

THE CONSEQUENCES OF INDIA'S MALE SURPLUS FOR WOMEN'S PARTNERING AND SEXUAL EXPERIENCES*

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Abstract

Data from the third wave of India's 2005-2006 National Family and Health Survey are used to examine the influence of the community-level sex ratio on several dimensions of women's partnering behavior and sexual experiences. Multi-level logistic regression models that control for individual demographic attributes and community-level characteristics reveal that the local male-to-female sex ratio is positively and significantly associated with the likelihood that women marry prior to age 16 and have experienced forced sex. These associations are modest in magnitude. However, no significant associations are observed between the sex ratio and whether women have had two or more lifetime sexual partners or women's risk of contracting a sexually-transmitted disease. Birth cohort, education, religion, caste, region, urban residence, and several community-level measures of women's status also emerge as significant predictors of Indian women's partnering and sexual experiences. The implications of our results for India's growing surplus of adult men are discussed.

THE CONSEQUENCES OF INDIA'S MALE SURPLUS FOR WOMEN'S PARTNERING AND SEXUAL EXPERIENCES

The sex composition of India's population has long reflected an imbalance between the numbers of men and women (Agnihotri, 2000; Chakraborty & Kim, 2010; Guillot, 2002; Guilmoto, 2008). Although the sex ratio at birth may have recently become slightly more balanced (Haub, 2011; Sharma & Haub, 2008), the 2011 Indian census nonetheless recorded a larger deficit of female children than that observed in the 2001 census. The factors contributing to India's numerical surplus of males reflect the pervasive gender inequality in Indian society.

A strong preference for sons over daughters in India derives from patriarchal culture that favors the familial and economic contributions of males over females (Clark, 2000; Das Gupta, 1987; Das Gupta et al., 2003; George, 2002; Malhotra et al., 1995). This gendered social system manifests in family and economic realities that include lineage passed through sons and widespread practice and inflation of dowry payment for daughters (Das Gupta et al., 2003; Rao, 1993; Srinivasan & Lee, 2004). Both the economic reliance on sons and the added burdens of daughters over parents' lifetimes sustain son preference and gender inequality (Das Gupta, 1987).

More recently, this longstanding preference for sons has become easier to satisfy because of the widespread diffusion and adoption of sex-selective abortion technologies (Abrejo et al., 2009; Arnold, Kishor, & Roy, 2002; Hvistendahl, 2011; Jha et al., 2006). Imbalanced sex ratios in childhood are also generated by selective neglect of girls (Das Gupta, 1987) and differential survival rates. Discrimination against girls in immunization, nutrition (Boorah, 2004; Oster, 2009; Pande, 2003), and other health care practices (Mishra, Roy & Retherford, 2004) results in excess female mortality during early childhood (Oster, 2009). In turn, these sex ratio imbalances

at birth and during childhood contribute to sex ratio imbalances in adulthood as these cohorts age.

Levels, trends, and regional variations in India's skewed sex ratios, as well as the proximate and distal practices that generate these imbalances, have been well documented (Guilmoto, 2008; Pande & Astone, 2007). Much less attention, however, has been devoted to understanding the consequences of male surpluses for family behaviors and sexual outcomes (Dyson 2012). This paper uses data from India's 2005-2006 National Family and Health Survey (NFHS-3) to examine the association between community-level sex ratios and women's partnering and sexual experiences. We examine the effect of the local sex ratio on women's age at marriage, number of partners, risk of sexual victimization, and likelihood of contracting a sexually-transmitted disease (STD). By exploiting the substantial inter-community variation in India's sex ratio, we are able to explore how contemporary imbalances in the relative numbers of women and men are associated with women's family and sexual experiences. Examining the impact of adult sex ratio imbalances is not only important for understanding current social behaviors but may also have implications for future developments as younger birth cohorts characterized by unusually masculine sex ratios enter young adulthood.

BACKGROUND AND THEORETICAL ARGUMENT

With an overall male-to-female sex ratio of 106.4, women are moderately underrepresented in India's total population.¹ Of perhaps greater concern is the numerical deficit of young girls. A normal range of the sex ratio at birth (the number of male to female births) is considered to be between 103 and 107. The sex ratio at birth in India is currently 111 (Haub, 2011) and has shown only modest, if any, signs of improvement over recent years (Ramaiah, Chandrasekarayya, & Murthy, 2011). Indeed, India's childhood sex ratio appears to have

deteriorated—that is, become more masculine—over time. In 1961, the ratio of boys to girls at ages 0 to 6 stood at 102.5, rising to 104.0 in 1981 and to 109.4 in the most recent 2011 census (Census of India, 2011; United Nations Population Fund, India, 2009).

