

ABSTRACT

Title of Document: "FERTILITY AS MOBILITY" IN INDIA:
SALIENCE OF CASTE, EDUCATION AND
EMPLOYMENT OPPORTUNITIES

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In this dissertation, we use the "fertility as mobility" approach to study the determinants of fertility outcomes in India. More elaborately, we re-examine the Beckerian hypothesis of a tradeoff between number and quality of children with increasing income levels using the India Human Development Survey (2005) data. Our contention is that it is not necessarily the case that couples at higher end of the income scale will have fewer but higher quality children as compared to those lower down the income scale. Drawing on the seminal work of Susan Greenhalgh on "fertility as mobility" in late nineteenth century traditional Chinese society (1989) and modifying Coale's three necessary and sufficient conditions for demographic transition (1975), we argue that even couples lower down the income scale will be willing to invest in quality rather than quantity of children if the institutional framework in terms of education and employment opportunities enhance mobility prospects. We also find considerable persistence of occupations across generations suggesting that increasing occupational mobility across generations particularly for

those lower down the caste hierarchy is essential for mobility to be a relevant factor in fertility decisions for disenfranchised castes.

“FERTILITY AS MOBILITY” IN INDIA: SALIENCE OF CASTE, EDUCATION
AND EMPLOYMENT OPPORTUNITIES

By

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Chapter 1

Introduction

In this dissertation, we use the “fertility as mobility” approach to study the determinants of fertility outcomes in India. More elaborately, we re-examine the Beckerian hypothesis of a tradeoff between number and quality of children with increasing income levels using the India Human Development Survey (2005) data. Our contention is that it is not necessarily the case that couples at higher end of the income scale will have fewer but higher quality children as compared to those lower down the income scale. Drawing on the seminal work of Susan Greenhalgh on “fertility as mobility” in late nineteenth century traditional Chinese society (1989) and modifying Coale’s three necessary and sufficient conditions for demographic transition (1975), we argue that even couples lower down the income scale will be willing to invest in quality rather than quantity of children if the institutional framework in terms of education and employment opportunities enhance mobility prospects. In this chapter, we provide an overview and rationale behind undertaking such an exercise as well as highlight our contributions to the demographic literature.

Association between income and fertility outcomes

In his seminal work, Becker (1960) uses an analogy of consumer durables to suggest that there is a tradeoff between quantity and quality of children. Simply stated, he argues that economic theory suggests income and number of children are positively associated with each other so that at higher income levels, there is a demand for more children. Simultaneously, though higher income levels are also associated with better

“quality” children. However, “better” quality children require higher levels of investment, monetary or otherwise; so that quality of children must be traded off for quantity of children, with the net result that higher levels of income is associated with fewer but higher quality children.

However, the problem with applying the economic analogy of consumer goods to children is that while richer people do want better houses, cars and so on, they do not necessarily want fewer of those than poor people, extending the same logic to children suggests that richer people would want both better quality and more children (Jones, Schoonbroodt and Tertilt, 2008). This logical fallacy is resolved by Hotz, Klerman and Willis (1993) who suggest that it is not children per se that are normal goods but expenditure on children is- the total expenditure on children are an increasing function of income but the income elasticity of demand for number of children is still negative.

Jones et al. (2008) disagree; they argue that in his original paper though Becker emphasizes the trade- off between quantity and quality of children, he does not offer it as an explanation of the negative association between fertility outcomes and income level. The absence of a positive relationship between fertility and income is then an indication of a “missing variables” problem viz., knowledge of contraceptives. The expectation is that the adoption of contraception among the high income group accounts for their effective planning of their family size vis-à-vis lower income groups and hence, lower fertility levels.

In a subsequent paper, Becker and Lewis (1973) argue that if income is accurately measured the relationship between fertility and income is positive though the observed

relationship is negative- since higher quality children demand more resources; couples have fewer children at higher income levels, this makes the relationship between income and fertility outcomes to appear negative. Further, Becker and Tomes (1976) argue that the quality of children production function has an endowment component, which generates a negative association between fertility and income- under conditions in which the child's quality endowment and parent's ability are positively correlated and the marginal value of education is higher among parents with higher wages, one can expect fertility to be inversely correlated with income while educational investment is increasing in parental endowment (Jones et al., 2008).

The above discussion summarizes briefly Becker's hypothesis of a quantity-quality tradeoff but it also suggests that the relationship between quantity and quality of children and income level is far from a straightforward one- -in the following chapter (Chapter 2), we detail the several inadequacies of the Beckerian hypothesis. Indeed the debate surrounding the relationship between fertility and income has continued to perplex economists, sociologists and demographers alike. It seems, therefore, necessary to suggest an alternate theoretical framework that helps us to better understand the relationship between fertility and income levels. In order to do so, we study the income-fertility relationship from a social mobility perspective. Highlighting income as one of the dimensions of social mobility, we propose that contrary to what is suggested by Becker viz., couples higher up the income scale are more likely to have fewer children but invest more in their quality than couples lower down the income scale- the negative association between fertility outcomes and income levels do not hold if the institutional context is such that avenues of mobility, which we measure in terms of education and

employment opportunities are available. In such instances, even couples lower down the income scale will be willing to invest in their children so as to be able to access these opportunities.

We use the India Human Development Survey (IHDS, 2005), which is a large nationally representative survey of around 41, 000 households and 215,000 individuals for our analysis. The analysis of fertility- income relationship using large survey data is hindered because not all relevant information is present in the same dataset. For instance, DHS or WFS are disadvantaged in that while they collect fertility data, they typically leave out data pertaining to educational and health expenditures that is crucial to a study of fertility- income relationship. The Indian DHS- National Family Health Survey does not have data on expenditure on education on children and income levels which is an independent variable in our analysis. In contrast, IHDS has a wealth of data that allows researchers to combine fertility data with a host of information on the background of the respondents, including income and educational expenditures.

Broad national level trends in fertility in India

A heterogeneous fertility level across different social classes/ groups is quite a well- known phenomenon among those familiar with the Indian demographic scene, and has also been observed internationally (Yang and Morgan, 2003; Aneshensel, Becerra, Fielder and Schuler, 1990; Folmar, 1992). This is best highlighted by a comparative assessment of total fertility rates by background characteristics in the different NFHS years, even though different rounds of NFHS use slightly different categorization of different background characteristics. For instance, NFHS- I (1998-9) does not provide

any information about TFR by the standard of living index categories while NFHS- II has three standard of living categories (low, medium, high) and NFHS- III (2005- 06) provides information by standard of living index quintiles. Nevertheless, two fertility trends are distinct from Table 1 below: (1) almost all social classes/ groups have experienced a decline in TFR across the different NFHS years and (2) notwithstanding the decline in total fertility rates across the groups; in some instances, substantive intra-group differences remain. In NFHS- III, for example, women with the lowest standard of living have a TFR of 3.89 while those enjoying the highest living standards have fertility rates well below the replacement level of 2.1 at 1.8.

[Table 1 about here]

Another particularly striking feature of the fertility decline in India is the regional variations. As per NFHS- III data, some states as Andhra Pradesh, Himachal Pradesh, Kerala and Maharashtra have fertility levels at or below 2.1 while in states such as Bihar, Uttar Pradesh and some of the North- eastern states it is hovering around 4.0. Nationally, the overall fertility level declined from 3.4 to 2.7 but across the states it has been declining at greatly varying rates apart from greatly varying levels. For example, in Assam it declined from 3.5 to 2.4 while in Rajasthan during the same period of NFHS- I to NFHS- III it declined from 3.6 to 3.2.

[Table 2 about here]

Approaches to study fertility in India

There is a broad consensus in the literature that the cultural context as defined by kinship patterns, patriarchy and gender autonomy is associated with fertility levels in

India (see, for example, Dyson and Moore, 1983, Malhotra, Vanneman and Kishor, 1995, Murthi, Guio and Drèze, 1995, Drèze and Murthi, 2001; among others). Greater women's agency and empowerment are correlated with lower levels of fertility. For example, the higher status of women and their greater autonomy in South India is believed to have contributed towards its lower fertility rates. Tribal populations have distinct kinship patterns and gender relations, particularly a higher rate of labor force participation, which may be contributing to their lower fertility levels. Total Fertility Rate is also higher among the Muslims versus the Hindu population; but it is debatable to what extent this holds controlling for the lower levels of socio- economic development among Muslims (for further discussion on this issue see Basu, 1997; Jeffery and Jeffery, 1997; Jeffery and Jeffery, 2000; Iyer, 2002). The proximate determinants of fertility- proportions of female married, prevalence of contraceptive methods, incidence of induced abortion and the fertility inhibiting effect of breastfeeding- also conform to the differential patterns in fertility by background characteristics and states (Bongaarts, 1982; Visaria, 1999). For instance, according to NFHS-III data though marriage is early and almost universal in India, the proportion of unmarried women in the ages 20- 24 years is higher in the southern state of Kerala (42 percent) as opposed to the north- Western state of Rajasthan (14 percent). Similarly, although the use of contraception has gone up throughout the country, according to NFHS- III, the range is from a low of 24 percent in Meghalaya to a high of 73 percent in Himachal Pradesh.

In contrast, the empirical evidence of an association between level of development and modernization and fertility levels is at best tentative. Murthi and Drèze (2001) report statistically non-significant association between fertility levels and general

indicators of development as the poverty index, urbanization and male literacy. Female literacy has, however, strong and significant association with fertility level and operates through several pathways (Murthi et al., 1995, Drèze and Murthi, 2001, Krishnan, 1992), including diffusion of knowledge and behavior regarding fertility control measures from other contraceptive users (McNay et al. 2003).

“Fertility as Mobility” perspective

While both the cultural discourse of kinship patterns and gender norms and the structural discourse of socio-economic development have received much attention; the examination of differentials in fertility level from the “social mobility” perspective remains unexamined. We came across only *two* studies with an India focus that have addressed fertility trends in India from a mobility perspective- Basu and Desai (2010) offer the desire for securing upward mobility through investment in child’s education and thereby securing a place in India’s growing national economy as an explanation for the phenomenon of one- child families among the middle classes in the country. In another piece, Pallikadavath and Wilson (2005) study the fertility decisions of the Vettuvan community- a disenfranchised caste community in Kerala- and conclude that Vettuvan parents sought to limit family size to two children- ideally a son and a daughter- to maximize their mobility chances. Educational investment on the son is expected to increase the chances of upward mobility through a secured employment while education of the daughter is expected to enhance the family’s social status through a “good” marriage.

Both these studies are, however, limited in that they focus on a very small segment of the Indian population. Only about 5 percent of the families are one- child families and Vettuvans are one of the Scheduled Caste communities in Kerala, which has better social development indicators than other states in India. It, therefore, becomes necessary to see if the broad idea that fertility decisions are influenced by social mobility prospects can be generalized for the entire population as well. In this dissertation, we develop a theoretical framework that allows us to examine if the association observed for small segments of the Indian populations holds for the larger population in India as well.

Other contributions of the dissertation

Men's role in fertility outcomes

Compared to the number of studies devoted to understanding the correlates of women's characteristics with fertility outcomes, fewer have focused on studying the role of men (Goldscheider and Kaufman, 1996; Forste, 2002). A part of the neglect arises because women physically bear children and child rearing has historically been considered a woman's domain. But surveys on fertility/ family formation too tend to collect information about women and ignore men; Froste (2002) notes that past surveys in the U.S. have focused exclusively on women because men's reporting of fertility is considered to be unreliable. In the West, the lack of data on men's role in family formation and their subsequent parenting means that there is not enough information to study such recent developments in the family as growth of non- marital child births and marital disruption (Bianchi, 1998; Brown & Eisenberg, 1995; Goldscheider & Kaufman, 1996; Moore, 1995).

In the context of developing countries, a wealth of information on women has allowed us to understand the linkages between fertility outcomes and various background characteristics as education levels (Cleland and Rodriguez, 1988; United Nations, 1987; Cochrane, 1983; UNESCO, 1983; Weinberger, 1987; Cochrane, 1979), sex preference (Arnold, 1985; Das, 1987), and women's access to income and employment activities (Derose, 2002; Mason and Palan, 1981). Research on men's role in fertility outcomes has focused on gender relations within the family and spousal bargaining power (Bankole, 1995; Basu, 1992; Dyson and Moore, 1983; Dodo & Tempenis, 2002; Ezeh, 1993; Oheneba-Sakyi & Takyi, 1997) but comparatively little research has been done to study the association between men's background characteristics and fertility outcomes. Basu (2002), for instance, points out that it is difficult to disentangle whether educated husbands reflect the fertility goals of their (educated) wives or they are a group that is intrinsically different from their counterparts who have lesser or no education. Additionally, given that there is a growing recognition of the importance of educating sons across all economic and social sections in developing countries, it is not clear if their education reflects a different set of world values or if the association is merely a conflation of an association between education and financial resources. Because we use an analytical framework where we control for income, we are able to see to what extent income is an intervening variable in an association between education of men and fertility outcomes.

Social Mobility in India

Sociological discussions on social mobility in India typically draw on the work of the social anthropologist Srinivas and are around the concepts of *sanskritization* and

westernization (1952, 1977). The notion of *sanskritisation*, which is identified as the process through which castes manipulate their ritual status and legitimize their upward mobility by embracing practices of the “upper” castes such as prohibition of widow remarriage or observing *purdah* or adopting vegetarianism and teetotalism. The other strategy towards social mobility involves adopting the secular practices associated with westernization, though the attempt to manipulate ritual status through these alternative strategies may also conflict with each other- for instance, the greater emphasis on providing secular education to women is at odds with the role identified for women under *sanskritisation* as primarily the custodians of family status and caste purity.

While the two variables that we use as markers of mobility- access to education and non- agricultural employment opportunities- are distinctly associated with westernization, our analysis diverges from the previous discussion since the focus is not so much on how individuals or communities manipulate their ritual caste or social status to move up the social order, instead the focus is at the individual level, viz., couples restricting their family size in order to make the requisite investment so that their children are able to access the growing but limited opportunities of upward economic and social mobility (Desai, 2007; Desai and Das, 2004) created by India’s growing and increasingly globalized economy.

Other discussions of social mobility in India have focused on alternative dimensions of mobility- income, education, wages and occupation across generations and within social groups. So, for instance, Kumar, Heath and Heath (2002a and 2002b) focus on inter- generational mobility across classes, which they define in terms of occupations- viz. higher and lower salaried classes, business and petty business class, skilled and semi-

skilled labor, manual labor, unskilled labor, farmers and lower agricultural labor. A forthcoming article using data from the 2005 India Human Development Survey (Moitram and Singh, 2012) also focuses on intergenerational occupation mobility while Ray and Mazumdar (2010) study inter- generational mobility in terms of education and occupations. In addition to inter- generational occupation mobility, Hnatkovska, Lahiri and Paul (2012) also review evidence on inter- generational mobility in terms of income and wage while Sethi and Somanathan (2010) present a comparative assessment of social mobility among Scheduled Castes and Scheduled Tribes- the two historically disadvantaged sub- populations in India. Munshi and Rosenzweig (2006) take another perspective on social mobility in India by examining the role of caste networks in limiting mobility. They find that caste networks by imposing restrictions on their members often tend to restrict inter- generational mobility.

In adding a demographic dimension to the discussion of social mobility in India, we along with Basu and Desai (2010) and Pallikadavath and Wilson (2005) contribute to the rather limited literature on this subject. Additionally, unlike previous literature on social mobility, we focus on mobility experience as well as access to mobility opportunities, broadening the definition of mobility from a purely objective criterion.

Chapter scheme in the dissertation

The dissertation is organized along the following lines: next chapter (Chapter 2) details a review of the literature and outlines our research questions and hypotheses. We begin this chapter with a detailed exposition of Becker's hypothesis on the negative relation between fertility and income levels and its critique by sociologists and

economists. Based on these critiques, which essentially point out that fewer children does not necessarily imply better quality children and at higher income levels there is no automatic demand for fewer quality children, we propose an alternative theoretical framework using the fact that income levels constitute one of the objective dimensions of social mobility. Our framework proposes that mobility would be a relevant factor in fertility decisions if and only if (1) mobility is within the calculus of rational choice, (2) mobility is desirable and (3) means to achieve mobility are available. While drawing on prior literature on the social- psychological costs of mobility, our framework essentially builds upon an earlier work of Greenhalgh (1988) examining the association between fertility outcomes and mobility from an “institutional” perspective in China by making it more amenable to empirical analysis. The chapter states the research questions and hypotheses and sets the stage for studying the association between *mobility experience* and *aspirations* of couples and fertility outcomes using the latter framework in the specific case of India. In particular, we highlight the role of education and occupation as vehicles for social mobility in the Indian context and contend that couples who have *experienced* mobility in terms of either being at the upper end of the occupational hierarchy (i.e., professionals) or have the high levels of education that is necessary to access occupations at the higher end of the hierarchy are most likely to aspire for mobility. Additionally, such couples also have the necessary resources (monetary and non- monetary) to ensure that their children are able to access these opportunities. The result is that net of (couples’) level of education and occupation (of men), the negative relation between fertility and income levels is considerably weakened. Furthermore, if the institutional context is such that it supports mobility possibilities (for instance, education

and employment opportunities are available), then even those who have not experienced mobility in the sense that they are at the lower end of the occupational hierarchy (laborers or farmers) or do not have the education to be at the upper end of the occupational hierarchy will be willing to invest in the quality of the education of their children; thereby attenuating the linkages between fertility outcomes and income levels.

Chapter 3 provides information on the India Human Development Survey (IHDS), which we use for our analysis and the rationale behind using it for our empirical analysis. We also illustrate the robustness of IHDS data through a comparative assessment of IHDS and other national surveys and census. The subsequent discussion provides detailed information about the analytical sample and dependent and independent/ control variables, including ways in which each of the variables are measured and the expected direction of relationship between the dependent and independent/ control variables; and the statistical techniques we use in order to answer our research questions and test our hypotheses.

Chapter 4 presents the results. Broadly, the results support the assertion that the hypothesized negative association between income and fertility outcomes is considerably weakened when we take into account a couple's level of education (both men and women) and men's occupational background, which we argue in the Indian context to be markers of status. But we only find limited support for the hypothesis that availability of education and employment opportunities substantially attenuates the relationship between fertility outcomes and levels of income.

Chapter 5 delves deeper into the first condition we articulated in Chapter 2 for mobility to be a relevant factor in fertility decisions- viz., mobility must be within the calculus of rational choice. The result that given limited inter- generational occupation mobility in India it is not significantly associated with fertility outcomes is hardly surprising. More importantly though we find that fertility decisions are significantly associated with occupations for couples in which the men are professionals like their fathers.

Chapter 6 reviews the results in light of overall limited support for the hypotheses that upward social mobility in Indian context is associated with fertility outcomes. In particular, we found that there is little support for the hypothesis that institutional context in terms of accessibility to education and employment opportunities attenuates the income- fertility relationship while Chapter 5 confirms that because of occupational mobility across generations is not widespread it is not a significant factor in most couples' fertility decisions. We reinterpret these findings by drawing on attempts in the literature to highlight the linkages between culture and demographic outcomes.

Chapter 2

Beckerian Quantity- Quality Tradeoff in “Fertility as Mobility” framework

In the demographic literature, the Beckerian model of a quantity- quality tradeoff forms the cornerstone of any analysis on the role of income in relation to fertility outcomes. This dissertation builds on this work to take into account social mobility considerations that increase the importance of quality compared to quantity of children.

Beckerian income- fertility hypothesis

When economists first proposed new household economics models, the relationship between income and fertility posed a great challenge. In many industrial societies, richer households had smaller families than poorer households. Unless assumed “inferior” goods, standard neo- classical economic theory suggests that at higher income levels more number of children will be preferred or that the income elasticity of quantity of children is positive. This challenge was addressed by Gary S. Becker by focusing on child quality instead of quantity. In his famous 1960 treatise “An Economic Analysis of Fertility”, using the analogy that children are equivalent to consumer durables, Becker makes a distinction between income elasticity of quantity and quality of children demanded.

Parallel to quantity demand for children, there is the quality demand for children. Quality of children is defined as the sum of those traits which may be developed, excluding purely biological characteristics like hair color, skin color, sex, etc. At higher income levels, couples not only demand more children, but better “quality” children as well. However, the income elasticity of quality demand for better quality children require

investment or are more “expensive”, therefore, quality must be traded off for quantity, with the result that the income elasticity of quantity demand for children appears to be negative (Becker and Lewis, 1973).

The Beckerian framework has its limitations though- sociologists contend that its theoretical framework does not capture the social dimensions of the dynamics of human reproduction while econometric analysis using instrumental variables does not find evidence in support of the hypothesis. Still others have argued that the quantity- quality tradeoff is not universal but holds in specific situations/ contexts.

“Child Quality” is not a Decision Variable

The theoretical framework of the Beckerian model of income- fertility relationship has, been critiqued on the grounds that the consumer durable analogy to child quality is incorrect due to its failure to take into consideration the role of parents as “producers” of children and an incomplete cost analysis. Many of these inadequacies relate to its failure to take into account the sociological context of reproduction.

Numerous critiques (Turchi, 1975; Blake, 1968; Duesenberry, 1960) have pointed out that the social aspect of reproduction is far more complex than what is suggested by the analogy between family size decisions and purchase of consumer durables.

Unlike the consumer durable market, there is no factor as credit that would restrict couples from having any number of children that they desire- that is, they can have as many or as few children as they want. Secondly, across most cultures there exists tremendous institutional pressure that encourages marriage and children. Couples are not subject to a similar pressure with regard to the acquisition of consumer durables. Third,

unlike consumer durable goods where there is the possibility of adjusting consumption behavior to attain consumption equilibrium, couples cannot post- hoc adjust the number of children to maximize the utility that they derive from children. Fourth, parents do not have any control over the innate characteristics of their children, unlike in a consumer durable market where consumers can choose among visible products whose qualities they are able to ascertain with some reasonable effort. Finally, parents are under social obligations of adequate upbringing of their children; clearly no such obligations exist with respect to consumer durables.

In this dissertation, we elaborate further on the social obligations of parents towards the upbringing of their children and the implications it has for the Beckerian quantity- quality tradeoff. Most parents are desirous of investing in children so that they are sufficiently equipped to access education and employment opportunities necessary for upward social mobility. However, since opportunities for upward mobility are not equally distributed across various social strata/ income groups, not all parents are likely to consider it rational to make such investment. Our contention is that the quantity- quality tradeoff in terms of fewer but better quality children is not equally important for *all* parents, but only for those parents who perceive chances of mobility for their children, possibly because they have experienced mobility themselves.

Role of parents as producers of children

Yet another critique is that the dynamics of fertility suggested by Becker would change significantly if not only the role of parents as “consumers” but their role as “producers” is considered as well. This refers to the fact that parents may, for instance,

decide to produce more than one child to achieve, among other things, one of the essential elements of child quality viz., the socialized child. Second, parents have to adjust the problem of spreading fertility decisions over time so as to be able to overcome the problem of “empty nest”. Third, as producers of children parents have to comply with societal norms of child quality. Blake (1968) suggests that all these features relating to the role of parents as producers suggests that parents, whether rich or poor, are likely to prefer more than one child as an alternative to childlessness. Societal norms concerning quality of child may impinge more strictly on rich parents; further inhibiting a positive association between income and child quality.

Opportunity cost of children

Higher income couples are more likely to be under significant social pressure to produce “better” quality children. Moreover, the desire for social mobility means that parents are likely to overstretch their resources to have children with the requisite qualifications. Further, indirect costs in terms of intensive parenting especially common among the affluent classes as well as increasingly considered essential in modern societies for social mobility also increases the opportunity cost of children (Lareau, 2003). Blake (1968) critiques Becker for his failure to fully take into account the opportunity cost of children. The increasing opportunity cost of children with increasing income levels suggests that the association between income and fertility levels may be negative.

Furthermore, feminist critique of Becker’s model of the household, also termed the unitary household model based on the assumption of a benevolent altruist (Katz,

1997), is applicable here. With respect to fertility outcomes, what is of importance is not only the interaction between husband and wife but the possible impact of older children in effecting fertility outcomes (Turchi, 1975).

Unobserved heterogeneity in parental preferences

The “empirical regularity” (Schultz, 2007: 19) in support of the Beckerian hypothesis of a tradeoff between quantity and quality of children (see the references cited in Clark and Cummins, 2011) is likely due to an inherent endogeneity between family size and child quality arising out of unobserved heterogeneity in parental preferences. Most studies assume that parental preferences are homogenous, but this may not be the case. Some parents may be more willing to invest in the quality of their children than others. If this is indeed the case, then the observed association between number of children and child quality is most likely on account of a positive association between parental preferences and child quality.

Results from studies adopting the unanticipated birth of a twin as an instrument find that the Beckerian quantity- quality tradeoff does not always hold ground and that there might well be a positive correlation between parental quality and child quality. More elaborately, the use of the random incidence of twin births allows economists to disentangle the issue of child quality when there is an unexpected birth- the Beckerian model, under these circumstances, predicts a negative association between quantity and quality while the alternate hypothesis, which takes into account unobserved parental heterogeneity, suggests no association. Indeed, empirical studies adopting this alternative methodological approach find that the association between quantity and quality of children is insignificant and often positive (Schultz, 2007). See, for example, Angrist,

Lavy, and Schlosser (2006) and Qian (2006) who do not find any evidence of quantity-quality tradeoff in Israel and China respectively. Li, Zhang and Zhu (2008) report the expected Beckerian quantity- quality tradeoff in the Chinese countryside. But as Clark and Cummins (2011) note that this result might be influenced by the restrictive fertility policies of the Chinese government while Becker's proposition relates to the relationship between quantity and quality of children in free market world.

Quantity- Quality tradeoff in a developing country

The empirical observation of a negative correlation between quantity and quality of children with rising income levels that is so consistently observed in developed countries is not necessarily generalizable to developing countries, especially with educational attainment as the outcome variable (Maralani, 2008). Instead the correlation varies greatly by time and place and ranges from negative to positive, depending on the specific context. For example, evidence from Brazil suggests a negative association between family size and educational attainment (Psacharopoulos and Arrigada, 1989). Evidence from Thailand too confirms a negative association between family size and educational attainment (Knodel, Havannon, and Sittitrai, 1990), but with a qualification- the association is negative only for families with six children or more and the association is modest when other family characteristics are controlled in a regression framework (Anh, Knodel and Treiman, 1998). The reverse is true in Botswana and Kenya, where the association between family size and educational attainment is positive (Chernichovsy, 1985; Gomes, 1984). In India, larger families are more likely to send their children to school than smaller families, where children are held back from going to school in order to meet labor shortage. However, in both large and small families, girls have lower

chances of going to school and are most likely to be prevented from going to school in order to meet the labor demands of the family (Jejeebhoy, 1993). Furthermore, patterns are not uniform even within a country- while there is a positive association among Israeli Jews, there is no association between educational attainment and family size among Israeli Muslims who are far less socio- economically privileged than their Jewish counterparts (Shavit and Pierce, 1991; Angrist et al., 2006). In another study based in Indonesia, the association between family size and children's schooling was positive in urban areas for older cohorts but negative for more recent cohorts, while for rural areas there was no significant association (Maralani, 2008). Also see Buchmann and Hannum, 2001.

