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Full title: Norms and Resources: Community Effects on Spacing and Stopping among Young Women in India

Short title: Norms and Resources

Acknowledgements
This research was conducted when the author was a doctoral candidate in the Department of Sociology at Duke University. The author would like to thank S.Philip Morgan, David Brady, Yong Cai, Elizabeth Frankenberg, Linda K. George, Kenneth C. Land, and Ilene Speizer for helpful comments.

Abstract

This study explores the influence of community reproductive preferences (norms) and socioeconomic characteristics (resources) on young women's contraceptive use to space or stop childbearing in India. Given the predominance of female sterilization in India, I argue that the prevalence of sterilization among older women in the community is a localized norm and could inform young women's choice of contraception. Mean ideal family size in the community is the other normative dimension used in this study that reflects the context within which young women make contraceptive choices. Drawing on data from two waves of the National Family Health Surveys (India DHS) in 1992-93 and 2005-06, I use multilevel analyses to delineate community effects on the use of contraception. Results demonstrate not only strong community effects on the spacing and stopping behavior of young women, but also the salience of different aspects of community factors in the two survey periods.

Keywords: contraception, community, norms, resources, India, family planning

Introduction

One in three births were unwanted in India in 2005 (IIPS and Macro International 2007). If unwanted fertility were eliminated, the country would have achieved replacement fertility as early as 1998 (IIPS and ORC Macro 2000). Helping women meet their reproductive preferences is significant not only for achieving replacement level fertility in India; it is also an important social welfare goal in and of itself. However, recent data from the National Family Health Surveys 3 (NFHS 3) shows that among women who do not want any more children, about a third are currently not using any contraception and among women who want to space or delay childbearing, more than 60 % are not using contraception. This discrepancy between stated preferences and actual behavior, referred to as the unmet need for family planning has occupied the interest of demographers for several decades (Bogue 1974; Westoff 1978; Bongaarts and Bruce 1995; Westoff and Bankole 1995; Westoff 1998; Jain 1999; Casterline and Sinding 2000).

Despite this increased focus on unmet need, its level shows only marginal decline over the last few decades (Darroch, et al. 2013; Sedgh and Hussain 2014). Studies of the reasons for unmet need identify access and non-access barriers to adequate use of contraception. However, as the bulk of empirical evidence shows, improving access to family planning services and contraceptive methods have had only a small effect on reducing unmet need (Cleland, et al. 2014). Instead, non-access barriers such as concerns regarding side effects and opposition to use of contraception are increasingly growing in importance (see Bongaarts and Bruce 1995; Casterline, et al. 1997; Casterline, et al.

2001; Seltzer 2002; Campbell, et al. 2006; Machiyama and Cleland 2014 for recent evidence).

The aim of this paper is to extend research on unmet need by studying the influence of a wide range of community factors on the spacing and stopping behavior of young women in India. I draw on data from two waves of the National Family Health Surveys in 1992-93 and 2005-06 (referred as 1992 and 2005 hereafter) to identify factors associated with contraceptive use in the two time periods as well as examine patterns of change over time.

I focus on young women because although unmet need has been declining in India, it is disproportionately high among currently married young women in the ages 15 to 29 years (IIPS and Macro International 2007). In 2005, over 22 per cent of young women had an unmet need for family planning (spacing and limiting) compared to only 6 % of women older than 30 years. Young women represent almost one fifth of the entire Indian population, and 40% of currently married women in the country. More than 75% of women ages 15 to 29 years have been married by age 20, invariably through marriages arranged by their families, leaving them exposed to a long fertile period, and greater possibility of high and unwanted fertility. Not surprisingly, they contribute to more than half of the country's total fertility.

India's Family Planning Program

India's family planning program was one of the first state-sponsored population programs in the world. Since its initiation, the program has emphasized permanent methods of contraception. This is because of a culture and tradition that deems family planning appropriate only for older women who have fulfilled (or exceeded) their childbearing desires (Rajaretnam and Deshpande 1994; Jejeebhoy 1998; Santhya 2003). Undoubtedly, female sterilization is an efficient contraceptive, because of both its high use- and cost-effectiveness. Nonetheless, studies show that given the low age at marriage, delayed childbearing and adequate spacing between children can bring about a decline in the fertility of individual couples (for India, see Rajaretnam 1990; Matthews et al. 2009; for China, see Bongaarts and Greenhalgh 1985).

Although the program ostensibly adopted a cafeteria approach, whereby a variety of reversible and permanent methods were offered free or at subsidized rates, in reality, it is skewed towards female sterilization. Thus, field workers have little incentive to promote or educate users about reversible contraception in the official basket of contraceptives – pills, IUDs and condoms (Mishra et al. 1999). Evidence from the NFHS and small-scale studies support these claims: health workers rarely visit and counsel young newly married women, and when prospective users of contraceptives request information from health workers, only a minority of them are informed of reversible methods (Rajaretnam and Deshpande 1994).

The family planning program is now deeply embedded in society, and contraceptive use is synonymous with female sterilization (Matthews et al. 2009). Sterilization is often the only contraceptive used by women as they cycle through wanted, mistimed and unwanted pregnancies. In 2005, more than three-fourths of all sterilized women did not use any contraception prior to getting sterilized (IIPS and Macro International 2007). The use of sterilization has also been increasing gradually over time. In 1992-3, 27% of currently married women ages 15-49 years were sterilized; this increased to 34% in 1998-9 and further to 37% in 2005. Additionally, more women are getting sterilized at younger ages. The median age at sterilization was 26.6 years in 1992, which decreased to 25.5 years in 2005. Arguably, the overwhelming use of sterilization has aided in the reduction of overall fertility in the country, notably at higher parities (Saavala 1999). However, estimates show that with very little increase in the age at childbearing, along with a gradual lowering of the age at sterilization and short birth intervals, India is in fact poised to experience an increase in the rate of growth of its population (Matthews, et al 2009).

Community Effects on Contraception

Traditionally, social scientists studied fertility behavior as a function of socioeconomic indicators such as education and income (Notestein 1945; Davis 1963; Dyson and Murphy 1985). An emerging line of research in fertility examines the role of ideational forces in shaping women's behavior by influencing their existing value systems

(Johnson-Hanks et al. 2011; Thornton et al. 2012). At the heart of cultural models is the notion that people's values orient them to a particular mode of living and behaving (Swidler 1986). Several scholars conceptualize these cultural models as schemas, scripts or mental maps (Sewell 1992; Johnson-Hanks et al. 2011). The dominant theme underlying this research is that schemas and ideas provide people with an understanding of what is good for them, guidelines for a particular course of action and methods and strategies to achieve goals (Geertz 1973).