Moreover, this sex ratio imbalance is particularly acute in some regions of India (Arnold, Kishor, & Roy, 2002; Dyson, 2001). For example, circa 2000, the sex ratio at birth was over 129 and 124 in Punjab and Haryana, respectively, and was nearly as high in several other Indian states (Sharma & Haub, 2008). Similarly high sex ratios are observed for the child population: there are currently 120.5 boys per 100 girls age 0 to 6 in Haryana (Census of India, 2011). These imbalances in sex ratios at birth and during childhood portend a looming surplus of adult men in India's population, and thus warrant attention to the consequences of the numerical deficit of women in India.

One area of social life that is likely affected by numerical imbalances in the numbers of young women and men encompasses the formation of sexual and romantic partnerships. A useful theoretical perspective that addresses the effect of sex ratio imbalances on women's partnering behavior is demographic-opportunity theory (South, Trent, & Shen, 2001; Trent & South, 2011; Uecker & Regnerus, 2010). Demographic-opportunity theory posits that the numerical composition of the population by various social attributes and categories shapes social behavior (Blau, 1977). In the context of relations between the sexes, this theoretical approach argues that the likelihood of social interaction between women and men is determined in large measure by the number of opposite sex group members with whom such interactions could occur (South et al., 2001; Trent & South, 2011; Uecker & Regnerus, 2010). Demographic-opportunity theory and its extensions (South & Trent, 2010) delineate how the number of men relative to women influences women's partnering behavior and sexual encounters, positing that women's

probability of marrying and experiencing various sexual outcomes are determined in part by the sex ratio in the local community.

Until recently, research in this area has been limited to testing the propositions of demographic-opportunity theory in the United States. Numerous studies demonstrate that women exhibit higher marriage rates in geographic areas containing more plentiful supplies of available men (e.g., Albrecht, Fossett, Cready, & Kiecolt, 1997; Fossett & Kiecolt, 1993; Lichter, Anderson, & Hayward, 1995; Lichter, McLaughlin, Kephart, & Landry, 1992; McLaughlin, Lichter, & Johnston, 1993). Once having married, however, women are also more likely to divorce in such areas, presumably because a copious supply of alternative mates may draw them away from their current spouse (McKinnish, 2004; South et al., 2001). Women's engagement in premarital sexual activity is greater in counties with comparatively high male-to-female sex ratios (Billy, Brewster, & Grady, 1994; cf. Brewster, 1994). Perhaps as a consequence, rates of nonmarital childbearing also appear higher in geographic areas characterized by a numerical surplus of men (Billy & Moore, 1992; South & Lloyd, 1992).

Prior research has also related sex ratio imbalances to the incidence of violence against women. Findings from this research are somewhat inconsistent (O'Brien, 1991; Whaley, 2001), but U.S. rape victimization rates are higher in geographic areas with higher male-to-female sex ratios (Blau & Golden, 1986; Messner & Blau, 1987). The sex ratio is also positively associated with male-on-female intimate partner violence (D'Alessio & Stolzenberg, 2010) and female homicide victimization (Avakame, 1999). These patterns suggest that when women are scarce, men are less able to develop normative sexual partnerships, and as a consequence employ violence as a means to obtain sex and exercise control over women (Guttentag & Secord 1983).

Fewer studies have examined the relationship between sex ratios and partnering and sexual experiences in contexts outside of the United States. Cross-national research has found positive associations between the male-to-female sex ratio and women's rates of marriage, and negative associations with nonmarital childbearing and divorce (Barber, 2001; South & Trent, 1988). Recent studies of the impact of China's sex ratio imbalance report that the community-level sex ratio is positively associated with women's early marriage, the probability of nonmarital sexual activity, and the number of lifetime sexual partners (Trent & South, 2011; see also Eberstein & Sharygin, 2009; Guilmoto, 2012). Women in China are also more likely to be sexually active, to have had premarital sexual intercourse, to have been forced to have sex, and to test positive for a sexually transmitted infection when there is a surplus of men in their local community (Trent & South, 2012). Similarly, Merli and Hertog (2010) link sex ratio imbalances to the spread of HIV/AIDS in China. To our knowledge, however, no study has examined the consequences of sex ratio imbalances for Indian women's partnering and sexual experiences, despite the fact that India's population sex ratio imbalance rivals that of China.

Demographic-opportunity theory and the findings from prior empirical research imply several hypotheses regarding how sex ratio imbalances affect women's partnering and sexual encounters in India. Demographic-opportunity theory suggests that when men are comparatively abundant, young women will be more likely to encounter a desirable romantic partner. In the Indian context, where husbands are often chosen by parents and other family members, this means that families as well will be better able to find a suitable match for daughters in high sex ratio contexts. As a result, women residing in communities characterized by high male-to-female sex ratios will be more likely to marry at a young age compared to women residing in communities with fewer men.