These studies suggest the importance of context in a study of the relationship between family size and quality of children. Among other things, a society's level of development, modes of production and access to schooling may influence the relative association of family size on schooling of children (Desai, 1995; Lloyd, 1994; King, 1987). In certain contexts, the quality-quantity trade-off between number and quality of children may not hold, and the desire to have better-educated children may not necessarily lead parents to choose smaller families (Gomes 1984; Mueller 1984).

A similar ambivalence exists when health of children is used as a measure of child quality; though the results are not specific to developing countries context. For example, Strachan (1989) finds a positive association between quantity and quality of children, the tendency to suffer from one or more allergies decreases as family size increases. Using twin births as an instrument for family size and height as a measure of child quality, Lundborg, Ralsmark and Rooth (2011) conclude based on a study of Swedish male birth

cohorts between 1965- 1978 that there is a positive correlation between family size and height. While another study in Britain finds that children in large families (3+) are 2.5 cm shorter than the average height for their age (Sample, 2007) and Horton (1988) finds a similar negative effect of birth order on height for age using a multipurpose survey from 1978 in the Bicol region of the Philippines. Alternative theories exist to explain the differing results between family size and health outcomes (Lundborg et al., 2011). One of the hypothesis supporting a positive association between family size and health outcomes is the “in utero programming” hypothesis – which suggests that the maternal immune system becomes stronger with number of births and that this is transferred to the child in utero (Ohfujii et al., 2009); while Horton (1988) explains her results in terms of the inability of parents to allocate resources in such a way so as to offset the inevitable advantages accruing to children in earlier birth orders who are born when per capita resources (financial and in terms of parental time and attention) are greater. (Also see the literature cited in Lundborg et al., 2011).

More broadly, Raut (1985) proposes an alternative to the Beckerian quantity-quality tradeoff that may be particularly relevant to a developing country. His proposition is that in the short run the poor will tend to have larger families than the rich, not because there is an inverse association between income levels and quantity of children, but because the poor perceive higher costs of producing skilled children and capital and the rich perceive higher costs of producing unskilled children. It follows then that in such an economy the poor are likely to specialize in producing unskilled children and hence, have large families and the rich are likely to specialize in skilled children and physical capital and hence, have smaller families in each generation.

To sum up then, the major critiques outlined here suggest that (1) Lower quantity does not automatically lead to higher quality; and (2) Higher income does not automatically lead to higher quality demands.

Beckerian hypothesis restated in a mobility- fertility complex

What then explains the income-quantity relationship? My argument is that (1) income is one of the objective dimensions of mobility and high income is a proxy for social mobility. Richer families belong to a social class where parents are expected to invest in child quality and here the social cost of low quality children is very high. (2) Income fertility relationship varies by external conditions. If external conditions allow for achievement of higher quality, parents will curtail fertility, not otherwise.

Fertility as Mobility

The argument that there is an association between mobility and fertility can be traced back to at least Malthus. It states that small family size is conducive to upward social mobility (Dumont, 1890 as cited in Greenhalgh, 1988). The rationale for this argument draws upon the property of capillarity or capillary action of liquids in the physical world. So, just as gravity necessitates that liquids have to be thin in order to rise up in narrow tubes, in the same manner families have to be small in order to rise up the mobility ladder.

Later theorization has, of course, moved beyond this simplistic formulation and rather eugenicist orientation (Basu and Desai, 2010) and takes into consideration such factors as women's employment in the modern world, and changing consumption preferences with macro- level changes in economic prosperity.

Women's labor force participation, especially in the formal sector, is not compatible with child bearing and rearing and therefore, acts as an incentive to limit family size (Lloyd, 1991; Jaffe and Azumi, 1960). To the extent that upward income mobility in a modernizing society is associated with increased women's participation in the formal labor force, one can expect an inverse association between upward mobility and fertility outcomes. Relatedly in societies where institutional structures and social norms dictate that women bear the major share of the burden of child bearing and child rearing, women have a greater incentive to reduce fertility (McDonald, 2000). However, in instances where state and other social institutions provide child care support, this relationship may be accentuated (Casper et al., 1994; Mason and Palan, 1981)

Easterlin's hypothesis (1969, 1975, 1978), which is framed at the macro level, too could be applied at the micro- individual level to predict an association between mobility and fertility. It states that the baby boom in the US was caused by increases in the relative economic status of couples and the decreases in relative income accounts for the subsequent decline in fertility. That is, if income is high relative to consumption preferences, fertility will be high and vice versa. Bean and Swicegood (1979) extensions of Easterlin's hypothesis sees inter-generational upward mobility as increases in relative economic status vis-à-vis tastes and preferences formed in parents' household and therefore, is associated with high fertility and the relationship holds true in the opposite direction for downward inter-generational mobility.

Apart from these hypotheses, which emerge from the literature on demographic transition, there are several others that lay emphasis on social and psychological dimensions of mobility and its implications for fertility (Bean and Swicegood, 1979). The

social isolation hypothesis suggest that social mobility can either augment fertility because the process of mobility itself is disruptive of ties with which a couple is integrated with the larger society, and mobile couples may have more children as a means of reintegration with the social class into which they have entered (Blau and Duncan, 1967). Alternatively, the *stress and disorientation* hypothesis suggests that social mobility, whether upward or downward, is associated with considerable stress and loss of social security leading to depressed fertility. The *status enhancement* hypothesis predicts a negative association between upward mobility and fertility. Westoff (1953) notes that the temperament to be mobile leads to a voluntary limitation of fertility because child bearing/ child rearing involves resources, both monetary and non-monetary, that could be otherwise used for attaining higher social position.

While all these hypotheses are valid, they are all uni-dimensional in terms of their understanding of the association between social mobility and fertility. Davis's (1963) theory of "multiphasic response" recognizes that the process of demographic change is far more complex- it is both "reflexive" and "behavioral". Reflexivity is reflected in that a change in one of the components brings about a change in the other components which in turn influences the component which induced the change in the first place. The behavioral aspect of the process of demographic change is reflected in the human decisions involved in the pursuit of various goals, including *the goal of getting ahead and appearing respectable* (Davis, 1963: 352). Or in other words, from the perspective of an individual, social mobility influences one's demographic decisions and behavior and family size could be restricted or expanded both in the interest of upward mobility as well as prevention of sliding down the social ladder (Demeny, 1974).

More recently, drawing from the latter perspective, Greenhalgh (1988) outlines what she terms as an “institutional” approach to the study of mobility- fertility linkages. It distinguishes itself by emphasizing subjective mobility aspirations as opposed to objective mobility. Not only that, it goes beyond the conventional emphasis in the literature on the occupational dimension of mobility and defines it broadly to include social, economic and political components. Furthermore, this approach sees mobility goals to be linked with another key objective that couples have, which is to enhance their security. As she puts it, security is “only the first step on the ladder of social advancement. Security and mobility form a goal hierarchy, or aspiration ladder, such that once security goals are satisfied, actors move on to pursue mobility goals” (Greenhalgh, 1988: 638). A couple’s fertility behavior is only among a sub-set of behaviors that they adopt to achieve a range of goals from security to mobility. Unlike previous theoretical formulations, this perspective emphasizes the (instrumental) values of children to parents/ couples in achieving the desired security-mobility goals. Finally, in addition to the mobility- fertility linkages at the individual level, it emphasizes the institutional structures that operate beyond the individuals, which provide the frame of reference for their particular goals and strategies.

Empirical research on fertility- mobility linkages

Empirical research has abandoned the earlier focus on factors as social isolation, stress and disorientation, status enhancement and relative economic status- as the main links between mobility and fertility; instead the theoretical perspective offered by Greenhalgh (1988) has gained greater currency. It is the latter approach that we draw

upon as well as modify further in our attempt to incorporate mobility into the discussion on the association between income and fertility outcomes.

Greenhalgh's (1988) institutional framework is useful in its emphasis on the *subjective dimension of mobility* and the *mediating role of institutions* in social mobility. Her cultural interpretation of mobility- fertility linkages, with its emphasis on culture- "the learned repertoire of beliefs and behavior patterns" (Greenhalgh, 1988: 638) along with the social, economic and political institutions in which individuals operate as providing the framework for both the security- mobility aspirations as well as their fertility behavior in any society, is a holistic approach than the previous one which focuses purely on the social- individual linkages. Additionally, by situating fertility within the cultural (and institutional) context of security –mobility goals, it provides a framework that can be applied to different societies; different time- periods within the same society (since the cultural-institutional complex in a society changes from time to time); and finally, different classes/ social groups within a society (because different social strata within the same society, such as rural and urban, may be faced with different cultural- institutional contexts).

An alternative framework for studying the fertility- mobility complex

However, while Greenhalgh's (1988, 1989) work is useful in providing us with the institutional frame of reference for individual demographic decisions and behavior and their association with mobility, it is difficult to translate her institutional approach into empirically verifiable hypothesis. Her own empirical investigation of the mobility- fertility complex in China is a narrative essay. Clearly, therefore, there is a need to recast

her approach to allow for a way in which it can also prove useful for quantitative analysis. In order to do so, we borrow from Coale's (1975) three necessary and sufficient conditions for a demographic transition to take place in a country/ community and propose the following alternative framework to study fertility- mobility linkages.

1. Mobility should be within the calculus of rational choice.

The social stratification literature suggests that the overall mobility structure varies across countries and there is evidence in the literature that fertility decisions vary according to the mobility experience of couples. Boyd (1973), for example, finds in her study of five metropolitan cities in Latin America that variations in fertility by mobility experience as articulated in terms of past and present career statuses of husbands in four cities- Bogota, San Jose, Panama City and Caracas. See also Kasarda, Billy and West (1986) and the studies cited therein.

Therefore in order to be associated with fertility outcomes, mobility must be within the calculus of rational choice among couples. Social mobility would be a factor in fertility decisions if and only if couples consider upward mobility to be achievable. This means that mobility has a lesser role in fertility decisions in hierarchical societies, which do not allow much scope for mobility.

2. Mobility should be desirable.

Not only should mobility be achievable, but it should also be desirable; in the sense that the costs of mobility (such as stress associated with the process of upward mobility or social isolation caused by the inability to integrate with the new social class at destination and loss of ties with the class of origin) for an individual (or a couple in the

case of fertility) should not be so high so as to outweigh its benefits. In her study, Boyd (1973) concludes that of the five cities in Metropolitan Latin America under study- Bogota, Columbia, San Jose, Costa Rica, Mexico City, Mexico, Panama City, Panama and Caracas, Venezuela, the absence of a significant relationship between mobility and fertility in Mexico City, which was the least economically developed of all cities under study, suggests that the disruptive effects of mobility may have been offset by the importance attached to family networks.

In further analysis Boyd (1973) argues that the evidence of a relation between mobility and fertility in developing countries- see Poti and Datta's (1960) study in West Bengal (India) and Hutchington's (1961) study in Brazil; and its absence in developed countries- Scott (1958), Berent (1952), Boggs (1957), Tien (1965), Westoff, Potter and Sagi (1963, 1961), Blau and Duncan (1967) and Featherman (1970)- is associated with the social structure in these two broad sets of countries. Her contention is that the social structure is more hierarchical and rigid in developing as compared to developed countries, with the result that social mobility is a far more stressful process in the former than the latter. One implication of the stress associated with the mobility process in developing countries is that it has an adverse impact on fertility level. Developed countries, on the other hand, have a relatively less hierarchical social structure and social mobility is more institutionalized and is, therefore, less stressful; with the outcome that socio-economic status has no significant association with fertility levels.

3. Means to achieve mobility must be available.

Given that mobility is within the calculus of rational choice as well as is desirable, means to achieve mobility must be available also. Not everyone may have equal access to opportunities to achieve mobility. A number of intervening factors mediate the process of social mobility so that the chances of mobility are not equally shared by all (Ganzeboom, Treiman and Ultee, 1991). Even claims of similar mobility patterns across industrial nations, as suggested for instance by Kuznets (1966), are not supported by empirical evidence. See, for example, Western and Wright (1994) for a comparative study of mobility in two north American countries- USA and Canada, and two Scandinavian countries- Norway and Sweden and Erikson, Goldthorpe and Portocarero (1979) for a comparative study of Sweden, England and France, among others. Within nations differentials in ability to achieve mobility is likely to vary across race or class or geographical locations. For example, in the US, Hertz (2006) finds that the rate of upward income mobility is far lower for African Americans. African American children who are born in the bottom quartile are nearly twice as likely to remain there as adults as are white children whose parents had identical incomes, and are four times less likely to attain the top quartile. Furthermore, these differences persist even after controlling for a host of parental background factors, children's education and health, as well as whether the household was female-headed or receiving public assistance.

It follows, therefore, that if there are differentials across social groups/ contexts in terms of their means to achieve mobility, the extent to which it is taken into account as a factor in fertility decisions is likely to vary across social groups as well. Hence, the third

condition for mobility to be a factor in fertility decisions is that not only should it be within the calculus of rational choice and be desirable, it should also be achievable.

This alternative framework while providing three empirically testable hypotheses on mobility- fertility linkages also retains useful features of Greenhalgh's (1988) institutional framework. One, by virtue of being empirically tested, they can be used to examine the association between mobility and fertility in *any* cultural contexts. Second, it allows investigation of the macro- micro linkages, an individual's chances of mobility are affected by the overarching institutional structures while fertility decisions and outcomes are at the individual level. The macro- micro linkages are most explicit in the third statement since it allows for differentials in access to opportunities of mobility across social groups and thereby, provides the scope to investigate if and to what extent mobility- fertility linkages vary across social groups.

In the subsequent sections, we discuss education and occupation mobility in the specific context of India. The rationale for focusing on India stems from the opportunity it provides to study a variety of situations ranging from the very poor to the very rich, the highly educated to those without any education, there is also considerable variations in terms of educational and employment opportunities. Additionally, we also highlight the role of subjective expectations about mobility. Our core argument is that education and occupation are markers of social status in India. Opportunities for mobility as evident from access to education opportunities are not equitable across various social strata/ income groups. There is also very little inter- generational occupation mobility and not all groups share similar optimism about mobility. Under these circumstances, we contend that the association between mobility and fertility outcomes will vary according to the

couple's mobility experiences and/ or their perceptions about mobility for themselves and their children.

“Fertility as mobility” in India: Role of Education

Discussion on social mobility in the Indian context is framed around the concepts of “westernization” and “*sanskritization*” (Srinivas, 1952). This discussion stresses that the strategies adopted for upward mobility involve the emulation of the practices, institutions and values of the dominant caste group in a particular region (or what has been referred to as “*sanskritization*”) as well as the adoption of “secular” or “western” values (or “*westernization*”). Acquisition of formal schooling is one of the ways in which “secular” or “western” values associated with Westernization can be imbibed.

In a more recent context of neo- liberal economic policies followed in the country over the last 20 years, Basu and Desai (2010) highlight the importance of educational investment as a vehicle for upward mobility for middle class parents with one child. While the above mentioned economic policies have generated rising opportunities and aspirations, they also necessitate the acquisition of good “quality” education to access these opportunities. However, given the poor quality of public education, most parents rely on private education to meet the demands of quality education. But private education is extremely prohibitive. In this scenario, limiting family size is the rational decision for middle class parents to maximize investment in the education of their children.

Pallikadavath and Wilson (2005) also reach a similar conclusion in the context of fertility among the disadvantaged castes (Scheduled Castes) for the state of Kerala. They note that contrary to national level trends among all caste groups in Kerala society

fertility is lowest for the most disadvantaged caste group. Vettuvan parents believe that the ideal family consists of 2 children- 1 boy, 1 girl. This strategy maximizes their chances of social mobility in the context of limited resources and a patrilocal stem family, with strictly partible patrilineal inheritance (i.e., all sons are expected to inherit on an equal basis and daughters marry out and become part of the households of their husband). While sons and daughters are both valued, their expected role towards social mobility is gendered- sons through a high status job and daughters through a “good” marriage. Education is essential to meet these twin objectives. But more than one son is not desirable because under the system of strictly partible patrilineal inheritance it will lead to division of already small landholdings while more than one daughter is likely to lead to difficulties because of the dowry burden it places on parents.

The above paragraph highlights the role of education as an instrument for social mobility, but there is also well- established evidence that access to education is nowhere near equitable in India. For instance, persons placed lower down the caste hierarchy as well as in the income scale do not have the same access to education opportunities as those occupying positions higher in the caste hierarchy or from economically well- off backgrounds. Similar evidence also exists in terms of differentials in rural- urban areas and regional locations. These differentials in access to education opportunities are reflected in differential educational outcomes across social groups and economic classes. Table 3 and Table 4 below from the India Human Development Survey, 2005 highlights this disparity in terms of various educational outcomes. While 71 percent of the forward caste children aged 8- 11 years in the survey could read, the comparable percent for Muslim, Scheduled Caste and Scheduled Tribe children was less than 50 percent. See

also Desai et al. (2010) and Drèze and Sen (2002) among others for evidence on disparity by caste, income and place of residence in other development outcomes.

[Table 3 and Table 4 about here]

“Fertility as mobility” in India: Role of Occupation and Occupational Mobility

Occupational rigidity in the Indian context is associated with caste affiliations, where in each caste is associated with specific occupations. Under this system, caste that are placed higher up the hierarchy are typically associated with occupations up the occupational hierarchy, while those down the caste hierarchy are associated with occupations lower down the hierarchy. Dalits or former untouchables were particularly assigned menial and manual occupations. Further, these occupations were passed from one generation to the next and there was little scope of mobility. Modernity is expected to weaken the traditional grip of caste on occupational mobility through three pathways outlined below.

The “liberal theory” of industrialism, as developed by various American theorists, holds that the chances of mobility are higher in industrial as opposed to pre- industrial societies (Kerr et al, 1960, 1973; Kerr, 1969, 1983; Dunlop et al, 1975; Parsons, 1960, 1967, 1971). Essentially a functionalist theoretical framework, this theory argues that industrial societies have certain distinctive characteristics that set them apart from traditional societies in terms of offering higher rates of social mobility. These distinctive features of industrial societies which aid social mobility can be usefully thought of as either structural or processual or compositional (Erikson and Goldthorpe, 2008: 437).

One of the key structural features of industrial societies is technology.

Technology in industrial society is not only advanced vis-à-vis pre- industrial ones, but is also changing rapidly. Advancing and rapidly changing technology makes three- fold claims on the structure of social division of labor: it calls for highly differentiated division of labor and continuous and rapid changes in the social structure of division of labor, which manifest itself in high rates of mobility both across generations and within one's lifetimes. The best empirical evidence of such high rates of mobility is perhaps in the declining share of active population in agriculture and a corresponding increase in their share in the manufacturing and services sector of the economy during initial stages of development. As the economy develops further and with rapid technological advancement, this trend intensifies- employment in the manufacturing and services sector grow rapidly and there is an even greater emphasis to upgrade skill levels (Kuznets, 1966). Thus, though some skills are rendered obsolete with economic development/ modernization, one can expect that the overarching trend in an industrial society is of an increase in the number of jobs and occupations requiring sophisticated skills with the net result that upward rather than no or downward mobility is more likely both from an inter- generational and a work- life perspective.

In contrast to the above economic rationale behind greater upward mobility in industrial versus pre- industrial society, there is also a sociological explanation which emphasizes the shift away from ascription (caste in the Indian context) towards achievement with industrialization. Here the argument is that unlike in pre- industrial societies where one's social origins (as, for example, denoted by the kinship ties into which a person is born) is strongly associated with one's eventual position in life, in

industrial societies the achievement of an individual, most important of which is the educational achievement, plays an important role. The increasing demand for qualified personnel means in industrial societies means what a person can “do” is emphasized more than what s/he is born into. It is this emphasis on “merit” rather than the previously restrictive emphasis on ascribed status that provides individual in industrial societies as compared to traditional ones more chances for upward mobility.

Finally, there is a compositional effect that aids upward mobility in industrial society. The expansion of the economy is associated with an increasingly important and rapidly expanding role of the manufacturing and services sector; both of which require personnel with specialized skills and therefore, an increasing emphasis is placed in these sectors on educational achievement and/ or occupational degrees. While the role of the manufacturing and the services sector expand, the role of the agricultural sector- where a greater emphasis is placed on kinship based networks- diminish. This compositional change associated with an expanding manufacturing and services sector and a shrinking services sector too aids upward mobility in industrial as compared to pre- industrial societies.

Theoretical frameworks outlined above leads us to expect a high degree of mobility in modern India, but this is not borne out by empirical evidence. Recent discussions using survey data (Kumar et al, 2002a) finds that majority of the sample retain the same profession as their fathers (67 percent). Upward mobility is experienced by around 19 percent of the sample, 7 percent experienced downward mobility and another 7 percent experienced horizontal movements. Jhilmam and Mazumdar (2011) similarly find limited occupation mobility- about 13- 14 percent of their study sample

was upwardly mobile in 2004. Furthermore, there has been little change over time. Driver (1962) using data from interviews with 1 percent of the male heads of households in Nagpur district concluded that inter- generational occupation mobility is frequent but confined to occupations of similar rank. Kumar et al (2002b) analysis comparing inter- generational mobility in 1971 with 1996 corroborates limited mobility, though such mobility was somewhat greater in 1996 (71 per cent remained in their father's occupation) than in 1971 (75 percent remained in their father's occupation).

There is also evidence that education mobility across generations has not manifested itself into inter- generational occupation mobility. Jhila and Mazumdar (2011) find in their study that about 48 percent and 56 percent of children in 1993 and 2004 have higher educational levels than their parents. The corresponding percentages for upward occupational mobility are 9 to 13 percent in 1993 and 11 to 15 percent in 2004.

“Fertility as mobility” in India: Role of Subjective Expectations

This line of reasoning draws from a strand of literature in economics which suggests that parents who have higher subjective expectations about returns from education, which may differ substantially from actual returns from education, are more likely to make investment in the education of their children (Jensen 2010; Attanasio and Kaufmann, 2009; Nguyen 2008).

Maertens (2011) based on child level data collected from three villages in Maharashtra and Andhra Pradesh suggests that not every parent has an idea about the potential return from education. The probability a parent has some idea of returns to education is associated positively with information received from media and schools,

number of educated people known and the parent's own education. Among parents who had some idea of the returns from education, expectations with regard to the returns for their own children's education differ by region, gender of the child and caste. Girls and persons belonging to SC/ ST communities are expected to earn less.

Additionally, social customs too influence the perceived returns from education. In the South Asian context, the practice of exogamy and early marriage reduce parental incentive in making educational investment in their daughters (Foster and Rosenzweig, 2001; Field and Ambrus, 2008).

Research Questions

In this dissertation, we exploit the alternative framework outlined above to analyze income- fertility linkages under the overarching framework of mobility in the Indian context. We use the Indian context because the mobility structure can *only* be context specific.

Using empirical data from the India Human Development Survey (2005), we examine the association between income and fertility outcomes and the extent to which the association is modified when we take into account dimensions of a couple's mobility experiences and aspirations. The research questions are thus stated as follows:

R1: What is the association between income and fertility outcomes in India?

We have highlighted in the previous paragraphs the role of education and high status jobs in the process of social mobility. Our second research question, therefore,

investigates the role of these two markers of social status as well as instruments of social mobility in modifying the income- fertility relationship.

R2: To what extent is the association between income and fertility outcomes in the Indian context due to the association between income and two markers of social mobility viz., educational attainment and occupational status?

The previous section highlights the role of subjective expectations in motivating investment in children's education, differential access to "quality" educational opportunities and limited occupational mobility in the Indian context. Our third research question, therefore, examines the role of institutional context in modifying the fertility-income relationship.

R3: To what extent the institutional context of mobility modifies the mobility-fertility relationship through their influence on the prospects of attaining social mobility?

Research Questions stated as Hypotheses

These overarching research questions have been further broken down into the following testable hypotheses.

H1: In absence of controls, income is negatively associated with fertility.

H2: The relationship between income and fertility is at least partly due to the link between income and social mobility and hence, the income coefficient will decline with the addition of factors associated with mobility such as education and occupational status.

H3: The relationship between income and fertility will be weaker in areas where:

- a. greater investment is required in the form of educational expenditure to ensure mobility.
- b. mobility potential is greater.

Rosenzweig and Wolpin (1980) study in India with twins as a means of identification found that family size (as induced by birth of twins) has a negative effect on children's educational attainment in a small sample (25 twins in approximately 1,600 children). This study suggests that there is evidence that the Beckerian quantity- quality tradeoff holds in the Indian context (H1).

Our contention is that higher the level of education of couples (we are particularly interested in the education of men), greater will be the willingness to invest in the education of their children, even after controlling for income. We hypothesize that an individual's educational attainment is a marker of both an *aspiration* for and an *experience* of social mobility. We have highlighted that one of the roles of education in the process of social mobility is in terms of access to high status occupations (Pallikadavath and Wilson, 2005)- high educational attainment is necessary to access high status occupations. Because presumably these couples have themselves experienced the mobility that education offers in terms of access to high status occupations, they will also be willing to invest in the education of their children. Additionally, in the context of rapid privatization of education and excessive reliance on homework, those with higher education are able and willing to invest in their children's education (Leibowitz, 1974).

We hypothesize that occupations higher up the occupational hierarchy will have the lowest fertility levels. The highest occupation in the occupational hierarchy are

professionals, professionals are expected to have the lowest fertility (Abu- Lughod, 1964, Kahl, 1968). Here too the reasoning is similar to that of level of education. Professionals are likely to have acquired skills through formal education, which in a modern society qualifies them for better jobs. Other occupation groups in contrast are most likely to acquire skills either through informal apprenticeship and/or they inherit land or family business/ proprietorship. By virtue of being at the top most end of the occupational hierarchy, professionals are most likely to be willing to invest in the education of their children so that either they retain their occupational status across generations or they move further up the occupational hierarchy from lower- end professionals (for example, clerks) to upper- end professionals (for example, doctors). Moreover, they are in the best position to ensure that their children get high quality education and have social networks that will ensure higher paying jobs. In sum then, their own experience of being at the top of the occupation hierarchy as well as their desire to ensure that their children are professionals is reflected in their willingness to invest in the “quality” of their children via educational investment.

