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IMPACT OF RESIDENTIAL STATUS OF WOMEN ON FERTILITY

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Abstract

Relationship between migration and fertility is well established and implications of such relation for population policy in broader context to urbanization and modernization are an emerging concern among demographers and other population scientists. Reduction in total fertility rate from 3.39 in NFHS-1 to 2.68 in NFHS-III may be due to several direct or indirect impacts of socio-economic and demographic variables. Migration may be one of them which is supposed to play its role in affecting fertility. Among all the possible determinants affecting fertility, change of residential status of women must be one of the important factors with its significant role.

In this paper, the impact of migration on fertility has been discussed based on the data of National Family and Health Surveys (NFHS) conducted in the country. Relationship between migration and fertility is studied by taking residential status of women as rural stayers, urban stayers, rural-urban migrants and urban-rural migrants. Different measures of fertility are used for this purpose. Poisson regression model is also utilized to study the effect of migration on fertility by controlling for the other socio-economic and demographic factors. A substantial support is found for this relationship and rural-urban migration has had a more effective role in reducing fertility to a great extent.

Key words: Residential status, total fertility rate, parity progression ratio, migration, Poisson regression model and National Family and Health Survey.

1. Introduction

Demographers have long been interested in social and economic processes that affect fertility, including cultural diffusion, assimilation, economic development etc. A study of the effect of migration on fertility has been a long-standing concern among the population scientists (Chattopadhyay *et al.*, 2006, White *et al.*, 1995). This interest has

been, particularly, pervasive in developed countries, where a large number of studies on migration and fertility have appeared, much of which have focused on the movement of rural population to urban (Brockerhoff and Yang 1994; Goldstein et al. 1997; Lee and Farber 1984; Lee 1992; McKinney 1993; White *et al*. 1995).

The total fertility rate (TFR) of India has reduced from 3.39 (NFHS-I) to 2.68 (NFHS-III). This decline in fertility may be due to many changes in social and demographic variables. Some such proximate variables may be educational level, age at marriage, knowledge of contraceptives and many more factors acting simultaneously. The changing residential status of women plays an important role in shaping the fertility behavior of a couple. For example, one can expect people moving from rural areas to urban centers having higher fertility may be less likely to use contraceptives, while people migrating from large, more modernized urban centers to smaller towns or villages being graduated towards more modern attitude and behavior, including a low reproductive behavior. A number of studies have shown a lower fertility among the rural–urban migrants than the rural non-migrants (Bogin, 1988; Brockerhoff and Yang, 1994; Goldstein and Goldstein, 1981; Kulu, 2005 and Lee and Farber, 1984), and a higher fertility among rural–urban migrants than the urban non-migrants (Liberty *et. al*., 1976; Oucho and Gould, 1993). A wide variety of conflicting evidence has been presented in the numerous studies dealing with the relationship between migration and fertility. It has seen concluded that the fertility of migrants is higher, lower, or the same as that of non-migrants and if difference exists it may be merely due to differences in study design, in analytic methods, in definition of migrants, and in the measures of fertility used (Brockerhoff and Yang 1994; White *et. al*., 1995).

As compared to population studies on other aspects a very limited work on the effect of migration on fertility has been done in India to understand this phenomenon due to non availability of sufficient and reliable data. Most demographic studies on fertility change in India have treated rural and urban population separately and have compared the fertility levels between them despite the fact that urban population has expanded with the increase of migrants from rural areas. A majority of migrants have spent some part of their life in urban areas and the earlier period of their life in rural area and vive-versa. Age at marriage, level of education, economic status and many such characteristics are affected by the residential change as an individual adopts herself according to the surrounding (Mayer and Riphahn, 2000). Hence, residential change, as mentioned above, plays a major role in determining reproductive behavior, but there are neither appropriate data nor techniques to deal with it adequately, either in its own right or in its relationship with other aspects of population dynamics (Ayiemba, 1990).

An important question, however, is that, if residential change affects fertility, then by how much? The aim of this paper is to examine the relationship between migration (residential change) and fertility based on the NFHS data. The relationship between residential status and fertility is studied by classifying women according to their residential status as rural stayers, urban stayers, rural-urban migrants and urban-rural migrants. Fertility measures namely total fertility rate (TFR), age specific fertility rate

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(ASFR) and parity progression ratio (PPR) are used to study the impact of residential status of women on fertility. Poisson regression model proposed by Espenshade and Wenzhen (1994) and Shah and Nathanson (2004) is also utilized to study the effect of women's residential change on the fertility by controlling for the other socio-economic and demographic variables.