A high male-to-female sex ratio is also hypothesized to increase the number of sexual partners women have in their lifetime. Theoretically, a surplus of men may increase women's involvement with multiple partners both because women will be more likely to form a relationship with an alternative new partner while in an existing relationship and because women will be more likely to find another partner following the dissolution of a marriage, either through abandonment, divorce, or widowhood. However, in the Indian context both premarital and extramarital sexual activity are exceedingly rare (e.g., less than 1 percent of unmarried women in NFHS-3 report being sexually active), thus, the latter process is the most likely operating in India. In contrast, when men are relatively scarce, women's opportunities to find a new partner will be constrained, and thus women will be less likely to have more than one sexual partner over their lifetime.

Demographic-opportunity theory also implies that women will be more likely to be forced to have sexual intercourse when there is a numerical surplus of men in their local community. When men are abundant, and hence women are scarce, many men will be unable to find female partners through normative social behavior. Consequently, in high sex ratio settings some single men may attempt to obtain sexual satisfaction through physical force. A surplus of men (and shortage of women) may also elicit sexual violence by husbands. In high sex ratio contexts, married men will have few potential sexual partners outside of marriage and hence may be more likely to force their wives to have sex. In addition, husbands may resort to violence when threatened by wives' extramarital sexual opportunities, which are more numerous when men are plentiful and women are scarce (D'Alessio & Stolzenberg, 2010). Thus, demographic-opportunity theory suggests a positive association between the community-level sex ratio and women's risk of victimization from forced sexual intercourse.

Finally, demographic-opportunity theory suggests that a sex ratio imbalance will increase women's risk of contracting an STD. This increased risk could occur through several pathways. A numerical surplus of men likely increases women's chances of having multiple lifetime sexual partners, of engaging in frequent sexual intercourse, and of experiencing forced sex, all of which are risk factors for contracting an STD (Doshi & Gandhi, 2008; Rodrigues et al., 1995). And a surplus of men—and corresponding deficit of women—likely increases men's experience with commercial sex and thus their STD rate, and we know that husbands are the main source of infection for married women (Doshi & Gandhi, 2008; Pallikadavath et al., 2005). In contrast, a scarcity of men leaves women with fewer opportunities to be sexually active, and when they are sexually active they will be more likely to have sex with fewer and safer partners. Women will also be less likely to have intercourse forced on them when there are fewer men relative to women. Thus, women's overall risk of contracting an STD may be reduced when men are comparatively scarce.

In examining the effect of imbalanced sex ratios on women's partnering behavior and sexual experiences, it is important to consider the Indian context. Although family-related practices and values vary across geographic areas and the urban/rural divide, India can nonetheless be characterized as a predominantly traditional society. Premarital sexual activity and divorce are strongly proscribed. Marriage is nearly universal, occurs at an early age, and is often arranged (Banerjee, 1999; Desai & Andrist, 2010; Netting, 2010; Singh, 2005). Less than 5 percent of married women report that they alone chose their husbands, although 62 percent report they had at least some say in the decision (Desai & Andrist, 2010). Yet, with increasing educational attainment and labor force participation, Indian women have gained freedom in both the public and private spheres, and many now enjoy greater autonomy in their behaviors,

including more freedom to choose their marital partners (Netting, 2010; Singh, 2005), even though these new found freedoms may be concentrated among the urban middle class (Fuller & Narasimhan, 2008). Given these changes in Indian society, we might expect that women's likelihood of having the partnering and sexual experiences examined here have changed over time. Our analysis captures these secular changes by including birth cohort as a covariate.

We also consider other individual- and community-level characteristics that are likely associated with women's partnering and sexual experiences and that might confound an association between the community sex ratio and the outcome variables. Higher levels of education and wealth may be associated with more liberal attitudes that allow more freedom in women's personal lives (Singh, 2005). Social norms surrounding women's partnering and sexual behavior are also likely to vary by religious affiliation, caste, and geographic region (Banerjee, 1999; Singh, 2005). We also control for community-level indicators of women's education, labor force participation, household decision-making power, and freedom of movement. Communities in which women have low status and little power are likely to display high levels of son preference and consequently high male-to-female population sex ratios as well as gendered social norms and cultural expectations that limit women's partnering opportunities.

DATA AND METHODS

Data for this analysis are from the third wave of India's National Family and Health Survey (NFHS-3). Collected in 2005-2006, the nationally-representative NFHS-3 consists of a household questionnaire (N=109,041) and separate questionnaires administered to women ages 15-49 (N=124,385) and men ages 15-54 (N=74,369). The survey provides data on multiple indicators of demographic behavior, health, nutrition, and socioeconomic characteristics. Our analysis draws primarily on data from the women's questionnaire. However, we also draw on the

household and men's datasets to create measures of the sex ratio and other community-level characteristics.