At the other end of the spectrum, we expect fertility to be highest among farmers and/or laborers. As an occupation group, they are a binary opposite to professionals. They are likely to have had very limited formal education, their skills are based on informal apprenticeship and their chances of securing a job in the modern economy is limited. Their own experience of upward mobility is limited and they do not hold much hope of upward mobility for their children as well. Under these circumstances, they have little incentive to invest in the formal education of their children and therefore, they are not faced with the “quantity- quality” dilemma to the same extent as professionals. Indeed, it

may be “rational” for them to have more children since they can be expected to contribute to family income from an early age (Caldwell, 1976).

Our third hypothesis deals with the institutional context of mobility- as defined by the amount of educational investment, availability of educational and employment opportunities and the ways in which it shapes mobility aspirations. We hypothesize that the overall context of educational expenditure indicates the willingness to invest in children’s education 1) partly because public school systems are so inadequate that private education and private tuitions are required and 2) partly because extra educational investment is perceived to be necessary (either in the form of private schooling or private tuitions) to gain a competitive edge in India’s growing but highly competitive economy (Hypothesis 3a). The latter in turn relates to mobility aspirations of parents for their children. We have noted in prior paragraphs that occupations are a marker of social mobility and the instrumental role of education in accessing occupations higher up the hierarchy. We contend that even when households do not themselves incur a large expenditure on education, the fact that they reside in a context where there is on average a high expenditure on education is likely to influence their perceptions about the value and need for education investment, including the potential social mobility benefits from investing in the education of their children. Couples residing in these areas are likely to be conscious of the need to invest in the “quality” as opposed to “quantity” of children and therefore, will have lower desired and actual fertility.

Following similar lines of reasoning, availability of education and employment opportunities influences the mobility aspirations of all in a community. Such an institutional context creates a climate where even those who have not experienced

mobility themselves perceive a chance of mobility for their children that come from access to education opportunities and availability of employment opportunities and hence, find a rationale for investing in the quality vis-à-vis quantity of children (Hypothesis 3b). In other words, in areas with access to education and employment opportunities, the association between fertility outcomes and levels of income is further weakened.

Table 5 below summarizes our hypothesis in terms of the direction and strength of the association between income and fertility outcomes.

[Table 5 about here]

Conclusion

Chapter 2 has outlined the theoretical framework which forms the backdrop to our dissertation. Subsequently, we have also stated the research questions and the hypothesis that we propose to examine in this dissertation. We hope we have successfully demonstrated in this chapter the theoretical contribution of this dissertation to the literature on income- fertility relationship by bringing into the picture the context of social mobility. Our contribution to the literature is also in terms of modifying Greenhalgh's institutional framework for fertility- mobility analysis to one that is amenable to quantitative analysis, while at the same time retaining all the useful features of her framework. We proceed in the next two chapters to describe the data we use to test our hypothesis (Chapter 3) and present empirical evidence on our hypothesis (Chapter 4).

Chapter 3

Data and Methods

In the previous chapter, we stated our research question and hypothesis. This chapter discusses the data; the dependent, independent and control variables and outlines the research methods and designs.

Data

In order to carry out our analysis, we use household survey data, India Human Development Survey (IHDS, 2005). IHDS is a multi- topic survey of 41,554 households across 33 states and Union Territories in India, only the small island states of Andaman and Nicobar & Lakshadweep are excluded. Of a total of 593 districts (Census of India, 2001) in India, 383 were included in the sample. The number of villages in the sample is 1,504 and the number of urban blocks is 970. The sampling procedure adopted in the survey aimed to ensure a nationally representative sample (Desai et al., 2009). The districts were selected using stratified random sampling to represent a range of socio-economic conditions. Villages and urban centers and households were selected using appropriate population proportional sampling techniques. Table I in the Appendix gives district wise coverage of total, rural and urban sample in IHDS.

One way to assess the overall representativeness of IHDS is to compare it with the census data and other nationally representative surveys as the National Sample Surveys and National Family Health Surveys. Table 6 below compares some of the key variables in IHDS with other national surveys (Desai et al., 2010, p. 220).

[Table 6 about here]

The comparative distribution of the IHDS sample with other national surveys and census confirms the robustness of IHDS data. The IHDS sample distribution is consistent with distribution from other surveys on most of the variables presented in the table. This is especially true for certain key variables measuring individual or household characteristics like percent literate, residence, religion and caste. With respect to other variables differences could either be on account of wording of questions (such as percent of households owning TV, LPG use, using electricity) or due to special efforts made in IHDS vis-à-vis other surveys to collect data on certain variables (such as work participation rate for women).

A wide array of topics including sources of income, consumption expenditure, education and health have been covered in IHDS for a sample of 41, 554 households. Additionally, it asks 33,482 ever- married women in ages of 15- 49 years questions pertaining to their fertility behavior and history. While collection of fertility data in India is not unusual in itself since other nationally representative household surveys and even the census collect detailed fertility data, the uniqueness of the IHDS (2005) is in terms of the additional household (such as caste and assets) and individual- level (such as education and income) information it collects that helps us to study the correlates of fertility outcomes or decisions.

Sample

The analytical sample is restricted to *married men* who are *above 18 years* but *less than 59 years* whose wives were interviewed in the survey (N= 31, 419). Most

studies of fertility outcomes have focused on married women, but we choose to restrict our sample to married men. This allows us to examine the relatively less investigated role of men in fertility outcomes (Goldscheider and Kaufman, 1996; Forste, 2002). Further given that a small proportion of the Indian women are in the labor force (Desai and Das, 2004), it seems reasonable to focus on a men's occupation in a study examining the role of occupations in modifying the income fertility relationship in India.

The primary reason for restricting the sample to *married* men is that almost all fertility in India takes place within marriage. This is also the reason behind an upper age limit of 59 years for men in the sample. The maximum age of women in the sample is 49 years, assuming a maximum age gap of 10 years between husband and wife, it seems reasonable to restrict the maximum age for men to 59 years. We restrict sample to married men who are above 18 years of age and whose wives were interviewed. Those below 18 years are simply too young for a study on fertility outcomes (the legal age at marriage is set at 18 years for women and 21 years for men). Table 7 illustrates the loss in terms of sample size with the above restrictions.

[Table 7 about here]

We recognize that this limits our sample- 16, 311 women of reproductive age who either do not have husbands or do not have husbands of ages 15 to 49 are excluded. But given our focus on the linkages between social mobility experience and aspirations and childbearing, we believe this is a justifiable exclusion.

Table 8 presents descriptive statistics analogous to the one presented in Table 6 for two groups of men- men in the study sample versus men excluded from the analytical

sample and two groups of women- women in the analytical sample and women in the reproductive ages who are not in the study sample.

[Table 8 about here]

Table 8 shows that men in the study sample (N= 31, 419) are comparable to men in the study age range but excluded from the analytical sample because their wife were not interviewed in the household survey (N= 12, 134) on demographic characteristics as percent literate and caste/ religious background. There is also considerable similarity with respect to access to amenities as electricity, flush toilets and use of LPG.

But there are differences between the two samples as well, which probably relate to the fact that men in the excluded sample are more likely to reside in joint households and hence, their wives were not interviewed in the household survey (IHDS only interviewed one eligible woman in the households studied). Thus, the latter have a larger household size (7.92) than the study sample (5.62). This also explains as to why the excluded sample tend to belong to households that tend to be poor (3 percentage point difference) and are located in rural areas (6 percentage point difference). Work participation rate is higher in the study sample (94.33) than in the excluded sample (88.80), a 4 percentage point difference. The excluded sample also has a lower access to piped water (5 percentage point difference) but has a higher ownership of TV (3 percentage point difference). But these differences are not large and because the study and the excluded sample are similar on other key characteristics, we proceed in our study without making any weight adjustment for the excluded sample.

There are fewer differences between women in reproductive ages who are and are not included in the sample. Women in the analytical survey mostly report the same background characteristics as men because they live in the same household and traditionally women after marriage belong to the same caste and religious community as their husbands'. As expected they report lower literacy and work participation rates. Women in reproductive ages who are not in the study sample also report a profile similar to their counterparts who are part of the sample. However, because most of these women are between the ages 15- 18 and still in school, we find that the excluded sample reports higher literacy rate and lower work participation rate.

Dependent variables

We use two alternative measures of fertility so as to take into account both the demand for children (fertility preferences) and the supply of children (fertility behavior). Ideal number of children is a measure (albeit imperfect) of demand for children in two ways: among young couples or those who have not been married for a long period of time, it allows us to measure their fertility goals since their current family size is not a reflection of their true fertility objectives. At the other end, for older couples (even though there is a tendency to ex- post rationalize the presence of existing number of children) who have either under or over achieved their fertility goals, it allows us to measure their true fertility goals. Current number of children because it reflects actual fertility is a measure of supply of children.

Apart from capturing the entire gamut of fertility behavior in terms of demand for and supply of children, the two measures of fertility also make it plausible to see if there

is any modification of fertility behavior over time. For example, based on one's life experiences a couple may revise their estimation of ideal number of children. In such instances, focusing on one of the measures of fertility will fail to give us an accurate picture of the linkages between mobility and fertility.

IHDS allows us to measure both fertility *preferences* and fertility *behavior*. In this dissertation, we use the total number of desired children (FP5). Current number of children is calculated from the fertility history of woman respondent recorded on page 26 of the Education and Health Questionnaire.

However, while the measurement of current fertility is straightforward, the measurement of ideal or desired fertility poses a challenge to demographers. The fundamental critique is that there may be no real difference between desired and actual fertility but that the concept of a gap between these two measures is an artifact of survey measurement or data analysis (Casterline and Sinding, 2000; Pritchett, 1994). For couples at the end of their reproductive cycle desired fertility preferences may be a reflection of modern norms. Yet another point of concern is that each of the possible measures of desired fertility has their own validity problems. For instance, World Fertility Surveys (1972- 1984) measured desired fertility in terms of wantedness of the previous birth. Subsequent longitudinal survey data, however, shows a tendency to ex-post revise estimates in favor of wantedness of existing children (Bankole and Westoff, 1998).

Nevertheless, the validity of the concept of a gap between desired and actual fertility is now well- established (Pritchett, 1994) and in this dissertation we proceed to measure ideal number of children from the woman respondent's answer to question 20.5

in the Education and Health Questionnaire on page 28. Question 20.5 asks the respondent the following:

“If you could go back to the time you did not have any children and could choose the number of children to have in your life, how many would that be?”

This line of questioning is similar to that used in Demographic and Health Surveys though IHDS does not allow for a non-numeric option “up to God”. The responses are disaggregated in terms of ideal sex composition of the desired number of children, but for the purposes of this dissertation we use total number of desired children. While the shortcomings associated with this measure are well known- there is a tendency for ex- post rationalization of current fertility and child mortality risks are not explicitly recognized (Bhushan and Hill, 1995), the question works well because it is simple and easy to understand.

The other question in IHDS useful for measuring desired fertility is the willingness to have additional children, which did not work for our purposes because it was asked to women only if they were not currently pregnant.

Key independent variables

Log of personal income

The first hypothesis (H1) in Chapter 2 states that in the absence of controls, income is negatively associated with fertility. We use log of personal income as the key independent variable to test this hypothesis.

Instead of asking households to report their annual income, IHDS collects information on various possible sources of income- net farm income (Section 4 of the household questionnaire), income from wages and salaries (Section 6 of the household questionnaire), net family business income (Section 7 of the household questionnaire), property and pension incomes (Section 8 of the household questionnaire). This information is then used to compute a composite measure of personal income for each of the household members who reported working in either of the above mentioned activities. Farm income, for instance, is divided among different members of the household based on hours they reported working on the farm. In keeping with standard econometric techniques, we use log of personal income rather than its actual value in the regression models.

Importantly, we use current income as a proxy for income at the time of childbearing. However, given the context limited income mobility for majority of the population in India (Drèze, Lanjouw and Stern, 1992), current income provides a good proxy for income at the time of birth.

Because IHDS is the first major national survey to report a measure for income, there is no available national estimates of comparisons of income and fertility outcomes. National Family Health Survey (NFHS) provides estimation of fertility levels by wealth index. Simple cross tabulation using NFHS- III confirm the expected negative association between the wealth index and fertility level. Couples higher up the wealth ladder have on an average lower desire for additional number of children than those in the lower quintiles.

[Table 9 about here]

Men's years of education

The second hypothesis in Chapter 2 (H2) states that the relationship between income and fertility is at least partly due to the link between income and mobility and hence, the income coefficient will decline with the addition of factors associated with mobility such as education and occupational status. We thus have two independent variables here- level of education and occupation status.

Education in IHDS is recorded in terms of years of education completed on page 17 of the household questionnaire, with 15 years indicating college degree or more.

Question 10.5 asks the respondent the following:

How many standard years has [NAME] completed?

Table 10 compares desire to stop childbearing by number of living children for men and women with different education background. Unlike previous National Family Health Surveys, NFHS-3 is unique in that both men and women are asked questions about desired fertility. NFHS- 3 confirms a negative and linear association between education and fertility level. For example, the percent of men who have 1 child and would not want to have any more children increases from 23 percent for illiterates to 37 percent among those with 12 years or more years of education. The corresponding percentages for women are 21 percent among illiterates and 39 percent among college educated.

[Table 10 about here]

Occupation groups

Hypothesis 2 in Chapter 2 states that occupation status modifies the fertility-income relationship.

Occupation of household members in IHDS is not recorded through a single question. Rather it is based on the member's participation in different possible income earning activities in the year preceding the survey. A respondent is assigned an occupation depending on his/ her income source. The survey collects information on the following sources of current income- agriculture (Section 4 of the household questionnaire), income from wages (agricultural and non- agricultural) and salaries (Section 6 of the household questionnaire), and finally, business (Section 7 of the household questionnaire). Thus, a respondent is classified as a farmer if (s)he reports working on the family farm in the year preceding the survey. Collection of data on multiple income sources also gives the option to a respondent to report multiple income activities. For example, a person in rural India may have combined work on his/ her own farm with either or both agricultural and (or) non- agricultural labor. In cases (around 5 per cent of the sample) where an individual has reported multiple jobs (and hence, occupation), we have taken the job that contributed the highest to household income into consideration.

Occupations are recorded in two-digit codes, which are the same ones adopted by the office of the Registrar General and Census Commissioner at the time of 1991 census. These codes range from 00 to 99. Since 99 occupation categories is not feasible for comparative purposes, we have collapsed them into five main occupation groups-

professionals, businessmen, farmers, laborers and others. See Appendix Table II for the detailed census occupation classification and how they have been collapsed into 5 occupation categories.

A study in Bangladesh (Bhuyan, 1996) found that laborers had highest average ever born children (4.19), followed by agriculturalists (farm owners or cultivators) (3.24), businessmen (1.71) and finally, those in service (1.97). Analysis of fertility behavior by occupation of father from Egypt (1947) found only one occupation group consisting of professionals- engineers, doctors, officers and technicians- had fewer children than other occupational groups. There was no significant difference in terms of number of children among other occupation groups (El- Badry, 1956 as cited in Abu- Lughod, 1964). On the other hand, Kahl's 1964 comparative study of ideal family size among Brazilian and Mexican men found that ideal family size is highest for low manual occupations. The study (Kahl, 1968) found that on average sons of "high non- manual workers" had completed secondary education and nearly 50 percent of the sample had even higher levels of education. The corresponding averages for sons of "low manual workers" and "high manual workers" were incomplete secondary and "low manual workers" was incomplete primary. This also suggests that among all professional groups the dilemma posed by the "quantity- quality" tradeoff in fertility decisions is most severe for the professionals; and they are likely to have fewer children so as to be able to invest in their education.

There is comparatively little information from Indian secondary sources on fertility differentials across occupations and much of it is dated. Nevertheless, they do confirm difference in fertility levels by occupation categories. Rele (1963) notes that

according to the Sample Census of Births and Deaths, Uttar Pradesh, 1953- 54, the completed fertility for women aged 45 years and more is 5.63 for agricultural laborers, 6.14 for agricultural land holders and tenants, and 6.31 for non- agricultural laborers. In his own study in rural parts of Uttar Pradesh, he finds that occupation and caste interact with each other to produce fertility differentials. Brahmins or Kshatriyas in agricultural occupations have higher fertility as compared to men in agricultural occupations belonging to other castes/ religious groups. Rele also notes that the proportion of landowners among those who are in agricultural occupation is higher for Brahmins or Kshatriyas than other groups. When the occupational composition of all household members is considered, the fertility in household with all working members in agriculture is lower than those in which either or some of the members are in non- agriculture.

Expenditure on education as a proxy for investment on child quality

Hypothesis 3a in Chapter 2 states that in areas where education costs are higher, the quantity- quality tradeoff associated with increases in household income levels will be weakened. In order to test this hypothesis we categorize states into three categories- high, medium and low- according to the average expenditure on education. This categorization allows us to capture if residence in states with high education expenditure levels as Kerala as compared to low expenditure states as Bihar creates a context of willingness to invest in the “quality” of children, after controlling for income, education, occupation and other background variables. The rationale for choosing states as opposed to districts or villages as the unit of analysis when the dependent variable is the overall average expenditure on education is that there are likely to be greater inter- state variations in terms average expenditure on education as opposed to variations among districts or

villages within a state. This is probably because under the Indian constitutions states as opposed to districts/ villages can legislate on education, which affects the availability and cost of education services within the entire jurisdiction of a state.

The IHDS collects information on three categories of education expenditure- expenditure on school fees, private tuitions and miscellaneous expenditures as books, school transportation and school uniform (page 5 of the Education and Health Questionnaire). These three expenditures have been added to compute the total expenditure on education. The average expenditure for all children in the IHDS sample who report expenditure on education is Rs. 1926.14/-. Highest average expenditure on education is reported in Punjab at Rs. 4166.90/- while the lowest average expenditure is reported in Assam at Rs. 944.03/-. Average education expenditure by states is given in Appendix Table III. We use this information to categorize states by levels of total expenditure on education. The high expenditure states are those where the average household expenditure on school fees is Rs. 3000/- and above. Himachal Pradesh, Haryana, Punjab, the North- Eastern states (barring Assam), Kerala and Jammu & Kashmir are in this category. The low expenditure states with average household expenditure on school fees below Rs. 2000/- are Uttar Pradesh, Bihar, Jharkhand, Rajasthan, Chattisgarh, Madhya Pradesh, Assam, Orissa and Maharashtra (including Goa). The remaining states are medium expenditure states with average expenditure on education between Rs. 2001/- and Rs. 3000/-.

[Table 11 about here]

Control variables

We now proceed to elaborate on each of the control variables we use in the regression models. We briefly discuss the rationale for including the particular variable as a control in the analysis, the expected direction of relationship with the outcome variables and how they have been measured in IHDS.

Caste/ religious background

There are well- documented differences in demographic, education and health outcomes by religious groups in India. For example, compared to Hindus, Muslims have higher infant and child survival rates, child sex ratios, life expectancy, and maternal mortality (Government of India, 2006), but have lower literacy rates. These empirical evidences of differences support the control for couple's religious background in an analysis of their fertility behavior.

Caste system has been the organizational principle of the Indian society for centuries; and a priori fertility differential among the various caste groups is to be expected. Moreover, while the concept of caste originated within Hinduism, it has permeated as a principle of social organization to other religious groups as well. Caste groups that have been historically discriminated such as the former "untouchables" have on an average worse demographic, education and health outcomes vis-à-vis the more privileged caste groups (that is, castes traditionally marked to be on the upper end of the hierarchy).

The IHDS uses an eight- fold classification of caste/ religious background: Brahmins (reference category), OBC (Other Backward Castes), SC (Scheduled Castes),

ST (Scheduled Tribes), Other Upper Castes, Muslims, Christians and Other Minority Religions. This eight- fold classification allows for persons from religious groups other than Hinduism to identify with any caste groups, if they so wish. While this approach is useful because it takes into account that caste as a mechanism of social organization exists in other religions as well, a detailed examination of fertility trends by these caste categories is complicated because post- independence censuses and other survey reports do not use the same caste classification- particularly, Brahmins are not classified as a distinct group from the upper castes nor do they give other minority religions the option to identify their caste affiliations. But pre- independence estimates suggest that Brahmins have lower levels of fertility than the rest of the population (Davis, 1946). Based on this evidence and national level estimates presented in Table 12, we expect fertility levels to be lowest among the Brahmins and highest among the Muslims, followed by SCs. We also expect that other minority religious groups have fertility levels lower than or equivalent to the Brahmins.

[Table 12 about here]

It must be noted though that there is considerable state level variations from the national level trends. For example, as per estimates from NFHS II the fertility among the SC population in Kerala is lower (1.52) than that recorded for the state as a whole (1.96). NFHS III confirm these figures- fertility rate for women who do not belong to SC/ ST/ OBC at 2.2 children is higher than for women belonging to SC and OBC (at 1.3- 1.7 children). A similar observation is also true for the Hindu- Muslim fertility differential- Muslim fertility in some states as in Kerala (1.5) is lower than the All- India fertility (2.68) (IIPS, 2005).

Wife's age

Fertility is, of course, negatively associated with women's age. It is also necessary to control for women's age to take into account that younger women are not likely to have realized their ideal fertility; while levels of actual fertility for older women may not reflect their desired fertility.

Current residence

It is generally acknowledged that fertility in urban populations is typically lower than in rural ones. Broadly speaking, various structural factors and cultural norms in rural communities can be thought of as conforming to the high fertility patterns characteristic of pre- industrial societies while those of urban communities to the low fertility levels characteristic of societies experiencing demographic transition or of post- industrial societies. Factors that contribute to higher fertility in rural areas include higher levels of infant mortality (and therefore, the need to offset it with high levels of fertility), predominance of subsistence agriculture (and the greater demand for children to carry out agricultural work), lower levels of education (which is inversely related to fertility through various pathways such as higher costs of rearing children and a greater emphasis on "quality" as opposed to "quantity" of children, lower infant mortality on account of better health and sanitation knowledge/ practices, greater knowledge of contraceptive methods, greater chances of paid non- agricultural employment and therefore, higher opportunity cost of mother's foregone income, delayed age at marriage, etc.), prevalence of cultural norms as universal marriage, emphasis on children as a source for old age support and as a means to fulfill various filial duties/ obligations.

Evidence from India on rural- urban fertility differential conforms to the expected differential in rural- urban fertility pattern. According to various rounds of the National Family Health Survey, the Total Fertility Rate (15- 49 years) is 3.64 for rural areas and 2.70 for urban areas in NFHS- I (1990-2); 3.06 and 2.27 for rural and urban areas respectively in NFHS II (1996- 8); and 2.96 and 2.06 for rural and urban areas respectively in NFHS III (2003- 5).

In addition to rural residence, residence in urban areas can be divided into two further categories- residence in metro cities and in other remaining urban areas. We expect fertility level to be lowest for couples residing in metro cities, followed by other urban areas and rural areas. We distinguish between metro cities and other urban areas because compared to other urban areas, metro cities (Mumbai, Kolkata, Delhi, Chennai, Hyderabad and Bangalore) enjoy better standards of living, opportunities for female employment are greater and there is greater acceptance and use of contraceptive methods; raising the costs of child rearing and child bearing and reducing the demand for children. Data from IHDS confirms this hypothesis (Desai et al., 2010). Of the households in metro cities, 90 percent have access to electricity for 18+ hours in a day; the comparative statistic for other urban areas is 69 percent. Fewer women in metro cities as compared to other cities are married before the age of 18 (38 percent versus 47 percent). Under- 5 mortality is 31 per 1000 in metropolitan cities; whereas in other urban areas it is 56 per 1000.

Ordered logit models

In order to test Hypothesis 1 through Hypothesis 3a (refer Chapter 2), we use ordinal logit regression models since the dependent variable is ideal number of children and current number of children. We run step- wise regression models, where we introduce the key independent variable in the first model and examine how its effect on the dependent variable is mediated with the addition of controls in the subsequent models.

Model 1 is the first model, with just log of personal income as the independent variable. We expect it to be negatively and significantly associated with fertility outcomes as per our expectations stated in Hypothesis 1.

Model 2 adds background control variables as caste, wife's age and current residence in the model. While still negative and significant, the coefficient for log of income in Model 2 is expected to be smaller than the coefficient in Model 1. Model 3 adds men's years of education. As per Hypothesis 2, we expect the coefficient for log of income to be still smaller than in Model 2. Finally, Model 4 is the full model- it introduces men's occupation in the model. Following Hypothesis 2, we expect the coefficient for log of personal income to be the smallest in Model 4.

[Table 13 about here]

We run another set of regression models with men's current state residence as the key independent variable in order to test Hypothesis 3a. In this instance, Model 1 is the same as Model 4 in Table 13 with the exception that for the sake of parsimony professionals and businessmen are combined together in one category while farmers,

laborers and others are combined together to form the reference category of “non-professionals”. The results in Model 1 are, therefore, expected to mirror those in Model 4 in Table 13.

In Model 2, we introduce a variable which categorizes couple’s residence into low, medium and high expenditure states in terms of their expenditure on education. Model 3 is the full model with the interaction of couple’s current residence categorized in terms of high, medium and low expenditure states and men’s occupation. The interaction term helps us to capture the extent to which the overall context of high expenditure on education creates a climate in which even couples who do not necessarily have the resources to be able to spend on education (that is, the men are non- professionals) are aware of the need for greater investment in children and therefore, have fewer children.

Following the reasoning of Hypothesis 3a, the association between log of personal income and fertility outcomes is expected to progressively reduce in size as we introduce the key independent variable in Model 2 and the interaction term in Model 3. We also expect fertility to be lowest in the high expenditure states, followed by the medium and low expenditure states. Compared to non- professionals in medium and low expenditure states, non- professionals in high expenditure states in Model 3 will have lower fertility. We expect fertility to be highest among non- professional in low expenditure states.

[Table 14 about here]

Hierarchical Linear Models

Hypothesis 3 in Chapter 2 states that the relationship between income and fertility will be weaker in areas where mobility potential is greater.

In order to test this hypothesis we introduce a set of hierarchical linear models, in which individuals are nested within villages/ districts, to assess how employment and education opportunities influence overall fertility levels. We contend that couples in communities that have better employment and schooling opportunities are likely to perceive better chances of mobility for their children and therefore are likely to opt for smaller families to be able to make the desired education investment necessary to access them.

We estimate two- level hierarchical linear model using the statistical software HLM. We estimate a village level model for each of the dependent variable- desired and actual fertility- that incorporates village level data from the census and IHDS (2005). A second set of models separately for rural and urban areas of a district incorporate census information on districts. Given that districts and villages are distinct administrative units in India as well as that villages and districts (including rural parts of a district compared to its urban parts) often reflect distinct social, cultural and historical realities, they form a convenient unit of analysis at the community level (Desai and Andrist, 2010). The HLM analysis is based on an unweighted sample because the IHDS sample was selected in a stratified design in which states and districts were the main axis of stratification and the use of hierarchical linear model already incorporates the stratification design.