2. Data and Methodology

The data for this study are taken from different rounds of National Family Health Surveys (NFHS) i.e., NFHS-I, NFHS-II and NFHS-III conducted in 1992-93, 1998-99 and 2005-06 respectively. The NFHS questionnaires contain a number of questions on respondent's residential history that can be interpreted as migration questions. Data available in NFHS's provide not only information about the urban and rural character related to current places of the residence of respondents but also provided information on previous residences and the length of stay on such places. For this study, respondents are classified in to four categories namely rural stayers, urban stayers, rural-urban and urban-rural migrants.

Only currently married women are taken into account. Women's questionnaire included a question "how long you have been living continuously on this (current) place of residence?". Those who answered 'always', are classified as non-migrants, whereas, for those whose answers were in terms of 'number of years lived at the current place of residence' or 'length of time at the current place of residence', a further question "Just before you moved here, did you live in a city or in a town or in the countryside?" was asked. Using this information it was possible to identify four migration streams: rural-rural, urban-urban, rural-urban and urban-rural. For this study rural-rural and rural non-migrant are combined and taken as rural stayers, urban-urban and urban non-migrant are similarly combined and considered as urban stayers.

NFHS provides estimates of TFR and age specific fertility rates for the three years preceding the survey for rural and urban residence of women separately. Here TFR and ASFR have been calculated for four different above mentioned residential status and PPR was estimated by the methodology given by Yadava *et al*. (1992). For the sake of completeness, the methodology for calculating PPR is briefly described in Appendix-A.

Further, to identify the impact of residential status on fertility a Poisson regression model given by Espenshade and Wenzhen (1994) and Shah and Nathanson (2004) is also used by taking the number of children ever born (CEB) at the time of survey as dependent variable and different residential categories (migration status) as the explanatory variables after controlling for the other socio-economic and demographic variables. This model is fitted to estimate the relative effect of different migration status on fertility taking different sets of explanatory variables. It is briefly described below:

Since, the children ever born is a count variable, a count model, namely Poisson Regression model which is applied is given as:

$$P(Y_i = y_i) = \frac{e^{-\lambda_i}\lambda_i^{y_i}}{y_i!} \qquad \ldots (1) \qquad y_i = 0, 1, 2\ldots$$

$$= 0; \quad \text{otherwise} \qquad \lambda_i > 0 \quad I = 1, 2, 3\ldots.$$

where Y denotes the number of CEB to a woman.

Here $E(Y_i) = \lambda i$ with

$\lambda_i = \exp(\beta_0 + \beta_i X_i)$

where x_i's represent the residential status of women under various socio-economic and demographic characteristics of women and β_i's are the corresponding regression coefficients.

The demographic variables included are

(a) women's age,
(b) women's age of marriage,
(c) contraceptive use, and
(e) geographical region,

Socio-economic characteristics included are:

(a) women's education,
(b) husband occupation,
(c) standard of living index(SLI),
(d) caste, and
(e) religion.

Detailed explanation of data and explanatory variables are given in the Appendix A.3.

3. Results and Discussion

Table 1 show the distribution of total fertility rate (TFR) based on the number of births in 36 months preceding the survey to the currently married women in different residential status groups (rural stayer, urban stayer, rural-urban and urban-rural migrants) according to their socio-economic status. TFR was found higher (3.93, 4.05 and 4.51 in NFHS-I, II and III respectively) among rural stayers in all the three rounds of NFHS data (see also Fig.1). The differences in TFR between rural stayers and other streams i.e., urban stayers, rural-urban migrants and urban-rural migrants were 0.70, 0.55 and 0.29 respectively in NFHS-III. These differences in TFR show that residential change might be one of the major factors for decline in fertility. The percentage decline in TFR

Table 1
Total fertility rate of currently married women for various characteristics according to residential status in NFHS I, II and III

