



DEVELOPMENT PATHS OF THE RELATION BETWEEN FERTILITY AND FEMALE EDUCATION: A CONTINUOUS SCIENTIFIC SURVEY OF LITERATURE OVER THE DECADE

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Abstract

Improved female education in developing world has been viewed as the prime institutional variable that can help lower fertility rates. Rising education level, increased school attendance and other social behavior are much more powerful in promoting fertility reduction. The launching of the Seventh plan provides an easy platform to initiate those 'Beyond family planning' measures which contribute to the overall objective of fertility reduction in India. As far as fertility reduction is concerned, educational policy should be given high priority. There exists a strong negative correlation between female fertility rate. This paper proffers the development paths of the relation between fertility and female education.

Keyword: *Fertility, Female Education, Developing World, Social Behaviour, Correlations*

Introduction

A number of factors have been identified by social researcher on the basis of empirical research, which explains differential fertility. Of all the links between social factors and fertility, the relation between women's education and fertility decline has seen as the most important and powerful. The two variables-fertility and female education substantiates a close link. The academic community and social science researcher has extensively explored and investigated historical popularity of these two entities. This paper delves into a detail and continuous scientific study of glimpse of earlier studies advancing over different years. To express the breadth of our current knowledge base, including gap several theories have been proposed. Prior investigation has queried diverse approaches to show the interlinkage of these two variables – fertility and female education. The assumption that educational attainment is inversely related to fertility has been one of the cornerstones of contemporary educational and demographic analysis. Few social scientists take issue with the position that rising levels of educational attainment of women are associated with lower fertility. The inverse relationship of education to complete family size is one of the clearest cut correlations found. Though there is overwhelming evidence that exposure to education tends to reduce fertility, there are several problems with the hypothesis that increased level of education attainment correlate with lower fertility. During last few years, the controversy extends to more fundamental issue such as; whether the influence is direct or indirect. The paper divided into three parts. First part a general view of glimpse of earlier study was conducted, secondly international studies and third part comprises of Indian studies. Sociologists often points to the spread of education as a key determinant of social change. Social scientists have linked the spread of formal education to a wide range of social transformation including economic growth and globalization, demographic transition, political change and spread of new belief system (Becker, 1991, Coldwell, 1988, Coleman, 1990, Thornton and Lin, 1994). Of all the links between social factors and demographic change, the relationship between women's education and fertility decline has been positioned as one of the most powerful.

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Background

Nevertheless, the link between fertility and education has become central to the issue regarding women. Fertility refers to the actual reproductive performance of a woman or a group of women. One possible and important indicator of the level of fertility is the average number of children born per woman of unbroken marriages during reproductive age (Chakraborty, 1984). Patel (1993) refers to fertility behavior as a process of bearing and rearing children. Jeffrey and Basu (1996) refer to it as the 'completed family size'. Fertility also includes other related terms such as total fertility rate, crude birth rate, replacement level fertility, Net Reproductive rate, General Fertility rate, Completed fertility rate. The National Family Health Survey (NFHS) of 1993 defines Total Fertility Rate (TFR) as the number of live births per 1000 women population if they went through all reproductive years at a particular time. NFHS defines crude birth rate as the total number of live births per 1000 population in a given year.

The crude birth rate is the most easily obtained and most often reported fertility measure. It is calculated from the number of babies born in a given year (or any other time period) divided by the total midyear population and multiplied by 1000. So, if there were 30,000 births in a population of 1 million people, we would say that the crude birth rate was 30 births per 1000 people (30,000 divided by 1,000,000 multiplied by 1000). As the name implies, demographers consider the crude birth rate less precise than other metrics because it doesn't take into account the age and sex structure of a population, which greatly affects how many children are born to a population in a given year or at a particular time. The most crucial factor is the percentage of young women in the reproductive age because they produce most of the babies. Thus, a population with a higher proportion of young people has a higher crude birth rate than a population of older people. The Total Fertility Rate or TFR is considered a more refined measure than the crude birth rate and is commonly used because it is easy to visualize what it means; the average number of children a woman would have in her lifetime based on the childbearing rates of women in a population in a given year. This average makes it a valuable measure for gauging fertility trends and comparing different populations. The TFR measures the fertility of an imaginary group of women whose reproductive lives are subject to the rates of childbearing experienced by real women in a specific year.