There are 15,895 men at Level 1, and 1,417 villages at Level 2 and 15, 891 men at Level 1 and 265 rural and urban districts at Level 2.

[Table 15 about here]

We start with a baseline model with no covariates (Model 1). This model simply allows us to partition variance between villages/ districts (alternatively communities) and couples within a village. Background characteristics of men are introduced in Model 2 to provide a basic description of variation in fertility at the couple level. Model 3 through Model 6 introduces a new Level 2 variable each time while dropping the previous Level 2 variable from the model, so as to help us see the extent of reduction in Level 2 variance with the addition of each new variable in the model. Model 7 is the full model that combines all the Level 2 variables from Model 3 through Model 6.

Stylistically, we estimate the following model in which the first equation models fertility outcomes at the level of the couple and the second equation models district-level intercepts:

$$Y_{ij} = \Pi_{0j} + \Pi_{1j} \times X_{1ij} \dots \Pi_{nj} \times X_{nij} + \varepsilon_{ij}$$

$$\Pi_{0j} = \beta_0 + \beta_{1j} \times Y_{1j} \dots \beta_{mj} \times Y_{mj} \times \varphi_j,$$

where Y_{ij} represents fertility outcomes for a couple i in district j ; Π_{0j} is the intercept for district j ; $X_{1ij} - X_{nij}$ represents the 1 to n characteristics of a couple i in district j that influence their fertility outcomes; $\Pi_{1j} - \Pi_{nj}$ represents the corresponding Level 1 coefficients that indicate the effect of characteristics $X_1 - X_n$ on fertility outcomes; ε_{ij} is the Level 1 random effect; β_0 is the intercept in the Level 2 equation; $Y_{1j} - Y_{mj}$ represents

the various 1 to m district-level indicators that we discuss in details below; $\beta_{1j}.. \beta_{mj}$ are the corresponding Level 2 coefficients that indicate the effect of indicators $Y_1 - Y_m$ on fertility outcomes; and ϕ_j is the district-level random effect.

Employment and Educational Opportunities in a Community

Availability of employment and educational opportunities in a community are the key independent variables of interest in our regression models. We describe below how each of these variables have been constructed.

Employment prospects in a village/ district

In Model 3, we introduce at Level 2 variables that capture the communities' access to employment opportunities. As argued in Chapter 2, employment opportunities capture the mobility opportunities available within a community. Our expectation is that communities that have access to better employment opportunities and hence, better chances of mobility will have overall lower fertility levels than those who do not have access to such opportunities.

For district level models, this is captured through percent of farmers and percent of laborers in the respective rural and urban areas of a district computed from 2001 census. For village level models, we introduce village level information on employment prospects collected as part of the IHDS (2005).

In addition to the household survey, the IHDS (2005) collected village level information in the villages surveyed. A total of 1501 villages were surveyed as part of this effort. The village level questionnaire collected information such as geographic

details of the village in terms of number of hamlets and their composition in terms of caste and religion, land usage and prices of essential commodities. In this dissertation, we make use of the information on employment opportunities and infrastructure facilities available in the village. Specifically, the village questionnaire asks a well-informed person in the village such as the village headman to report on the kind of employment opportunities available *in* and *within* commuting distance of the village. We use this information to construct a dummy variable (V_AGR) that takes on a value 1 if there are only agricultural opportunities available in and around the village. For all other villages, it has a value of 0.

We hypothesize that the percent of farmers and laborers in a district is indicative of employment opportunities in a district. Higher the percent of farmers and percent of daily laborers in a district, lower are the opportunities of more lucrative non-agricultural employment. We expect it to be negatively associated with fertility outcomes. Similarly, if a village has access to only agricultural opportunities, it indicates that the chances of mobility via employment are lower and therefore, the tradeoff in such villages with respect to quantity and quality of children is not as sharp as in other villages, which have access to both agricultural and non-agricultural employment opportunities. Villages that score 1 on V_AGR will have higher fertility levels than villages that score 0.

Schooling opportunities in a village

For village level models, we introduce availability of private schools and drop the previous variables on employment prospects in Model 3a. We introduce this variable on availability of private schools only for village level models and not for district level

models because while all districts have private schools, not all villages have one.

Presence of private schools in a village, therefore, allows us to measure availability of schooling opportunities. This is the only variable that is specific for village level models, all other variables are measured at both the village and district level.

The presence of private schools is indicative of a greater parental demand for “quality” education for their children (De, Noronha and Samson, 2002). While almost all villages have access to government schools, not all villages have access to private schools. Based on IHDS data, Desai et al. (2010) compute a mean school index for village access to government and private schools. It stands at 1.95 for government schools and 0.75 for private schools. It is our contention that parental demand for private schooling for their children is at least partly motivated by the perception to invest in quality of children so that the latter are able to access mobility (employment) opportunities. We hypothesize that in villages with access to private schools there would be a greater consciousness about the importance of investing in quality of children and hence, lower fertility levels even when parents do not themselves send their children to private schools.

The IHDS records the presence of private schools in its village survey (see page 8 of the village questionnaire). It records if there is a private primary, middle, secondary or senior secondary school. We create a dummy variable for the presence of private school in a village. If there is either a private primary, middle, secondary or senior secondary school in a village, it is assigned a value of 1. Otherwise it takes on a value 0.

Other contextual factors

In addition to our key independent variables, we control for a number of contextual factors at the level of the community- women's labor force participation, demographic variables (percent of literate women and percent of population belonging to marginalized caste and tribal communities) and level of infrastructural facilities in the village.

Women's labor force participation in a village/ district

In Model 4, instead of indicators about employment prospects, we add census information about women's labor force participation - percent of women who are main workers and percent of women who are marginal workers. The Indian census defines marginal workers as those who have not worked for a major part of a year (that is, less than 183 days a year or six months).

Overall women's employment can be expected to be negatively associated with fertility outcomes (see Mason and Palan, 1981 and the literature cited therein). The rationale for introducing a variable controlling for district/ village level employment of women in a study that explores the association between fertility outcomes and mobility is that districts with higher employment of women are more likely to be aware of the possible employment opportunities for their daughters and hence, more likely to be faced with the quantity- quality dilemma than villages/ districts where such employment is lower.

Demographic indicators

In Model 5, we drop the variable on employment prospects and instead introduce census information on percent of female literacy at the village/ district level. Our rationale for including percent female literate in the hierarchical linear models is that it defines the overall context of fertility in a village/ district. In making this assertion, we draw from a previous study by Desai and Alva (1998) wherein the authors highlight the role of the community context in attenuating the association between maternal education and child health. We similarly argue that the percent of literate women shape the cultural norms pertaining to fertility levels in a community. Villages or districts with higher literacy among women are likely to be the ones where there is a greater recognition among community members about the importance of women's education and given that women's education has an inverse association with fertility outcomes (see Drèze and Murthi, 2001 and the literature cited therein), we expect communities with higher level of women's education to have lower fertility levels.

We noted earlier in the chapter that persons who belong to Scheduled Caste and Scheduled Tribe communities typically report higher fertility rates than those belonging to other caste communities. Lower levels of socio- economic development is well documented among these two marginalized communities (World Bank, 2011). And given that low socio- economic development is often associated with high fertility levels (Kirk, 1996), our hypothesis is that to the extent the percent of Scheduled Castes or Scheduled Tribes in a community is reflective of overall socio- economic development in a district/ village, villages/ districts with a higher percent of persons belonging to either of these communities will have higher fertility levels.

Infrastructural amenities

In Model 6, we drop the previous information on demographic characteristics, and instead introduce a variable that captures infrastructural amenities in the community. Availability of infrastructure is reflective of overall economic development in a community. Moreover, in the present context, infrastructural amenities also highlight the availability of road/ transportation and communication services necessary to access employment opportunities. Our hypothesis is that communities with better infrastructure facilities will have lower fertility levels.

For village level models, we introduce three amenities indices- a (physical) infrastructure index, a social index and a program index. These indices are based on information in the village questionnaire about access to infrastructure facilities (infrastructure index), credit organizations, women's organizations, development organizations and caste based organization (social index) and access to government programs (program index). The details of the items that constitute these indices are presented in Table 16. The village is assigned a point for the presence of each of these infrastructure facilities, organizations and government programs. We expect each of these indices to be negatively associated with fertility outcomes.

[Table 16 about here]

Unfortunately, we do not have such corresponding information at the level of the district. Instead for rural areas of a district we compute an amenities index from information in the census on number of villages with electricity, piped water, etc. using

census information and for urban areas of a district we use percent population in urban areas as a proxy measure of infrastructural amenities.

Full model

Finally, Model 7 is the full model with all the covariates from Model 3 through Model 6 and allows us to study potentially confounding effects. Table 15 indicates two sets of full models- Model 7 and Model 7a. Model 7 is the full model for district level hierarchical linear models. It does not include schooling opportunities, which is a variable specific to village hierarchical models.

Conclusion

Table 17 summarizes the discussion in this chapter in terms of the research hypothesis outlined in Chapter 2. For each of the three hypotheses outlined in Chapter 2, Table 17 gives us the key independent variable(s), control variables, if any and statistical methods that we use to test the hypotheses. For example, we use hierarchical linear modeling to test Hypothesis 3b, which states that the relationship between income and fertility will be weaker in areas where options for mobility are available. The key Level 2 variable is the presence of private schools in the villages, which is a proxy for availability of educational opportunities in the villages. There is no corresponding variable for district- level models. Employment opportunities are measured by the percent of farmers/laborers in the district (for district models) and a dummy for the presence of non-agricultural employment opportunities in the village (for village- level models).

[Table 17 about here]

Now that we have detailed our data and methods, we proceed to Chapter 4 in which we present the results of our analysis.

Chapter 4

Fertility- Income Linkages in the Indian Context

We saw in Chapter 1 and Chapter 2 that economic theory suggests income is negatively associated with levels of fertility. Becker (1960) famously explains this negative association using the classical utilitarian framework in which having children is akin to purchasing consumer durables with high income elasticity for both quantity and quality, though the income elasticity of quantity is greater than that of quality. At higher income levels, families demand both *more* units and *better* quality of a consumer good. That is, while at higher levels of income, couples are more likely to desire more children, they have to constantly trade it off with the quality of the children that they are going to raise; on a given income. However, the rationale behind this reasoning has been questioned on the grounds that it fails to take into account the social context of reproduction while economists point out that the direction of causality is not clear- the association between family size and income levels may be due unobserved heterogeneity in parental preferences. Also, there is evidence that the Beckerian model cannot be applied universally, in certain contexts such as in developing countries it may not hold true.

We argue in Chapter 2 that our contribution to the literature is in terms of placing the Beckerian quantity- quality tradeoff with increases in income in the context of “fertility as mobility” framework. Chapter 3 detailed the data and the methods we propose to use to reexamine the tradeoff between quantity and quality of children from a mobility perspective. In this chapter, we present the regression results from our analysis.

As discussed in Chapter 3, we utilize stepwise ordinal logistic regression to evaluate the association between income level and fertility outcomes taking into account an individual's level of education and occupation. We then examine to what extent the institutional context in terms of demand for education and employment opportunities modify the association between income level and fertility outcomes. We use both ordinal logistic regression models and hierarchical linear models in our analysis. Specifically, we use hierarchical linear models to study the contextual role of education and employment opportunities in modifying the association between income and fertility levels.

Association between fertility outcomes and level of income, in the absence of controls

The first step in our analysis is to see if a simple association between fertility outcomes and level of income holds true.

Table 18 gives a cross tabulation of level of household income¹ and fertility outcomes. This simple tabulation utilizes income quintiles reported in IHDS, 2005 based on *household* (and not personal) income for all households in the sample. The cut-off points for the income quintiles are Rs.14, 000, Rs.22, 950, Rs.36,098 and Rs.69,000 (Desai et al., 2010). A small percent (around 1.5 percent) of households have reported negative incomes. These households are not necessarily poor households, the negative incomes could well be losses incurred as part of business ventures. These households are also included in the data tabulation below as a separate category.

[Table 18 about here]

¹ Quintile for income was generated using all households in the sample, and with weights.

There is a steady but small decrease in average ideal number of children with increases in income. Desired fertility is on average 2.55 children among the lowest quintile while it is around 2.22 children among the most affluent (or the fifth quintile). With regard to living number of children, the average number of children remains roughly the same at around 2.5 though the standard deviation is higher for living than desired number of children at more than 1 child for each of the quintiles. In the case of desired number of children, it is less than 1 child for each of the income quintiles in the range 0.7- 0.8.

Model 1 in Table 19a and Table 19b examine the association between fertility outcomes and income level in the absence of controls in a regression framework. The coefficients describing the association between log of personal income and fertility levels are negative and statistically significant (Model 1, Table 19a and Table 19b). The log odds of desired family size are 0.292 times smaller for each unit increase in log of personal income ($p < 0.01$). The corresponding coefficient for living number of children is -0.139 ($p < 0.01$). The negative and significant relationship between income and fertility outcomes confirms the first hypothesis (H1) as stated in Chapter 2. In the absence of any controls, increasing incomes is associated with fewer children so as to increase investment in the quality of children being raised.

[Table 19a and 19b about here]

Association between fertility outcomes and level of income, controlling for men's background characteristics

Model 2 in Table 19a and 19b evaluates if the negative association between fertility outcomes and income levels still hold, when we control for a couple's background characteristics. As outlined in Chapter 3, these background variables are caste, wife's age and residence².

The size of the income coefficients is lower in Model 2 than in Model 1 for both desired and actual fertility but it is still negative and significant. The coefficients are -0.122 (Model 2) and -0.292 (Model 1) for desired number of children in Table 19a and -0.120 (Model 2) and -0.139 (Model 1) for living number of children in Table 19b. Thus, as implied by Hypothesis 1, there is a negative but weaker association between fertility outcomes and income levels when we control for a couple's background characteristics as caste, wife's age and current residence.

Associations between desired and actual fertility levels and caste shows that as expected (refer Chapter 3) Brahmins desire and have fewer number of children than Other Backward Castes (OBC), Scheduled Castes (SCs), Scheduled Tribes (STs) and Muslims. Christians have lower desired and actual fertility levels than Brahmins. Other "upper" castes Hindus and other religious minorities report statistically non-significant differences with Brahmins with respect to desired and actual fertility. On an average, Muslims have the highest fertility levels. The widest gap in fertility outcomes is between Muslims ($\beta= 1.486$ in Model 19a and $\beta= 1.348$ in Model 19b) and Brahmins ($\beta= 0.00$).

² Simple cross tabulation of fertility outcomes by caste, wife's age and residence are provided in Appendix Tables IV, V and VI respectively.

Muslims are followed by somewhat similar levels of fertility among Scheduled Castes, Scheduled Tribes and Other Backward Castes. Other religious minorities (Jain and Sikh) and Christians report lower fertility levels than our reference caste group, Brahmins.

Women in older age groups report higher desired and actual fertility as compared to women in ages 18- 23 and older the woman, higher is the ideal and living number of children. This is a combination of secular changes in fertility as well as the greater time older women have had to have children. Thus, the log odds of desired family size is 1.039 times higher for women of 35 years or more as compared to women in ages 18- 23 (the reference group, $p < 0.01$). The corresponding log odds of desired fertility (as compared to the reference category) for women in ages 30- 34 years and 24- 29 years are 0.737 and 0.326 respectively. The log odds for living number of children are 1.869 for women in ages 24- 29, 2.749 for women in 30- 34 and 3.438 for women 35 years or older ($p < 0.01$).

Rural areas report the highest levels of desired and actual fertility. The log odds of desired fertility are 0.729 times and 1.219 times lower for other urban areas and metro cities respectively ($p < 0.01$). The corresponding log odds for living number of children are $\beta = -0.403$ and $\beta = -0.680$ for other urban areas and metro cities respectively. The coefficients are statistically significant at $p < 0.01$.

Association between fertility outcomes and level of income, controlling for men's years of education and background characteristics

The next step in the study of the association between fertility outcomes and income is to take into account men's education in a regression framework along with other background characteristics introduced in the previous section. Our a priori

expectation as articulated in Chapter 2 and Chapter 3 is that addition of years of education in a regression model further diminishes the size of the income coefficient but it would still be inversely and significantly associated with fertility decisions³.

The regression results indicate that the income coefficients in Model 3 (Table 19a and Table 19b) remain negative but are considerably smaller than in Model 2 for both desired ($\beta = -0.044$, $p < 0.01$) and actual ($\beta = -0.033$, $p < 0.01$) fertility. Years of education has the expected negative and statistically significant sign with both the fertility outcomes ($\beta = -0.0531$, $p < 0.01$ for ideal number of children, $\beta = -0.574$, $p < 0.01$ for living number of children). Thus, as Hypothesis 2 suggests educational attainment weakens the association between income and fertility.

Other background variables have the expected signs with the outcome variables—desired and living number of children.

Association between fertility outcomes and level of income, controlling for men's occupation, years of education and background characteristics

The final model (Model 4, Table 19a and Table 19b) adds men's occupation in the regression equation⁴.

With the introduction of this new variable in the model, income though still negative is not significant either for desired ($\beta = -0.013$) or living number of children ($\beta = -0.007$).

³ The bivariate association between fertility outcomes and years of education is given Appendix Table VII.

⁴ The mean fertility level by occupation groups are presented in Appendix Table VIII.

All occupation groups have higher and significant ($p < 0.01$) levels of fertility than professionals. Thus, the log odds of desired fertility among businessmen is 0.236 times higher than professionals, followed by farmers ($\beta = 0.400$), laborers ($\beta = 0.302$) and a miscellaneous category of others ($\beta = 0.169$). The corresponding coefficients for actual fertility are 0.418 for businessmen, 0.489 for farmers, 0.305 for laborers and finally, 0.253 for others. Men's years of education and other background variables have the expected relationship with fertility outcomes.

Overall the results confirm our expectations that the Beckerian story of a negative association between fertility outcomes and level of income is on weaker grounds when we introduce years of education and occupation along with other background characteristics (caste, wife's age and current residence) in a regression framework (H2).

Association between fertility outcomes and level of income, controlling for education expenditures

The next set of regression equations (Tables 21a and 21b) examines how the relationship between fertility outcomes and level of income is modified, when we introduce a control for expenditure on education typically incurred by the families living in the same state. But first Table 20 presents average fertility levels by states categorized in terms of expenditure on education as high, medium and low expenditure ones.

[Table 20 about here]

Table 20 indicates that contrary to our expectations desired fertility is lower in medium (2.18) than high (2.36) expenditure states and there is not much of a difference between the high and medium expenditure states in terms of living number of children.

Actual fertility in high expenditure states is 2.35, which is marginally higher than the corresponding average in medium expenditure states. But there is a wider gap between desired and actual fertility in medium (2.18 and 2.25) states when compared to high (2.36 and 2.35) expenditure states. As expected low expenditure states have the highest level of both desired (2.65) and actual (2.61) fertility.

Model 1 in Table 21a and Table 21b is similar to Model 4 in Table 19a and Table 19b. Unlike the detailed occupation categories in Table 19a and Table 19b, for the sake of parsimony, occupations are collapsed into two categories of professionals (includes professionals and businessmen) and non- professionals (includes farmers and laborers) in Table 21a and Table 21b. The results of these models, therefore, parallel those in Model 4 in Table 19a and Table 19b. We find that in the presence of background controls, men's years of education and occupation affiliation, the size of the income coefficient is much smaller than if these additional controls were absent.

Controlling for expenditure on education in Model 2, we find that for both of the dependent variables- desired and actual fertility- log of income is no longer statistically significantly associated with fertility outcomes. This is also true in Model 3, where we interact current residence in terms of high, medium and low expenditure states with occupation groups (that is, professionals versus non- professionals).

The results in Model 2 and Model 3 confirm the descriptive statistics presented in Table 20. There is no statistically significant difference between the high and medium expenditure states in terms of actual fertility, but desired fertility is lower in medium than high expenditure states. As we hypothesized (H3a), couples residing in low expenditure

states have higher fertility levels than those in medium and high expenditure states. Thus, the log odds of desired fertility is 0.993 times and of actual fertility is 0.641 times higher in low expenditure states than high expenditure ones ($p < 0.01$).

Further, the interaction of state wise ranking in terms of expenditure on education and fertility outcomes shows that professionals in low expenditure states have higher actual and desired fertility relative to professionals in high expenditure states. Table 21c gives the discrete change in probabilities in the outcome variable based on results presented in Model 3 of Table 21a and Table 21b for key independent variables. Discrete change is the difference in the predicted value as one independent variable changes values from 0 to 1 while all others are held constant at specified values. Table 21c suggests a higher discrete change in desired and actual fertility for professionals in low expenditure states (0.022 and 0.019) as compared to medium expenditure states (0.008 and 0.006).

The results presented here suggest that expenditure on education brings into sharper focus the tradeoff between quantity and quality of children and as per our theoretical expectations income is not the critical link between expenditure on education and fertility outcomes. Even those lower down the income scale (i.e. the non-professionals) are likely to have fewer children if they live in states marked by relatively high expenditure on education. It seems that the context of high education expenditure suffices to motivate even those who have fewer resources (that is, non-professionals) to have fewer children presumably to increase their investment on children to improve their “quality” in the hope that better education would equip them to access better employment opportunities in the future.

Other control variables in our model have the expected sign with the dependent variables- i.e., men with higher education have lower fertility levels. Fertility is lowest among men residing in metro cities and among Brahmins, other “upper” castes, and other religious minorities and men with older wives report the highest fertility levels.

[Table 21a, Table 21b and Table 21c about here]⁵

Hierarchical Linear Models

Hierarchical linear models presented in Table 22a through Table 24b assess the extent to which institutional context of mobility modify the income- fertility relationship. We are particularly interested in mobility opportunities presented by the context of education and employment opportunities.

[Table 22a through 24b about here]

The baseline model (Model 1, not reported here) contains no covariates and shows that the percent of variance between couples and groups (villages and rural and urban parts of a district in this instance). Results show that around 28 percent of the variation in desired fertility and 5 percent of the variation in actual fertility is between villages. The remaining 72 percent and 95 percent of the variance for desired and actual fertility is between couples respectively.

Around 23 percent of variance in desired fertility is between rural parts of districts. The corresponding percent for actual fertility is 5 percent⁶. The remainder 77

⁵ Table IX and Table X in the Appendix presents parallel regression results controlling for wife’s years of education for each of the regression models presented in the text. Even though women’s education has the expected negative association with fertility outcomes, the association between income levels and fertility outcomes continue to be inconsistent with Beckerian quantity- quality tradeoff hypothesis.

percent variance and 95 percent is between individuals respectively for desired and actual fertility. Finally, 23 percent of the variance is between urban parts of a district for both desired and actual fertility.

Association between fertility outcomes and level of income taking into account the institutional context of employment opportunities

Model 3 in Table 22 through Table 24 show the association between availability of employment opportunities and fertility outcomes. Contrary to our hypothesis, results indicate accessibility to employment opportunities have no discernible association with fertility outcomes.

Villages that have access to only agricultural employment do not have higher fertility levels as compared to those who have access to all types of employment (Model 3, Table 22a and Table 22b). The coefficients associated with V_AGR (or villages that have access to only agricultural employment) are not statistically significant.

This is also true for the urban areas within a district. Percent of farmers and percent of laborers- the two variables that operationalize availability of employment opportunities- are not statistically significant (Model 3, Table 24a and Table 24b).

With respect to rural areas within a district, we find that higher the percent of farmers, higher is the overall actual fertility in the district after controlling for couple level variations in fertility outcomes (Model 3, Table 23b) though the associated coefficient is not large. Percent of laborers in rural areas of a district does not have a

⁶ The contextual analysis is for village variables are only based on rural sample. The couple level model for rural sample is presented in the Appendix Table XI. The regressions confirm that the rural results are not very different from the entire sample.

statistically significant relationship with actual fertility. On the other hand, the coefficient for percent of farmers and percent of laborers in Model3, Table 23a which deals with desired fertility is not statistically significant.

The absence of a relationship at the village level between the presence of only agricultural opportunities within a village and fertility outcomes is in contrast to a positive and statistically significant relationship between percent of farmers and actual fertility at the district (rural) level. Our contention is that migration outside the village in search of employment opportunities reduced the strength of the association between the dummy variable (V_AGR) categorizing villages in terms of accessibility to only agricultural opportunities and employment opportunities other than agriculture and fertility outcomes. There is data to back up this claim. A 2006 study detailing trends on internal migration in India by Lusome and Bhagat indicates that it has increased substantively during the period 1971- 2001 both in terms of inter and intra district migration from rural to urban areas. According to Indian census 2001, there were 309 million internal migrants based on place of last residence, which makes it roughly 30 percent of the population and is double in terms of number of internal migrants recorded in 1971. Trends for migration between census years indicate that between 1991 and 2001, around 32 percent and 36 percent of all men migrated from rural to urban areas and rural to rural areas. Intra- district migration accounts for 43 percent of the total migration in a district- 23 percent of migration is between rural areas within a district and 10 percent is between rural and urban parts of a district. A more recent study (Chandrasekhar, 2011) gives us further evidence of the number of workers commuting from their villages to urban areas for work. In 2009- 2010, 80.5 million people in non- agricultural work were

commuting from rural to urban areas. Therefore, a variable that captures the extent and kind of migration from the village would have probably allowed us to better assess the relationship between employment opportunities and fertility outcomes.

Analysis of explained variance allows us to examine the relative importance of alternate set of factors- employment prospects, availability of schooling facilities (only for village level models), women's labor force participation, demographic characteristics and infrastructural facilities. The percent reduction in variance over Model 2 (with only couple level factors) with the introduction of variable(s) measuring employment in Model 3 ranges from 1 percent to 90 percent. It is lowest at 1 percent for village level desired fertility models (Table 22a) and rather unsurprisingly highest at 90 percent for rural-district level actual fertility models (Table 23b) where the employment variables have statistically significant coefficients.

Association between fertility outcomes and level of income taking into account the institutional context of private schooling opportunities

Model 3A in Table 22a and Table 22b examine if the presence of private schools in a village has a negative and statistically significant association with fertility outcomes. The results do not validate our hypothesis. Presence of private schools in a village does not have a statistically significant association with either desired or actual fertility.

Once again, many rural students go to private schools outside the village so village may not be a useful unit of analysis. Second, while there are now private schools even in less prosperous parts of rural India, the "quality" and functioning of these schools are *not* necessarily better than government ones (De, Noronha and Samson, 2002).

Moreover, the costs of private schooling range from Rs.15/- per month in less privileged areas to Rs.150/- per month in more prosperous areas. Clearly, the burden that a school fee of Rs. 15/- places on a couple is different from that placed by Rs. 150/-. It is, therefore, possible that a more discernible variable on private schooling within the village that captured the fee structure of private schools would have allowed us to capture the relationship between presence of schooling opportunities and fertility outcomes.

