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Ascertaining The Degree of Fertility Preference Implementation in India: An Analysis of NFHS Data

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Abstract

In traditional societies family size preferences are found to be greater than actual fertility, but in developing countries the family size preferences are lower than actual fertility; however in developed countries the two are almost similar Ware (1974). The need therefore exists to examine the extent to which observed changes in fertility can be explained by the ability of individuals or couples to implement their fertility desires. The study examines the levels, trends and differentials in fertility preference implementation in India and how this has contributed to the observed fertility changes in the country. Bongaarts variant of Easterlin's supply-demand framework is used for the analysis of fertility to estimate the level of preference implementation. This evaluation index can assist governments and health programmers in designing and implementing appropriate strategies towards the country achieving a sustainable fertility level.

Key words Natural Fertility, Fertility Regulation Preference Implementation Index.

Introduction

The discrepancy between observed and wanted fertility in India points to the fact that women have not been able to translate their fertility preferences into reality. For example, wanted fertility declined from 1.9 in 2005 to 1.8 in 2015 while actual fertility fell from 2.7 to 2.2 over the same period (NFHS 3 and NFHS-4). These differences show that there is some degree of unwanted fertility in the country. Fertility preference studies have been limited in India.

A number of studies in the past brought forth the strong influence of men on fertility decisions, which cannot be ignored or captured by proxy information from the wives. It was found that fertility desires of both marriage partners are important predictors of couples' fertility and that the desires of both spouses have equal effects on fertility behaviour. Decomposition of changes in fertility into its determinants shows that while on the average the level of implementation index is a more important determinant of fertility decline for all the developing countries examined, the demand for children (wanted fertility) is the dominant factor. The studies cited above have not been able to address the extent to which couples and individuals have been able to achieve their fertility preferences. In addition, few known studies have been done within a theoretical context to quantify fertility measures in the country at the national level. This study specifically estimates the extent to which people have been able to implement their fertility preferences and the contribution of this to fertility changes in India. It will also be an indicator of the extent to which available reproductive health programs and services in the country have assisted couples and individuals to achieve their fertility preferences. These should assist the government and the health programmers improving the infrastructure and towards the country achieving a sustainable fertility level.

Objective of Study

There exists great discrepancy between observed and wanted fertility in India, which points to the fact that women have not been able to translate their fertility preferences into reality. The need therefore exists to examine, the extent to which observed changes in fertility can be explained by the ability of individuals or couples to implement their fertility desires. This study aims to

1. Examine the levels, trends and differentials in fertility preference implementation in India.
2. Ascertaining the level of fertility preference implementation on the observed fertility changes in the country.

Review of Literature

Preferences for family size or for sex of a child reflect the values attributed to children within a given cultural setting as well as individual considerations such preferences indicate the demand for children United Nations (1987). The crucial role played by socio-economic development in fertility decline is by now widely recognized in the demographic literature. However, when such development takes place at a slow



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Shrinkhla Ek Shodhparak Vaicharik Patrika

pace, direct intervention in the form of family planning efforts can be and often is, attempted.

Thus, both socio-economic development and family planning programme efforts are expected to contribute to fertility decline. A number of studies have tried to assess the relative roles of development and programme in bringing about a fertility change. Mauldin and Berelson (1978) observed that although programme efforts are important, programmes in countries with a better social setting are more successful. Srikantan(1977) also highlighted the importance of the socio-economic context for the success of family planning programmes.