And yet, values and norms are not set in isolation. They are defined and prescribed within communities and groups that women belong to, and turn to for information, social support and interaction (Donner 2008). Over the last quarter century, researchers have come to recognize that social, cultural and economic forces operating beyond the control of a woman's circumstances nonetheless have powerful effects on her childbearing attitudes and behavior (Coale and Watkins 1986; Bongaarts and Watkins 1996; Montgomery and Casterline 1996). Underlying this conceptualization of fertility is the perception that these exogenous forces vary across social contexts (Entwisle et al. 1989; Brewster et al. 1993; Hank 2002). Communities provide a local context that shapes women's values, preferences and behavior (Brewster et al. 1993). Importantly, the power of "cumulating experience" of earlier adopters of contraception within a community strongly influences the choices made by subsequent users (Entwisle et al. 1996). To the extent that women align their values and behavior with the norms and constraints of their group, neighborhoods in which they reside are particularly important for shaping their childbearing attitudes and behavior.

Theoretical work on communities and neighborhoods recognize that they generally influence individual behavior through localized norms and the local opportunity structure (Brewster 1994; Hank 2002). Figure 1 describes these direct mechanisms as well as their indirect interrelationships. Community factors (observed) indirectly affect young women's contraceptive behavior by influencing their beliefs and attitudes that are situated more proximally (unobserved) about family and fertility regulation. Individual and household factors also operate in a similar way, by influencing contraceptive behavior through women's attitudes and values. The focus of this paper is on understanding the influence of community factors (left box in Figure 1) on contraceptive use.

***** FIGURE 1 ABOUT HERE ******

Empirical evidence reveals that community interactions and norms about family planning have strong effects on the fertility behavior of women (see Stash 1994; Rajaretnam and Deshpande 1994; Watkins and Danzi 1995; Rutenberg and Watkins 1997). In South Nyanza, Kenya, women frequently discuss family planning with friends, relatives and neighbors (Rutenberg and Watkins 1997). This study also revealed that although women get "official" information about contraceptive methods from family planning clinics, they ultimately make contraceptive decisions based on stories that circulate in informal networks in their community. In Nepal, information shared freely among men and women in the community influenced individuals' perceptions and decisions about contraception (Stash 1999). While sterilization enjoyed positive

evaluations among most women in the community, negative perceptions about reversible methods were in wide circulation. Similarly, a study conducted in two districts in South India revealed that women who discontinue a particular reversible method actively discourage its use among other women in the community (Rajaretnam and Deshpande 1994). Other studies present a different picture. For instance, evidence from Thailand shows that women prefer to use a method about which a lot is known already, but do not actively avoid methods because of side effects experienced by previous users (Entwisle et al. 1996).

Neighborhoods and communities are particularly salient for young women in India. Neighborhoods provide young women a community outside their marital home, and are frequently the site where they form their non-kin networks, given the limitations on their physical mobility and the close proximity of household compounds. Women's actions are deeply aligned with the "behavioral codes and ideas about feminity and proper conduct" prescribed within the neighborhood (Donner 2008, pp. 8). Their interactions with community members as well as observations of community and non-community role models are an instrumental way for women to form aspirations for themselves and their families (Appadurai 2004), and to evaluate the appropriateness of the use of a particular contraceptive method.

Second, community characteristics may encompass resources such as local economic and social conditions as well as the availability of health and family planning clinics, all of which are related to women's fertility behavior (Stephenson et al. 2007;

Frankenberg et al. 2009). More generally, the relationship between community socioeconomic characteristics and a variety of health outcomes is widely known (Link and Phelan 1995; Robert 1999). Better facilities for health and education translate into greater resources for women to make an informed choice about contraception and to avail of an appropriate method. Across several countries in Sub-Saharan Africa, socioeconomic development and wealth at the district level are found to be strongly associated with contraceptive use among women (Stephenson et al. 2007). Other aspects of the community such as the local labor market and female labor force participation are also found to be relevant to fertility at the individual level (Brewster and Rindfuss 2000; Hank 2002).

Data and Definition of Variables

I use data from the National Family Health Surveys (India DHS) in 1992 and 2005 conducted by the Ministry of Health and Family Welfare (MoHFW), with technical assistance from ICF Macro (IIPS 1995; IIPS and Macro International 2007) to examine community effects on contraceptive use of young women and their change over time. These surveys were initiated to provide important data to monitor programs as well as to identify emerging population health and family welfare issues. The survey has a multi-stage sampling design. Within each state, in rural areas, a two-stage design was used. Primary sampling units (PSUs) or villages were selected with probability proportional to population size (PPS). Next, households were randomly selected within each PSU. In

urban areas, the survey followed a three-stage sampling design. First, wards were selected within each state based on PPS. Next, within each ward, one census enumeration block or primary sampling unit (PSU) was selected. Finally, households were randomly selected from PSUs. Thus, PSUs represent either a village in rural areas or a census block in urban areas and typically about 30 households were selected from each PSU for the survey.

The original survey in 1992 interviewed all ever-married women ages 15-49 who stayed in the household the previous night. In 2005, never-married women ages 15-49 and men ages 15-59 years were also included in the survey. See Table 1 for descriptive statistics.

*****TABLE 1 ABOUT HERE*****

For this study, I analyze 15-29 year old currently married women who are not pregnant, who report wanting to space and stop in 1992 and 2005. Thus the analysis of contraceptive use is restricted to women who reported wanting to space or stop. Because the sample is selected based on the respondent's reports, there is a possibility that this sample selection may bias the estimates obtained. Accordingly, I checked to see the extent of such bias by estimating a Heckman selection model of contraceptive use that accounts for the bias brought on by selecting only those women who report wanting to space or stop childbearing. The results showed that selection bias did not significantly influence the parameter estimates. In the interest of parsimony and ease of interpretation,

in this paper, I show the results of only the multilevel logistic regression models. See Table 2 for analytical sample.