Since presence of schooling does not have any significant association with fertility outcomes at the village level, it is not surprising that the introduction of a variable measuring the availability of schooling opportunities in a village makes no contribution in terms of reduction in variance over Model 2.

Given the ubiquity of schooling opportunities at the district level including private schools, we do not have corresponding district level models on its effect on fertility outcomes.

Other control variables in the HLM

Women's labor force participation

As we had expected women's employment is negatively and significantly associated with fertility outcomes. Across all the models percent of main women workers reduce fertility levels. However, in most instances, the coefficients are not large barring for urban areas within a district- Model 24a and Model 24b. In these instances, a percent increase in women's labor force participation as main workers reduces overall fertility by 0.039 and 0.037 log units for desired and actual fertility at the district level after control for factors that are associated with couple variation in fertility levels.

In contrast in all the models there is no statistically significant relationship between percent of marginal women workers and fertility outcomes. The explanation for this is in the definition of marginal workers, which includes women who have worked less than 183 days a year or six months. These women are most likely helping their family with their enterprise, whether in farming or non- farming sector through part time work (Nayyar. 1987).

Given the statistically significant relationship between percent of women who are main workers and fertility outcomes, it is not the least surprising that there is some percent reduction in unexplained variance over Model 2 when variables pertaining to women's labor force participation are introduced in Model 4. The highest percent reduction (94%) in Level 2 variance occurs for district level model pertaining to actual fertility in urban areas. On the other hand, the lowest percent reduction in Level 2 variance- a mere 6 percent- is for village level model on desired fertility (Table 22a); though labor force participation variables in Model 4 reduce Level 2 variance over Model 2 sharply by 70 percent in village level models on actual fertility (refer Table 22b).

Demographic characteristics

Results of village level hierarchical models (Model 5, Table 22a and Table 22b) and district level models for rural areas (Model 5, Table 23a and Table 23b) suggest that after controlling for couple level variation in fertility outcomes, there is no statistically significant association between percent of population belonging to disenfranchised communities- the Scheduled Castes and the Scheduled Tribes- and fertility outcomes at the village level. The relevant coefficients in these instances are not significant. This is

also the case for actual fertility in urban areas of a district. But in contrast to what we had expected, the proportion of Scheduled Caste population significantly reduces overall desired fertility levels in urban parts of a district (Model 5, Table 24a).

Percent of literate women significantly reduce overall fertility levels both at the district (rural as well as urban areas) and village level after controlling for couple level variation in fertility outcomes, but the overall impact is highest in urban parts of a district (Model 5, Table 24a and Table 24b).

Demographic factors reduce unexplained variance at Level 2 over Model 2, which is the model that has only couple level variables. The largest reduction in unexplained variance (95 percent) is in actual fertility for urban parts of a district (Model 5, Table 24b), followed closely by actual fertility for rural parts of a district (Model 5, Table 23b). The percent reduction is smallest at the village level- 10.5 percent for desired fertility (Model 5, Table 22a) and 72 percent for actual fertility (Model 5, Table 22b).

Infrastructural facilities

Variables measuring infrastructural amenities in the village and at the district level are introduced in Model 6.

In the village level models, of the three indices that we constructed to take into account the different types of infrastructure in a village- infrastructure index, social index and program index- only the social index is significantly and negatively associated with desired and living number of children at the village level, once couple level variations in fertility outcomes have been taken into account. The relevant coefficients are, however, not large.

The fact that the social index rather than the infrastructure or the program index stood out as a variable influencing fertility outcomes requires some explanation. The social index composes of items as presence of women's organization/ trade union/ development organization or NGOs/ caste based groups in the village (refer Table 16 in Chapter 3 details). So, while these organizations may not have an explicit goal of influencing fertility outcomes, our argument is that their presence in a village is indirectly and negatively associated with fertility though the exact pathways may differ. For instance, our conjecture is that women's and development organization by emphasizing issues of concern to women and/ or development goals are likely playing an important role in reducing overall village fertility levels. Similarly, it can be argued that aside their stated organizational objectives caste based networks and trade unions provide a platform for people to network and share information, which could be particularly important in the context of job search. The role of social networks for the purpose of accessing employment opportunities has already been highlighted in previous research- for example, Ito (2009) finds that the ratio of village- total workers in regular employment (other than the household members) to village- total working age people, a proxy measure about information exchange among villagers, significantly decreases the costs of finding regular employment. Social networks also play an important role in the migration process- social contacts at the destination (whether it is a city, town or another village) provide important economic and psychological support to migrants during the initial adjustment phase of their stay in their destination (Banerjee, 1983). The presence of absorptive social networks at destination also influences the choice of places to migrate among potential migrants.

In the district level models for rural areas, the average amenities index is inversely and statistically significantly related to fertility outcomes, once couple level variation has been taken into account (Model 6 in Table 23a and Table 23b). On the other hand, percent urban- which we have taken as a proxy measurement for infrastructure in the urban parts of a district does not have any statistically significant relationship with desired number of children (Model 6 in Table 24a) but significantly reduces living number of children (Model 6 in Table 24b).

The percent reduction in unexplained Level 2 variance over Model 2 when measures of infrastructural facilities are introduced in Model 6 is higher for district level models (93 percent in Model 6, Table 23b and 90.0 percent in Model 6, Table 24b) as compared to village level models (0.03 percent in Model 6 in Table 22a).

Full model

The full model or Model 7 includes all the variables mentioned above in order to examine potentially confounding effects. Variables measuring availability of employment opportunities within an area/ community are not significant in the full model(s). Presence of private schooling in the village also does not exhibit the expected significant association with fertility outcomes.

Among the other variables, women's literacy and participation in the labor force as main workers have a statistically significant negative association with overall fertility levels in both the models for urban parts of a district. At the village level too, percent of literate women and percent of women who are main workers play a key role in influencing fertility outcomes. In addition to what we had anticipated in Chapter 3,

women's participation in the labor force could *also* potentially be fostering an institutional environment where it is advantageous to invest in girls' education.

While the social index has a significant negative association with village-level actual fertility, it is no longer significantly associated with ideal fertility outcomes. Instead there is a counterintuitive positive association between the program index and living number of children. Overall at the district level, with the exception of urban areas, infrastructure facilities remain statistically significant. All the demographic variables (percent of Scheduled Caste population, percent of Scheduled Tribe population and percent of literate women) are significant when ideal number of children is the dependent variable in rural parts of a district.

Just as one would expect, when all the factors are put together in a single model (Model 7) the reduction in unexplained variance at Level 2 is by far the most as compared to prior models.

Conclusion

To conclude this chapter, Table 25 summarizes the key results. This is essentially a reproduction of Table 17 in Chapter 3 but we have added two new columns for the two dependent variables- desired and actual fertility. The table indicates that there is a broad support for the hypotheses that we proposed in Chapter 2 except for results using hierarchical linear models.

Other than rural parts of a district, the results from the hierarchical linear models do not indicate support for the hypothesis that employment prospects in a community modify the fertility- income relationship. Similarly, we also did not find evidence that

private schooling facilities in a village modify the association between fertility outcomes and income level. This, however, does not mean that we should conclude that context has no role in influencing the association between fertility outcomes and individual income levels. As we have suggested in the text, more nuanced measures of schooling opportunities and employment prospects at the village/district level, such as an employment measure that takes into account migration from a village, could help us capture their contextual role. Our argument in favor of better measurements of education and employment opportunities as opposed to discarding the hypothesis on the contextual role of education is buttressed by the fact that we did find some evidence that employment prospects within the rural parts of district affects its overall fertility level. And finally, there is support for hypothesis H3a, which asserts that the context of educational expenditure modifies the fertility- income hypothesis when we use ordered logistic analysis.

We now proceed to Chapter 5 in which we examine the role of inter- generational occupation mobility and fertility outcomes. We already noted in Chapter 2 while there is much evidence of inter- generational education mobility in India, inter- generational occupation mobility is far limited (Jhilam and Mazumdar, 2011). This suggests that occupation in the regression models presented here may be a proxy for inter- generational occupational rigidity. It, therefore, remains to be examined to what extent there is an association between fertility outcomes and inter- generational occupation mobility.

Chapter 5

Inter- generational Occupation Mobility in India

We began in Chapter 2 with a re- phrasing of Coale’s pre- conditions for demographic transition to take place in a country into three necessary and sufficient conditions for social mobility to be a factor in a couple’s fertility decisions. In this chapter, we re- visit the first condition, viz., mobility must be within the calculus of rational choice by focusing on the experience of inter- generational occupational mobility and its association with fertility outcomes. A priori, we do not expect a significant relationship inter- generational occupation mobility and fertility outcomes since social mobility has been relatively low in India with aspirational changes outpacing objective achievements (refer Chapter 2) but this remains an empirical question to be explored below.

Limited Application of the Liberal Theory of Social Mobility

Chapter 2 outlined the “liberal” theory of social mobility which emphasizes a “modernist” or “universal” approach to the study of social mobility and its limited application in the Indian context. This theoretical framework suggests that there are three alternative pathways- structural, processual and compositional- through which a traditional society with generally limited chances of social mobility offers greater and equitable chances of mobility across all socio- economic sections as it transitions to a modern society (Erikson and Goldthorpe, 2008). To recall further from Chapter 2, structural changes refer to technology used in industrial societies that renders redundant the structural division of labor in traditional societies as well as rapidly changing

technology in modern societies which necessitates high rates of mobility both across generations and within one's lifetimes. Processual changes refer to the shift in emphasis from ascribed status (such as lineage or kinship) in traditional societies to achieved status (such as level of education and skill set) in modern societies as a critical factor in social mobility. Finally, compositional changes refer to economic expansion in modern societies that are typically associated with the growth of the secondary and tertiary sector and a shift away from the agricultural sector. While kinship networks play an important role in agriculture, greater emphasis is placed on specialized skills and educational achievements in the industrial and services sector.

However, contrary to what is predicted by the theory, there is no clear evidence that modernity in India is associated with increasing social mobility across all dimensions, but most importantly for the purposes of this dissertation we find that there is very limited inter- generational occupation mobility. Furthermore, the liberal theory of social mobility receives only limited support for countries in the western hemisphere as well. Evidence from Europe and Northern America does not support the argument that social structure in the developed world is completely amenable to social mobility (Boyd, 1973). Recent literature in economics on income mobility in the US and other countries suggests that the coefficient for inter- generational income elasticity is significantly different from zero, with zero indicating perfect mobility (Solon, 2002, 1999, 1992). A number of intervening factors mediate the process of social mobility (Ganzeboom, Treiman and Ultee, 1991); even claims of similar mobility patterns across industrial nations (Lipset and Zetterberg, 1959) is not supported by empirical evidence. See also Western and Wright (1994) for a comparative study of mobility in two North American

countries- USA and Canada, and two Scandinavian countries- Norway and Sweden and Erikson, Goldthorpe and Portocarero (1979) for a comparative study of Sweden, England and France. More importantly, just as in India, the chances of inter-generational mobility are also likely to vary for people of different social backgrounds. For example, in the US, Hertz (2006) suggests that the rate of upward income mobility is far lower for Black than White families. While only 10 percent of the Whites born in the lowest deciles remain there as adults, the comparable figure for Blacks is 42 percent.

Alternative Theories on Social Mobility

Since there is no clear evidence in support of the liberal theory of mobility, alternative theoretical frameworks attempt to explain social mobility in the Western world. Lipset and Zetterberg (1956, 1959), for example, argue that among industrial nations there is no apparent association between rates of economic growth and social mobility. Rather, according to them, once societies cross a threshold level of industrialization absolute rates of mobility in these societies become higher than in their pre- industrial state.

Yet another radical departure from the liberal view is provided by Sorokin (1959). He rejected the “structural” view of mobility; instead he offered what can be termed as the “cyclical” view of mobility. He argues that while it is true that Western countries did witness higher rates of social mobility with modernization, it is by no means “unprecedented” or “eternal”. Rather he argues that what the Western world witnessed is specific to historical period- societies in certain historical phases have witnessed an increase and at other times a decrease in social mobility. And while it is true that some

forms of barriers to mobility such as those based on religion have been largely dismantled in Western societies, other forms of barriers such as those based on educational systems and occupational qualifications have either emerged or become stronger.

A relatively recent formulation, Featherman, Jones and Hauser (1975), provides an even more comprehensive challenge to the claims of liberal theorists on mobility. They argue that mobility rates across countries can scarcely be expected to be similar because they are determined by such structural factors as economic, technological and demographic forces. However, when mobility is measured at the individual level net of the structural factors, industrial societies do display similar rates of mobility. The emphasis on relative as distinct from absolute rates of mobility suggests a reformulation of Lipset and Zetterberg's hypothesis- when mobility is considered at "phenotypical" level of absolute rates of mobility; mobility rates are not similar across nations. However, once "genotypical" level of mobility - that is the mobility rates of individuals after discounting exogenous factors as the structure of the economy, occupational structure and demographics- is taken into account, mobility rates across developed nations can be expected to be similar. As far as absolute rate of mobility across countries is concerned, Featherman, Jones and Hauser concur with Sorokin that mobility regimes tend to stabilize once nations are "deemed" industrialized and thereafter, there is no particular affinity to even greater openness or equal opportunities for individuals across all sections of the society for upward mobility.

Inter- generational Occupation Mobility in India

It remains to be seen if these alternative theories could help explain inter-generational occupation mobility or rather its stickiness in the India. An application of Featherman, Jones and Hauser (1979) theoretical formulation would suggest that structural changes in the economy could account for some of inter- generational occupational mobility in the country. Net of these structural changes, mobility rates of individuals from different caste backgrounds ought to be similar if the hypothesis of diminishing role of caste in occupational mobility were to hold true.

Though still primarily an agricultural economy, the major structural change associated with the Indian economy since independence (1947) is a contraction of the agricultural sector and a corresponding expansion of the industrial/ manufacturing sector and services sector. In terms of the composition of the Gross Domestic Product, agriculture accounted for 38.1 percent of the Indian economy in 1980, its share went down to 19.6 percent in 2005. The share of the manufacturing sector remained fairly constant during this time period at 17.7 percent in 1980 to around 15.1 percent in 2005. The share of the services sector, on the other hand, increased by more than 20 percentage points from 44 percent in 1980 to 65 percent in 2005 (Reserve Bank of India, 2008; Panagriya, 2008: 283). This structural change in the economy would necessarily be associated with a reduction in the number of people employed in agriculture and an increase in the numbers employed in industrial/ manufacturing sectors and the services sector. Table 26 below gives the distribution of occupation profile of men in different census years and suggests a far limited change in terms of occupational distribution across various years.

[Table 26 about here]

Table 26 indicates that while there is a steady reduction in the proportion of men reporting themselves as cultivators, there has been a concomitant increase in proportion reporting themselves as agricultural laborers. Nevertheless, there has been a very slow drop in the proportion employed in the agricultural sector- the combined share of cultivators and agricultural laborers was at 61 percent in 1991 as compared to 67 percent in 1951. This decline in agricultural employment is not necessarily matched by a corresponding increase in the share of the manufacturing and services sector but particularly noteworthy is the steady decline in the household manufacturing sub- sector between 1961 and 1991 from 6 to 2 percent (we do not consider here the figures for 1951 since it combines household and non- household manufacturing). While fertility studies in India have typically suggested that farm households' labor demands lead to demands for child labor and consequent higher fertility (Khuda, 1991, Shariff, 1991, Nadkarni, 1976), given the generally small size of farms in India (Chandra, 2011, Rosenzweig and Evenson, 1977) and high rates of underemployment for adults (Mahendra Dev and Venkatanarayana, 2011), we do not expect to see this factor playing an important role in fertility of Indian families. However, if this transition involves movement into higher skill occupations, it may lead to higher investment on quality and lower investment on child quantity.

Simple cross tabulations using 1971 and 1991 National Election Study data (NES) collected by the Centre for the Study of Developing Societies (CSDS)⁷ suggest that in

⁷ The National Election Study of 1971 and 1996 are primarily concerned with determinants of electoral behavior, but it asks the main occupation of the respondents and that of their fathers; thus allowing

terms of inter- generational occupational mobility these structural changes translate into outmigration from the agricultural sector into other sectors of employment (Kumar et al., 2002b). However, the increase is not uniform across different sectors of the economy, rather unsurprisingly a large proportion of the outmigration is into manual labor (skilled, semi- skilled and unskilled labor, but excluding those in the agricultural sector)- people whose fathers were agriculturalists (defined as owner and tenant cultivators, dairy and poultry farmers, laborers and landless laborers, sharecroppers, fishermen and shepherds) accounted for 34.2 percent and 39.5 percent of the salaried class in 1971 and 1996 respectively, 20.0 percent and 28.3 percent of the business class in 1971 and 1996 respectively and 19.7 percent and 32.0 percent of the manual labor class in 1971 and 1996 respectively.

The next step in the analysis is to study inter- generational mobility by caste, net of the structural changes. Over time trends indicate *some* weakening of traditional caste-occupation linkages even though overall “upper” castes are most likely to be in more privileged occupations, that is, salaried jobs and business and least likely to be working as manual labor (Desai and Dubey, 2011, Kapur et al., 2010). The Scheduled Tribes are most likely to be engaged in farming while those belonging to Scheduled Castes are most likely to be engaged in manual labor. Muslims (the second largest religious group) in India are most likely to be concentrated in business and are likely to be relatively less in the agricultural sector. In 1971, the chances of men from upper castes reaching the salaried income group were four times higher than the disenfranchised castes. Compared

researchers to study inter- generational occupation mobility (Kumar et al, 2002a and 2002b). When allied with data on caste and community, we are able to study inter- generation occupation mobility patterns along lines of caste and religious background.

to 1971, all caste groups except Muslims improved their chances of moving into the salaried income group in 1996. Correspondingly, they (all caste groups) also had lower chances of ending up as agriculturalists.

Regression analysis indicates that these trends hold after discounting changes in the structure of the Indian economy. Fewer people from OBC (Other Backward Castes) community were in the manual category and correspondingly more were agriculturalists in 1996 than would be expected if the OBC- manual labor/ agriculturalist link remained the same as in 1971. Kumar et al. (2002b) conclude that this indicates that land distribution program carried out in the 1950s yielded some benefits. For Scheduled Castes, the likelihood of being in the salaried class is higher in 1996 than if the linkage between Scheduled Caste and salaried observed in 1971 were maintained. To some extent, this points to the efficacy of reservation policies under which certain percent of government jobs are “reserved” for marginalized castes. However, there is no corresponding evidence of improved chances for Scheduled Tribes, another intended beneficiary of reservation policies (Kumar et al., 2002b).

Data

In the previous paragraphs, we see that in spite of some evidence of mobility, occupations are fairly sticky across generations in India. We now proceed to examine if occupation in the regression model in Chapter 4 indeed proxies for lack of inter-generational occupational mobility.

While longitudinal data is most appropriate for a study of inter-generational occupation mobility, we continue to use IHDS (2005) for our analysis. Other than the fact

that this helps to maintain continuity with the analysis presented in Chapter 4, it should also be noted that there are *no* available panel data on India that collects information on occupations. Additionally, IHDS allows us to study the association between fertility outcomes and inter- generational occupation mobility, which is not possible with other data sets like the census or NSSO, which have information pertaining to inter- generational occupation mobility but not pertaining to fertility outcomes.

Sample

The analysis presented below is restricted to a smaller sample 29, 114 couples. As before the analytical sample consists of married men who are above 18 years but less than 59 years whose wives were interviewed in the survey. We dropped households in which the head of the household was not clearly marked and/ or female headed households which recorded the occupation of the head of household's husband and not the father.

Table 27 illustrates the loss in terms of sample size with the above restrictions.

[Table 27 about here]

Table 28 presents descriptive statistics analogous to the one presented in Table 8 for two groups of men- men in the previous study sample (N= 31, 419) and men in the new study sample (N= 29, 114). The table shows in terms of key characteristic variables the two samples are similar.

[Table 28 about here]

Key independent variable

The analysis proceeds in the same manner as outlined in Chapter 3- we use ordinal logistic regression models, the same dependent and control variables. The only difference is that we have a new measure of father's occupation, which is essential to measure occupation mobility. Question 1.19 on page 3 of the household questionnaire in IHDS asks

“What was the occupation of the household head's father (or husband) for most of his life?”

In Chapter 3, we have already given details on how men's occupation is measured in the survey. We code father's occupation in the same manner. But we also further collapse men's and their father's occupation into two categories- professionals and non-professionals- for analytical ease. Farmers and laborers are placed in the category of non-professionals while businessmen and professionals are placed in the category of professionals. The reasoning behind this classification is that businessmen are closer to professionals than to farmers and laborers in terms of their fertility behavior; while the latter two display similar fertility behavior (Bhuyan, 1996).

Regression Model

We use ordinal logit regressions as outlined in Chapter 3. Model 1 has only the log of personal income as the independent variable. Model 2 introduces three control variables- caste, rural/ urban residence and wife's age. Model 3 has men's years of education along with the other variables in Model 2. Model 4 and Model 5 introduce men's occupation and father's occupation respectively. Model 6 is the full model with the

interaction between father's and men's occupation. The interaction term measures the association of inter- generational occupation mobility with fertility outcomes. While we expect the size of the income coefficient to decrease with the addition of each new variable into the respective models in keeping with the overarching theme of this dissertation, our *key* hypothesis in this chapter is that because inter-generational occupation mobility is pretty restrictive in the presence of a variable measuring inter-generational occupational mobility (Model 6) men's occupation will have no statistical association with fertility outcomes.

[Table 29 about here]

Association between fertility outcomes and inter- generational occupation mobility

Data from IHDS (2005) confirms that while majority of the population in all caste groups are non- professionals, the proportion is lowest for caste groups at the upper end of the caste hierarchy, viz. Brahmins and other “upper” castes and other religious groups as Sikhs and Jains. Muslims too have a relatively low proportion of population as non-professionals. Disenfranchised population groups are most likely to be non-professionals- 90 percent among Scheduled Tribes and 89 percent among Scheduled Castes.

Table 30 presents simple cross tabulation of men and their father's occupation- not surprisingly, majority of men who are non- professionals (that is, farmers, laborers or “others”) had fathers who were also non- professionals. Of the men who are professionals, 77 percent had fathers who are non-professionals while 25 percent have fathers who are professionals. In other words, the evidence in this table which does not

take into consideration the structural changes in the economy is consistent with previous analysis by Kumar et al. (2002a and 2002b) and Jhilam and Mazumdar (2011) of *some* inter- generational mobility in terms of upward inter- generational occupational mobility of a transition from non- professionals (father's occupation) to professionals (men's current occupation). We find that a comparatively higher percent of men from OBC (84.31 percent), Scheduled Caste (87.27 percent) and Scheduled Tribes (88.43 percent) are professionals while their fathers were non- professionals. The corresponding percent for Brahmins and other "upper" castes are 59.45 percent and 68.87 percent respectively.

The results of the regression models are presented in Table 31a and Table 31b for ideal and living number of children respectively. In accordance with the main hypothesis of this dissertation, we find that the size of the income coefficient progressively diminishes with the addition of each new variable into the model. Additionally, for desired number of children, the income coefficient is not significant in Model 4 through Model 6.

More pertinently, for the purposes of this chapter we find that men's occupation is not significant for both desired and living number of children in Model 4 through Model 6. But men whose fathers were professionals have lower desired ($\beta = -0.099$ in Model 5) and actual fertility ($\beta = -0.230$ in Model 5) than men whose fathers were non- professionals. The interaction variable in Model 6 is not significant for either desired or actual fertility- men who are professionals and whose fathers were also professionals do not have significantly lower fertility outcomes than those who are non- professionals and whose fathers are also non- professionals. For desired fertility, men's occupation and father's occupation too are insignificant in Model 6. On the other hand, for actual fertility

while men's occupation is not significant, father's occupation is significant for actual fertility ($\beta = -0.270$ in Model 6).

[Table 31a and Table 31b about here]

Other variables in the model behave in predicted manners. Brahmins have the lowest desired and actual fertility among all caste/ religious groups with the exception that there is no statistically significant difference with the other "upper" castes and Sikh/Jain and Christians have the lower fertility levels. Muslims report the highest fertility levels. Women in oldest age groups have as expected highest ideal and living number of children. Fertility is lower in rural areas as compared urban areas and metro cities.

Conclusion

The results in this chapter are in accordance with the first pre- condition for mobility to be a factor in fertility decisions- viz. that it must be within the calculus of rational choice. Lower fertility seems to be particularly concentrated among men who have a long term professional background (men whose fathers' were also professionals). The results, particularly of Model 5 in Table 31a and Table 31b, indicate that men whose fathers are professionals have lower fertility outcomes than men whose fathers are not professionals. In other words, it is *not* couples who are *currently* experiencing mobility but those who have been in professional occupations for at least two generations who are most likely to have lower fertility- thus, it would seem that mobility is more "real" for this group of couples and hence, they are likely to factor it in their fertility decisions.

New professionals whose fathers' were not professionals, on the other hand, have not yet started using mobility as a motivation for fertility decisions.

Chapter 6

Conclusion

In concluding the dissertation, we re-visit the hypothesis outlined in Chapter 2 and assess to what extent our hypotheses were supported by empirical evidence in Chapter 4 and Chapter 5. In order to recapitulate, the three hypotheses stated in Chapter 2 are the following:

H1: In absence of controls, income is negatively associated with fertility.

H2: The relationship between income and fertility is at least partly due to the link between income and mobility and hence, the income coefficient will decline with the addition of factors associated with mobility such as education and occupational status.

H3: The relationship between income and fertility will be weaker in areas where:

- a. greater investment is required in the form of educational expenditure to ensure mobility.
- b. mobility potential is greater.

In outlining the regression results in Chapter 4, we found conclusive evidence supporting the first and second hypotheses (H1 and H2). On the other hand, support for hypotheses H3a and H3b is at best weak (see Table 25). While not diluting the emphasis in Chapter 4 for better measurements of mobility opportunities so as to accurately understand the association between mobility aspirations and experience and fertility outcomes, we argue here the results also suggest that child bearing decisions of couples are shaped by norms surrounding fertility in their social milieu as opposed to individuals

being solely motivated with the desire to access mobility opportunities (Table 21a through Table 24b in Chapter 4) or their own mobility experience (Table 31a and Table 31b in Chapter 5).