Residential status / Characteristics	NFHS III			
	Urban stayers	Rural-Urban	Urban-Rural	Rural stayers
Women education				
No education	3.69	3.95	4.03	4.22
Primary	3.27	3.15	3.33	3.62
Secondary	3.10	3.05	3.46	3.60
Higher	2.68	2.94	3.43	3.65
Religion				
Hindu	2.97	3.15	3.53	3.64
Muslim	3.82	4.34	4.49	4.71
Other	3.83	3.87	3.80	4.85
Husband education				
No education	3.66	3.87	4.23	4.26
Primary	3.44	3.5	3.61	3.92
Secondary	3.16	3.31	3.43	3.75
Higher	2.94	2.78	3.82	3.6
Caste				
SC/ST	3.77	3.84	3.93	4.34
OBC	3.21	3.38	3.58	3.78
General	3.07	3.27	3.43	3.49
Standard of living index				
Low	4.01	4.41	4.91	4.41
Medium	3.65	3.62	3.63	3.97
High	2.97	3.10	3.21	3.37
All	3.24	3.39	3.65	3.93

Residential status / Characteristics	NFHS II			
	Urban stayers	Rural-Urban	Urban-Rural	Rural stayers
Women education				
No education	4.03	4.15	4.23	4.27
Primary	3.90	3.52	3.84	3.85
Secondary	3.25	3.21	3.58	3.62
Higher	2.84	3.05	3.62	3.57

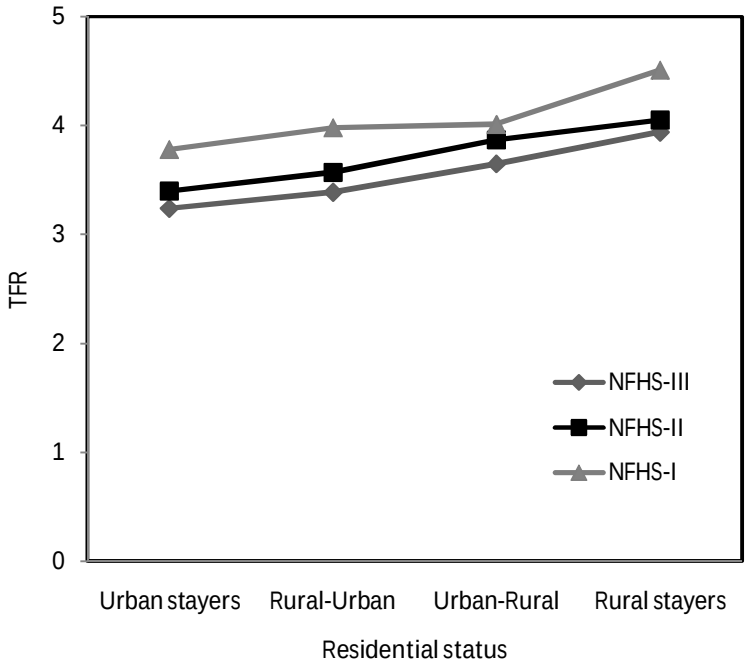
Religion				
Hindu	3.19	3.45	3.69	3.89
Muslim	4.15	4.23	4.98	4.82
Other	3.80	4.03	5.26	5.54
Husband education				
No education	4.17	3.92	4.26	4.36
Primary	3.56	3.84	3.85	4.05
Secondary	3.52	3.60	3.77	3.86
Higher	2.97	3.24	3.74	3.83
Caste				
SC/ST	4.07	4.20	4.12	4.49
OBC	3.23	3.59	3.56	3.86
General	3.34	3.30	4.02	3.88
Standard of living index				
Low	4.09	4.19	4.23	4.41
Medium	3.64	3.65	3.85	4.00
High	3.05	3.25	3.67	3.39
All	3.40	3.57	3.87	4.05

Residential status / Characteristics	NFHS I			
	Urban stayers	Rural-Urban	Urban-Rural	Rural stayers
Women education				
No education	4.58	4.58	4.87	4.72
Primary	3.93	3.58	3.66	4.15
Secondary	3.74	3.47	3.38	3.82
Higher	3.26	3.28	3.78	3.69
Religion				
Hindu	3.54	3.79	3.96	4.40
Muslim	4.89	5.39	5.25	5.64
Other	3.92	4.26	4.28	4.52
Husband education				
No education Primary Secondary Higher	NA	NA	NA	NA
Caste				
SC/ST OBC General	NA	NA	NA	NA

Standard of living index				
Low Medium	NA	NA	NA	NA
High				
All	3.78	3.98	4.01	4.51

NA: Data not available.