The demographers have been successful in identifying direct determinants of actual fertility but they have not yet been able to identify the direct determinants of reproductive preferences, Bongaarts(1978). Moreover, socio-economic differentials of actual fertility have long been known, but they said differentials of reproductive preferences were almost unknown until recently. Using the percentage of women wanting more children as contained in World Fertility Survey data, Brackett 6 and others (1978) were the first to dispute the hypothesis that uneducated women had unrestricted fertility desires or desire a very higher number of children than educated women. In subsequent studies using World Fertility Survey data, the United Nations (1981) and Lightbourne(1984) examined both the percentage of women wanting more children and mean desired family size, and reported that reproductive preferences vary little by socio-economic status. So the demographers have been engaged in debates over the relationship between population and development, as throughout the world, a shift from high to low fertility has invariably accompanied economic and social modernization. This change has largely been accomplished by reduction in time devoted to childbearing arising from change in fertility level and change in nature of fertility from biological, to one of conscious decision of individual couples Coale (1973). Many demographers see fertility transition as a complex process that involves key roles for changes in the demand for children as well as for the decision of new attitudes about birth control and greater accessibility to contraception provided by various family planning programs, Mason(1997), Feyisetan & Bankole (2004). Bongaarts and Hardee (2017), developed a FP program indicator called "public-sector family planning program impact score" to measure the quality and scope of the government's public family planning program.

Several analytical models have been designed to identify and measure the determinants of fertility. In the absence of experimental evidence, researchers have turned to country-level regression analysis to estimate the fertility effects of programs, Bongaarts & Hardee (2019). In addition, an indicator of family planning program effort is used as a key explanatory variable. Easterlin's economic framework is a model of behavioural and biological factors affecting fertility in developing countries. The model consists of three central concepts: demand for children, the potential supply of children, and the momentary and psychic costs of contraception. Though the model is simple and attractive, it could not address dynamic issues and has not succeeded in quantifying these factors in an acceptable manner. Bongaarts (1993), proposed an alternative approach to the implementation of the original model. It is a reformulation of Easterlin's framework and measures reproductive performance in terms of births. He introduced a new variable called the degree of preference implementation to quantify the roles of the costs of fertility regulation and unwanted childbearing. It has been observed that declines in fertility are associated with both development and strength of programme effort, and that socio-economic development and family planning programmes operate synergistically, with one reinforcing the other.

Theoretical framework

The framework for this study is adapted from the Bongaarts (1993) variant of the supply-demand framework for the determinants of fertility and enhanced by ideas from literature reviewed on the crucial role of males on eventual couples' fertility behaviour. The Bongaarts framework posits that fertility (F) as measured by total fertility rate is an outcome of the interaction of natural fertility (supply of births), wanted fertility (demand for births) and degree of fertility preference implementation (the extent to which people are able to implement their fertility preferences). The degree of preference implementation is in turn dependent on cost of fertility regulation and that of unwanted childbearing. Following is a summary of the key variables and their relationships in the Bongaarts (1993) model.

Supply of births (F_n) is measured as natural total fertility. Natural fertility means the rate of childbearing that would prevail in the absence of deliberate efforts by couples to limit family size. Demand for births (F_w) is measured as wanted total fertility. Wanted fertility is the rate of childbearing that would be achieved if all women were able to eliminate

unwanted births. Degree of preference implementation (I_p) is measured by an index with values ranging from 0 to 1.

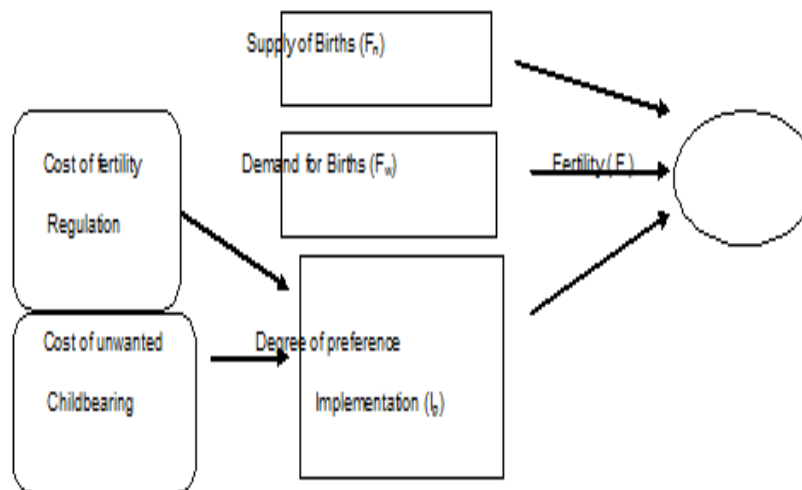


Figure 1. Key variables and interrelations in variant of supply-demand model.