*****TABLE 2 ABOUT HERE*****

Given the multilevel framework in which I seek to explain women's contraceptive behavior, the community should be small enough to correspond to the immediate neighborhood in which women live. The thirty households selected within each PSU in both rural and urban areas could be taken to roughly represent the local environment of women. Accordingly, in this study, I treat PSUs as local communities in which women's preferences and actions are deeply embedded. Past research shows that individual responses aggregated at the cluster level can be used as valid and efficient proxies for community characteristics (Lesthaeghe and Meekers 1986; Entwisle et al. 1989; McNay et al. 2003; Moursund and Kravdal 2003; Hayford 2005; Stephenson et al 2007). Several of these studies estimate such averages using the DHS data from India. For example, McNay et al (2003) use district averages to explain the contraceptive use of uneducated women in India using the 1992-3 NFHS. Kravdal (2004) uses the 1998-9 NFHS to study the effect of community-level education on fertility behavior, by constructing community averages derived from individual data. They then test and validate their analysis of community averages serving as proxies for various community characteristics.

Dependent Variable: Contraceptive Use

The analytical issue at stake is to understand the preference-behavior disjuncture: among women who report wanting to space or limit future childbirth, some of them use contraception and some do not. Accordingly, in this study, I model the use of contraceptives by young women for spacing and limiting purposes in the two periods to understand the factors associated with contraceptive use and its change over time. Two outcome variables are used in the analysis: a dichotomous variable with a value of one if the respondent is currently using any contraception among those who report that they want to delay childbearing for at least 2 years; and a dichotomous variable with a value of one if the respondent is currently using any contraception among those who report that they want no more children. Table 3 shows how contraceptive use varies among young women by their key socioeconomic characteristics.

Women not using a modern or traditional method are classified as not currently using contraceptives. Modern methods included in the survey are: female and male sterilization, oral pills, IUDs, condoms, injectables and emergency contraception. Traditional methods covered in the survey include rhythm, withdrawal and other folk methods. I include traditional methods in the analyses because they have been shown to be effective if properly used (Johnson-Hanks 2002). Additionally, well-educated women in India seem to show a preference for using less invasive forms of contraception that does not interfere with their bodies' normal functioning (Basu 2005). Therefore,

traditional methods are found to be prevalent as a form of "ultramodern" contraception among this elite subgroup of women who are averse to medicalization of what is inherently a natural process (Basu 2005).

There are several reasons for operationalizing contraceptive behavior as current use versus noncurrent (ever-use or former use) use. Current contraceptive use is a well-studied (Entwisle et al. 1989; Mason and Smith 2000) and significant measure. Contraceptive prevalence rate (CPR) which is based on contraceptive use in a particular period is a widely used indicator of development, health and women's empowerment. The NFHS allows three possible measures of contraceptive use: never use, former use, and current use. Models run using *ever use* (versus *never use*) of contraceptives produced essentially similar results, though the effects were of a slightly greater magnitude. However, current contraceptive use is more relevant to this study because of its close temporal proximity to potential explanatory variables measured at the time of the interview. The category consisting of former users is very diverse that includes discontinuers, sporadic users and limiters who used in the past for spacing purposes (Entwisle et al. 1989). Thus, following convention and for practical reasons, I choose current contraceptive use as a measure of contraceptive behavior.

Community-level Independent Variables

For community-level predictors, I obtain averages of all ever-married women ages 15-49 within communities. These consisted of 89,404 ever-married women ages 15-49 years

from 2,987 PSUs in 1992, and 92,301 ever-married women ages 15-49 years from 3,437 PSUs in 2005. The only exception is for the level of sterilization among older women within the community, which I obtain by aggregating individual responses of women ages 30-49 years. Descriptive statistics of the communities are shown in Table 3. All descriptive measures are weighted using the sampling weights provided in the NFHS.

*****TABLE 3 ABOUT HERE*****

I assess community effects by constructing twelve community measures under two main categories: community norms and community resources. My analyses show that multicollinearity among the variables is not a concern. I elaborate these measures below.

Norms. I use two variables to serve as proxies for patterns of cultural norms and social interactions in the community: percentage of older women who are sterilized (*percent sterilized 30-49 years)* and *mean ideal family size* in the community. Sterilization of older women in the community is indicative of the prevailing culture towards contraception in the community. The experiences of older women in a community could also serve as guidelines for young women in the same community. To the extent that female sterilization is deemed an acceptable method of contraception in the community, and young women are exposed to positive information about sterilization, they are more likely to adhere to the behavior expected of them in the community. To calculate the

percentage of older women in the community who are sterilized, I aggregated the responses of all women ages 30-49 who were interviewed in the community. I included visitors to the group of permanent residents in the community since they are part of the social network of a given young woman and may bring new information and ideas from outside the community (Hayford 2005). Using the responses of 30-49 year old women helps assess how older women in a community influence the attitudes and behavior of younger women in the same community without the problem of endogeneity.

I use *mean ideal family size* within the community as another proxy for the cultural fertility norms in the community. In each survey, all women were asked, "if you could go back to the time you did not have any children and could choose exactly the number of children to have in your whole life, how many would that be?" Ideal family size is a value orientation indicative of the prevailing attitudes within the community regarding children and women's fertility. Where the local preferences favor larger family size, we would expect young women residing in these communities to face social constraints in using contraception. In general, ideal family size has been declining over time in most of India, reflecting an orienting schema of a smaller family size (Dharmalingam, et al 2014).

Resources. (1)Socioeconomic characteristics. *Percent secondary schooling* refers to the percentage of ever-married women ages 15-49 years in the community that has completed secondary schooling. To estimate mean community wealth, I use the wealth

index derived for each household. The NFHS measures household wealth as a composite index of the economic status of a household based on its ownership of key assets. This measure has been developed and tested in a number of developing countries and represents the level of wealth that is consistent with expenditure and income measures (Rutstein, et al. 2004). First, a list of household assets and housing characteristics is compiled to construct factor scores for each household asset. Next, a wealth index is estimated for each household, from which wealth quintiles are constructed. *Percent rich* indicates the percentage of women in the community who belong to households that are in the higher wealth quintiles (third, fourth and fifth). *Percent Muslims* indicates the percentage of women in the community who are Muslim, the leading minority subgroup in the country. Finally, I add variables to control for *PSU size* and to indicate whether a PSU was located in a rural or *urban* area.