We delimit the sample of NFHS-3 women in two ways. First, we select only women who were ages 15 to 39 at the time of the NFHS-3 administration. Because we lack longitudinal community-level data, we can only measure the sex ratio to which the NFHS-3 respondents are exposed at the time of the survey. When respondents were at risk of experiencing some of the outcomes examined here, the older NFHS-3 women may have been exposed to a much different sex ratio than we observe at the time of the NFHS-3 administration. While not perfectly timing the measurement of the independent and dependent variables, constraining the sample to younger women increases the temporal alignment between the measured sex ratio and women's experiences that might be affected by the sex ratio.

Second, we select only women who resided in a primary sampling unit in which at least 25 women and men contribute to the measurement of the sex ratio. We apply this restriction so that community sex ratio estimates are not derived from very small sex- and age-specific population counts. Kravdal's (2006) simulation analysis suggests that, in the DHS, constructing PSU-level variables from as few as 25 respondents results in relatively low levels of bias.²

Applying these selections result in a maximum sample of 101,264 female respondents ages 15 to 39. These respondents are distributed across 3,827 primary sampling units (PSUs), which are used to aggregate sex- and age-specific population counts from the household-level questionnaire in order to create community-level sex ratios. In rural areas, the PSUs are villages; in urban areas, the PSUs are census enumeration blocks.

Dependent Variables: Our analysis explores the potential influence of the community-level sex ratio on several aspects of women's partnering and sexual experiences, all of which are measured

dichotomously. Women's likelihood of marrying at an early age is measured by a variable indicating whether respondents married prior to turning age 16. (The few respondents who had not yet turned age 16 at the time of the survey are excluded from this part of the analysis.) Because very few NFHS-3 female respondents report having had sexual intercourse with more than two different partners, we measure the likelihood of engaging in multi-partner sexual intercourse with a dichotomous variable scored positively for women who report that, over their lifetime, they have had intercourse with more than one partner. Women who have never had intercourse or who report having had only one sexual partner in their lifetime are scored 0 on this variable. A subset of the NFHS-3 women were administered a series of questionnaire items covering experiences of domestic and sexual violence. Having experienced forced sex is measured by a positive response to a question asking women whether, at any time in their life, they had been forced to have sexual intercourse or to perform any other sexual acts. Finally, whether the respondent has a sexually-transmitted disease is measured by a binary variable derived from self-reports indicating that during the past year the respondent had a disease received through sexual contact or symptoms of such a disease, including an abnormal genital discharge, sore, or ulcer.

Independent Variables: Our focal independent variable is the community-level sex ratio, which we measure as the number of men per 100 women at ages 15 to 59. We calculate this sex ratio from the NFHS-3 household questionnaire, which provides the age and sex of all members of sampled households.³ Across the 3,827 communities (i.e., PSUs) represented in our analysis, these sex ratios are estimated with an average of 93 women and men. So that the sex ratio effects are not unduly influenced by extreme values, we bottom code sex ratios below 70 to that value, and we top code sex ratios above 130 to that value. One limitation of this measure is that, as a

single point-in-time indicator, it may not capture well the availability of mates during women's risk period for marrying or experiencing the various sexual outcomes that constitute our dependent variables. We assume that the sex ratio observed at the time of the NFHS administration is a reasonable proxy for the unobserved sex ratio to which the older women were exposed when they were at risk of experiencing the outcomes examined here.⁴ We also assume that, for communities that practice village exogamy, the PSU-level sex ratio proxies for the sex ratio in surrounding areas, including neighboring villages, from where marital partners are selected.

Characteristics of communities other than the sex ratio are likely to influence the outcomes we examine here. Additionally, residents of communities characterized by different sex ratios may differ systematically in ways that influence women's partnering and sexual experiences. For example, communities that exhibit strong patriarchal cultures and pronounced son preference—and thus perhaps a high male-to-female sex ratio—may also encourage or discourage particular types of sexual behavior among women (and men). Accordingly, controlling for other possible individual-level and community-level covariates of women's marital and sexual experiences may serve to isolate a causal effect of the community sex ratio on the outcome variables.

At the individual level, we include dummy variables for decadal birth cohort, contrasting women born in the 1970s and the 1980s with those born in the 1960s (the reference category). Educational attainment is measured by completed years of schooling. Household wealth is a pre-constructed index using data from the household questionnaire, and includes such items as household ownership of the home, land, various types of furniture, appliances, and vehicles; characteristics of the dwelling unit such as construction materials, water sources, and sanitation,

and possession of a bank account. Scores on the index were derived from a principal components analysis based on all NFHS-3 households and standardized with a mean of 0 and standard deviation of 1.⁵ Our models also include dummy variables for respondents' religion, contrasting separately Hindu and Muslim respondents with those of other religions (predominantly but not exclusively Christians). Members of scheduled castes, scheduled tribes, and other backward castes (OBC) are distinguished from other respondents with separate dummy variables.