(Source: Bongaarts, J. (1993). The supply-demand framework for the determinants of fertility: An alternative implementation.)

The couples' characteristics equally influence the way they perceive and balance out the costs of fertility regulation and that of unwanted child bearing which eventually inform their attitude to fertility regulation. The availability and accessibility of health care service also influences couples fertility regulation attitude and preference as well as the woman's natural fertility. In this model, the woman's attitude to fertility regulation influences her fertility preference and vice versa. The model also shows that the fertility attitude and preferences of the two spouses have influence on each other for it is the outcome of these that determines the extent to which a woman achieves her fertility preferences. The actual fertility is then determined by the woman's fertility preference (demand for births), natural fertility (supply of births) and the extent to which she is able to implement her fertility preference (degree of preference implementation). According to this variant model, as society develops, the trend in actual fertility is a function of trends in wanted fertility, natural fertility and preference implementation.

Data and Methodology

The data for the paper have been brought from the two surveys NFHS-3 and NFHS-4. These are the most comprehensive surveys conducted in India with an objective to collect reliable and up-to-date information on marriage, fertility, family planning, mortality, maternal and child health, infant feeding practices, and child nutrition. The analysis makes use of Bongaart's variant of the Easterlin's supply-demand framework (Figure-1) for determinants of fertility to explain fertility changes in the states of India. The survey adopted a uniform sample design for all the states of India.

Estimation of Degree of Preference Implementation

According to Bongaarts¹ (1993), the quantitative relationship between the variables and fertility can be expressed in statistical form as follows:

$$F = F_w + F_u \quad (1)$$

where F is total fertility rate (births per woman), F_w is wanted fertility and F_u is unwanted fertility rate (which can simply be expressed as $F - F_w$). Also,

$$F_u = (F_n - F_w) (1 - I_p) \quad (2)$$

where F_n is total natural fertility and I_p is the index of preference implementation with values ranging from 0 to 1. F_u is a function of the difference between supply and demand, and the degree of preference implementation. Substitution of (2) in (1) yields

$$F = F_w \times I_p + F_n \times (1 - I_p) \tag{3}$$

According to Bongaart, natural fertility can be obtained using the following relation.

$$F_n = F / C \tag{4}$$

Where C is an index between 0 and 1 that measures the proportional reduction in natural fertility attributable to deliberate birth control.

$$C = 1 - 1.02 U_p \tag{5}$$

where U_p represents the proportion of married women who practice contraception.

Substitution of (5) in (4) gives an estimate of F_n . Rearranging equation (3) gives

$$I_p = (F_n - F) / (F_n - F_w) \tag{6}$$

Equation (6) can now be used to estimate the degree of preference implementation when natural fertility, actual fertility and wanted fertility are known.

Decomposition of Fertility Trends

A decomposition of the fertility decline into the contribution of changes in proportions married and marital fertility provides a better picture of the nature of the decline. For India, Retherford and Rele(1989) estimated that, of the 1.06 point decline in TFR between the periods 1960-1964 and 1980-1984, 0.76 (about three-fourths) was due to a decline in marital fertility. Mean age at marriage for females rose in India, but less impressively than in China; this factor contributed to a decline in TFR of only 0.30 points.

The principal objective of the supply-demand framework is the identification of the causes of fertility decline. The application of this framework requires that estimates of observed, wanted and natural fertility as well as the index of preference implementation are available for two successive points in time (t_1) and (t_2) and in the same population Bongaarts (1993). In the Bongaarts formulation, following variables were used.