(2) ***Media exposure in the community.*** *Mean media exposure* indicates the mean level of exposure to mass media in the community. In 1992, the survey included questions on weekly exposure to the television and the radio; in 2005, weekly exposure to newspapers was added. These responses were summed and averaged to get the mean level of exposure to media in the community.

(3) Family planning program effort in the community. The survey fielded different measures of respondents' reports of family program effort in 1992 and 2005 which I use in the analyses. Thus, the effects of family planning program activities within communities are likely to be conservative and must be interpreted with caution. In 1992, respondents were asked about visits to their homes by community health workers for contraceptive

services, and for antenatal care. As part of their antenatal care, health workers also provide information about the options for contraception available subsequent to birth. For both measures, I sum and then average the individual responses to get the mean level of visits by health workers in the community. In 2005, I include a variable to indicate whether a community health worker visited all eligible respondents at least once in the last three months to provide contraceptive services.

Individual-level control variables

I include several indicators of individual and household sociodemographic characteristics to control for fixed effects at the individual level. Because contraceptive use has a non-linear relationship with respondent's age, I include *age* and *age-squared* at interview. I also include *age at first marriage* as a control because it is associated with the decision to use contraceptives in some parts of the world (Blanc and Way 1998). Contraceptive use increases with *parity*, and so, I control for number of living children. Because families prefer to have *at least one son*, I include an indicator variable to capture the effect of son preference on contraceptive use of young women. Fertility differences between religions are well-known; in order to control for these differences, I include variables to indicate respondents' religion (*Muslim*, and *Other religion*, with *Hindu* being the reference). Respondents' education is measured as a series of categorical variables: *primary*, *secondary* and *high school* with *no education* being the reference category. Respondents' employment is coded in three broad categories: employed in a professional or service job

(*professional employment*), employed in agricultural or manual labor (*agricultural labor*), and not employed (*unemployed*), with the last being the reference category.

Husbands' education has been shown to influence wives' contraceptive use in some societies, independent of the effects of wives' education (Jejeebhoy 1995). Accordingly, I add a variable to indicate the completion status of *husband's secondary school* education and a variable to capture missing values. In models not shown in the paper, I also test the effects of husband's education as a series of categorical variables (no education, primary, secondary and higher secondary). Since the main results remain unchanged, I choose the single indicator in the interest of parsimony. I use the NFHS constructed measure of household wealth, based on the household's living standard and assets owned. Individuals are then split into wealth quintiles based on the household score: *lowest*, *second*, *fourth* and *highest* quintiles with the *middle* wealth quintile as the reference. I also include variables to capture respondents' level of exposure to media (high, moderate, low).[1]

State-level controls

Additionally, I incorporate two controls to account for heterogeneity between states. Net state domestic product per capita for both survey years are drawn from reports published

[1] In 1992, if the respondent reported weekly exposure to the two sources of media (television and radio), she is coded as having a high level of media exposure. Weekly exposure to one media source is coded as moderate exposure, and no exposure to any media is coded as low exposure. In 2005, if the respondent reported weekly exposure to three sources of media (television, radio and newspaper), she is coded as having a high level of media exposure. Weekly exposure to two media sources is coded as moderate exposure, and exposure to one or no exposure to any media is coded as low exposure.

by the Central Statistical Office. State literacy rates are taken from data from the National Sample Surveys Office.

Analytic Strategy

Given the hierarchical nature of the sampling design wherein PSUs are nested within states, multilevel models are particularly suited to analyze the impact of variables at different levels (Raudenbush and Bryk 1986; Guo and Zhao 2000; Goldstein 2003; Blakely and Subramanian 2006). By correcting the biases in parameter estimates that result from the clustering of data within PSUs and states, multilevel models provide accurate standard errors and coefficients. Standard regression techniques that do not correct for this clustering provide biased results, particularly when the effects of higher-level variables are strong. Finally, and of significance to this study is the ability of multilevel models to partition variance in the outcome variable at each higher level, so that we are able to gauge which level contributes to the most variation in the outcome. The relevance of multilevel models to partition variance at different levels substantively and technically, in this case, individual, neighborhood and state, has been elaborated in several studies elsewhere (Guo and Zhao 2000; Blakely and Subramanian 2006).

The multilevel model for dichotomous outcomes is quite similar to that used for standard logistic regression. All multilevel estimation models were computed on HLM7 via penalized quasi-likelihood approximation that uses an iterative process of analysis until estimates converge. Using contraception to space or to terminate childbearing

represent two distinct decision processes, and so, I estimate different models for whether or not a respondent uses contraception, given that she reports wanting to delay or stop childbearing.

The outcome variable used in the study y_{ijk}, whether or not respondent *i* in community *j* in state *k* is currently using any contraception (given that she desires to delay or terminate childbearing) follows a Bernoulli distribution. The probability that a woman is currently using contraception is defined as p_{ijk}, which is modeled using a logit-link function. The three-level model takes the form:

$$\log [p_{ijk} / (1- p_{ijk})] = \beta_{0jk} + \beta_1 X_{ijk} \quad \text{(level 1 model)} \quad (1)$$

$$\beta_{0jk} = \beta_{0k} + \beta_2 X_{jk} + u_{0jk} \quad \text{(level 2 model)} \quad (2)$$

$$\beta_{0k} = \beta_0 + \beta_3 X_k + v_{0k} \quad \text{(level 3 model)} \quad (3)$$

Equation 1 refers to the level 1 model in which $\log [p_{ijk} / (1- p_{ijk})]$ is the logit of the probability that a woman *i* living in community *j* in state *k* is using any contraception. β_{0jk} is the intercept, X_{ijk} is the vector of individual-level variables, and β_1 are the estimated parameter effects of the individual variables.

Equation 2 is the level 2 model that takes into account community characteristics. The level 1 intercept β_{0jk} is a function of a fixed population intercept for all communities β_{0k}, the vector of community characteristics of community *j* in state *k*, X_{jk}, and a random component u_{0jk} accounting for the unexplained residual variation at the community level. Equation 3 is the level 3 model that incorporates state variation. β_{0k}, in turn is a function of a fixed intercept for all states β_0, a vector of state characteristics X_k, and a random

unexplained residual term for each state v_{0k}. Parameter estimates at the community and state levels are given by β_2 and β_3. The models assume that the random effects across communities and states, u_{0jk} *and* v_{0k} respectively are uncorrelated (Guo and Zhao 2000). Their variances are the community effects and state effects and represent the extent to which young women's contraceptive use to space or stop resembles that of other young women who live in the same community or state. The inclusion of variables at the higher-level should reduce the unexplained random variation in those levels.