The argument here is similar to what Desai and Alva (1998) assert in the context of an association between maternal education and child health. Their contention is that a causal association between child health outcomes and level of mother's education is far weaker than what is presumed in the literature. While it is indeed the case that educated mothers are most likely to seek health services for their children, this association is largely overridden by the availability of health services in which they reside. Likewise we suggest that the association between overall higher levels of women's education, their participation in the labor force and availability of infrastructural amenities and fertility outcomes at the level of the community can also be viewed in terms of the process of westernization and social mobility (Hypothesis H3b). The overall context in a community in terms of percent of women who are literate, women's participation in the labor force and availability of infrastructure facilities through various linkages as identified in Chapter 3 are instrumental in setting the stage for norms around fertility levels. We indicated in Chapter 1 and Chapter 2 that one of the strategies for social mobility in India is adoption of secular practices associated with westernization. To the extent that women's education and their participation in the labor force relate to the process of westernization, it can be expected that these couples set the norms for fertility behavior in their community which is subsequently widely adopted by other couples irrespective of their income levels. Similarly, to the extent the availability of infrastructure helps in diffusing the "modern" ideal of a small family in a community, it can be expected to

weaken the linkages between fertility outcomes and levels of income. Thus, couples who reside in communities where a high percent of women are literate, women's labor force participation is high and better infrastructural facilities are more likely to follow the norms of overall lower fertility levels even when their own education level may not be high or their participation in the labor force is limited or they are lower down the income scale vis-à-vis couples with similar socio-economic background but residing in communities where the overall levels of women's education, women's participation in labor force and infrastructural facilities are poorer. Hence, we find that at the level of the community the association between fertility outcomes and income levels is weakened not so much by access to mobility opportunities but the cultural context of fertility norms as defined by women's literacy and labor force participation rate and the context of development as defined by infrastructural facilities.

Finally, following the same lines of reasoning, the extent to which lower fertility levels in high education expenditure states among the high income groups is associated with investment in quality of children to access better social mobility opportunities, it helps in diffusing the ideal of a small family; thereby weakening the links between fertility outcomes and income levels (Hypothesis H3a).

In drawing linkages between the community norm of a small family and a weakened association between fertility levels and levels of income, we also build on recent attempts in the literature by Desai and Andrist (2010: 681) to highlight the "synergies between new sociology of culture and demographic research". Using the framework of culture and action wherein culture provides a repository of "toolkits" which people may use in various configurations in order to devise "strategies for action" in their

daily lives (Swidler, 1984: 273), Desai and Andrist (2010) posit early marriage in India as part of a gender script that emphasize modesty, chastity and segregation. Families by marrying their daughters off early “do gender” so as to conform to the prevalent gender norms in their communities while at the same time by practicing *gauna* or the custom by which cohabitation is delayed till the young bride and groom come of age, they are able to ensure education for their daughters, which is an essential marker of status in modern India. See also Andrist, Banerji and Desai (forthcoming) for similar exposition on how the sociology of culture helps understand decisions and practices around marriage in India.

In the last concluding paragraph, we would like to highlight that our findings suggest that the prospect of mobility is “real” for only a small section of the population, who take it into consideration as a relevant factor in fertility outcomes/ decisions. In our view, the policy recommendations that stem from our analysis is to expand the chances of educational and employment opportunities so as to ensure that even those at the bottom of the socio- economic hierarchy are motivated to invest in their children. The best means to achieve a broadening of educational and economic opportunities remain an open question though. India already has the world’s largest affirmative action program in the form of subsidies and scholarships and reservations in educational institutions and government jobs (Kumar, 1992). Should policymakers further expand the scope of these policies to ensure equitable mobility opportunities? Can the expansion of these policies be achieved without further disrupting the social fabric of the country? In 1992 when the then Prime Minister of the country sought to expand the scope of affirmative policies, it led to unprecedented violence in which upper caste youth in urban areas, who were

concerned that such an expansion of affirmative policies would lead to widespread joblessness among their ranks; self-immolated themselves as a means of protest against these policies. It is, however, also possible that greater economic growth as well as greater recognition about the need to undo the historical inequities perpetrated against marginalized castes since then may lead to a greater acceptance of these policies. For instance, in a recent paper studying the efficacy of reservation policies for “lower caste” groups in engineering colleges in India, Bertrand, Hanna and Mullainathan (2008) find that while the most popular argument against affirmative action, viz., that it benefits the richer segments among marginalized communities does not hold much ground, there is also no evidence that the marginal “upper caste” applicant who loses his/her admission in an engineering college to a “lower caste” aspirant ends up with a more negative attitude either towards the “lower caste” or for affirmative action policies. Or should policy makers focus on strategies beyond affirmative action policies? These could include measures to improve chances of mobility such as via providing better quality teaching through government schools and building roads/ provide communications so that people can better access employment opportunities? Or should as Munshi and Rosenzweig (2009) argue a greater focus be placed on improving the functions of the markets such that the role of caste networks in accessing employment opportunities diminish in the future allowing for greater inter-generational occupational mobility? But then can the market be trusted to level the playing field and not reinforce traditional social inequities? Admittedly, each of these policy options has its own sets of advantages and challenges and raises its own set of questions. A comprehensive review of these options is essential before either one or a combinations of these various policy options is recommended to

overcome the stickiness of occupations across generations and enhance mobility for all sections of the Indian society, but more so for those at the bottom of the social hierarchy.

Table 1: Differentials in total fertility rates by background characteristics in various NFHS rounds.

	NFHS- I	NFHS-II	NFHS-III	
Total	3.39	2.85	2.68	
Residence				
Rural	3.67	3.07	2.98	
Urban	2.70	2.27	2.06	
Education				
Illiterate	4.03	3.47	3.55	No education
Literate < middle school complete	3.01	2.64	2.45	< 5 years education
Middle school complete	2.49	2.26	2.51	5- 7 years education
High school and above	2.15	1.99	2.23	8- 9 years education
	n/a	n/a	2.08	10- 11 years education
	n/a	n/a	1.80	12 or more years education
Religion				
Hindu	3.30	2.78	2.59	
Muslim	4.41	3.59	3.40	
Christian	2.87	2.44	2.34	
Sikh	2.43	2.26	1.95	
Jain	n/a	1.90	1.54	
Buddhist/ Neo-Buddhist	n/a	2.13	2.25	
No religion	n/a	3.91	n/a	
Other	2.77	2.33	3.98	
Social groups				
Scheduled Tribe	3.55	3.15	2.92	
Scheduled Caste	3.92	3.06	3.12	
Other Backward Caste	n/a	2.83	2.75	
Other	3.30	2.66	2.35	
Don't know	n/a	n/a	1.98	
Standard of Living				
Low	n/a	3.37	3.89	Lowest
Medium	n/a	2.85	3.17	Second
High	n/a	2.10	2.58	Middle
	n/a	n/a	2.24	Fourth
	n/a	n/a	1.18	Highest

Table 2: Differentials in total fertility rates by states in various NFHS rounds

	NFHS- I	NFHS-II	NFHS-III
India	3.39	2.85	2.70
Delhi	3.02	2.40	2.10
Haryana	3.99	2.88	2.70
Himachal Pradesh	2.97	2.14	1.90
Jammu & Kashmir	3.13	2.71	2.40
Punjab	2.92	2.21	2.00
Rajasthan	3.63	3.78	3.20
Uttaranchal	n/a	n/a	2.50
Chattisgarh	n/a	n/a	2.60
Madhya Pradesh	3.90	3.31	3.10
Uttar Pradesh	4.82	3.99	3.80
Jharkhand	n/a	n/a	3.30
Bihar	4.00	3.49	4.00
Orissa	2.92	2.46	2.40
West Bengal	2.92	2.29	2.30
Arunachal Pradesh	4.25	2.52	3.00
Assam	3.53	2.31	2.40
Manipur	2.76	3.04	2.80
Meghalaya	3.73	4.57	3.80
Mizoram	2.30	2.89	2.90
Nagaland	3.26	3.77	3.70
Tripura	2.67	n/a	2.20
Sikkim	n/a	2.75	2.00
Goa	1.90	1.77	1.80
Gujarat	2.99	2.72	2.40
Maharashtra	2.86	2.52	2.10
Andhra Pradesh	2.59	2.25	1.80
Karnataka	2.85	2.13	2.10
Kerala	2.00	1.96	1.90
Tamil Nadu	2.48	2.19	1.80

Table 3: Discontinuation rates for men and women by educational level

	Men					Women				
	Never Enrolled (age 7+)	1 & 5 (age 12+)	5 & 10 (age 17+)	10 & 12 (age 19+)	12 & degree (age 23+)	Never Enrolled (age 7+)	1 & 5 (age 12+)	5 & 10 (age 17+)	10 & 12 (age 19+)	12 & degree (age 23+)
All India	20	15	50	43	44	40	16	57	45	44
Age										
7- 9	7					11				
10- 14	6	23				10	22			
15- 19	10	9	51	46		19	9	53	42	
20- 29	14	9	48	38	49	33	11	52	39	46
30- 39	22	12	48	40	45	49	17	66	54	40
40- 59	30	18	53	50	39	61	22	66	54	40
60+	46	29	59	55	39	80	39	75	57	37
Place of Residence										
Metro	7	6	34	38	30	18	9	43	39	37
Other urban	11	9	40	36	25	25	10	46	38	39
More developed villages	21	15	53	50	42	42	18	62	52	55
Less developed villages	25	20	61	48	49	49	24	73	57	60

Income										
Lowest Quintile	29	24	65	50	57	52	26	73	56	58
2nd Quintile	27	22	68	54	63	49	23	73	55	71
3rd Quintile	23	17	63	53	61	43	20	69	60	58
4th Quintile	17	13	52	52	53	36	15	61	50	50
Top Quintile	7	6	30	33	35	22	8	41	37	39
Social Groups										
High caste										
Hindu	8	8	37	36	39	25	11	48	40	40
OBC	18	15	52	47	47	41	16	61	50	46
Dalit	26	19	61	51	53	48	21	66	47	55
Adivasi	31	23	65	43	54	54	25	69	48	49
Muslim	26	21	59	45	47	43	23	66	51	54
Other religion	8	6	34	45	41	14	8	42	40	45

Source: Table A6.2a in Desai et al. (2010)

Table 4: Schooling experiences of children aged 6- 14

	Avg. Annual Expenditure on..										
	Never Enrolled	Dropped Out	Now In School	Absent 6+ days last month	Repeated or Failed	In Private School	In Private Tuition	School Fees	Books, Uniform & Transport	Private Tuition	Total Expenditure
All India	10	5	85	20	6	28	20	481	606	178	1265
Sex											
Male	9	5	87	20	6	29	22	521	625	199	1344
Female	12	5	83	19	6	26	19	436	584	155	1175
Current Standard											
1- 5				21	5	28	18	427	514	127	1068
6- 10				16	9	26	26	636	855	300	1791
Place of Residence											
Metro	5	4	91	5	6	44	33	1564	991	506	3060
Other urban More developed villages	6	5	89	13	5	52	30	1052	923	329	2303
Less developed villages	9	5	87	18	6	24	19	318	609	137	1065
14	14	6	81	26	6	17	15	187	395	92	674
Income											
Lowest Quintile	14	6	79	24	6	15	15	162	374	78	614
2nd Quintile	14	5	81	23	7	15	14	161	373	76	610

3rd Quintile	10	6	84	21	6	22	19	295	502	128	925
4th Quintile	9	5	87	18	6	33	22	505	676	190	1370
Top Quintile	4	2	94	11	4	52	31				
Social Groups											
High caste											
Hindu	3	3	94	15	5	40	27	904	924	346	2174
OBC	9	4	87	21	5	26	20	398	543	149	1090
Dalit	12	5	83	22	8	17	18	271	471	134	876
Adivasi	16	7	77	19	9	15	9	203	392	73	669
Muslim	17	8	76	21	5	33	19	428	521	130	1079
Other religion	2	2	96	4	4	54	27	1446	1370	224	3040
Maximum Household Education											
None	23	7	70	25	6	15	14	152	367	70	589
1- 4 Std	11	8	81	22	9	13	19	132	379	95	607
5- 9 Std	7	5	88	21	7	22	19	288	498	126	912
10- 11 Std	4	2	94	15	4	39	24	662	773	228	1663
12 Std/ Some college	3	3	95	17	5	45	25	806	876	282	1964
Graduate/ Diploma	2	1	97	11	3	58	34	1620	1219	500	3339

Source: Table A6.3a in Desai et al. (2010)

Table 5: Expected direction and strength of income coefficient with fertility outcomes under alternate hypotheses

	Hypothesis I (No controls)	Hypothesis II (in presence of education and occupation controls)	Hypothesis III (in presence of control for institutional context of education and employment opportunities)
Direction	-ve	-ve	-ve
Strength	N/A	Weaker than in Hypothesis I	Weaker than in Hypothesis II

Table 6: Comparison of IHDS with other national surveys on selected variables.

	IHDS 2004- 5	NFHS III 2005- 6	NSS 2004- 5	Census 2001
Urban	26	31	25	28
Per cent literate				
Age 5+	67	67	66	NA
Age 7+	68	69	67	65
Caste				
Other Backward castes	42	40	41	NA
Scheduled castes	21	19	20	16
Scheduled tribes	7	8	9	8
Other	30	32	31	NA
Religion				
Hindu	80	82	82	81
Muslim	14	13	13	13
Christian	2	3	2	2
Sikh	2	2	2	2
Buddhist	1	1	1	1
Jain	1	1	1	1
Others	2	1	1	1
Per cent currently in school (age 5- 14)	80	NA	83	NA
Knowledge of AIDS (women)	54	61	NA	NA
Work participation rate for males	53	NA	55	52
Work participation rate for females	32	NA	29	26
Average family size	5	5	5	5
Number of children ever born to women (40- 4)	4	4	NA	NA
Number of children ever born to women (45- 4)	4	4	NA	NA

Per cent women married (age 15- 49)	73	75	76	77
Per cent women married (all ages)	48	47	48	48
Per cent electricity	72	68	65	56
Per cent piped water	40	25	41	37
TV ownership (color or b/w)	48	25 (color)	37	24
LPG use	33	25	22	18
Per cent flush toilets	23	NA	19	18
Per cent poor	26	NA	27	NA

Table 7: Steps in arriving at the analytical sample

	N
Total number of men in the sample who are between 18- 59 years	68, 487
Restriction I (Number dropped from the analytical sample because they were not married.)	24, 934
Restriction II (Number dropped because there was no corresponding ever married women in the household survey)	12, 134
Total <i>new</i> sample size (men)	31, 419

Table 8: Comparative descriptive statistics of various alternative samples

	Study sample (N= 31, 419)	Men in age range, with no corresponding ever married women in the household survey (N= 12, 134)	Women in the analytical sample (N= 31, 419)	Women in reproductive ages (15- 49 years) who are not part of the analytical sample (N= 16, 311)
Urban	29.65	23.29	29.65	33.31
Per cent literate	74.70	73.23	52.59	78.24
Age 5+	N/A	N/A	N/A	N/A
Age 7+	N/A	N/A	N/A	N/A
Caste				
Brahmins	4.97	5.58	4.97	5.11
Other Backward Castes	40.74	42.23	40.74	40.58
Scheduled Castes	22.17	20.05	22.17	21.98
Scheduled Tribes	7.65	8.26	7.65	7.8
Others	24.47	23.87	24.47	24.53
Religion				
Hindu	82.29	84.36	82.29	81.55
Muslim	11.65	10.59	11.65	12.01
Christian	2.40	1.72	2.40	2.81
Sikh	1.42	1.73	1.42	1.37
Buddhist	0.78	0.35	0.78	0.84
Jain	0.30	0.32	0.30	0.31
Others	1.16	0.90	1.16	1.11
Work participation rate	94.33	88.80	52.65	33.17
Average family size	5.62	7.92	5.62	5.32
Per cent electricity	72.34	72.16	72.34	72.00

Per cent piped water	41.00	34.84	41.00	40.74
TV ownership (color or b/w)	51.09	54.37	51.09	49.45
LPG use	24.80	24.66	24.80	24.94
Per cent flush toilets	22.48	22.89	22.48	23.11
Per cent poor	22.12	25.39	22.12	22.63

Table 9: NFHS- 3 percentage estimates of currently married men and women age 15-49 who want no more children by number of living children, according to wealth index.

Wealth Index	Number of living children							Total
	0	1	2	3	4	5	6+	
	Men							
Lowest	3.4	15.6	68.2	84.1	92.4	94.2	94.6	68.0
Second	3.3	18.4	78.9	89.2	94.3	93.6	96.6	70.5
Middle	4.8	22.2	83.1	91.9	93.2	96.9	94.7	70.2
Fourth	3.6	28.9	87.0	92.4	96.3	92.3	98.0	71.9
Highest	5.8	38.5	91.1	95.2	96.2	95.8	98.1	72.1
	Women							
Lowest	3.0	16.2	65.1	82.0	88.5	89.6	88.8	65.0
Second	2.4	18.9	78.3	87.4	90.3	91.1	89.3	68.2
Middle	2.0	23.3	82.8	92.6	92.9	94.3	89.0	71.0
Fourth	2.8	28.1	86.8	93.6	94.0	92.3	92.1	72.8
Highest	3.7	42.2	91.6	95.4	95.1	94.5	86.7	74.7

Table 10: NFHS- 3 percentage estimates of currently married men and women age 15-49 who want no more children by number of living children, according to education background

Years of education	Number of living children							Total
	0	1	2	3	4	5	6+	
	Men							
No education	6.9	22.8	74.8	87.6	91.5	93.4	95.1	73.6
< 5 years complete	4.1	20.6	81.6	91.5	95	95.2	96.7	73.4
5- 7 years complete	3.7	18.2	82.8	92.4	94.6	95	97.1	69
8- 9 years complete	2.5	21.9	81.7	89.4	94.5	96.1	94.8	66.5
10- 11 years complete	6.5	33.5	88.7	91.4	98.2	94.6	95.1	72.5
12+ years complete	2.7	36.9	90.4	93.7	96.9	93.4	99.7	69.2
	Women							
No education	3.8	21.2	73.3	87.1	90.5	91	89	72.6
< 5 years complete	3.6	28.5	85.9	93.5	91.8	95.2	91.5	74.3
5- 7 years complete	2.5	23.6	84.7	93.2	94.9	93.8	89.1	69.7
8- 9 years complete	1.7	25.9	87.1	94.1	95.4	94.3	96.5	66.8
10- 11 years complete	1.6	33.5	90.4	95	96.2	94.4	87.6	68.8
12+ years complete	1.7	39.3	92.3	96.1	94.2	90.6	88	63.7

Table 11: Categorization of Indian states by expenditure on private tuition, IHDS (2005)

Category	Average Expenditure on Private Tuitions (Rs)	States
High	3000 and above	Jammu & Kashmir, Himachal Pradesh, Punjab, North- East (excluding Assam), Kerala
Medium	2001- 2999	Uttarakhand, Gujarat, Assam, Andhra Pradesh, Karnataka, Tamil Nadu, Delhi, West Bengal
Low	2000 and below	Uttar Pradesh, Bihar, Jharkhand, Rajasthan, Chattisgarh, Madhya Pradesh, Assam, Orissa, Maharashtra (including Goa)

Table 12: NFHS estimates of total fertility rates by caste/ religion groups

	NFHS I (1992- 3)	NFHS II (1998- 9)	NFHS III (2005- 6)
Religion			
Hindus	3.3	2.78	2.59
Muslims	4.41	3.59	3.4
Christians	2.87	2.44	2.34
Sikh	2.43	2.26	1.95
Jain	n/a	1.9	1.54
Buddhist/ Neo- Buddhist	n/a	2.14	2.25
Other	2.77	2.33	3.98
No religion	n/a	3.91	2.92
Caste			
SC	3.92	3.15	2.92
ST	3.55	3.06	3.12
OBC	n/a	2.83	2.75
Other	3.3	2.66	2.35
Don't know	n/a	n/a	1.98

Table 13: Models examining the association between Fertility Outcomes and Level of Income, controlling for men's years of education and occupation.

Model 1	Model 2	Model 3	Model 4
Dependent variable: Ideal number of children/ Current number of children			
Log of income (-)	Log of income (Less negative than Model 1)	Log of income (Less negative than Model 2) Men's education	Log of income (Less negative than Model 3) Men's education Occupation group (Reference occupation: Professionals) Caste groups (Reference caste: Brahmins) Wife's age (Reference age: 18- 23 years) Current residence (Reference area: Rural areas)
	Caste groups (Reference caste: Brahmins) Wife's age (Reference age: 18- 23 years) Current residence (Reference area: Rural areas)	Caste groups (Reference caste: Brahmins) Wife's age (Reference age: 18- 23 years) Current residence (Reference area: Rural areas)	

Table 14: Models examining the Association between fertility outcomes and income level controlling for expenditure on education

Dependent variable: Ideal number of children/ Current number of children

Model 1	Model 2	Model 3
Log of income (-)	Log of income (Less negative than Model 1)	Log of income (Less negative than Model 2)
Men's education	Men's education	Men's education
Occupation group <i>(Reference occupation: Professionals and businessmen)</i>	Occupation group <i>(Reference occupation: Professionals and businessmen)</i>	Occupation group <i>(Reference occupation: Professionals and businessmen)</i>
	State residence categorized in terms of expenditure on education <i>(Reference state: High expenditure state)</i>	State residence categorized in terms of expenditure on education <i>(Reference state: High expenditure state)</i>
		Men's occupation* State residence categorized in terms of expenditure on tuitions
Caste groups <i>(Reference caste: Brahmins)</i>	Caste groups <i>(Reference caste: Brahmins)</i>	Caste groups <i>(Reference caste: Brahmins)</i>
Wife's age <i>(Reference age: 18- 23 years)</i>	Wife's age <i>(Reference age: 18- 23 years)</i>	Wife's age <i>(Reference age: 18- 23 years)</i>
Current residence <i>(Reference area: Rural areas)</i>	Current residence <i>(Reference area: Rural areas)</i>	Current residence <i>(Reference area: Rural areas)</i>

Table 15: Hierarchical Linear Models examining the association between perceived chances of mobility and fertility levels

Dependent variable: Ideal number of children/ Current number of children

Variables	Hypothesized effect	Model 2	Model 3	Model 3a	Model 4	Model 5	Model 6	Model 7 (at the district level)	Model 7a (at the village level)
Level 1		Intercept	Intercept	Intercept	Intercept	Intercept	Intercept	Intercept	Intercept
		Log of income	Log of income	Log of income	Log of income	Log of income	Log of income	Log of income	Log of income
		Men's education	Men's education	Men's education	Men's education	Men's education	Men's education	Men's education	Men's education
		Occupation group	Occupation group	Occupation group	Occupation group	Occupation group	Occupation group	Occupation group	Occupation group
		Caste groups	Caste groups	Caste groups	Caste groups	Caste groups	Caste groups	Caste groups	Caste groups
		Wife's age Current residence	Wife's age Current residence	Wife's age Current residence	Wife's age Current residence	Wife's age Current residence	Wife's age Current residence	Wife's age Current residence	Wife's age Current residence
Level 2									
			Percent of farmers/ Percent of laborers (district)/ Dummy for villages with access to only agricultural employment (village)					Percent of farmers/ Percent of laborers (district)/ Dummy for villages with access to only agricultural employment (village)	Percent of farmers/ Percent of laborers (district)/ Dummy for villages with access to only agricultural employment (village)
Employment prospects (Census of India, 2001 and IHDS, 2005)	+								

Schooling facilities (IHDS, 2005)		Presence of private school in the village		Presence of private school in the village
Women's labor force participation indicators (Census of India, 2001)	+	Per cent of women main workers		Per cent of women main workers
	+	Per cent of marginal workers		Per cent of marginal workers
Demographic indicators (Census of India, 2001)	+	Per cent of SC population	Per cent of SC population	Per cent of SC population
	+	Per cent of ST population	Per cent of ST population	Per cent of ST population
	-	Per cent of literate women	Per cent of literate women	Per cent of literate women
Village/district level socio-economic development indices (Census of India, 2001 and IHDS, 2005)	-		Infrastructure index, Social index, Program index (Village)/ Amenities index (dist. rural)/ Percent urban (dist. Urban)	Infrastructure index, Social index, Program index (Village)/ Amenities index (Dist. rural)/ Percent urban (Dist. urban)

Table 16: Itemized breakdown of infrastructure index, social index and program index.

	Infrastructure index	Social index	Program index
1	Access to paved roads	Mahila mandal (women's organization) in the village	Access to PDS
2	Access to electricity	Youth clubs, sports group or reading group in the village	Access to food work
3	Access to landline phone in the village	Trade union, professional group in the village	Access to SGRY
4	Access to mobile telephone service	SHGs in the village	Access to other govt. Employment program
5	Access to bus stop	Religious or Social/ festive group	Access to other women's welfare program
6	Access to police station	Caste association	Access to Non- formal education program
7	Access to bazaar	Development group or NGO	Access to skill development program
8	Access to kirana store	Agricultural or Milk cooperative	Access to National Old Age Pension scheme
9	Access to bank	Panchayat bhawan	Access to Widow's Pension scheme
10	Access to post office	Pani panchayat	Access to National Maternity scheme
11		Community centre	Access to National Disability Pension scheme
12		Community TV set	Access to Annapurna scheme
13			Access to Safe Drinking Water scheme
14			Access to sanitation program
15			Access to housing program
16			Access to improved stoves
17			Access to agricultural extension programs
18			Access to forestry programs
19			Access to small loans, micro-credit, etc programs
20			Access to ICDS program for immunization
21			Access to ICDS health check up program

22	Access to ICDS food/ meals program
23	Access to ICDS growth monitoring program
24	Access to ICDS early childhood/ pre- school education program
25	Access to ICDS street and light program
26	Access to other

Table 17: Discussion summary in terms of research hypothesis, dependent, independent and control variables

Dependent variable: Fertility outcomes- Desired and Actual fertility

S. No.	Hypothesis	Statistical modeling	Independent variable	Control variables
H1	Negative association between income and fertility outcomes, in the absence of controls	Ordinal logit	Income level	None
H2	Weaker negative association between income and fertility outcomes in the presence of education and occupation controls	Ordinal logit	Men's education level Men's occupation	Income level Caste groups Wife's age Current residence
H3a	Further weaker negative association between income and fertility outcomes in areas that require greater educational expenditure	Ordinal logit	State residence categorized in terms of expenditure on education	Caste groups Wife's age Current residence Education level Occupation affiliation

H3b	Further weaker negative association between income and fertility outcomes in presence of educational and employment opportunities.	Hierarchical linear model	Income level	Men's education level Men's occupation Caste groups Wife's age Current residence	Level 1 variables
			Presence of private school in the village (village) Percent of farmers/ Percent of laborers (district)/ Dummy for villages with access to only agricultural employment (village)	Per cent of women main workers Per cent of marginal workers Per cent of SC population Per cent of ST population Per cent of literate women Infrastructure index, Social index, Program index (Village)/ Amenities index (Dist. rural)/ Percent urban (Dist. urban)	Level 2 variables

Table 18: Mean ideal number of children and number of children by income quintiles, IHDS (2005)

	Average number of ideal children	Average number of living children
Income <0	2.51	2.59
Lowest Quintile	2.55	2.51
2nd Quintile	2.54	2.54
3rd Quintile	2.49	2.51
4th Quintile	2.37	2.42
Highest Quintile	2.22	2.54

Table 19a: Association between ideal number of children and level of income, controlling for men's years of education, occupation and other background characteristics.