To capture broad cultural, economic, and social factors that could confound the association between the sex ratio and women's marital and sexual experiences, we include in the models a control for geographic region, contrasting residents of Southern states (Andhra Pradesh, Goa, Karnataka, Kerala, Maharashtra, Tamil Nadu), Eastern states (Bihar, Orissa, West Bengal), and Northeastern states (Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, Tripura), with the remaining Northern states that serve as the reference category.

We also control for six community-level characteristics. A dummy variable differentiates residents of urban communities from residents of rural communities. The other community-level characteristics are constructed by aggregating responses from the NFHS women and household member questionnaires to the PSU level. Women's mean educational attainment is the average years of schooling completed by female community members aged 25 and older. Women's labor force participation is the proportion of adult women who report working for pay. Women's decision-making is the PSU-level average of the number of the following five decision-making areas in which women reported having at least some say: their own health care; making large household purchases; making household purchases for daily needs; visiting family or relatives; and what to do with the money that their husband earns. Women's mobility is measured by the

PSU-level average of the following number of locations to which women report they are allowed to travel to alone: market; health facility; and places outside the village or community. Women's access to cash is the proportion of women who report having access to a bank account.

Analytical Strategy: To examine the effect of the community sex ratio on women's marital timing, multi-partnered sex, experience with forced sex, and STD status, we estimate a series of multilevel random intercept logistic regression models. Multilevel models adjust for the nesting of observations within higher-order units (here, PSUs), and ensure that the standard errors of the regression coefficients are estimated using the correct number of degrees of freedom. Models are estimated using STATA's xtmelogit procedure (StataCorp, 2005).

RESULTS

Table 1 presents variable descriptions and descriptive statistics for all variables used in the analysis. Approximately one-quarter of the respondents reports marrying prior to turning age 16. Fewer than 2% of the respondents report that they have had sexual intercourse with more than one partner over their lifetime, and among the subset of women administered the domestic violence module, slightly more than 2% report having been forced to engage in sexual intercourse or to perform sexual acts at some point in their life. Approximately 7% of the respondents report having or exhibiting symptoms of an STD.

Table 1 about here

The remainder of Table 1 presents descriptive statistics for the independent variables. The sample size varies across the dependent variables because of the various sample restrictions (e.g., omitting women aged 15 from the calculation of age at marriage, using only the subset of women who were asked questions about forced sex) and, to a much lesser extent, because of missing values. We present descriptive statistics for the independent variables using the largest

sample (N = 101,264). However, the statistics for the other samples are quite comparable (results not shown).

The mean male-to-female sex ratio at ages 15 to 59 falls just shy of 98—very close to parity.⁶ As indicated by the large standard deviation, however, there is considerable variation in this sex ratio across the communities inhabited by the NFHS-3 women.

Looking at the distribution of respondents across birth cohorts, 10% of the women were born in the 1960s (and thus were ages 35 to 39 at the time of the survey), 37% were born in the 1970s (and were thus ages 25 to 34 at the time of the survey) and 53% were born after 1980 (and were thus ages 15 to 24 at the time of the survey). The mean level of education (completed years of schooling) is between 6 and 7 years. Seventy-two percent of respondents are Hindu, with Muslims and members of other religions each comprising 14% of the sample. Roughly one-third of the respondents reports belonging to either a scheduled caste or scheduled tribe, with another third belonging to an Other Backward Caste. Looking at the regional distribution of respondents, the plurality resides in Northern India, although each region is home to at least 12% of the respondents.

Turning to the community-level characteristics, 46% of respondents reside in an urban area. The mean years of school completed for women ages 25 and older is 4.24 years, and in the typical community about 28% of women work for pay. Of the five household decisions, in the typical community women have at least some say over two. Of the three locations to which women can travel, in the typical community they can go alone to about half. Averaged across communities, 18% of women have access to a bank account.

Table 2 presents the multilevel logistic regression models that examine the effects of the community sex ratio and the other explanatory variables on each of the four outcomes of

women's partnering and sexual experiences. Model 1 presents the findings for the likelihood that women married prior to turning age 16. As hypothesized, the coefficient for the male-to-female sex ratio is positive and statistically significant. The greater the relative supply of men in the local community, the more likely Indian women are to marry early in life. However, the effect of the sex ratio on women's marital timing is modest. As noted above, in India the child sex ratio (boys per 100 girls ages 0 to 6) has risen from 104 in 1981 to 109.4 in 2011 (Indiastat, 2011). Drawing on the coefficient for the community sex ratio in Model 1 of Table 2, an increase in the male-to-female sex ratio of 5.4 points would increase women's odds of marrying prior to age 16 by only about 2% [$= (e^{[.004][5.4]} - 1) * 100$].