Figure 1
Total fertility of currently married women according to different residential status, NFHS I, II and III



was found more among rural-urban migrants as compared to urban stayers (14 per cent), rural stayers and urban-rural migrants from NFHS-I to NFHS-III. More or less a similar trend in TFR was found in all the three rounds of NFHS data according to different socio-economic and demographic characteristics of women. TFR among non-educated women was found higher among rural stayers (4.22) compared to urban stayers (3.69) and rural-urban migrants (3.95) in NFHS-III. In NFHS I & II, TFR was nearly same among primary educated women of urban stayers and rural-urban migrants. However, it was found to be slightly higher over all the residential status when husband's literacy was considered against women literacy. TFR among 'Hindu' and 'other communities' was reported lower than Muslims in all the residential status groups. Further, the TFR among

SC/ST category in NFHS II & III (the data was not available for NFHS-I) was found more than General and OBC categories in all the residential categories. An inverse relationship was observed between fertility and standard of living (as indicated by SLI) in all the residential groups of women.

Age specific fertility rates (ASFRs) according to different residential status in NFHS-I, II and III are given in Table 2. ASFR were found higher among rural stayers than that of other groups of residential status (see Fig.2). Also, pace of change in the age pattern of fertility among rural stayers was observed to be less in comparison to other residential status in all the three NFHS data. Rural-urban migrants showed a maximum reduction in fertility in all the age groups, but it was more in 25-29 and 30-34 age groups, while among urban stayers, maximum decline of about 16 and 15 per cent was noted in 15-19 and 30-24 age groups respectively from NFHS-I to NFHS-III. The change in ASFR's was very less in all the age-groups among urban stayers from NFHS I to II, but it is interesting to note that the ASFR for age groups 20-24 and 30-34 observed a bit increasing trend among urban stayers from NFHS II to III. It may be due to increase in mean age at marriage over time. The ASFR was found little higher among rural-urban migrants as compared to urban stayers in the age groups 15-19 and 20-24, though it was almost same in all the other age groups in all the three rounds of the survey data. This might be because of their inclination to follow the urban trend.

Table 2

ASFR of currently married women for different residential status, NFHS I, II and III

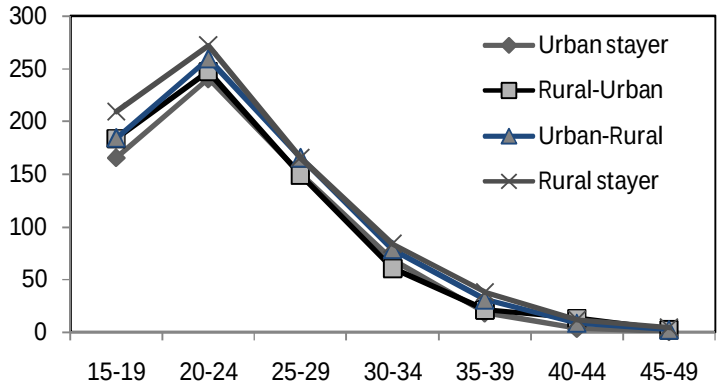
Age group	NFHS III			
	Urban stayers	Rural-Urban	Urban-Rural	Rural stayers
15-19	165.77	184.12	184.27	209.40
20-24	240.43	247.22	259.45	272.10
25-29	150.65	148.92	165.54	165.70
30-34	68.91	60.46	78.62	84.11
35-39	18.58	21.38	30.87	38.43
40-44	3.73	13.05	8.66	12.10
45-49	0.91	2.45	2.43	4.65
TFR	3.24	3.39	3.65	3.93

Age group	NFHS II			
	Urban stayers	Rural-Urban	Urban-Rural	Rural stayers
15-19	191.26	205.26	203.49	219.00

20-24	238.86	259.72	273.98	267.06
25-29	154.80	153.45	180.82	170.86
30-34	65.89	67.05	78.75	91.31
35-39	23.21	23.09	25.34	40.24
40-44	4.70	4.09	5.99	15.43
45-49	1.11	1.90	6.26	5.27
TFR	3.40	3.57	3.87	4.05

