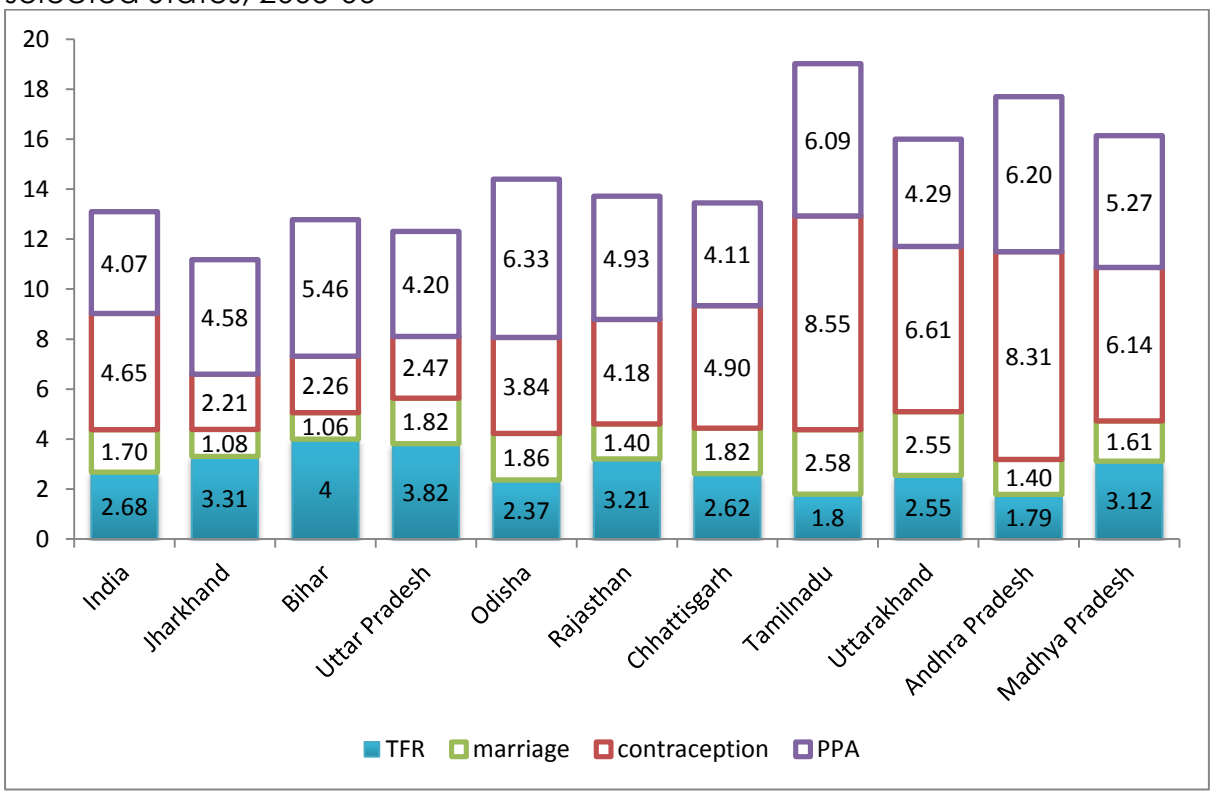
Table 1.2: Total Fertility Rate, Total Marital Fertility Rate, Total Natural Marital Fertility Rate and Total Fecundity Rate, India and selected states, 2005-06

	TFR	TM	TN	TF
India	2.68	4.38	9.03	13.10
Bihar	4.00	5.06	7.32	11.90
Chhattisgarh	2.62	4.44	9.34	14.80
Jharkhand	3.31	4.39	6.60	10.80
Madhya Pradesh	3.12	4.73	10.87	17.20
Odisha	2.37	4.23	8.07	13.00
Rajasthan	3.21	4.61	8.79	12.90
Uttrakhand	2.55	5.10	11.71	17.80
Uttar Pradesh	3.82	5.64	8.11	12.40
Andhra Pradesh	1.79	3.19	11.50	17.70
Tamil Nadu	1.80	4.38	12.93	18.20
NFHS1	3.40	4.80	7.94	11.51

It is evident that the transition from natural fertility to controlled fertility in states like Tamil Nadu, Andhra Pradesh, Uttarakhand and Madhya Pradesh is accompanied by a large increase in the use of contraception. The contribution of use of contraception in depressing the total fecundity was between 2 to 2.5 births in the states of Jharkhand, Bihar and Uttar Pradesh while it was above 8 births in Tamil Nadu and Andhra Pradesh.

The effect of decline in the proportions married on the total fecundity or the fertility inhibiting influence of delayed marriage on total fecundity is smaller than that of contraception. The impact of delayed marriage or proportion married ranges between 1 to 2.5 births across the states averaging 1.7 births for India as a whole. Two of the states which have shown highest impact of delayed marriage on fertility reduction are Tamil Nadu and Uttarakhand. However there has been least impact of delayed marriage in Bihar and Jharkhand in depressing the total fecundity of women.