	Model 1	Model 2	Model 3	Model 4
Log of personal income	-0.292*** (0.012)	-0.122*** (0.0132)	-0.0439*** (0.0140)	-0.0127 (0.0149)
Men's years of education			-0.0531*** (0.00297)	-0.0500*** (0.00319)
Occupations (Reference group: <i>Professionals</i>)				
Business				0.236*** (0.0673)
Farmers				0.400*** (0.0717)
Laborers				0.302*** (0.0683)
Others				0.169*** (0.0645)
Caste (Reference group: <i>Brahmins</i>)				
Other Upper Caste		0.0755 (0.0670)	-0.0372 (0.0673)	-0.0623 (0.0674)
Other Backward Castes		0.534*** (0.0627)	0.362*** (0.0635)	0.356*** (0.0636)
Scheduled Castes		0.621*** (0.0649)	0.375*** (0.0664)	0.375*** (0.0670)
Scheduled Tribes		0.852*** (0.0737)	0.608*** (0.0751)	0.610*** (0.0756)
Muslim		1.486*** (0.0696)	1.229*** (0.0711)	1.233*** (0.0712)
Sikh, Jain		-0.158 (0.142)	-0.278* (0.142)	-0.322** (0.142)
Christian		-0.319** (0.125)	-0.391*** (0.125)	-0.391*** (0.125)
Wife's age (Reference group: 18- 23 years)				
24- 29 years		0.326*** (0.0430)	0.308*** (0.0431)	0.310*** (0.0431)

30- 34 years		0.737***	0.690***	0.695***
		(0.0438)	(0.0440)	(0.0440)
35 years and above		1.039***	0.967***	0.972***
		(0.0392)	(0.0395)	(0.0396)
Location (Reference group: Rural areas)				
Urban areas		-0.729***	-0.673***	-0.626***
		(0.0339)	(0.0341)	(0.0353)
Metro cities		-1.219***	-1.204***	-1.162***
		(0.0455)	(0.0455)	(0.0462)
Number of observations	26330			

*** p<0.01, ** p<0.05, * p<0.1

Table 19b: Association between living number of children and level of income, controlling for men's years of education and occupation and other background characteristics.

	Model 1	Model 2	Model 3	Model 4
Log of personal income	-0.139*** (0.0101)	-0.120*** (0.0118)	-0.0325*** (0.0125)	-0.007 (0.0133)
Men's years of education			-0.0574*** (0.00267)	-0.0561*** (0.00286)
Occupations (Reference group: <i>Professionals</i>)				
Business				0.418*** (0.0565)
Farmers				0.489*** (0.0612)
Laborers				0.305*** (0.0578)
Others				0.253*** (0.0537)
Caste (Reference group: <i>Brahmins</i>)				
Other Upper Caste		0.0868 (0.0563)	-0.0346 (0.0565)	-0.0628 (0.0567)
OBC		0.470*** (0.0531)	0.290*** (0.0537)	0.288*** (0.0539)
SC		0.734*** (0.0552)	0.472*** (0.0565)	0.495*** (0.0571)
ST		0.539*** (0.0649)	0.276*** (0.0661)	0.305*** (0.0665)
Muslim		1.348*** (0.0605)	1.067*** (0.0617)	1.063*** (0.0619)
Sikh, Jain		-0.0753 (0.113)	-0.199* (0.113)	-0.250** (0.114)
Christian		-0.548*** (0.102)	-0.641*** (0.102)	-0.627*** (0.102)

Wife's age			
(Reference group: 18- 23 years)			
24- 29 years	1.869***	1.865***	1.868***
	(0.0401)	(0.0401)	(0.0401)
30- 34 years	2.749***	2.727***	2.733***
	(0.0424)	(0.0425)	(0.0425)
35 years and above	3.438***	3.393***	3.400***
	(0.0399)	(0.0400)	(0.0401)
Location (Reference group: Rural areas)			
Urban areas	-0.403***	-0.342***	-0.313***
	(0.0292)	(0.0293)	(0.0305)
Metro cities	-0.680***	-0.667***	-0.635***
	(0.0368)	(0.0368)	(0.0376)
Number of observations	27636		

*** p<0.01, ** p<0.05, * p<0.1

Table 20: Average number of ideal children and number of living children by states categorized in terms of expenditure on education, IHDS (2005)

	Average number of ideal children	Average number of living children
High expenditure states	2.36	2.35
Medium expenditure states	2.18	2.25
Low expenditure states	2.25	2.61

Table 21a: Association between desired number of children and income level in the context of expenditure on education

	Model 1	Model 2	Model 3
Log of personal income	-0.0401*** (0.0140)	0.00405 (0.0143)	0.00435 (0.0143)
Men's years of education	-0.0516*** (0.00302)	-0.0603*** (0.00307)	-0.0604*** (0.00307)
Occupations (Reference group: <i>Non- Professionals</i>)			
Professionals	-0.0680** (0.0337)	-0.144*** (0.0341)	0.0437 (0.104)
Expenditure on tuitions (Reference group: <i>High expenditure states</i>)			
Medium expenditure states		-0.238*** (0.0509)	-0.213*** (0.0570)
Low expenditure states		0.993*** (0.0488)	1.051*** (0.0548)
Interaction term 1 (Professionals * Medium expenditure state)			-0.0978 (0.117)
Interaction term 2 (Professionals * Low expenditure state)			-0.267** (0.111)
Caste (Reference group: <i>Brahmins</i>)			
Other Upper Caste	-0.0277 (0.0670)	0.108 (0.0675)	0.107 (0.0676)
Other Backward Castes	0.368*** (0.0632)	0.456*** (0.0637)	0.456*** (0.0637)
Scheduled Castes	0.377*** (0.0662)	0.572*** (0.0668)	0.573*** (0.0669)
Scheduled Tribes	0.619*** (0.0748)	0.625*** (0.0755)	0.621*** (0.0756)
Muslim	1.240*** (0.0708)	1.375*** (0.0715)	1.378*** (0.0716)
Sikh, Jain	-0.267* (0.142)	-0.0248 (0.147)	-0.0225 (0.147)
Christian	-0.388*** (0.125)	0.131 (0.130)	0.139 (0.131)

Women's age (Reference group:			
18- 23 years)			
24- 29 years	0.296***	0.306***	0.307***
	(0.0429)	(0.0433)	(0.0433)
30- 34 years	0.678***	0.716***	0.715***
	(0.0438)	(0.0443)	(0.0443)
35 years and above	0.957***	1.011***	1.011***
	(0.0394)	(0.0398)	(0.0398)
Location (Reference			
group: <i>Rural areas</i>)			
Urban areas	-0.669***	-0.570***	-0.570***
	(0.0341)	(0.0347)	(0.0347)
Metro cities	-1.202***	-0.883***	-0.884***
	(0.0454)	(0.0474)	(0.0474)
Number of			
observations	26, 451		
*** p<0.01, ** p<0.05, * p<0.1			

Table 21b: Association between living number of children and income level in the context of expenditure on education

	Model 1	Model 2	Model 3
Log of personal income	-0.0305** (0.0125)	0.00142 (0.0126)	0.00155 (0.0127)
Men's years of education	-0.0580*** (0.00271)	-0.0626*** (0.00273)	-0.0625*** (0.00273)
Occupations (Reference group: <i>Non- Professionals</i>)			
Professionals	0.0129 (0.0294)	-0.0285 (0.0295)	-0.103 (0.0822)
Expenditure on tuitions (Reference group: <i>High expenditure states</i>)			
Medium expenditure states		-0.0265 (0.0414)	-0.0178 (0.0466)
Low expenditure states		0.641*** (0.0402)	0.600*** (0.0455)
Interaction term 1 (Professionals * Medium expenditure state)			-0.0583 (0.0930)
Interaction term 2 (Professionals * Low expenditure state)			0.185** (0.0900)
Caste (Reference group: <i>Brahmins</i>)			
Other Upper Caste	-0.0424 (0.0563)	0.0241 (0.0564)	0.0247 (0.0564)
Other Backward Castes	0.282*** (0.0535)	0.328*** (0.0536)	0.328*** (0.0536)
Scheduled Castes	0.464*** (0.0564)	0.569*** (0.0566)	0.566*** (0.0566)
Scheduled Tribes	0.277*** (0.0659)	0.278*** (0.0662)	0.283*** (0.0662)
Muslim	1.058*** (0.0615)	1.124*** (0.0618)	1.123*** (0.0618)

Sikh, Jain	-0.208*	-0.0428	-0.0462
	(0.113)	(0.116)	(0.116)
Christian	-0.651***	-0.348***	-0.353***
	(0.101)	(0.103)	(0.103)
Women's age (Reference group: 18- 23 years)			
24- 29 years	1.869***	1.902***	1.902***
	(0.0400)	(0.0403)	(0.0403)
30- 34 years	2.732***	2.782***	2.785***
	(0.0424)	(0.0427)	(0.0427)
35 years and above	3.400***	3.466***	3.468***
	(0.0400)	(0.0404)	(0.0404)
Location (Reference group: <i>Rural areas</i>)			
Urban areas	-0.346***	-0.295***	-0.297***
	(0.0294)	(0.0296)	(0.0296)
Metro cities	-0.665***	-0.496***	-0.496***
	(0.0367)	(0.0383)	(0.0383)
Number of observations	27,764		

*** p<0.01, ** p<0.05, * p<0.1

Table 21c: Discrete change in probabilities for outcome variables for selected characteristics in Model 3, Table 21a and Table 21b at Mean

	Desired Fertility	Actual Fertility
Occupations (Reference group: <i>Non- Professionals</i>)		
Professionals	0.004	0.0101
Expenditure on tuitions (Reference group: <i>High expenditure states</i>)		
Medium expenditure states	0.018	0.002
Low expenditure states	0.091	0.059
Interaction term 1 (Professionals * Medium expenditure state)	0.008	0.006
Interaction term 2 (Professionals * Low expenditure state)	0.022	0.019

Table 22a: Coefficients from village level hierarchical linear models; dependent variable- desired fertility

	Model 2	Model 3	Model 3A	Model 4	Model 5	Model 6	Model 7
Level 1 variables							
Intercept	2.58**	2.58**	2.57**	2.57**	2.55**	2.57**	2.55**
Log of income	-0.004	-0.004	-0.004	-0.003	-0.001	-0.002	-0.0006
Men's years of education	-0.018**	-0.018**	-0.018**	-0.018**	-0.017**	-0.018**	-0.017**
Occupations (Reference group: <i>Non- Professionals</i>)							
Professionals	0.007	0.007	0.007	0.007	0.007	0.007	0.008
Caste (Reference group: <i>Brahmins</i>)							
OBC	0.046	0.048	0.046	0.049	0.049	0.052	0.058
SC	0.158**	0.158**	0.157**	0.161**	0.159**	0.163**	0.164**
ST	0.227**	0.227**	0.227**	0.229**	0.229**	0.233**	0.237**
Other upper caste							
Hindus	0.227**	0.266**	0.263**	0.27005**	0.271**	0.262**	0.276**
Muslim	0.462**	0.462**	0.462**	0.451**	0.464**	0.468**	0.456**
Christian	-0.054	-0.059	-0.054	-0.053	-0.037	-0.035**	-0.025
Other	-0.003	0.003	-0.002	0.005	0.063	0.019	0.082
Wife's age (Reference group: 18- 23 years)							
24- 29 years	0.129**	0.129**	0.129**	0.131**	0.132**	0.131**	0.133**
30- 34 years	0.276**	0.278**	0.276**	0.278**	0.282**	0.278**	0.283**
35 years and above	0.404**	0.404**	0.404**	0.406**	0.411**	0.406**	0.414**

Level 2 variables			
<i>Village level</i>			
<i>employment</i>			
<i>prospects</i>			
Villages with access to only agricultural employment (Reference group: Villages with access to employment in agriculture and other sectors)	-0.07		-0.08
<i>Schooling facilities in the village</i>			
Presence of private school in the village	-0.017		-0.0003
<i>Women's labor force participation indicators</i>			
Per cent of women main workers		-0.006**	-0.006**
Per cent of women marginal workers		0.002	0.001
<i>Demographic indicators</i>			
Per cent of SC population		0.00005	-0.001
Per cent of ST population		-0.0009	-0.0007
Per cent of literate women		-0.019**	-0.016**
<i>Village level socio- economic development indices</i>			
Infrastructure index			-0.019 -0.015

Social index							-0.025**	-0.013
Program index							0.015	0.012**
Level 2 variance	0.181	0.180	0.181	0.171	0.162	0.176	0.176	0.150
Level 1 variance	0.462	0.462	0.462	0.462	0.462	0.462	0.462	0.462
Reduction in Level 2 variance (over Model 2)		0.01	0.00	0.06	0.10	0.03	0.03	0.17

* p <= 0.05, **p <= 0.01

Table 22b: Coefficients from village level hierarchical linear models; dependent variable- living number of children

	Model 2	Model 3	Model 3A	Model 4	Model 5	Model 6	Model 7
Level 1 variables							
Intercept	2.58**	2.57**	2.57**	2.56**	2.55**	2.57**	2.55**
Log of income	0.005	0.005	0.004	0.006	0.0102	0.005	0.008
Men's years of education	-0.019**	-0.019**	-0.019**	-0.019**	-0.018**	-0.019**	-0.018**
Occupations (Reference group: <i>Non- Professionals</i>)							
Professionals	-0.016	-0.016	-0.016	-0.016	-0.014	-0.016	-0.014
Caste (Reference group: <i>Brahmins</i>)							
OBC	0.047	0.05	0.045	0.055	0.0601	0.059	0.073
SC	0.225	0.226**	0.225**	0.229**	0.227**	0.234**	0.234**
ST	0.270**	0.270**	0.269**	0.275**	0.269**	0.277**	0.275**
Other upper caste							
Hindus	0.143*	0.144**	0.145*	0.149*	0.14001	0.153*	0.141**
Muslim	0.439**	0.438**	0.438**	0.428**	0.444**	0.446**	0.439**
Christian	-0.115	-0.117	-0.116	-0.104	-0.077	-0.1103	-0.079
Other	-0.261*	-0.257*	-0.262	-0.252*	-0.1502	-0.242*	-0.139
Wife's age (Reference group: 18- 23 years)							
24- 29 years	1.05**	1.05**	1.05**	1.05**	1.05**	1.05**	1.05**
30- 34 years	1.52**	1.51**	1.51**	1.52**	1.53**	1.52**	1.53**
35 years and above	1.87**	1.86**	1.87**	1.87**	1.88**	1.87**	1.88**

Level 2 variables							
<i>Village level employment prospects</i>							
Villages with access to only agricultural employment							
		-0.02					-0.032
<i>Schooling facilities in the village</i>							
Presence of private school in the village							
			0.049				0.066
<i>Women's labor force participation indicators</i>							
Per cent of women main workers							
						-0.004**	-0.003*
Per cent of women marginal workers							
						0.002	0.0009
<i>Demographic indicators</i>							
Per cent of SC population							
						0.002	0.001
Per cent of ST population							
						0.0001	0.0007
Per cent of literate women							
						-0.017**	-0.016**
<i>Village level socio- economic development indices</i>							
Infrastructure index							
						0.011	0.016
Social index							
						-0.028**	-0.019**
Program index							
						0.008	0.005
Level 2 variance	0.319	0.102	0.102	0.097	0.088	0.097	0.082
Level 1 variance	0.838	0.838	0.838	0.838	0.838	0.838	0.838
Reduction in Level 2 variance (over Model 2)		0.68	0.68	0.70	0.72	0.70	0.74

* p <= 0.05, **p <= 0.01

Table 23a: Coefficients from district- level hierarchical linear models (rural), dependent variable- desired number of children

	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Level 1 variables						
Intercept	2.57**	2.57**	2.56**	2.54**	2.55**	2.53**
Log of income	-0.009	-0.009	-0.009	-0.008	-0.008	-0.007
Men's years of education	-0.02005**	-0.019**	-0.019**	-0.019**	-0.019**	-0.019**
Occupations (Reference group: <i>Non- Professionals</i>)						
Professionals	0.012	0.013	0.013	0.013	0.013	0.014
Caste (Reference group: <i>Brahmins</i>)						
OBC	0.079	0.079	0.085	0.083	0.086	0.085
SC	0.168**	0.169**	0.172**	0.173**	0.172**	0.173**
ST	0.2301**	0.231**	0.234**	0.237**	0.234**	0.237**
Other upper caste						
Hindus	0.297**	0.296**	0.299**	0.306**	0.294**	0.308**
Muslim	0.512**	0.514**	0.512**	0.513**	0.516**	0.511**
Christian	0.025	0.026	0.029	0.041**	0.035**	0.044
Other	0.131	0.149	0.139	0.169	0.197	0.197

Wife's age (Reference group: 18- 23 years)							
24- 29 years	0.123**	0.123**	0.123**	0.124**	0.123**	0.124**	
30- 34 years	0.272**	0.273**	0.273**	0.275**	0.275**	0.275**	
35 years and above	0.399**	0.40002**	0.401**	0.402**	0.402**	0.403**	

Level 2 variables

Employment opportunities

Per cent of farmers		0.006				0.0006
Per cent of laborers		0.004				0.002

*Women's labor force
participation indicators*

Per cent of women main workers				-0.014**		-0.005
Per cent of women marginal workers				0.0106		0.003

Demographic indicators

Per cent of SC population				-0.014		-0.015*
Per cent of ST population				-0.004		-0.007*
Per cent of literate women				-0.039**		-0.014*

Amenities index

Average amenities indes					-0.064**	-0.054**
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Level 2 variance	0.162	0.157	0.136	0.119	0.117	0.10009
Level 1 variance	0.497	0.497	0.497	0.497	0.497	0.497
Reduction in Level 2 variance (over Model 2)		0.68	0.73	0.76	0.76	0.80

* p <= 0.05, **p <= 0.01

Table 23b: Coefficients from district- level hierarchical linear models (rural), dependent variable- living number of children

	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Level 1 variables						
Intercept	2.59**	2.601**	2.59**	2.56**	2.57**	2.55**
Log of income	0.008	0.009	0.008	0.011	0.012	0.013
Men's years of education	-0.02001**	-0.019**	-0.019**	-0.019**	-0.019**	-0.019**
Occupations (Reference group: <i>Non- Professionals</i>)						
Professionals	-0.005	-0.004	-0.003	-0.002	-0.005	0.0003
Caste (Reference group: <i>Brahmins</i>)						
OBC	0.089	0.091	0.099	0.109	0.104	0.114
SC	0.242**	0.245**	0.249**	0.257**	0.247**	0.257**
ST	0.308**	0.31002**	0.315**	0.3204**	0.314**	0.32003**
Other upper caste						
Hindus	0.214**	0.208**	0.217**	0.242**	0.198**	0.243**
Muslim	0.504**	0.509**	0.501**	0.518**	0.507**	0.5104**
Christian	-0.141	-0.137	-0.128	-0.108	-0.098	-0.094
Other	0.062	0.101	0.063	0.154	0.177	0.201
Wife's age (Reference group: 18- 23 years)						
24- 29 years	1.05**	1.05**	1.05**	1.05**	1.05**	1.05**
30- 34 years	1.51**	1.52**	1.51**	1.52**	1.52**	1.52**
35 years and above	1.87**	1.87**	1.87**	1.87**	1.87**	1.87**

Level 2 variables						
<i>Employment opportunities</i>						
Per cent of farmers		0.007**				0.002
Per cent of laborers		0.0003				-0.0006
<i>Women's labor force participation indicators</i>						
Per cent of women main workers				-0.013*		-0.003
Per cent of women marginal workers				0.007		-0.002
<i>Demographic indicators</i>						
Per cent of SC population				0.005		0.002
Per cent of ST population				-0.00101		-0.003
Per cent of literate women				-0.034**		-0.016
<i>Amenities index</i>						
Average amenities index					-0.062**	-0.046**
Level 2 variance	0.092	0.084	0.077	0.059	0.056	0.049
Level 1 variance	0.856	0.856	0.856	0.856	0.856	0.856
Reduction in Level 2 variance (over Model 2)		0.90	0.91	0.93	0.93	0.94

* p <= 0.05, **p <= 0.01

Table 24a: Coefficients from district- level hierarchical linear models (urban), dependent variable- desired number of children

	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Level 1 variables						
Intercept	2.57**	2.57**	2.54**	2.56**	2.57**	2.55**
Log of income	-0.009	-0.009	-0.009	-0.008	-0.009	-0.008
Men's years of education	-0.02004**	-0.02006**	-0.02008**	-0.019**	-0.02003**	-0.019**
Occupations (Reference group: <i>Non- Professionals</i>)						
Professionals	0.012	0.012	0.013	0.013	0.012	0.013
Caste (Reference group: <i>Brahmins</i>)						
OBC	0.079	0.08002	0.083	0.086	0.0805	0.085
SC	0.168**	0.169**	0.173**	0.177**	0.169**	0.176**
ST	0.2301**	0.2305**	0.235**	0.239**	0.231**	0.239**
Other upper caste						
Hindus	0.297**	0.297**	0.303**	0.304**	0.297**	0.303**
Muslim	0.512**	0.512**	0.513**	0.514**	0.513**	0.513**
Christian	0.025	0.026	0.025	0.042	0.029	0.037
Other	0.131	0.133	0.155	0.188	0.138	0.185
Wife's age (Reference group: 18- 23 years)						
24- 29 years	0.123**	0.123**	0.123**	0.123**	0.123**	0.123**
30- 34 years	0.272**	0.272**	0.273**	0.274**	0.272**	0.274**
35 years and above	0.399**	0.399**	0.4007**	0.402**	0.399**	0.402**

Level 2 variables						
<i>Employment opportunities</i>						
Per cent of farmers		0.0103				0.004
Per cent of laborers		-0.005				0.007
<i>Women's labor force participation indicators</i>						
Per cent of women main workers				-0.039**		-0.024**
Per cent of women marginal workers				0.019		-0.002
<i>Demographic indicators</i>						
Per cent of SC population					-0.026**	-0.022*
Per cent of ST population					0.0002	0.003
Per cent of literate women					-0.0809**	-0.0501**
<i>Amenities index</i>						
Per cent urban						-0.455
						-0.102
Level 2 variance	0.162	0.162	0.113	0.101	0.157	0.094
Level 1 variance	0.497	0.497	0.497	0.497	0.497	0.497
Reduction in Level 2 variance (over Model 2)		0.67	0.77	0.80	0.68	0.81

* p <= 0.05, **p <= 0.01

Table 24b: Coefficients from district- level hierarchical linear models (urban), dependent variable- living number of children

	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Level 1 variables						
Intercept	2.59**	2.61**	2.57**	2.57**	2.59**	2.57**
Log of income	0.008	0.008	0.008	0.011	0.008	0.0101
Men's years of education	-0.020006**	-0.0201**	-0.02002**	-0.019**	-0.019**	-0.019**
Occupations (Reference group: <i>Non- Professionals</i>)						
Professionals	-0.005	-0.004	-0.002	-0.002	-0.004	-0.0008
Caste (Reference group: <i>Brahmins</i>)						
OBC	0.089	0.0905	0.095	0.112	0.092	0.1102
SC	0.242**	0.246**	0.249**	0.259**	0.242**	0.261**
ST	0.307**	0.311**	0.316**	0.324**	0.310**	0.324**
Other upper caste						
Hindus	0.215**	0.212**	0.219**	0.237**	0.214**	0.232**
Muslim	0.504**	0.505**	0.501**	0.515**	0.507**	0.512**
Christian	-0.141	-0.139	-0.129	-0.102	-0.129	-0.114
Other	0.062	0.065	0.077	0.196	0.076	0.189
Women's age (Reference group: <i>18- 23 years</i>)						
24- 29 years	1.05**	1.05**	1.05**	1.05**	1.05**	1.05**
30- 34 years	1.51**	1.51**	1.51**	1.52**	1.51**	1.52**
35 years and above	1.86**	1.86**	1.86**	1.87**	1.86**	1.87**

Level 2 variables							
<i>Employment opportunities</i>							
Per cent of farmers			0.02				-0.004
Per cent of laborers			-0.019				-0.016
<i>Women's labor force participation indicators</i>							
Per cent of women main workers						-0.037**	-0.019**
Per cent of women marginal workers						0.0105	0.004
<i>Demographic indicators</i>							
Per cent of SC population						0.002	0.005
Per cent of ST population						-0.002	-0.0004
Per cent of literate women						-0.081**	-0.06**
<i>Amenities index</i>							
Per cent urban							-0.514*
							-0.136
Level 2 variance	0.092	0.087	0.055	0.046	0.087	0.04	
Level 1 variance	0.856	0.856	0.856	0.856	0.856	0.856	0.856
Reduction in Level 2 variance (over Model 2)		0.90	0.94	0.95	0.90	0.95	

* p <= 0.05, **p <= 0.01

Table 25: Summary of research hypothesis and empirical results

S. No.	Hypothesis	Statistical modeling	Independent variable/ Key Level 2 variables	Dependent variable Desired fertility	Dependent variable Actual fertility
H1	Negative association between income and fertility outcomes, in the absence of controls	Ordinal logit	Income level	Support	Support
H2	Weaker negative association between income and fertility outcomes in the presence of education and occupation controls	Ordinal logit	Men's education level	Support	Support
			Men's occupation	Support	Support
H3a	Further weaker negative association between income and fertility outcomes in areas that require greater educational expenditure	Ordinal logit	State residence categorized in terms of expenditure on education	Support	Support
H3b	Further weaker negative association between income and fertility outcomes in presence of educational and employment opportunities.	Hierarchical linear model	Percent of farmers/ Percent of laborers (district)/ Dummy for villages with access to only agricultural employment (village)	Not supported	Support <i>only</i> for district-level rural models
			Presence of private school in the village (village)	Not supported	Not supported

Table 26: Distribution of occupation profile of men, 1951- 1991

	1951	1961	1971	1981	1991
Cultivation	54	51	46	44	40
Agricultural labour	13	13	12	20	21
Livestock, forestry, fishing, hunting and plantations, orchards and allied activities	-	3	2	2	2
Mining and quarrying	-	-	1	1	1
Manufacturing, processing, servicing and repairs in household industry	12	6	3	3	2
Manufacturing, processing, servicing and repairs in non-household industries	-	6	7	9	9
Construction	-	1	1	2	2
Trade and commerce	6	5	6	7	9
Transport, storage and communications	2	2	3	3	4
Other services	13	12	9	9	11

Source: Census of India, various years.