	Observation point	
	t_1	t_2
Observed Fertility	F_1	F_2
Natural Fertility	F_{n1}	F_{n2}
Wanted Fertility	F_{w1}	F_{w2}
Index of preference implementation	I_{p1}	I_{p2}

The decline in fertility between t_1 and t_2 is equal to $F_1 - F_2$ and this can be expressed as a function of the mediating variables by substitution of equation (3).

$$F_1 - F_2 = [F_{w1}I_{p1} + F_{n1}(1 - I_{p1})] - [F_{w2}I_{p2} + F_{n2}(1 - I_{p2})] \tag{7}$$

Since the emphasis here is on examining changes in fertility that result from changes in determinants, this equation can be rewritten as

$$F = F_w + I_p (-) + F_n (1 -) \tag{8}$$

Where F_w, F_n and I_p are the average values of F_w, F_n and I_p and F, F_w, F_n and I_p represent absolute changes in F, F_w, F_n and I_p respectively.

Eqn. (8) divides the observed fertility decline into three components.

Change in	Contribution to Fertility Decline (F)
Natural fertility (ΔF_n)	$\Delta F_n (1 - I_p)$
Wanted fertility (ΔF_w)	$\Delta F_w I_p$
Index of implementation (ΔI_p)	$\Delta I_p (F_w - F_n)$

The above formulation shows that a change in wanted or natural fertility to the observed fertility decline depends on the average level of implementation index. Similarly, the fertility effect from a given change in the index of implementation depends on the average between natural and wanted fertility ($F_n - F_w$).

Analysis of the Results

Levels of fertility preference implementation index

There are two levels of analysis. The first is estimating the degree of preference implementation for India across different background characteristics and the second level is the decomposition of fertility trends. The procedure was done to examine the contribution of degree of preference implementation to fertility decline in specific populations.

Shrinkhla Ek Shodhparak Vaicharik Patrika

Table 1
Estimates of F, F_w , F_n and I_p (between two periods)

Background Characteristics	Year	F	F_n	F_w	I_p	Year	F	F_n	F_w	I_p
Residence										
Urban	2005	2.06	4.80	1.6	.86	2015	1.75	3.64	1.5	.88
Rural	2005	2.98	5.52	2.1	.74	2015	2.41	4.55	1.9	.81
Education										
No education	2005	3.55	5.92	2.4	.67	2015	3.06	6.12	2.3	.80
5-7 years	2005	2.51	4.48	1.9	.76	2015	2.38	5.06	1.9	.56
complete	2005	1.80	3.16	1.6	.87	2015	1.71	3.49	1.5	.89
More than 12 years										
Religion										
Hindu	2005	2.65	4.84	1.9	.84	2015	2.13	4.35	1.7	.84
	2005	3.09	4.9	2.0	.41	2015	2.61	4.28	2.0	.73
Muslim	2005	1.96	3.27	1.9	.97	2015	1.99	3.90	1.7	.78
Christian	2005	1.96	4.36	1.5	.84	2015	1.58	4.79	1.4	.95
Sikhs										
Caste										
SC	2005	2.92	5.12	2.0	.71	2015	2.26	4.52	1.8	.78
ST	2005	3.12	4.95	2.1	.64	2015	2.48	4.59	2.0	.82
OBC	2005	2.75	4.91	1.91	.72	2015	2.22	4.19	1.8	.85
Others	2005	2.35	4.52	1.72	.78	2015	21.93	3.94	1.6	.86
Region										
North	2005	2.17	5.04	1.75	.87	2015	1.98	4.30	1.58	.90
Central	2005	3.34	5.76	2.23	.69	2015	2.43	4.34	1.93	.79
East	2005	3.31	5.91	1.99	.66	2015	3.02	5.59	1.95	.71
North East	2005	2.89	4.90	1.71	.64	2015	2.23	3.66	2.11	.92
West	2005	2.13	5.20	1.59	.83	2015	1.89	3.64	1.84	.97
South	2005	1.91	5.79	1.53	.91	2015	1.73	3.76	1.52	.91

Source: Calculated from NFHS-3 and NFHS-4 data

The attainment of couple's fertility preference is high as per different background characteristics. In other words, many Indian couples have been able to implement their fertility preferences. Table -1 shows that, it is relatively low in East (.71) & Central regions (.79) and for couples with middle level education (.56) and Muslim couples (.73). The results typically show that most of the regions are above the transition period and majorities are approaching the end of fertility transition. Declining infant mortality, growing individualism and desire for other goods are also important factors influencing a small family size. This observed increase could be as a result of the programme effort by the various state governments in making contraception available, accessible and affordable as well as improved contraceptive technology.