Age group	NFHS I			
	Urban stayers	Rural-Urban	Urban-Rural	Rural stayers
15-19	197.31	210.24	206.08	228.83
20-24	272.26	282.62	282.88	283.75
25-29	176.99	179.17	175.81	192.21
30-34	74.14	80.29	85.65	113.55
35-39	26.98	31.18	39.39	56.33
40-44	6.98	10.72	7.64	20.62
45-49	1.13	2.28	4.38	6.35
TFR	3.78	3.98	4.01	4.51

Figure 2
ASFR of currently married women according to different residential status



Source: NFHS-III

Table 3 shows the findings of parity progression ratios (PPRs) of women according to their residential status. At each parity, PPRs was found highest among rural stayers in all the three rounds of NFHS data. In NFHS-III, the values of PPR for parity 1 were 0.90, 0.92, 0.96 and 0.97 respectively among urban stayers, rural-urban migrants, urban-rural migrants and rural stayers, indicating that around 10 per cent, 8 per cent, 4 per cent and 3

per cent of the women after delivering their first child, stop bering another child. This shows that one child family norm is almost absent among the urban-rural migrants and rural stayers. The PPRs among rural-urban migrants were found less at each parity as compared to rural stayers, but greater than urban women (see Fig.3). Similar scenarios are found in NFHS-II and NFHS-I. However, there has been decline in the percentage of women of all residential status over time, who progressed from lower parity to higher parity. For example, a maximum percentage decline at parity 3 among urban stayers (about 33 per cent) followed by rural-urban migrants (about 23 per cent) from NFHS-I to NFHS-III, shows a declining trained of fertility in all the categories of rural stayers more so among urban stayers and rural-urban migrants.

Table 3

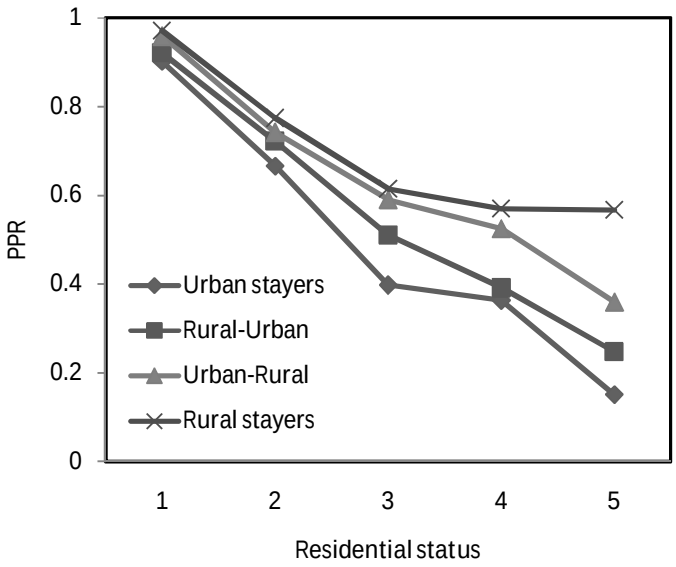
Parity Progression Ratios (PPRs) of currently married women according to residential status in NFHS-I,II and III

Parity	NFHS III			
	Urban stayers	Rural-Urban	Urban-Rural	Rural stayers
1	0.9016	0.9216	0.9584	0.9708
2	0.6662	0.7215	0.7414	0.7741
3	0.3970	0.5108	0.5901	0.6145
4	0.3633	0.3916	0.5253	0.5698
5	0.1510	0.2469	0.3599	0.5678

Parity	NFHS II			
	Urban stayers	Rural-Urban	Urban-Rural	Rural stayers
1	0.9334	0.9481	0.9549	0.9687
2	0.6945	0.7756	0.8442	0.8260
3	0.4638	0.5967	0.6869	0.7081
4	0.3032	0.3725	0.6705	0.6451
5	0.2859	0.2961	0.5413	0.6435

Parity	NFHS I			
	Urban stayers	Rural-Urban	Urban-Rural	Rural stayers
1	0.9519	0.9735	0.9889	0.9847
2	0.7473	0.8298	0.8546	0.8884
3	0.5895	0.6605	0.7532	0.7682
4	0.5413	0.5796	0.5837	0.6946
5	0.3756	0.5436	0.3570	0.6600

Figure 3
PPRs of currently married women according to residential status



Source: NFHS-III

Table 4 shows the effect of migration on fertility by controlling for the different socio-economic and demographic characteristics of women through Poisson regression model. Children ever born (CEB) among rural-urban migrants was found to be less by 15 per cent than that of rural stayers, whereas urban stayers had 24 per cent less children compared to rural stayers. This indicates that migration of women has had its significant influence on fertility. To analyse this effect according to different socio-economic and demographic variables, rural stayers is taken as the reference category.