Results

Descriptive Patterns

Age patterns of contraceptive use among young women reveal striking trends. The proportion of young women using contraception has increased significantly for every age group in this period. Among 15-49 year old currently married, not pregnant women, 47% were using any contraception in 1992 (see Figure 2). This increased sizably in 2005, by almost a third to 62%. Even as overall contraceptive use has increased over time for all women, in both periods, married 15-24 year old women have the lowest contraceptive use among all women, whereas women ages 25-29 years also have contraceptive use rates that are lower than the national mean. Contraceptive use increases in both periods with age, peaking among women in their mid to late thirties. This is suggestive of the pattern of women not using contraception to space during the early childbearing years, but only to stop as they reach or exceed their target family size.

***** FIGURE 2 ABOUT HERE****

In descriptive analyses not shown, I find that contraceptive use among young women varies widely by their socioeconomic characteristics and use dynamics have changed considerably between 1992 and 2005. In general, across all education categories, more young women are using contraception in 2005. A sharp education gradient in contraceptive use can be seen in 1992, which has become flatter in 2005. To elaborate, the percentage of women in the lower education categories has declined considerably, with a complementary increase in the percentage of women in higher education categories, particularly those who have completed secondary school. In both time periods, contraceptive use is highest among women employed in professional or service occupations, and whose households are in the higher wealth quintiles. Hindu and Muslim women have lower use rates compared to women from other religions (composed mainly of Christian, Jain, Sikh women). Women who are exposed to television, radio and newspaper at least once a week and women residing in urban areas have use rates higher than average. Although the socioeconomic characteristics exhibit strong associations with contraceptive use, they are probably not causal. Rather, they are likely correlated with other characteristics, such as social class of the household, and the availability and accessibility of family planning clinics and counselors to the respondents.

Analytical Results

Tables 4 and 5 show the odds ratios and their z scores for community and state variables of the logit regressions of contraceptive use among young women who want to space and

stop respectively. To examine how the association between community characteristics and the contraceptive use of young women unfolds in the presence of variables at the individual, household and state-level, I compared models that progressively incorporate additional covariates. The tables display only the results of community effects (odds ratios for individual and state controls are available upon request). The exponentiated community effects represent the factor change in the odds of contraceptive use (among women who wish to space or stop) for a one-unit difference in the community variables. The ordering of variables in Tables 4 and 5 differ slightly in order to show the distinct effects of community resources and norms on spacing and stopping. The results are robust to the sequence in which variables are added.

Factors that Influence the Odds of Spacing. In both years, Model 1 in Table 4 shows that there is a significant random effect at the community-level net of individual and state-level controls, indicating substantial unexplained within-community heterogeneity. In 1992, Model 2 shows that the variation between communities drops to non-significance upon the inclusion of community socioeconomic characteristics. This suggests that all variation between communities in whether a young woman uses contraception to space can be explained by community socioeconomic characteristics in 1992.[2] By 2005, community variation reduces by 45% but is still significant when community socioeconomic characteristics are added in Model 2. In general, I find that

[2] This finding is robust to the order in which community-level variables are added; that is, the variation between communities drops to non-significance whenever socioeconomic characteristics of the community are added.

community levels of women's education and wealth are consistently related to an increase in the odds of young women's use of contraception to space childbearing by a factor of 1.005 to 1.02.

Models 3 and 4 show that other aspects of community resources are also strongly associated with the use of contraception to space in both years: young women in communities with a high level of media exposure have increased odds of using contraception to space, and young women in communities with a low level of media exposure have reduced odds of contraceptive use to space. Thus ideas and attitudes gained from the media are diffusing within communities in both periods. However, the effect of media in the community has weakened over the two survey periods. Further, because media exposure does not have an independent effect on the variance in spacing, it is possibly related to the socioeconomic characteristics of the community. Model 4 shows that the mean level of health worker visits for family planning has a small, positive effect on the odds of spacing, but only in 1992.

Model 5 shows that mean ideal family size in the community is strongly associated with the odds of using contraception when a young woman desires to space in both years. As the average ideal family size in the community increases, the odds of a young woman using contraception declines (by a factor of 1/0.74 = 1.35 in 1992 and 1/0.53 = 1.89 in 2005). This suggests that the normative expectations of a woman's community circumscribe her contraceptive behavior. However, community norms have no effect on the variance in 1992 after adjusting for socioeconomic characteristics. This

indicates that community socioeconomic characteristics rather than norms drive the heterogeneity in spacing behavior between communities in 1992. However, in 2005, norms alone reduce the variance in spacing by over 15% at the community after accounting for individual, community and state characteristics.

Factors that Influence the Odds of Stopping. Table 5 displays the odds ratios and z scores for contraceptive use among young women who expressed a desire to stop. Model 1 shows that the heterogeneity between communities is strong and significant, net of individual and state controls in 1992. In Model 2, upon the inclusion of community norms, heterogeneity between communities declines by about 20% and 25% in 1992 and 2005 respectively. Model 2 shows that both mean ideal family size and the level of sterilization of older women have strong and significant effects on the odds of stopping in 1992 and in 2005. In both years, an increase in mean ideal family size by one child decreases the odds of stopping by a factor of at least 1.8 (=1/0.55). The odds of stopping increase by a factor of 1.28 in communities with high prevalence of sterilization among older women, whereas it reduces by a factor of 1.16 (=1/.86) in communities with low prevalence of sterilization.

Including community socioeconomic characteristics in Model 3 has only a marginal effect on community variance in both years after community norms are controlled. Thus, even net of community socioeconomic characteristics, community norms about ideal family size and the sterilization experiences of older women seem to

influence the stopping behavior of young women within communities. These effects are remarkably stable, even after controlling for community socioeconomic characteristics (Model 3), media exposure (Model 4) and family planning program effort (Model 5). While community level of education is moderately associated with stopping behavior, mean level of household wealth has no significant impact. In line with existing evidence, the results show that communities with a high proportion of Muslims have a modest negative influence on stopping behavior (see Dharmalingam and Morgan 2004). Living in communities with high media exposure increases the odds of stopping, but there is no association between communities with low media exposure and stopping.