Determinants:

Replacement Level Fertility (RFL)

The TFR is used in determining replacement level fertility or when couples have an average of about two children who will then replace them in the population. We might think that two children per couple would be enough for a couple to replace themselves, but some children will die before they grow up to have their own two children. This death means the replacement level fertility requires a TFR slightly above 2. Whether the TFR is high or low, a population with replacement level fertility will eventually stop growing.

Net Reproductive Rate (NRR)

The Net Reproduction Rate is a slightly different way of examining the extent to which a population is replacing itself. The net reproduction rate is defined as the number of daughters born to women during her lifetime given current age-specific birth rates and her chances of living to the end of her childbearing years. A net reproduction rate of one means that each generation of mothers is having exactly enough daughters to replace themselves in the population. If less than one, the reproductive performance of the population is below replacement level.

General Fertility Rate (GFR)

The General Fertility Rate tracks the number of births per 100 women of childbearing age (typically ages 15 to 49 but sometimes 15 to 44).

Completed Fertility Rate (CFR)

A Completed Fertility Rate is determined from the average number of children they had. This measure is a useful way to measure the fertility of a certain group of women and to compare the fertility levels of different generations.

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Cohort Rates Vs Periodic rates

Completed Fertility is a cohort measure of fertility because it describes the fertility of a specific birth cohort of women. The TFR and Crude Birth rate are period rates because they measure fertility for a given period of time.

Data and Methods:

Many factors contribute to the probability that a woman of reproductive age (roughly 15 to 49) will have a child. Demographers pay the closest attention to four factors that impact fertility, which are known as the proximate determinants because statistically they account for all differences in fertility level among populations. These determinants are:

1. Proportion of women who are permanently or temporarily unable to conceive.
2. Proportion of women either married or in a sexual union (in fecund).
3. Percentage of women using contraception.
4. Level of induced abortion.

Where contraceptive use and abortion are less prevalent, marriage rates and either permanent or temporary inability to conceive (infecundity) are most important contributing factors to the birth rate. Bourdieu (1977) who is strongly influenced by Marxian perspective in his 'cultural reproductive' model recognizes the significance of education in the reproduction of class, race and gender inequality. Fertility is an important indicator of demographic change. Many social anthropologists, social scientists and demographers have observed a drastic decline in fertility in western countries. But the third world developing countries are seen to be still in the process of transition to lower fertility rates. During the mid 1940's demographic studies became a focal point for all social scientists as the problem of population explosion aggravated. Over the years it has been found by demographers that various factors and process influence the paradigm of transition in infertility. The theories of demographic can be divided into two parts: In first part, all the classic demographic theories would be included. And in past classical transition theories, diffusion theory, the wealth flow theory of Caldwell(1982) and micro economic theories are important. The Classical Demographic Transition Theory is the main theory in the field of fertility transition. It is based on the three phased transition models. The first phase started with high fertility, high mortality, and thus slow population growth. Then a transitional phase started with the falling mortality causing rapid population growth. And the third phase began with low fertility rates bringing a return to slow or no growth (Davis, 1945 and Notestein, 1945). This theory is based on modernization principles, focusing mainly upon social and economic forces.

Post classical Transition Theories interpret fertility decline in terms of the change in the idea about the acceptability of birth control to explain when fertility falls(Watkins,1986, Cleland and Wilson 1987). Micro economics theories of fertility are postulated by a number of demographers who tried to relate it to the economy. The theories of Gary Becker and the theories of Harvey Leibenstein and Richard Easterlin are also of great significance in this matter. Becker (1960) in his theory, which is an extension of economic theory of consumer choice, treat children like other consumers durable taking into account their cost, time spent on them, household income and preference. For him, the increasing cost of children because of the money and time spent, on their upbringing and education is the sole cause of fertility decline. And it is only the women's education and their good position in the family, which decides the preferences in the family in matter of fertility.

Though the theories of demographic transition are guided by modernization process and put much emphasis on development and on industrialization process and urbanization as the causes of fertility decline, yet these are the theories on which for the first time make female literacy and education important factor for female autonomy, which in turn influences their fertility decision.

To express the breadth of our current knowledge –base including gaps the logit coefficient of the effect of wife's and husband education was identified. The multivariate analysis also permit assessment of the importance of contraceptive behaviour of women with level of education was studied. The study deduces the use of panel data regression, by estimating OLS. To extrapolate the requisite observation dependent and independent variables comprises very crucial parts. To explain the inter-correlation – the paper advocates the use of maximum likelihood probit technique. The studies proffer Structural Equation Modeling (SEM) in STATA, using Maximum Likelihood with missing value method. To optimize model fit, maximized comparative fit index(CFI) and minimized Root Mean Square Error of approximation (RMSEA) and Bayesian Information Criterion (BIC) also suffice the requirement of few studies. The paper summarizes the role of education on fertility and sustained development in a globalized world.