The fertility among rural stayers was found highest in comparison to other categories of women in all the socio-economic and demographic variables. The current age and age at marriage of women respectively were found directly and inversely related to the number of children ever born. The CEB in each age group of rural-urban migrants and urban stayers have been found less than that who always stayed in rural areas. Also the differences in fertility was found maximum (20 per cent) among women of the age group 20-24 between rural stayers and rural-urban migrants where as, in the age group 25-29, the maximum difference (32 per cent) was noted between the fertility of rural and urban stayers.

As far as the age at marriage of women is concerned, fertility was found maximum among women having higher age at marriage (24+) and it was 30 and 27 per cent more among rural stayers as compared to urban stayers and rural-urban migrants respectively.

Further, fertility of urban stayers and rural-urban migrants were found less than rural stayers (about 40 and 31 per cent respectively) among non contraceptive users.

However, among the contraceptive users, fertility among urban stayers and rural-urban migrant were also observed less (about 23 and 12 per cent respectively) than the rural stayers. This might be due to the fact that high parity women are found more in rural India and they choose sterilization after completing their desire family size.

Table 4
Poisson regression analysis to assess the impact of residential status on fertility
In presence of several other socio-demographic variables

Characteristics	Urban always	Rural-Urban	Urban-Rural	Rural always
	Exp(β) (95% C.I.)	Exp(β) (95% C.I.)	Exp(β) (95% C.I)	RE
Residential status	0.76 (0.75, 0.77)	0.85 (0.84, 0.86)	0.78 (0.80, 0.90)	1.00
Current age of respondent				
15-19	0.80 (0.7, .90)	0.88 (0.76, 1.01)	0.79 (0.66, 0.95)	1.00
20-24	0.74 (0.71,0 .77)	0.80 (0.76, 0.84)	0.80 (0.75, 0.86)	1.00
25-29	0.68 (0.67, 0.70)	0.83 (0.8, 0.86)	0.81 (0.77, 0.85)	1.00
30+	0.72 (0.71, 0.72)	0.85 (0.84, 0.87)	0.82 (0.8, 0.84)	1.00
Age at marriage				
<18	0.91 (0.89, 0.92)	0.94 (0.92, 0.83)	0.88 (0.86,0.91)	1.00
18-24	0.78 (0.77, 0.79)	0.83 (0.81, 0.85)	0.75 (0.72, 0.78)	1.00
24+	0.71 (0.67, 0.75)	0.73 (0.68, 0.80)	0.69 (0.62, 0.77)	1.00
Contraceptive use				
Never used	0.60 (0.58, 0.61)	0.69 (0.67, 0.71)	0.65 (0.63, 0.68)	1.00
Used	0.77 (0.76, 0.78)	0.88 (0.87, 0.90)	0.83 (0.81, 0.85)	1.00