It is also observed that wanted fertility F_w fell in almost all the regions and across all background characteristics. This could be due to changes in the cost and benefits of children, which makes couples to desire smaller families. Declining infant mortality, growing individualism and desire for other goods are also important factors influencing a smaller family size. The observed decline in fertility could be because of the relative low cost and high benefits associated with fertility control, incompatibility of child bearing / rearing with labour force participation for women, coupled with the high cost of child bearing/ rearing.

However, family welfare programmes, which are now implemented in each and every state of India also represents another factor influencing preference implementation.

Degree of fertility preference implementation index tells the extent to which people have been able to implement their fertility preferences and by extension, measures the achievement of the various governments against their goals of providing family welfare services to their people. This evaluation index can assist governments in designing and implementing appropriate strategies for the achievement of the set targets.

Contribution of I_p , F_w and F_n to fertility decline

Contributions to fertility change by I_p , F_w , and F_n for all the states are 0.12, 0.28 and 0.10 births per woman respectively. The observed decline in fertility could be because of the relative low cost and high benefits associated with fertility control, incompatibility of child bearing/ rearing with labour force participation for women, coupled with the high cost of child bearing/ rearing. The change in wanted fertility is significantly affected by development variables and hence the level of development. However, the absolute change depends on the stage of fertility transition and states at a higher stage therefore have smaller absolute change (states of west and south regions). The results clearly indicate the important role of wanted fertility, which on the average account for the largest proportion of the observed decline. Reduction in natural fertility and changes in preference implementation do not play an important role. This implies that change in demand for children is the key factor that brings about fertility decline in India. The variation could be as a result of the level and development of reproductive health services and facilities in various states, the level of fertility transition and socio-cultural and economic factors.

Conclusion

Past studies on determinants of fertility did not give quantifying relationship between factors that link fertility to its basic determinants because of absence of a conceptual framework. The Bongaarts's variant of the Easterlin model allows convenient quantification of the three key determinants of fertility: the supply of births, demand for births, and the degree of preference implementation. In addition, Bongaarts proposed a procedure to decompose fertility trend in terms of separate effects attributable to each of the mediating variables. Changes in fertility were decomposed to estimate the contribution of each of the determinants to fertility decline. The results show variation in the value of preference implementation in different regions, with all regions having an index ≥ 0.70 . The lag among the states in eastern and central regions could be due to variation in family planning programme efforts in the regions as well as socio-cultural norms. Generally, the fertility implementation index increased while wanted fertility declined over the years. This observed increase in indices of fertility preference implementation (I_p) could be as a result of improved program effort by the various governments in making contraception available, accessible and affordable to their populace as well as improved contraceptive technology. The observed trend in wanted fertility could be due to changes in the cost and benefits of rearing children, which makes couples to desire small family sizes. Declining infant mortality, this leads to the survival of more children, hence less pressure on the family resources. The decomposition procedure using data from two sets of National Family and Health Survey of India indicates that on the average, changes in fertility were largely due to changes in wanted fertility. Preference implementation was found to be a less important determinant of fertility decline than wanted fertility. They contributed 20% and 56% respectively. This is because preference implementation index in the two periods is very high and there is little scope for a significant increase. The results of the analysis clearly show the importance of the degree of fertility preference implementation index. It tells the extent to which people have been able to implement their fertility preferences and by extension, measures the achievement of the various governments against their goals of providing family welfare services to their people. This evaluation index can assist governments in designing and implementing appropriate strategies for the achievement of the set targets.

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Shrinkhla Ek Shodhparak Vaicharik Patrika

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