Results and Discussions

The relationship between fertility and education has been widely investigated in many population and demographical social science research studies. Education elevates a woman's permanent income through earnings, and that reduces the optimal fertility choices of the females to produce some higher quality of human capital (*Becker 1960, Mincer 1963, Becker and Lewis 1973, Willis 1973*). Education can influence fertility indirectly through its impact on some other factors that influence fertility directly. Under positive preferential marriage system, the education status of women is causally dependent over her partners' education, and ultimately education generates some multiplier effect over households' permanent income (*Behrman and Rosenzweig 2002*). Fertility is regarded as positive force in population dynamic because it is responsible for biological replacement and continuation of human society. Fertility levels determine the age structure of a population which in turn governs the social, economic and demographic characteristics of the population. The pattern of relationship between women education and fertility status are diverse and vary over regions and also depends upon the levels of development (*United Nations, 1987, 1995*). Education enables women to gather more autonomy over their own lives and stronger voices within the traditional family settings (*Mason, 1984, 1992*). Evidence from developing countries shows numerous key points of interest about the positive association between education and fertility (*Jejeebouy, 1995*). Studies over within countries illustrate the inverse relationship between fertility and women education specially visible in urban pockets in compare to rural or traditional areas (*Kritz and Gurak, 1991*). Studies also affirm that women education largely influences reproductive variables of the household in compare to socioeconomic variables, and also influences the other determinants of fertility (*Singh et al, 1990,1993*). Present study examines the strong and crucial link between increased level of education for females and lower fertility rates. Various studies focused on leverage effect of education over fertility (*McNicoll, 1978*). Controversies over studies persists regarding the investment choice over education is the most cost effective way to condense fertility (*Simons, 1979*) and the same controversies over whether the primary or secondary education is the most appropriate for investment in education to reduce fertility (*Cochrane, 1979*). Studies also concerned with the lack of uniformity between the observed relationship of female education and fertility (*Jain, A.K., 1981*). The higher the level of a women educational attainment, the fewer number of children she is likely to bear and the gap between two children also increases. Such changes in behaviour bring some change in long run demographic profile of a region. The study makes an effort to unveil the problem of overpopulation prevailing in the developing country like India. The study unearths the area of Paschim Bardhaman because it is a physical face of land with combination of agrarian as well as predominantly industrial mining production unit. The study meliorates the importance of female education, converging various facets of government interventions and schemes indeed. *Corjn et. al* have observed the higher level of education of the female partners leads to postponement of the first child birth. The research thesis caters such needs in the upcoming proceedings.

In the subsequent society a squat amount of enhancement in education primarily increase fertility (*Cochrane, 1979*). *Graff, (1979)* opined that apparent theoretical basis for causal linkages between fertility and education is not available, hence lot of empirical studies tries to prove the negative correlation between fertility enhancement and spread of education, but most of such studies are lacking of uniformity. The enormity of effect of education over fertility varies over Countries (*Harmelin and Mason, 1981*). The

educational status of the both parents has fertility discouraging effect to diverse extent has been reported by past studies in India and abroad. *Hirschman and Rindfuss (1980)* observed significant association ship between higher levels of education of the women with the timing of first birth. *Jain, A.K., (1981)* observed that in some cases curvilinear association between female education and marital fertility is persisting, and that indicates an increase in marital fertility with a small increase in female education. *Pillai, V.K., (1981)* observed that education of first four years of the wife increases the family size, while beyond four years of education reduces it. According to studies with an increase in wife's education husband's education also augment may be because of educated women frequently marry those men who are more educated than them but the reverse is not true (*Jain and Nag, 1987*). *Jejeebhoy (1992)* tries to ascertain a theoretical association that the outcome of a small amount of education or no education and primary education is insignificant but beyond the threshold level of education (middle, higher education) the effect of maternal education on fertility becomes universally inverse. *Corijn, M., et al. (1996)* identified that high level of education of the female partner leads to the rescheduling of first childbirth, but high level of education of the male partner does not. Considering for India, *Dr'eze and Murthi (2001)* showed that female literacy has significant negative blow on fertility, whereas male literacy has no contribution to fertility reduction, after controlling for female literacy. Different studies in Indian context opined that from the original stage of demographic transition female education exercise significant negative impact on fertility. But as demographic transition proceeds such impacts tend to be weaken because better educated people took the leading role to adopt the small family norms followed by the lower strata (*Bhat 2002*). A study by *Akin, M.S., (2005)* originated that female education in primary and secondary level has significant negative impact on fertility, whereas male education in primary and secondary level has significant positive impact on fertility.