Region				
North	0.77 (0.75, 0.79)	0.86 (0.83, 0.89)	0.79 (0.75, 0.82)	1.00
Central	0.73 (0.71, 0.74)	0.95 (0.92, 0.97)	0.87 (0.84, 0.91)	1.00
East	0.72 (0.7, 0.74)	0.95 (0.92, 0.98)	0.78 (0.72, 0.84)	1.00
Northeast	0.77 (0.75, 0.79)	0.67 (0.64, 0.70)	0.62 (0.58, 0.66)	1.00
West	0.84 (0.81, 0.86)	0.83 (0.79, 0.87)	0.88 (0.83, 0.93)	1.00
South	0.88 (0.86, 0.91)	0.83 (0.8, 0.86)	0.83 (0.78, 0.88)	1.00
Standard of living index				
Low	0.88 (0.84, 0.91)	0.95 (0.91, 0.99)	0.88 (0.84, 0.93)	1.00
Medium	0.85 (0.84, 0.87)	0.86 (0.84, 0.89)	0.79 (0.76, 0.82)	1.00
High	0.82 (0.81, 0.84)	0.90 (0.88, 0.92)	0.79 (0.77, 0.82)	1.00
Respondent education				
No. educated	0.96 (0.94, 0.98)	0.99 (0.97, 1.01)	0.91 (0.88, 0.94)	1.00
Primary	1.00 (0.97, 1.03)	0.93 (0.9, 0.97)	0.90 (0.85, 0.95)	1.00
Secondary	1.00 (0.98, 1.02)	0.92 (0.89, 0.94)	0.88 (0.85, 0.92)	1.00
Higher	0.99 (0.93, 1.05)	0.89 (0.82, 0.98)	0.82 (0.73, 0.92)	1.00
Partner profession				
Did not work	0.97 (0.9, 1.05)	0.95 (0.86, 1.04)	0.68 (0.58, 0.80)	1.00
Prof./tech./Manag.	0.67 (0.65, 0.070)	0.73 (0.69, 0.77)	0.66 (0.61, 0.72)	1.00
Agriculture	0.89 (0.85, 0.93)	0.98 (0.93, 1.03)	0.84 (0.81, 0.81)	1.00

Other profession	0.82 (0.8, 0.83)	0.90 (0.88, 0.91)	0.80 (0.78, 0.82)	1.00
Caste				
SC/ST	0.81 (0.79, 0.82)	0.84 (0.82, 0.87)	0.81 (0.78, 0.85)	1.00
OBC	0.79 (0.77, 0.81)	0.90 (0.88, 0.93)	0.84 (0.81, 0.87)	1.00
OTHER	0.75 (0.74, 0.77)	0.86 (0.83, 0.88)	0.76 (0.73, 0.79)	1.00
Religion				
Hindu	0.72 (0.71, 0.73)	0.84 (0.82, 0.85)	0.80 (0.78, 0.85)	1.00
Muslim	0.83 (0.81, 0.86)	1.00 (0.97, 1.04)	0.84 (0.79, 0.89)	1.00
Other	0.75 (0.73, 0.78)	0.67 (0.63, 0.70)	0.68 (0.63, 0.73)	1.00

Note: C.I. = Confidence interval and RE = Reference

The residential status of women when divided over different regions of India explained significantly the variation in the fertility pattern. Fertility among rural-urban migrants living in central and eastern regions was observed almost same as that rural stayers, while in other regions (North, Northeast, West and South), the difference in fertility between rural stayers and rural-urban migrants varied from 23 per cent in northeast to 14 per cent in northern regions.

It is interesting to note that the difference in fertility level among rural and urban stayers was found minimum among western and southern region. As expected in southern and western regions of India, the public health facilities are relatively more prevalent in rural areas compared to other regions. Standard of living index (SLI) was also taken into consideration to explain the fertility pattern and fertility variation was found nominal among the different residential status groups.

Evidences show that level of education affects both fertility and migration, higher education being associated with lower fertility and higher level of migration with higher education (Cochrane, 1989; Brockerhoff and Eu, 1993). To see the impact of residential status on fertility in different educational status of women, it was observed that urban stayers had significantly more children (5 per cent) than rural stayers among non educated group, but fertility difference between rural stayers and rural-urban migrants was found insignificant. Among educational categories primary, secondary and higher groups, unlike uneducated group, the fertility difference between urban and rural stayers was found insignificant. While, a significant impact of rural-urban migration on fertility was found in different educational groups of women and rural-urban migrants have had about 7, 8 and 11 per cents fewer children than rural stayers.

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The impact of residential status on fertility regarding partner's (husbands) profession, it was found that the partner's who did not do any work, residential status played no significant role on the fertility. On the other hand, the women whose partner's profession was Prof./Tech./Manager had 27 per cent less children are found among rural-urban migrants compared to rural stayers, but among those whose profession was agriculture, the difference between rural-urban migrants and rural stayers was insignificant.

Considering the caste and religion, the fertility difference was found maximum between rural stayers and rural-urban migrants among SC/ST category (16 per cent less). In OBC category, urban stayers and rural-urban migrants respectively had 21 and 10 per cent less number of children compared to rural stayers. Thus, the fertility level varied significantly according to residential status and caste. Rural-urban migrants of Hindu and other religions have had 16 and 33 per cent fewer children compared to rural stayers. While, no significant change was observed in fertility level between rural-urban migrants and rural stayers among Muslims.