Model 5 adds the level of family planning program effort within the community. Two findings are notable in this model. First, in 1992, community variance is reduced substantially by 20%. Additional analyses not shown demonstrate that this finding is also robust to the order in which the variables are added. Clearly, family planning program effort in communities contributes considerably to the heterogeneity in young women's stopping behavior in 1992. Second, the inclusion of program effort in 1992 renders the effect of sterilization among older women in the community non-significant. This suggests that program effort mediated the effect of sterilization in communities in 1992. It is possible that communities that had a high level of sterilization among older women were also the ones that health workers visited most, who provided the motivation for young women to get sterilized. The effect of the mean level of ideal family size is also strong and significant, demonstrating the strength of local norms in shaping the contraceptive behavior of young women.

Model 5 finds that the level of visits by health workers in communities has no effect on the use of contraception to terminate childbearing. Likewise, its contribution to the variation between communities in contraceptive use for stopping is negligible. This result suggests that by 2005, with a more widespread reach of program effort across communities, there is not a lot of variation between communities in this factor. On the other hand, entrenched community norms and localized knowledge promote young women's continued adherence to contraceptive use for stopping, which is strongly oriented towards female sterilization.

Summary and Discussion

This paper demonstrates the differing impact of community resources and norms on the spacing and stopping behavior of young women at two time points in a setting where female sterilization is the most widely preferred method. Community resources and community norms are both powerful in shaping the stopping and spacing behavior of young women in India in 1992 and 2005. This paper finds a stable positive relationship between resources in the community (education, wealth, media exposure and family planning program effort) and the odds of using contraception to space or stop. Community resources, namely, women's education, household wealth, exposure to mass media and program effort in a community all play roles in the likelihood that a young woman will use contraception if she desires to space. Particularly notable is the finding that all heterogeneity between communities with regard to spacing is explained by

community socioeconomic characteristics and resources in 1992. Another important finding is that family planning program effort at least partially mediates the effect of sterilization of older women on the likelihood that a young woman who desires to stop will use contraception in 1992. By 2005, however, sterilization experiences of older women have become well-established to have powerful, independent effects on contraceptive use to stop childbearing.

As expected, the spillover effects of education are high in communities with a high level of education. The effect of media exposure at the community level also has consistent effects for spacing and stopping, demonstrating the influence of the mass media on attitudes towards fertility regulation (Barber and Axinn 2004). However, the level of media exposure in the community has no impact on the variance in stopping, suggesting that media exposure is likely correlated with other socioeconomic characteristics of the community.

Importantly, the influence of community norms seems to have strengthened over time for both spacing and stopping. This is a significant finding because it means that normative expectations about contraceptive choice and type are increasing, rather than decreasing over time, as young women's contraceptive use seems to be constrained or enhanced by the values of the social group to which they belong, independent of their own characteristics. In this case, their immediate local environment provides information and guidelines to young women, who have very little status in the average Indian community, and rely on generalized norms within the community on matters relating to childbearing and contraception.

Mean ideal family size in the community has a substantial influence on young women's contraceptive behavior in both years. Further, older women who are sterilized exert a powerful influence on young women who wish to stop childbearing in 2005: in 1992, the effect of this measure was largely a function of the invigorated program effort within communities. Together, these measures capture a considerable portion of the variation in the stopping behavior of young women.

On the other hand, the analyses in this paper show that the sterilization experiences of older women in the community do not influence the spacing behavior of young women in that community. This finding suggests that positive feedback about sterilization plays an influential role in informing young women's decision to sterilize themselves; but does little to inform their contraceptive decision making when it comes to spacing.

Given the pervasive imprint of female sterilization nationally, few studies integrate this important context in studies of fertility in India. This study is an attempt to understand its influence on contraceptive use dynamics among young women in India. A major drawback of this study is not incorporating the influence exerted by husbands, parents and in-laws on young women's spacing and stopping behavior. Lack of information in the DHS regarding the influence of family members imposed constraints on the kind of analyses that were possible. Another limitation is that this analysis is exploratory and provides indirect evidence on the role of community norms on the contraceptive behavior of young women in India. Further analyses are needed to fully understand the nature of community interactions and the extent of its influence.

How do we interpret the influence of the specific measures of community norms chosen in this study? Mean ideal family size was shown to have powerful effects net of all other community characteristics on spacing as well as stopping behavior of young women. Ideal family size within a community reflects the implicit social norms with respect to how many children are considered appropriate for a family. Such a prescription might well be fluid, and as has been recognized by several studies, might indicate a latent demand for family planning services (Koenig et al 1992).

The second community variable representing community norms, the influence of the sterilization experience among older women is indicative of behavior in the networks that young women find themselves in. As older women are encouraged by family planning personnel to adopt sterilization, they perceive contraception only as a means to stop childbearing rather than to space (Rajaretnam and Deshpande 1994). Young women may aspire to the higher status that is accorded to older women (Saavala 1999) and show a greater acceptance of sterilization based on the generally positive feedback about the procedure circulating in the community. Young women also find reassurance in the permanence of sterilization, especially as it can be done even without negotiating with their husbands' or in-laws. In fact, evidence suggests husbands support wives' decision to sterilize (Saavala 1999). This line of reasoning is speculative, but it shows the need for future empirical work to examine more carefully the localized environment that serves to perpetuate the dominance of sterilization.

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Table 1. Descriptive Statistics of Individual-level Variables (15-29 currently married and not pregnant women)

Variable		1992	2005
Number of young women		35385	31974
		Mean	Mean
Current contraceptive use		0.27	0.46
Contraceptive type			
	Modern reversible	0.08	0.14
	Female sterilization	0.13	0.24
	Traditional	0.05	0.09
Education			
	None	0.57	0.41
	Primary	0.17	0.16
	Secondary	0.23	0.38
	High school	0.03	0.05
Age			
	15-19	0.32	0.15
	20-24	0.35	0.39
	25-29	0.33	0.46
Living children			
	0	0.28	0.17
	1	0.27	0.27
	2	0.23	0.31
	3+	0.22	0.25
Religion			
	Hindu	0.80	0.82
	Muslim	0.12	0.14
	Other	0.08	0.04
Employment			
	Not employed	0.73	0.63
	Professional/ service	0.02	0.05
	Agricultural/ manual	0.25	0.32
Household wealth quintile			
	Poorest	0.18	0.20
	Second	0.20	0.21
	Middle	0.21	0.21
	Fourth	0.22	0.20
	Richest	0.19	0.17
Husband's education			