Martin. 1995, in his article outlines the relationship between women's education and fertility , delves into Demographic and Health survey with WFS (World Fertility Survey). An U-shaped relationship was documented in several developing countries .He made an appraisal that higher education is congruous related with lower fertility .He dissects the result by exploring the percentage distribution of women , by country , according to educational attainment and literacy status,26 developing countries are perpetuated and likely to display the largest fertility differential by education. The paper has critically propelled the frequency or incidence of marriage with the population likely to be called Nuptiality is highlighted by the means of median age at marriage for successive educational group. In Latin American region, uneducated women typically have more children than their educated counterparts. The paper documented that women's contraceptive needs are closely linked to her stage in the reproductive cycle, and since better educated women tends to be younger and uneducated women. The paper replicated multivariate analysis also permits assessment of the importance to contraceptive behavior of women level of education relative to her husband. The Logit coefficient of the effect of wife's and husband education on current contraceptive use by 26 developing countries, was identified. The research substantiates the belief that women educational advancement plays crucial role in proffering sustained decline in fertility.

Dreze and Murthi.(1999) tries to covers the factor determining fertility level and draw inference for decline in fertility with female education . It examine the determinants of fertility in India , using district level panel data set linking two recent census 1981 and 1991. The paper showcases the excepted reason for decline in desired family size and planned no. of birth with education. Endogenous factors which might reasonably affect fertility taken into consideration. The paper disseminated TFR (Total fertility Rate) as dependent variables, importance of community effects, son preference indicator to illustrate the results more significantly. All the information's is available from Standard Census Sources calculated from NSS data. The research advocates panel data Regression, perceived district specific effect in two ways – Fixed effect or as random effects, estimation of OLS using dummy variables for each district. In order to perform all the tests (including test of significance and Hausman Test) it uses the robust Huber-White Estimate of Variance which allow for different error variance across districts as well as serial correlation for given district. The paper corroborates the main result of showing the contract between female education and fertility, with coefficient significance, poverty index, district specific effect, fertility decline and gender

bias coupled with child mortality. The paper fails to broach the income effect much and its imposition to reduce fertility level on their own. Further research can be conducted to show the intensification effect in the particular case, parity specific bias in child mortality is higher among women with lower fertility. The study proffers that female education plays a central role in declining fertility.

Cruces, et al, (2005) in his study show the effect of fertility on maternal labor supply in Argentina and Mexico exploiting a source of exogenous variability in family size first introduced by Angrist and Evans (1998) for the United States. The estimates for the US can be generalized both qualitatively and quantitatively to the populations of two developing countries where, compared to the US, fertility is known to be higher, female education levels are much lower and there are fewer formal facilities for childcare. In this paper, the fertility variable of interest – i.e., the causing variable in the empirical labor supply regression models – is the indicator More than two children, which is instrumented by the indicators: Same sex, Two boys and Two girls. In both Argentina and Mexico, slightly above 50 percent of the women in any of the samples considered have a third child while in the US the same figure is only about 36 to 40 percent. The study shows that the “mixed sex sibling preference”, the basis of AE identification strategy, is present in Argentina and Mexico. More importantly, it find that the AE estimates for the US can be generalized both qualitatively and quantitatively to the populations of two developing countries that are different from the original application.

Gunes(2013)tries to features the relationship between female education and fertility by accomplishing a change in Compulsory Schooling Law (CSL) Turkey in the year 1997. The paper notifies the motive of CSL were to increase the educational level to Universal Standard and reinforcing that all children can comply. The CSL explores an instrument that varied the number of years of schooling, without significant curriculum change, to identify the impact of schooling on fertility. It appraises the trend in fertility and development in Turkey before CSL. The study shows that Turkey government took ‘BIG BANG’ approach to education reforms and increase Compulsory Schooling (CS) from five to eight years. The CSL purport the effect on enrollment rates to both sexes, especially on female enrollment in rural areas which increased from 84.74% in 1997/1998 to 93.54% in 1999/2000. Academic Year (Ministry of National Education 2011) .The paper substantiates on 2008 (Turkish Demographic and Health Survey (TDHS -2008, conducted every five years by health university institutes of population studies. The study documented with two types of questionnaire – household and individual questionnaire, with targeted population of every married women of reproductive ages and all usual members of household. The studies disseminate the effect of female education on teenage fertility using OLS as well as alternative approach (difference in difference) with CSL treatment variables. It replicated the effect of CSL by generalized regression framework by considering various intensity indicators as well. It employed robustness check of various intensity measures. These methodology unveils the variation in female schooling identifies education on fertility. The paper proffers that educational participation in developing countries – especially one with high teenage fertility rate might be an effective policy tools for addressing fertility related concerns and can accelerates the demographic transition al later age.