Figure 1: Contribution of Proximate Determinants in Fertility Decline, India and selected States, 2005-06



The estimated total fecundity rate for Tamil Nadu has been slightly higher and outside the range by one birth. Also the estimated value of TF in the states of Andhra Pradesh, Uttarakhand and Madhya Pradesh is about 17 births. The wide variation in total fecundity rate among the states may be caused due to the errors in reported data on abortion rate and postpartum insusceptibility. Certainly there are inaccuracies in the data.

Decomposition of Fertility Decline between 1992 and 2005

The decomposition of the change in TFR in India and selected states between 1992 and 2005 has been presented in Table 5.9. The table shows the percentage and absolute changes in TFR due the four major proximate determinants responsible for that change. The decomposition results are given as distributions of the absolute change in TFR taking into account the contributions made by various proximate variables.

Table 1.3 Decomposition of the Change in TFR due to the Proximate Determinants between 1992 and 2005

	Change due to delayed marriage		Change due to contraceptive practices		Change due to induced abortion		Change due to postpartum infecundibility		Decline in TFR
	Per cent	Absolute	Per cent	Absolute	Per cent	Absolute	Per cent	Absolute	NFHS3-NFHS1
India	45.2	-0.326	51.3	-0.369	0.3	-0.002	3.2	-0.023	-0.72
Madhya Pradesh	32.7	-0.255	46.6	-0.364	1.0	-0.008	19.7	-0.154	-0.78
Odisha	32.1	-0.170	37.0	-0.196	1.3	-0.007	29.6	-0.157	-0.53
Rajasthan	23.4	-0.091	54.4	-0.212	1.1	-0.004	21.1	-0.082	-0.39
Uttar	42.3	-0.423	35.3	-0.353	1.4	-0.014	21.0	-0.210	-1.0

Pradesh									
Andhra Pradesh	32.5	-0.263	57.5	-0.466	0.7	-0.005	9.4	-0.076	-0.81
Tamil Nadu	48.2	-0.337	44.2	-0.309	5.5	-0.039	2.2	-0.015	-0.7

The decomposition analysis suggests that increased used of contraception (51%) has been the major cause for fertility decline in India followed by the delayed marriage pattern (45%). The analysis does not show any impact of abortions. However, a very low decline (3%) has been caused due to the changing pattern in postpartum infecundibility.

Among the EAG states, the contribution of delayed marriage has been observed maximum in the state of Uttar Pradesh (42%) while it was lowest in Rajasthan (23%). Tamil Nadu has shown maximum impact of delayed marriage (48%) in fertility decline. In the state of Rajasthan, the major cause of fertility decline has been the increased use of contraception (54%). Thus, it is clear that change in contraceptive use is generally the main factor responsible for fertility change in Rajasthan.

In case of absolute change in TFR, there was a decline in TFR of 0.72 births per woman within the years 1992 and 2005. By decomposing the contribution of the four proximate determinants, it is possible to see that 0.33 and 0.37 births have been averted due to delayed marriage and contraceptive utilization respectively in India. Also, changes in postpartum infecundibility, which are largely due to breast feeding pattern and abstinence, contributed very little to the fertility decline witnessed in India over a period of twelve years. Uttar Pradesh has witnessed maximum decline in TFR of 1 birth per women over a period of twelve years. The decomposition analysis also showed that about 0.42 and 0.35 births were averted due to the delayed marriage and increased use of contraception respectively in the state.

Conclusion

In spite of data limitations, the fertility decline has been explained by proximate determinants with varying magnitude in different states and India as whole. The four proximate determinants of fertility have played important role in reducing fertility from potential level (TF) to the actual level (TFR) being the joint impact of these determinants on fertility decline higher in 2005 than in 1992. The impact is larger among the non EAG states of Andhra Pradesh and Tamil Nadu. The substantial increase in the use of contraception and a decline in the proportion married (as result of delayed age at marriage) caused an overall decline in the total fertility rate. Important contribution has been estimated from the extended length of breastfeeding and sexual abstinence.

The analysis indicates that variations in two major factors – marriage and contraception - are the primary proximate causes of fertility differences among EAG states. The decomposition analysis conducted to assess the magnitude of change caused due the proximate determinants shows the use of contraception and delay in age at marriage are major contributing factors in the fertility decline.

As is evident from the analysis, the strongest reduction in fertility has been caused by the contraceptive utilization, the Govt. needs greater emphasis in increasing the availability and utilization of contraception, especially among women with greater need. Since the delayed age at marriage has significantly contributed in fertility decline in the country, the emphasis needs to be put on this factor. While index of postpartum infecundibility has been an important factor in explaining the fertility decline from potential (TF) to actual level (TFR), it has not shown impact in declining the fertility level during the 12 years period from 1992 to 2005. This index remained unchanged over the time.

The induced abortions may have not contributed so far in fertility decline, however, this factor may be expected to contribute in coming days with emphasis on providing safe abortions. Government

policies can concentrate on efficiently increasing the contraceptive practices, raising the age at marriage and encouraging breast feeding practices.