Several of the other explanatory variables are also significantly associated with the odds that women marry prior to turning age 16. The odds of marrying this young decline significantly across birth cohorts, reflecting the increase in age at marriage over time in India. Women's educational attainment and household wealth are significantly and inversely associated with the odds of marrying prior to turning age 16. Hindu and Muslim women are significantly more likely than other women to marry as children, and members of scheduled castes and OBCs are significantly more likely than members of other castes or tribes to marry this young.

Table 2 about here

Net of the effects of the other predictors, residence in the Northeast and (perhaps surprisingly) residence in an urban area are significantly associated with early marriage. The coefficients for the community-level explanatory variables also present a mixed picture. As expected, high levels of women's educational attainment and labor force participation, as well as greater freedom of movement, are inversely associated with marrying prior to turning age 16. However, greater household decision-making authority and access to cash (as indicated by

having a bank account) are positively associated with early marriage. Of course, given fairly strong associations among these community-level indicators of women's status, their net effects should be interpreted with caution.

Model 2 of Table 2 explores the determinants of women's likelihood of having two or more sexual partners over their lifetime. In the Indian context, this most likely reflects the likelihood of remarrying following abandonment, divorce, or widowhood. Although the coefficient for the sex ratio is, as hypothesized, positive, it fails to attain statistical significance. However, several of the other explanatory variables are significantly associated with the likelihood of engaging in multi-partnered sex. Members of the 1980s birth cohort are significantly less likely than members of the 1960s cohort to have had more than one sexual partner, likely due to cohort differences in the duration of exposure to risk of multi-partnered intercourse, including through remarriage. Both educational attainment and household wealth are inversely associated with the odds of having more than one lifetime sexual partner. Hindu and Muslim women are less likely than members of other denominations to have engaged in multi-partner sex. Members of scheduled castes and scheduled tribes are more likely than other (non-OBC) women to have had intercourse with more than one partner.

Compared to residents of Northern India (the reference category), residents of the Northeast are more likely, and residents of the East and South are less likely, to have had more than one sexual partner. Urban residents are more likely than their rural counterparts to have had more than one partner. Of the community-level predictors, women's labor force participation and freedom of movement are significantly and positively associated with the odds that women have had more than one sexual partner.

In Model 3 of Table 2, we examine whether the community sex ratio is associated with the likelihood that women report having been forced to engage in sexual intercourse or perform other sexual acts. As hypothesized, the coefficient for the male-to-female sex ratio is positive and statistically significant. When women are faced with a relative abundance of men in their local community, and men are correspondingly faced with comparatively few women, women are more likely to report having been forced against their will to engage in sexual intercourse or other behaviors. An increase in the sex ratio of 5.4 men per 100 women would increase women's risk of experiencing forced sex by about 3% $[= (e^{[.006][5.4]} - 1) * 100]$.

Education and household wealth are both inversely associated with women's risk of having been forced to have sex, and members of scheduled tribes are more likely than members of "other" or no caste or tribe to have been victims of sexual violence. Compared to residents of the North, residents of the East and Northeast are significantly more likely, and residents of the South are significantly less likely, to report having been forced to engage in sexual intercourse. Of the community-level predictors, women's greater household decision-making power and freedom of movement are inversely associated with sexual victimization, but higher levels of women's labor force participation are positively associated with the risk of forced sexual intercourse.

Finally, Model 4 of Table 2 presents the results for women's risk of reporting having contracted an STD or symptoms consistent with an STD. The coefficient for the male-to-female sex ratio is not statistically significant. Thus, although the community sex ratio appears to increase women's likelihood of experiencing at least one of the risk factors for an STD—forced sex (Model 3)—this association is apparently too weak to produce a significant association between the sex ratio and women's risk of contracting an STD.⁷

Several of the other explanatory variables are, however, significantly associated with women's STD risk. Members of the 1980s birth cohort are significantly less likely than members of the 1960s birth cohort to report having an STD or associated symptoms, and both educational attainment and household wealth are inversely associated with the odds of contracting an STD. Hindu and Muslim women are significantly more likely than members of other religions to have an STD. Residents of all three Non-Northern regions are significantly less likely than residents of the North to report having an STD or associated symptoms. At the community-level, women's household power is positively associated, and women's spatial mobility inversely associated, with STD risk.