Secondary or greater	0.44	0.61
Exposure to media		
Low	0.45	0.32
Medium	0.28	0.36
High	0.27	0.32

Note: Sample weights used in these calculations

Table 2. Descriptive statistics of community variables

Variable	1992	2005
Number of communities	2,987	3,437
Mean Community size (households)	20.34	17.24
Percent Contraceptive use	44.73	56.18
Percent women with secondary school education	29.01	45.72
Percent women professionally employed	4.68	8.98
Percent women from households above poverty line	49.46	48.13
Mean level of exposure to mass media	0.86	1.34
Percent Muslim	10.63	12.85
Percent urban	40.18	43.09

Note: Sample weights used in these calculations

Table 3. Analytical Sample

	1992	2005
Young women who desire to space	11571	7110
Young women who desire to stop	12512	15190

Table 4. Odds Ratios (and Z-scores) from Multilevel Logit Regression of Young Women's Contraceptive Use for Spacing on Individual, Community and State Characteristics

	Model 1		Model 2		Model 3		Model 4		Model 5	
	1992	2005	1992	2005	1992	2005	1992	2005	1992	2005
Community variables										
Community size			0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00
			(-1.5)	(1.4)	(-1.4)	(1.3)	(-1.5)	(1.4)	(-1.1)	(1.4)
Urban			1.03	1.22*	0.94	1.17	1.01	1.08	1.02	1.09
			(0.4)	(2.4)	(-0.6)	(1.9)	(0.5)	(1.0)	(0.6)	(0.7)
Socioeconomic characteristics										
Percent women with secondary school education			1.02*	1.02*	1.02*	1.01*	1.02*	1.01*	1.02*	1.01*
			(12.9)	(9.0)	(9.5)	(6.3)	(9.3)	(6.1)	(7.4)	(4.5)
Percent women from households in top wealth quintiles			1.005*	1.01*	1.004*	1.01*	1.00	1.01*	1.00	1.01*
			(2.9)	(5.2)	(2.3)	(4.1)	(1.8)	(4.0)	(1.6)	(3.7)
Percent Muslim			1.00	1.00	1.00	1.00	1.003*	1.00	1.004*	1.003*
			(1.4)	(0.1)	(1.6)	(0.3)	(2.3)	(0.7)	(2.9)	(2.9)
Media exposure										
High					1.44*	1.29*	1.47*	1.28*	1.46*	1.33*
					(3.4)	(2.4)	(3.4)	(2.4)	(3.6)	(2.6)
Low					0.80*	0.71*	0.80*	0.72*	0.83*	0.76*
					(-2.3)	(-3.8)	(-2.3)	(-3.7)	(-2.0)	(-3.1)
Family planning program effort										
Level of visits by health workers for family planning							1.02*	0.99	1.02*	0.99
							(4.5)	(-1.0)	(4.5)	(-0.7)
Level of visits by health workers for antenatal							0.99		0.99	

care							(-0.8)		(-0.8)	
Community norms										
Mean ideal family size									0.74*	0.53*
									(-3.0)	(-7.8)
High prevalence of sterilization among women ages 30-49									0.98	0.98
									(0.2)	(-0.2)
Low prevalence of sterilization among women ages 30-49									1.14	0.87
									(1.6)	(-1.7)
Intercept	0.26*	0.65*	.21*	0.58*	0.21*	0.58*	0.21*	0.58*	0.21*	0.54*
	(-6.4)	(-2.7)	(-11.1)	(-3.7)	(-10.7)	(-3.5)	(-10.2)	(-3.4)	(-10.5)	(-4.2)
Community variance	0.66*	0.63*	.38	0.35*	0.37	0.33*	0.36	0.33*	0.34	0.28*
Number of individuals	11571	7110	11571	7110	11571	7110	11571	7110	11571	7110
Number of communities	2823	2833	2823	2833	2823	2833	2823	2833	2823	2833
Number of states	20	20	20	20	20	20	20	20	20	20

Note: All models control for all individual and household characteristics and state controls.
* denotes p-value less than 0.05.

Table 5. Odds Ratios (and Z-scores) from Multilevel Logit Regression of Young Women's Contraceptive Use for Stopping on Individual, Community and State Characteristics

	Model 1		Model 2		Model 3		Model 4		Model 5	
	1992	2005	1992	2005	1992	2005	1992	2005	1992	2005
Community variables										
Community size			1.00	1.00	1.00	1.01*	1.00	1.01*	1.00	1.01*
			(0.6)	(1.9)	(0.3)	(2.4)	(0.5)	(2.3)	(0.8)	(2.2)
Urban			1.00	1.31*	0.92	1.08	0.90	1.08	1.06	1.11
			(0.1)	(5.5)	(-1.1)	(1.4)	(-1.4)	(1.22)	(0.8)	(1.6)
Socioeconomic characteristics										
Percent women with secondary school education					1.004*	1.003*	1.003*	1.001	1.01*	1.002
					(3.0)	(2.2)	(2.0)	(1.3)	(2.8)	(1.2)
Percent women from households in top wealth quintiles					1.00	1.004*	1.00	1.003*	1.00	1.003*
					(1.2)	(2.9)	(1.6)	(2.6)	(0.7)	(2.7)
Percent Muslim					0.99*	0.99	0.99*	0.99*	0.99*	0.99
					(-4.3)	(-1.8)	(-4.6)	(-1.6)	(-3.5)	(-1.4)
Media exposure										
High							1.21*	1.22*	1.31*	1.23*
							(2.2)	(2.2)	(3.1)	(2.3)
Low							0.98	0.93	0.99	0.93
							(-0.3)	(-1.1)	(-0.1)	(-1.1)
Family planning program effort										
Level of visits by health workers for family planning									1.04*	1.03
									(11.0)	(0.5)
Level of visits by health workers for antenatal									1.00	