Kahler, (2016) investigates the positive guild between women’s education and lifetime fertility intention, which exist between both the individual and country level. The paper appraises that the mechanism behind the positive correlation is income effect, which considers in Gender theory. It advances that highly educated women are more gendered equal partnership contributor in the society. The study evaluates the detailed hypothesis analysis by cross sectional studies of differences in the relationship between women human capital and fertility decision. It replicated the findings based on Euro barometer survey by using stratifies sampling procedure, covering 1000 respondents in each countries. It diffused the coding process, by bifurcating responses variables and explanatory variables. It disseminated the volume index of GDP per capita in purchasing power standard. The study simulated the multilevel analysis model based on pooled data set, with proportional odd model. The scatter plot surfaced the highly educated women and mean family size was intended. The paper proffers that countries in which women pertaining highest educational

level also encourage fertility sometimes more widespread. It ushers new insight in imparting the positive effect of female education and fertility behavior.

Kim. (2016), outlines a negative correlation between women education and fertility. The section of the paper contemplates that women education level talks about the impact on women's health, and their physical capacity to give birth, children health, the number of children desired, and women ability to control birth and knowledge of different birth control method. The paper tries to assess the influencing factor of educated women regarding fertility decision like income, forgone. It incorporate that the research of developed countries by means of TFR (Total Fertility Rate). The result surfaced that lower the TFR, the stronger the correlation between women education and fertility. It deduces a simple mechanism for the relationship between female education and fertility. By considering fertility as the maximum no. of children a couple could have (supply) minus the number it deliberately avoids having (fertility control) in other forms, it may be viewed as the sum of the number of desired (demand) and unplanned children. It perceived the difference in fertility and contraceptive use between education groups. The Research broach that in both developed and developing countries, better educated women have fewer children than less educated women. Not only this it unveils that education improves, maternal and education improves maternal and child health. Therefore it ushers that policy maker must have long term policy goals for promoting female education.

Aydogon and Uslu, (2019) paper reveals that with the increase in female education between age 15-19 years, development increases and rate of adolescent fertility decreases. The article postulates the hypothesis that rate of adolescent fertility decrease with higher education. The paper depicted that women who achieve a certain level of education are employed in labor force participation religiously dedicating their time and energy and as a result opportunity cost of staying at home decrease, which intact smaller family than crowded one. The theoretical background presenting the determinants of adolescent fertility relationship and total fertility rate in general. The paper made exclusive use of methodology. The data set of this study contain observation on multiple countries cover panel data combined with time series regression using adolescent fertility as the dependent variable. It uses the conventional panel model which includes a lagged dependent endogenous variable. The rule fixed effect model (fem), using dummy variable suffice the methodology criteria. The paper disseminated covariance model or estimator (CV) for each cross sectional unit. FEM are surfaced with dynamic panel data with PLS, GLS, 2-SLS, GMM also contemplates the part of paper. The paper fails to use Random effect model (REM). The paper use different indices such as female to male tertiary enrollment (%), ratio of female to male secondary enrollment (%), ratio of female to male primary enrollment (%) are used as indices to measure different level of education. The research contributes the use of lofty methodology and finds that the levels of development are negatively correlated with rate of adolescent fertility. The paper broach a clear view that adolescent fertility rate decrease with increase in adolescent female literacy. The paper unveils that fertility rate of female between 15-19 years of age decline with tertiary education.

Conclusion

Thus, from the literature review it is seen that the issue of women's education and fertility has been studied extensively. A couple of studies concerning the role of other socio economic factors in the linkage between women's education and fertility have also been included. This chapter discusses studies of both India as well as outside India. Nevertheless, special importance has been given to studies of correlatives and interrelationship between female education and fertility. Hence, it can be concluded from the exhaustive and continuous Scientific Survey on Review literature that fertility rate decreases with increase in education.

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