To illustrate further the strength of the associations between the community sex ratio and Indian women's partnering and sexual experiences, Table 3 presents predicted probabilities of the outcome variables for selected values of the sex ratio, holding constant all other independent variables at their respective means. Not surprisingly, for the two outcomes nonsignificantly associated with the sex ratio—2+ partners and STD risk—the probability barely changes, if at all, as one moves from the minimum observed value of the sex ratio (70) to the maximum (130). But even for the two outcomes that are significantly affected by the community sex ratio, the effect is rather weak. The probability of marrying before age 16 increases only from .21 to .24 across the entire observed range of the sex ratio. And the (quite low) risk of sexual victimization shifts only from .007 to .01 as the community sex ratio moves from 70 men per 100 women to 130 men per 100 women. Thus, while the community sex ratio significantly shapes Indian women's risk of early marriage and forced sex, its influence is by no means powerful.

Table 3 about here

DISCUSSION AND CONCLUSION

The population of India has long been characterized by a numerical imbalance between the sexes, and the surplus of males is thought by many observers to have far-reaching implications, especially for women's partnering and sexual experiences. Yet, little research has explored the impact of sex ratio imbalances on Indian women's lives. We address this question by using individual- and community-level data from the third wave of the National Family and Health Survey to test hypotheses derived from demographic opportunity theory, which posits effects of the community male-to-female sex ratio on an array of women's partnering and sexual experiences. We find statistically significant, albeit substantively modest, associations between the sex ratio and the likelihood that women marry before age 16 and have experienced forced sex. However, we find no support for the hypothesized effects of the sex ratio on either the number of sexual partners or STD risk. Thus, our findings provide qualified support for the hypotheses derived from demographic opportunity theory.

Our results suggest that India's anticipated increase in the supply of adult males may shape Indian women's partnering and sexual experiences. Although over time the average age for women has been rising (Banerjee, 1999; Desai & Andrist, 2010), the looming imbalance in the adult sex ratio is likely to partially suppress that trend. Younger ages at marriage, in turn, are related to earlier ages at first birth, lower levels of educational attainment, and reduced rates of labor force participation. Thus, the impending surplus of young adult men may serve to thwart efforts to combat child marriage and may impede improvements in women's status.

Our findings indicate that women are more likely to be forced to have sex when there are more men relative to women in their communities. Indian women often suffer a lack of power and agency both in their families and the larger society (Desai & Andrist, 2010; Singh, 2005). Subservience to husbands, as well as other family members (especially mothers-in-law), is acute

and widespread (Allendorf, 2012). Future gains in Indian women's status may limit their social and sexual vulnerability. Nonetheless, the positive effect of a male surplus on women's risk of sexual victimization raises concern in light of the projected increase in India's male-to-female sex ratios. Although women's risk of victimization may diminish over time should India become less traditional and patriarchal, such a reduction may be stalled by India's growing excess of men.

We find no grounds for the concern that India's sex ratio imbalances may increase women's STD risk. Women in India marry early, are unlikely to have experienced premarital sex, and rarely have more than one sexual partner. Thus, their overall risk of contracting an STD is currently very low. Nonetheless, women's STD risk is also dependent on men's behaviors. We know from prior research that a shortage of women significantly increases men's likelihood of commercial sex use in China (South & Trent, 2010) and sex ratio imbalances have been implicated in the spread of HIV/AIDS (Merli & Hertog, 2010). Moreover, in India husbands are the main source of sexually-transmitted infections for married women (Doshi & Gandhi, 2008; Pallikadavath et al., 2005). Thus, any changes to Indian men's sexual behaviors resulting from a numerical shortage of women should be closely monitored because these changes may have important implications for the future of women's sexual health.

We acknowledge several limitations to our study. The community-level sample sizes of men and women used to compute the sex ratio are relatively small and our measure of the sex ratio may not be an accurate estimate of the actual community-level sex ratio. Moreover, the age constraint on the sex ratio (ages 15 to 59) is rather crude. A more detailed age-matching of women to their marital and sexual partners may have resulted in stronger findings. Longitudinal life-history data that would allow the sex ratio to be measured at each risk-period and treated as a

time-varying covariate would be ideal. It is also possible that the rural villages and urban census enumeration blocks that constitute communities are geographically too small to adequately capture the marriage (or sexual actor) pools affecting women's lives. Future research on the consequences of India's sex ratio imbalance for women's partnering and sexual experiences will benefit by addressing these limitations of our data and analysis.

When combined with recent research showing generally similar findings for China (Trent & South, 2011; 2012), our results may hint at fairly universal consequences of male surplus for women's partnering behaviors in high sex ratio societies. Male-to-female sex ratios at birth and/or during childhood remain high—and are frequently increasing—in several societies, including not only India and China but also Armenia, Azerbaijan, Georgia, Pakistan, Singapore, and Vietnam (Guilmoto, 2009; Hvistendahl, 2011). Although pronounced social, economic, and cultural differences among these countries may moderate or condition the impact of imbalanced sex ratios, it is possible that women in these societies will experience secular changes in their partnering and sexual experiences presaged by our findings for India. More generally, the sociocultural and demographic impacts of a male surplus deserve attention in the wide array of countries characterized by high and/or increasing male-to-female population sex ratios.