care									(0.4)	
Community norms										
Mean ideal family size			0.52*	0.55*	0.66*	0.64*	0.66*	0.66*	0.69*	0.65*
			(-11.0)	(-10.8)	(-5.5)	(-6.8)	(-5.6)	(-6.5)	(-5.0)	(-6.5)
High prevalence of sterilization among women ages 30-49			1.28*	1.52*	1.27*	1.55*	1.27*	1.53*	1.09	1.54*
			(4.3)	(7.3)	(4.2)	(7.4)	(4.1)	(7.3)	(1.4)	(7.4)
Low prevalence of sterilization among women ages 30-49			0.86*	0.81*	0.88*	0.83*	0.88*	0.83*	0.94	0.82*
			(-2.4)	(-3.5)	(-2.0)	(-2.9)	(-2.0)	(-3.0)	(-0.9)	(-3.2)
Intercept	2.17*	2.86*	2.21*	2.81*	2.21*	2.97*	2.23*	2.85*	2.25*	2.85*
	(5.4)	(7.8)	(8.4)	(11.3)	(7.8)	(11.7)	(8.0)	(11.2)	(9.7)	(11.4)
Community variance	0.41*	0.44*	0.33*	0.32*	0.31*	0.32*	0.31*	0.32*	0.25*	0.31*
Number of individuals	12512	15190	12512	15190	12512	15190	12512	15190	12512	15190
Number of communities	2909	3384	2909	3384	2909	3384	2909	3384	2909	3384
Number of states	20	20	20	20	20	20	20	20	20	20

Note: All models control for all individual and household characteristics and state controls.
* denotes p-value less than 0.05.

Figure 1. Conceptual Model of Community Effects on Young Women's Use of Contraception to Space and Stop in India

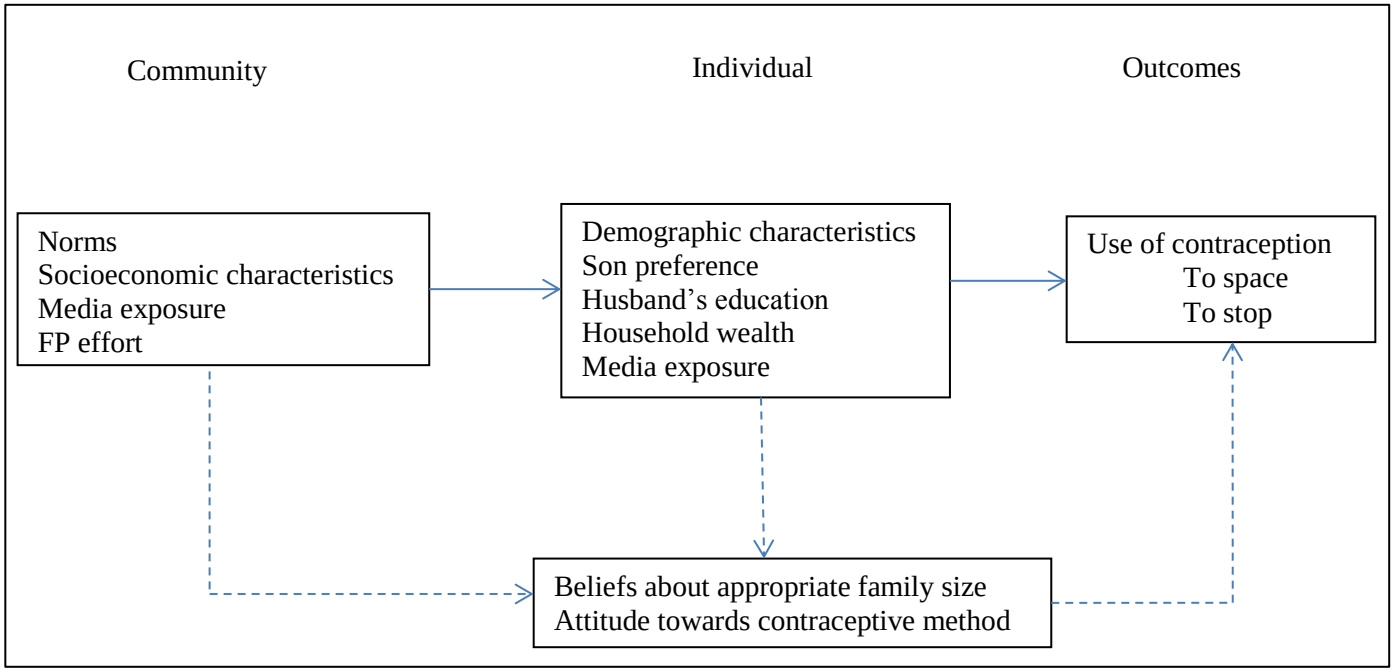
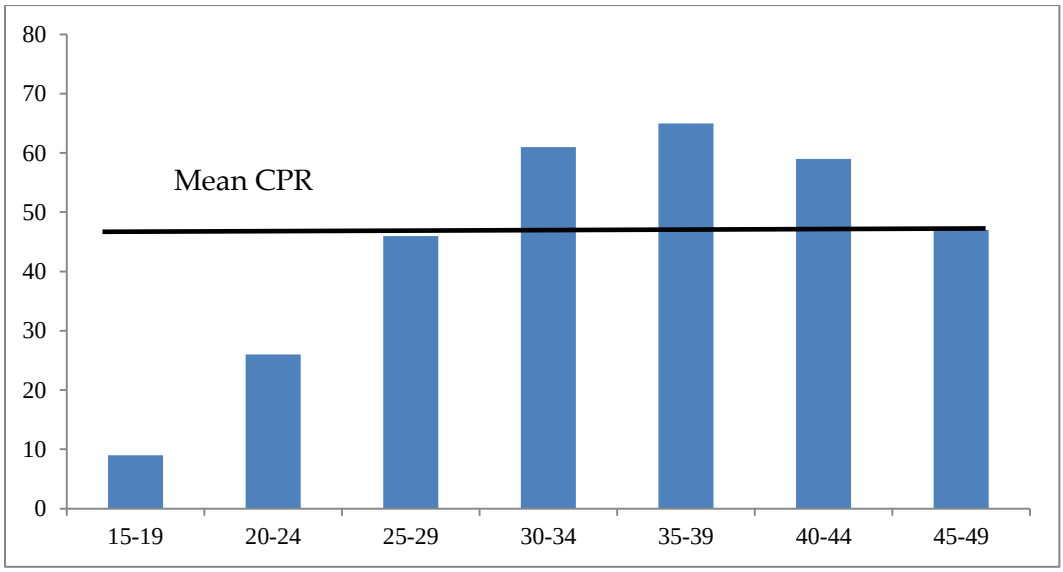


Figure 2. Contraceptive Prevalence Rate (%), Currently Married Not Pregnant Women

Panel A: 1992



Panel B: 2005