Table 27: Steps towards arriving at the analytical sample

	N
Total number of men in the sample who are between 18- 59 years	68, 487
Restriction I (Number dropped from the analytical sample because they were not married.)	24, 934
Restriction II (Number dropped because there was no corresponding ever married women in the household survey)	12, 134
Restriction III (Number dropped because we do not have information about the head of the household's father)	2, 305
Total <i>new</i> sample size (men)	29,114

Table 28: Comparative descriptive statistics of two alternative samples

	Previous sample (N= 30, 431)	New sample (N= 29, 114)
Urban	29.64	30.05
Per cent literate	74.71	70.70
Age 5+	N/A	N/A
Age 7+	N/A	N/A
Caste		
Brahmins	4.95	4.66
Other Backward Castes	40.74	40.72
Scheduled Castes	22.18	22.42
Scheduled Tribes	7.66	8.27
Others	24.46	23.93
Religion		
Hindu	82.29	82.30
Muslim	11.65	11.70
Christian	2.40	2.50
Sikh	1.42	1.30
Buddhist	0.78	0.80
Jain	0.30	0.30
Others	1.16	1.10
Work participation rate	94.33	94.60
Average family size	5.62	5.30
Per cent electricity	72.32	71.50
Per cent piped water	40.98	40.70
TV ownership (color or b/w)	51.07	49.20
LPG use	24.79	36.60
Per cent flush toilets	22.48	22.30
Per cent poor	22.09	21.80

Table 29: Models examining the association between fertility outcomes and level of income, controlling for men's years of education and inter- generational occupation mobility

Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Dependent variable: Ideal number of children/ Current number of children					
Log of income (-)	Log of income (--)	Log of income (--)	Log of income (--)	Log of income (--)	Log of income (--)
		Men's education	Men's education	Men's education	Men's education
			Men's Occupation group (Reference occupation: Professionals)	Men's Occupation group (Reference occupation: Professionals)	Occupation group (Reference occupation: Professionals)
	Caste groups (Reference caste: Brahmins)	Caste groups (Reference caste: Brahmins)	Caste groups (Reference caste: Brahmins)	Father's Occupation group (Reference occupation: Professionals)	Father's Occupation group (Reference occupation: Professionals)
	Wife's age (Reference age: 18-23 years)	Wife's age (Reference age: 18-23 years)	Wife's age (Reference age: 18-23 years)	Caste groups (Reference caste: Brahmins)	Interaction term: Men's occupations* Father's occupations (Reference occupation: Professionals * Professionals)
	Current residence (Reference area: Rural areas)	Current residence (Reference area: Rural areas)	Current residence (Reference area: Rural areas)	Wife's age (Reference age: 18-23 years)	Caste groups (Reference caste: Brahmins)

Current residence
(Reference area: Rural
areas)

Wife's age
(Reference age: 18- 23
years)

Current residence
(Reference area: Rural
areas)

Table 30: Inter- generational mobility across occupations

		Father's occupations	
		Non- professionals	Professionals
Men's occupations	Non- professionals	95.52	4.48
	Professionals	77.51	22.49

Table 31a: Association between desired number of children and income level taking into account inter- generational occupation mobility

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Log of personal income	-0.277*** (0.0120)	-0.102*** (0.0137)	-0.0253* (0.0145)	-0.0218 (0.0147)	-0.0214 (0.0147)	-0.0213 (0.0147)
Men's years of education			-0.0524*** (0.00321)	-0.0514*** (0.00327)	-0.0509*** (0.00328)	-0.0509*** (0.00328)
Men's Occupation (Reference group: <i>Non- Professionals</i>)						
Professionals				-0.0567 (0.0364)	-0.0433 (0.0371)	-0.0487 (0.0396)
Father's Occupation (Reference group: <i>Non- Professionals</i>)						
Professionals					-0.0999* (0.0555)	-0.123 (0.0809)
Interaction term (Men's Occupation * Father's Occupation)						0.0433 (0.109)
Caste (Reference group: <i>Brahmins</i>)						
Other Upper Caste		0.103 (0.0741)	-0.00465 (0.0745)	-0.00832 (0.0745)	-0.0155 (0.0746)	-0.0149 (0.0746)
Other Backward Castes		0.577*** (0.0694)	0.415*** (0.0702)	0.410*** (0.0703)	0.398*** (0.0705)	0.399*** (0.0706)
Scheduled Castes		0.629***	0.398***	0.391***	0.378***	0.379***

	(0.0715)	(0.0730)	(0.0732)	(0.0734)	(0.0735)
Scheduled Tribes	0.850***	0.628***	0.621***	0.610***	0.610***
	(0.0804)	(0.0817)	(0.0818)	(0.0820)	(0.0821)
Muslim	1.534***	1.293***	1.292***	1.283***	1.284***
	(0.0762)	(0.0777)	(0.0777)	(0.0778)	(0.0779)
Sikh, Jain	-0.134	-0.242	-0.244	-0.245	-0.246
	(0.161)	(0.161)	(0.161)	(0.161)	(0.161)
Christian	-0.319**	-0.377***	-0.386***	-0.393***	-0.392***
	(0.139)	(0.140)	(0.140)	(0.140)	(0.140)
Women's age (Reference group: 18- 23 years)					
24- 29 years	0.316***	0.335***	0.335***	0.334***	0.335***
	(0.0473)	(0.0475)	(0.0475)	(0.0475)	(0.0475)
30- 34 years	0.677***	0.686***	0.687***	0.689***	0.689***
	(0.0476)	(0.0477)	(0.0477)	(0.0478)	(0.0478)
35 years and above	0.983***	0.983***	0.984***	0.985***	0.985***
	(0.0424)	(0.0425)	(0.0425)	(0.0426)	(0.0426)
Location (Reference group: <i>Rural areas</i>)					
Urban areas	-0.721***	-0.655***	-0.652***	-0.646***	-0.646***
	(0.0361)	(0.0363)	(0.0364)	(0.0365)	(0.0365)
Metro cities	-1.221***	-1.187***	-1.188***	-1.184***	-1.184***
	(0.0483)	(0.0483)	(0.0483)	(0.0483)	(0.0483)
Number of observations	23,022				
*** p<0.01, ** p<0.05, * p<0.1					

Table 31b: Association between living number of children and income level taking into account inter- generational occupation mobility

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Log of personal income	-0.148*** (0.011)	-0.117*** (0.0124)	-0.0448*** (0.0131)	-0.0460*** (0.0132)	-0.0446*** (0.0132)	-0.0444*** (0.0132)
Men's years of education			-0.0474*** (0.00288)	-0.0477*** (0.00293)	-0.0465*** (0.00294)	-0.0464*** (0.00294)
Men's Occupation (Reference group: <i>Non- Professionals</i>)						
Professionals				0.0190 (0.0319)	0.0504 (0.0326)	0.0404 (0.0349)
Father's Occupation (Reference group: <i>Non- Professionals</i>)						
Professionals					-0.230*** (0.0470)	-0.270*** (0.0682)
Interaction term (Men's Occupation * Father's Occupation)						0.0734 (0.0919)
Caste (Reference group: <i>Brahmins</i>)						
Other Upper Caste		0.0707 (0.0619)	-0.0279 (0.0621)	-0.0268 (0.0622)	-0.0435 (0.0622)	-0.0427 (0.0622)
Other Backward Castes		0.480*** (0.0583)	0.335*** (0.0589)	0.337*** (0.0590)	0.310*** (0.0592)	0.311*** (0.0593)
Scheduled Castes		0.717*** (0.0605)	0.508*** (0.0617)	0.510*** (0.0618)	0.482*** (0.0621)	0.483*** (0.0621)
Scheduled Tribes		0.516*** (0.0703)	0.313*** (0.0714)	0.315*** (0.0715)	0.290*** (0.0717)	0.291*** (0.0717)

Muslim	1.389***	1.164***	1.165***	1.144***	1.146***
	(0.0659)	(0.0671)	(0.0672)	(0.0673)	(0.0673)
Sikh, Jain	0.0338	-0.0618	-0.0615	-0.0624	-0.0649
	(0.128)	(0.128)	(0.128)	(0.128)	(0.128)
Christian	-0.433***	-0.500***	-0.496***	-0.510***	-0.507***
	(0.113)	(0.113)	(0.113)	(0.113)	(0.113)
Women's age (Reference group: 18- 23 years)					
24- 29 years	1.962***	1.991***	1.991***	1.992***	1.993***
	(0.0444)	(0.0445)	(0.0445)	(0.0446)	(0.0446)
30- 34 years	2.771***	2.801***	2.800***	2.806***	2.807***
	(0.0463)	(0.0465)	(0.0465)	(0.0465)	(0.0465)
35 years and above	3.470***	3.493***	3.492***	3.497***	3.497***
	(0.0434)	(0.0435)	(0.0435)	(0.0436)	(0.0436)
Location (Reference group: <i>Rural areas</i>)					
Urban areas	-0.371***	-0.310***	-0.311***	-0.297***	-0.297***
	(0.0313)	(0.0315)	(0.0316)	(0.0317)	(0.0317)
Metro cities	-0.665***	-0.635***	-0.635***	-0.626***	-0.626***
	(0.0391)	(0.0391)	(0.0391)	(0.0392)	(0.0392)
Number of observations	24249				

*** p<0.01, ** p<0.05, * p<0.1

Table I: State- wise distribution of the IHDS sample

	District in 2001 census	Included in IHDS				Households surveyed			Individuals surveyed		
		Districts	Urban areas	Blocks	Villages	Rural	Urban	Total	Rural	Urban	Total
Jammu & Kashmir	14	5	5	21	20	400	315	715	2528	1702	4230
Himachal Pradesh	12	9	7	21	52	1057	315	1372	5663	1503	7166
Punjab	17	13	11	36	61	1033	560	1593	6202	2831	9033
Chandigrah	1	1	1	6	0	0	90	90	0	383	383
Uttaranchal	13	6	3	9	20	309	149	458	1757	736	2493
Haryana	19	14	6	18	79	1350	268	1618	8112	1291	9403
Delhi	9	10	7	56	6	60	900	960	329	4291	4620
Rajasthan	32	23	17	60	88	1590	895	2485	9663	4805	14468
Uttar Pradesh	70	43	24	75	138	2389	1123	3512	14966	6499	21465
Bihar	37	17	10	31	61	965	465	1430	5950	2856	8806
Sikkim	4	1	1	3	3	60	45	105	293	212	505
Arunachal Pradesh	13	1	1	3	6	120	45	165	623	209	832
Nagaland	8	4	1	2	5	100	30	130	480	84	564
Manipur	9	3	1	3	3	60	45	105	359	239	598
Mizoram	8	1	1	3	3	60	45	105	263	239	502
Tripura	4	2	1	3	7	184	45	229	818	190	1008
Meghalaya	7	3	1	3	6	116	45	161	505	250	755
Assam	23	8	7	21	38	699	318	1017	3286	1404	4690
West Bengal	18	14	21	75	66	1247	1133	2380	6170	4788	10958
Jharkhand	18	6	9	27	26	519	405	924	2913	2095	5008
Orissa	30	26	13	40	84	1464	600	2064	7710	2886	10596
Chattisgarh	16	15	6	18	49	905	270	1175	4833	1377	6210
Madhya Pradesh	45	31	13	42	121	2177	628	2805	12392	3409	15801
Gujarat	25	17	14	60	70	1167	911	2078	5926	4234	10160
Diu and Daman	2	2	0	0	3	60	0	60	281	0	281

Dadra and Nagar Haveli	1	1	0	0	3	60	0	60	315	0	315
Maharashtra	35	27	18	75	115	2078	1125	3203	10881	5721	16602
Andhra Pradesh	23	19	18	60	94	1526	909	2435	6669	3992	10661
Karnataka	27	26	21	78	144	2832	1189	4021	14184	5675	19859
Goa	2	2	1	3	6	100	65	165	475	307	782
Lakshadweep	1	0	0	0	0	0	0	0	0	0	0
Kerala	14	12	14	42	61	1089	642	1731	4892	3089	7981
Tamil Nadu	30	21	22	74	62	898	1200	2098	3691	4855	8546
Pondicherry	4	1	1	3	3	60	45	105	245	228	473
Andaman and Nicobar	2	0	0	0	0	0	0	0	0	0	0
Total	593	384	276	971	1503	26734	14820	41554	143374	72380	215754

Source: Table A1.1 in Desai et al. (2010)

Table II: Occupation Codes as used in Census of India, 2001

Division	Occ Code (2 digit)	Description	Occupation Category	Occupation Type
Professional, Technical and Related Workers Division 0-1	0	Physical Scientists	1	Upper Professional
	1	Physical Science Technician	2	Lower Professional
	2	Architects, Engineers, Technologists & Surveyors	1	Upper Professional
	3	Engineering Technicians	2	Lower Professional
	4	Aircraft and Ships Officers	1	Upper Professional
	5	Life Scientists	1	Upper Professional
	6	Life Science Technicians	2	Lower Professional
	7	Physicians (all, allopathic, homeopathic, veterinary, dental)	1	Upper Professional
	8	Nurses and medical technicians	2	Lower Professional
	9	Scientific, Technical, Medical trained other	2	Lower Professional
	10	Mathematicians, statistician & related	1	Upper Professional
	11	Economist & related	1	Upper Professional
	12	Accountants, auditors & related	1	Upper Professional
	13	Social scientists & related	1	Upper Professional
	14	Jurists	1	Upper Professional
	15	Teachers	6	Teachers
	16	Poets, authors, journalists & related	2	Lower Professional
	17	Sculptors, painters, creative	2	Lower Professional
	18	Composers and performing artists	2	Lower Professional
	19	Professionals n.e.c.	2	Lower Professional

**Administrative, Executive
and
Managerial Workers**

20	Elected & Legislative Officials	3	Managers
21	Administrative & exec. Officers Govt. & local bodies	3	Managers
22	Working Proprietors, Directors & managers, Wholesale & retail trade	4	Proprietors
23	Directors & managers, Financial Institutions	3	Managers
24	Working proprietors & managers, Mining, Construction, Mfg.	4	Proprietors
25	Working Proprietors, Transport, Storage & communication	4	Proprietors
26	Working Proprietors, Directors, Managers Other	4	Proprietors
29	Administrative, Executive, Managerial workers n.e.c.	3	Managers

**Clerical and
Related Workers**

30	Clerical and Other Supervisors	5	Clerical
31	Village Officials	5	Clerical
32	Stenographers, Typist, Tape & punch operators	5	Clerical
33	Book-keepers, cashiers and related workers	5	Clerical
34	Computing Machine Operators	5	Clerical
35	Clerical and related workers n.e.c.	5	Clerical
36	Transport and Communication Supervisors	5	Clerical
37	Transport conductors and guards	16	Transport
38	Mail distributors and related workers	16	Transport
39	Telephone and telegraph operators	5	Clerical

Sales workers

40	Merchants and shopkeepers, Wholesale and retail (Wholesale is propr)	4 & 7	Proprietors & Merchants
41	Manufacturers' agents	2	Lower Professional
42	Technical salesmen and commercial travellers	2	Lower Professional
43	Salesmen, shop assistants and related	8	Salesmen
44	Salesmen - insurance, real estate, securites, business services	2	Lower Professional
45	Money Landers and Pawn Brokers	7	Merchants

	49	Sales workers n.e.c.	8	Salesmen
Service workers				
	50	Hotel and Restaurant Keepers	7	Merchants
	51	Housekeepers, matrons, stewards (domestic & institutional)	9	Service
	52	Cooks, waiters, bartenders and related (domestic & institutional)	9	Service
	53	Maids & other house keeping service workers n.e.c.	9	Service
	54	Building caretakers, sweepers, cleaners and related workers	9	Service
	55	Launderers, dry-cleaners and pressers	9	Service
	56	Hair dressers, barbers, beauticians and related workers	9	Service
	57	Protective service workers	9	Service
	59	Service workers n.e.c.	9	Service
Farmers, Fisherman, Hunters, Loggers and Related Workers				
	60	Farm Plantation, Dairy and other Managers and Supervisors	12	Planter
	61	Cultivators (Tenant & Owner) with land less than 5 acres	10	Small Farmers
	61	Large Farmers (land cultivated > 5 acres)	11	Large Farmer
	62	Farmers other than cultivators	12	Planter
	63	Agricultural laborers	13	Farm Labor
	64	Plantation Laboreres and Related Workers	14	Other Agr. Labor
	65	Other farm workers	14	Other Agr. Labor
	66	Forestry workers	14	Other Agr. Labor
	67	Hunters and related workers	14	Other Agr. Labor
	68	Fishermen and related workers	14	Other Agr. Labor
Production and Related Workers, Transport Equipment Operators and Laborers				
	71	Miners, Quarrymen, Well Drillers and related workers	15	Machine Operators
	72	Metal Processors	15	Machine Operators
	73	Wood preparation workers and paper makers	18	Laborers
	74	Chemical Processors and related workers	15	Machine Operators

75	Spinners, weavers, knitters, dyers and related workers	16	Artisan
76	Tanners, Fellmongers and Pelt dressers	16	Artisan
77	Food and beverage processors	18	Laborers
78	Tobacco preparers and tobacco product makers	18	Laborers
79	Tailors, dressmakers, sewers, upholsterers and related workers	16	Artisan
80	Shoe makers and leather good makers	16	Artisan
81	Carpenters, cabinet makers and related wood workers	16	Artisan
82	Stone cutters and carvers	16	Artisan
83	Blacksmith, tool makers and machine tool operators	15	Machine Operators
84	Machinery fitters, assemblers, and precision instrument makers	15	Machine Operators
85	Electric fitters and related electric, electronic workers	15	Machine Operators
86	Broadcasting equipment and sound equipment operators	15	Machine Operators
87	Plumbers, welders, sheet metal and structural metal workers	15	Machine Operators
88	Jewellery and precious metal workers	15	Machine Operators
89	Glass formers, potters and related workers	16	Artisan
90	Rubber and plastic product makers	15	Machine Operators
91	Paper and paper board makers	15	Machine Operators
92	Printing and related workers	15	Machine Operators
93	Painters	18	Laborers
94	Production and related workers n.e.c.	15	Machine Operators
95	Bricklayers and other construction workers	18	Laborers
96	Stationary engines and related equipment operators, oilers and greasers	15	Machine Operators
97	Material handling and related equipment operators, loaders, unloaders	18	Laborers
98	Transport equipment operators	17	Tansport
Workers not classified by occupation			
99	Laborers n.e.c.	18	Laborers

Table III: Average expenditure on school fees by states, IHDS (2005).

	Average expenditure on school fees	Expenditure category state
Jammu & Kashmir	3536.47	High
Himachal Pradesh	3576.01	High
Punjab	4166.9	High
Uttarakhand	2300.65	Medium
Haryana	3481.34	High
Delhi	2866.52	Medium
Uttar Pradesh	1374.59	Low
Bihar	1254.69	Low
Jharkhand	1725.80	Low
Rajasthan	1755.39	Low
Chattisgarh	1027.09	Low
Madhya Pradesh	1067.49	Low
North East	3059.21	High
Assam	944.03	Low
West Bengal	2306.16	Medium
Orissa	1121.69	Low
Gujarat	2257.98	Medium
Maharashtra, Goa	1411.46	Low
Andhra Pradesh	2065.23	Medium
Karnataka	2508.68	Medium
Kerala	3208.30	High
Tamil Nadu	2528.17	Medium

Table IV: Average number of ideal children and number of living children by caste background, IHDS (2005)

	Average number of ideal children	Average number of living children
Brahmins	2.19	2.21
Other Upper Caste	2.20	2.22
Other Backward Castes	2.42	2.44
Scheduled Castes	2.45	2.53
Scheduled Tribes	2.64	2.49
Muslims	2.76	2.77
Sikhs, Jains	2.08	2.23
Christians	2.14	2.07

Table V: Average number of ideal children and number of living children by women's age, IHDS (2005).

	Average number of ideal children	Average number of living children
18- 23 years	2.24	1.16
24- 29 years	2.29	2.12
30- 34 years	2.44	2.60
35+ years	2.55	2.96

Table VI: Average number of ideal children and number of living children by location, IHDS (2005).

	Average number of ideal children	Average number of living children
Rural	2.55	2.54
Urban	2.25	2.31
Metro	2.08	2.18

Table VII: Average number of ideal children and number of living children by (men's) education background, IHDS (2005).

	Average number of ideal children	Average number of living children
Illiterate	2.66	2.75
Primary education	2.505	2.62
Upper primary education	2.42	2.44
Secondary education	2.304	2.28
Senior secondary education	2.27	2.19
College education	2.11	1.96

Table VIII: Average number of ideal children and number of living children by occupation groups, IHDS (2005).

	Average number of ideal children	Average number of living children
Professionals	2.15	2.102
Businessmen	2.36	2.46
Farmers	2.53	2.57
Laborers	2.56	2.54
Others	2.29	2.35

Table IX: Association between ideal and living number of children and level of income, controlling for men's and *wife's* years of education, occupation and other background characteristics

	Dependent Var:	Dependent Var:
	Ideal number of children	Living number of children
	Model 1	Model 2
Log of personal income	0.0299** (0.0150)	0.0504*** (0.0134)
Men's years of education	-0.0120*** (0.00349)	-0.0106*** (0.00317)
Occupations (Reference group: <i>Professionals</i>)		
Business	0.134** (0.0673)	0.315*** (0.0564)
Farmers	0.264*** (0.0717)	0.354*** (0.0613)
Laborers	0.110 (0.0685)	0.0921 (0.0580)
Others	0.0286 (0.0646)	0.107** (0.0538)
Caste (Reference group: <i>Brahmins</i>)		
Other Upper Caste	-0.0696 (0.0673)	-0.0585 (0.0566)
Other Backward Castes	0.271*** (0.0636)	0.210*** (0.0538)
Scheduled Castes	0.231*** (0.0671)	0.348*** (0.0572)
Scheduled Tribes	0.499*** (0.0757)	0.179*** (0.0667)
Muslim	1.104*** (0.0714)	0.917*** (0.0621)
Sikh, Jain	-0.235* (0.142)	-0.174 (0.114)
Christian	-0.0888 (0.127)	-0.305*** (0.102)

Wife's age		
(Reference group: 18- 23 years)		
24- 29 years	0.294*** (0.0433)	1.903*** (0.0404)
30- 34 years	0.644*** (0.0442)	2.741*** (0.0428)
35 years and above	0.851*** (0.0400)	3.332*** (0.0405)
Location (Reference group: Rural areas)		
Urban areas	-0.493*** (0.0357)	-0.156*** (0.0309)
Metro cities	-1.056*** (0.0465)	-0.522*** (0.0378)
Wife's years of education	-0.0985*** (0.00379)	-0.112*** (0.00331)
Number of observations	26,330	27,636

*** p<0.01, ** p<0.05, * p<0.1

Table X: Association between Desired Number of Children and Income level in the context of average expenditure on education at the level of the state, controlling for *wife's* years of education.

	Dependent Var: Ideal number of children	Dependent Var: Living number of children
	Model 1	Model 2
Log of personal income	0.0359** (0.0144)	0.0606*** (0.0128)
Men's years of education	-0.0262*** (0.00345)	-0.0150*** (0.00310)
Occupations (Reference group: <i>Non- Professionals</i>)		
Professionals	0.418*** (0.156)	-0.0839 (0.123)
Expenditure on tuitions (Reference group: <i>High expenditure states</i>)		
Medium expenditure states	-0.297*** (0.0532)	-0.115*** (0.0431)
Low expenditure states	0.900*** (0.0512)	0.489*** (0.0420)
Interaction term 1 (Professionals * Medium expenditure state)	-0.420** (0.183)	-0.264* (0.145)
Interaction term 2 (Professionals * Low expenditure state)	-0.769*** (0.176)	-0.0762 (0.141)
Caste (Reference group: <i>Brahmins</i>)		
Other Upper Caste	0.0838 (0.0676)	-0.000576 (0.0565)
Other Backward Castes	0.368*** (0.0638)	0.230*** (0.0536)
Scheduled Castes	0.424*** (0.0671)	0.387*** (0.0568)
Scheduled Tribes	0.516*** (0.0757)	0.135** (0.0663)
Muslim	1.237***	0.961***

	(0.0717)	(0.0620)
Sikh, Jain	-0.0117	-0.0544
	(0.148)	(0.115)
Christian	0.316**	-0.164
	(0.132)	(0.104)
Women's age (Reference group: 18- 23 years)		
24- 29 years	0.289***	1.934***
	(0.0435)	(0.0405)
30- 34 years	0.670***	2.791***
	(0.0445)	(0.0430)
35 years and above	0.908***	3.410***
	(0.0403)	(0.0407)
Location (Reference group: <i>Rural areas</i>)		
Urban areas	-0.456***	-0.143***
	(0.0351)	(0.0300)
Metro cities	-0.784***	-0.388***
	(0.0477)	(0.0385)
Wife's years of education	-0.0839***	-0.102***
	(0.00384)	(0.00332)
Number of observations	26,451	27,764

*** p<0.01, ** p<0.05, * p<0.1

Table XI: Association between ideal and living number of children and level of income, controlling for men's years of education, occupation and other background characteristics for only the rural sample

	Dependent Var: Ideal number of children Model 1	Dependent Var: Living number of children Model 2
Log of personal income	-0.0118 (0.0176)	0.0116 (0.0160)
Men's years of education	-0.0446*** (0.00393)	-0.0409*** (0.00360)
Occupations (Reference group: <i>Professionals</i>)		
Business	0.197** (0.101)	0.368*** (0.0879)
Farmers	0.383*** (0.0989)	0.385*** (0.0861)
Laborers	0.308*** (0.0977)	0.262*** (0.0852)
Others	-0.000187 (0.0985)	0.0769 (0.0855)
Caste (Reference group: <i>Brahmins</i>)		
Other Upper Caste	-0.241*** (0.0922)	-0.148* (0.0816)
Other Backward Castes	0.248*** (0.0855)	0.178** (0.0762)
Scheduled Castes	0.301*** (0.0891)	0.326*** (0.0798)
Scheduled Tribes	0.497*** (0.0960)	0.140 (0.0871)
Muslim	1.084*** (0.0958)	0.853*** (0.0870)
Sikh, Jain	-1.068*** (0.217)	-0.343** (0.170)
Christian	-0.542*** (0.165)	-0.993*** (0.138)

Wife's age		
(Reference group: 18- 23 years)		
24- 29 years	0.353*** (0.0523)	1.851*** (0.0498)
30- 34 years	0.734*** (0.0534)	2.714*** (0.0529)
35 years and above	1.030*** (0.0480)	3.353*** (0.0497)
Number of observations	16,206	17,060

*** p<0.01, ** p<0.05, * p<0.1

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