4. Conclusions

TFR was found lower among rural-urban migrants compared to rural stayers and urban-rural migrants in all the three rounds of NFHS data. The percentage decline in TFR was found more among urban stayers as compared to rural stayers, rural-urban migrants and urban-rural migrants from NFHS-I to NFHS-III. More or less a similar trend in TFR was found in all the three rounds of NFHS data according to different socio-economic and demographic characteristics of women. The ASFR for age group 20-24 observed a bit increasing trend among urban stayers and rural stayers from NFHS II to III. It may be due to increase in mean age at marriage over time. For age groups 15-19 and 20-24, ASFR was found little higher among rural-urban migrants as compared to urban stayers, though it was almost same in all other age groups. This might be because of their tendency to follow the urban trend. PPRs were found highest among rural stayers in all the three rounds of NFHS data. One child family norm is almost absent among the urban-rural migrants and rural stayers. The PPRs among rural-urban migrants were found less compared to rural stayers at each parity, but greater than urban stayers. There has been decline in the percentage of women of all residential status over time, who progressed from lower parity to higher parity.

The results of Poisson regression model based on CEB also show the similar trends as found in TFR, ASFR and PPR, among rural-urban migrants that was observed higher than urban stayers and lower than rural stayers in all the socio-economic and demographic variables. Hence, the lower fertility among rural-urban migrants as compared to rural stayers shows that rural-urban migrants are adapting small family size norm and fertility approaches close to urban stayers. This study, thus, allows one to understand the role of residential status in describing the fertility transition in India. Undoubtedly rural-urban migration has had the effect of reducing fertility in the population as a whole.

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Appendix-A

A.1. Estimation of parity progression ratios (PPR): Yadava *et al*. (1992) have proposed a procedure for estimating PPR from the data on open and last closed birth interval for the women who are in the reproductive period. In this contest it was assumed that among women of specific parity at the time of survey these are two types of woman "fertile" α_i and "sterile" 1- α_i

$$E\left(U_i^p\right)=\alpha_i E\left(U_i^f\right)+\left(1-\alpha_i\right)E\left(U_i^s\right) \qquad \ldots(A.1)$$

Where, $E\left(U_i^p\right)$, $E\left(U_i^f\right)$ and $E\left(U_i^s\right)$ mean open birth interval (OBI) for population, fertile and sterile respectively, of the women of i^{th} parity.

If the procedure includes only those women whose OBI is less then 'C'; such intervals will relate to those women who have given birth to their i^{th} child within the period (0, C) prior to the survey date. Hence the equation (a.1) can be written as

$$E_c\left(U_i^p\right)=\alpha_i^* E_c\left(U_i^f\right)+\left(1-\alpha_i^*\right)E_c\left(U_i^s\right) \qquad \ldots(A.2)$$

and proportion of fertile and sterile would be now α_i^* and $(1-\alpha_i^*)$.

If the choice of C is such that probability of closed birth interval greater than C is approximately zero then

$$\alpha_i^* = \frac{\alpha_i E\left(t_i\right)}{\alpha_i E\left(t_i\right)+\left(1-\alpha_i\right)C}$$

and

$$E_c\left(U_i^f\right)=\frac{E\left(t_i^2\right)}{2E\left(t_i\right)}$$

Where random variable 't_i' is the duration of last close birth interval of parity 'i'.

Since i^{th} order births are assumed to be uniformly distributed over time, the mean open birth interval for sterile female within the period (0, C) is

$$E_c\left(U_i^s\right)=\frac{C}{2}$$

Substituting the value of α_i^*, $E_c\left(U_i^f\right)$ and $E_c\left(U_i^s\right)$ in equation (A.2)

$$E_c\left(U_i^p\right) = \frac{\alpha_i E\left(t_i^2\right) + \left(1-\alpha_i\right)C^2}{2\left[\alpha_i E\left(t_i\right) + \left(1-\alpha_i\right)C\right]} \quad \ldots (A.3)$$

Where α_i is PPR for parity 'i'

Thus, with suitable choice of C and the knowledge of i^{th} order open and close birth interval, α_i can be estimated from equation (A.3). In this case C was taken as 120 Month.