Future research on the potential consequences of sex ratio imbalances in India and elsewhere might also benefit from exploring additional outcomes for women's lives. For example, although a surplus of men may lower women's age at marriage, it may also result in more favorable matches. When women are scarce, they may be more likely to marry men with greater social and economic resources than they would otherwise. Thus, male surplus may spur Indian women's upward social mobility. At the same time, however, in India more prevalent upward social mobility via marriage might also mean growing social and economic differences

between women's natal families and their husbands' households. These brides may be considered inferior in their new homes, particularly isolated from support networks, and more vulnerable to maltreatment and abuse.

Sex ratio imbalances have also been linked to the role of bride price and dowry use in marriage (Bhat & Halli, 1999; Rao, 1993) and the incidence of forced polyandry (Kaur, 2004). Numerical shortages of women are likely also associated with cross-region marriage (Kaur, 2004), and thus women's selective or forced migration to areas where they are scarce should be carefully monitored. In general, the ways in which India's male surplus will shape the future of marriage practices and women's well-being remain uncertain and in need of scholarly attention. A comprehensive understanding of how a numerical excess of men affects women's empowerment at the private household level and in the broader society awaits further study.

NOTES

1. In Indian demography the sex ratio is traditionally expressed as the number of females per males. Unless otherwise noted, we adopt the convention used most elsewhere in the world of measuring the sex ratio as the number of males per females.
2. Imposing more stringent criteria, such as a minimum PSU sample size of 50 or 100 persons, results in substantively similar findings.
3. Because of the need for confidentiality (largely due to the HIV test data), the NFHS-3 does not contain geographic identifiers below the state level that would enable us to attach census-based measures of the sex ratio specific for respondents' community of residence. Thus, we create measures of the community sex ratio from the NFHS-3 household-level data.
4. As a check on the stability of the sex ratio over time, we extracted from the 1991 and 2001 Indian population censuses district-level age- and sex-specific population counts and then computed the sex ratio at ages 15 to 59 for these two years. The Pearsonian correlation between the 1991 and 2001 district sex ratios is .77 ($p < .001$), indicating substantial though by no means perfect consistency over time in the sex ratio.
5. Because in this analysis we are using individual-level, not household data, the mean for our sample is not equal to 1.
6. The low mean male-to-female sex ratio appears to be due to the NFHS-3 household rosters containing more women and fewer men than would be expected on the basis of census data. Perhaps the NFHS-3 interviewers probed more so for the presence of female household members than male household members. Importantly, there is no reason to suspect that any overenumeration of women and/or underenumeration of men varies systematically across geographic areas, so the lower-than-expected mean male-to-female sex ratio should not bias the

observed effects of the sex ratio on the outcomes we examine here. We should also note that although the mean male-to-female sex ratio is lower than expected, we do observe substantial variation around the mean and our sample includes a substantial number of women residing in communities that exhibit a numerical surplus of men (i.e., a male-to-female sex ratio greater than 100).

7. In supplementary analyses we also estimated a model for whether the respondent tested positive for HIV (based on a dried blood spot test). We failed to observe a statistically significant effect of the community sex ratio on HIV status.

REFERENCES

- Abrejo, F. G., Shaikh, B. T., & Rizvi, N. (2009). "And they kill me, only because I am a girl" ...A review of sex-selective abortions in South Asia. *European Journal of Contraception and Reproductive Health Care*, 14, 10-16.
- Agnihotri, S. B. (2000). *Sex ratio patterns in the India population: A fresh exploration*. New Delhi: Sage.
- Albrecht, C. M., Fossett, M. A., Cready, C. M., & Kiecolt, K. J. (1997). Mate availability, women's marriage prevalence, and husbands' education. *Journal of Family Issues*, 18, 429-452.
- Allendorf, K. (2012). Women's agency and the quality of family relationships in India. *Population Research and Policy Review*, 31, 187-206.
- Arnold, F., Kishor, S., & Roy, T. K. (2002). Sex-selective abortions in India. *Population and Development Review*, 28, 759-785.
- Avakame, E. F. (1999). Sex ratios, female labor force participation, and lethal violence against women: Extending Guttentag and Secord's thesis. *Violence Against Women*, 5, 1321-1341.
- Banerjee, K. (1999). Gender stratification and the contemporary marriage market in India. *Journal of Family Issues*, 20, 648-676.
- Barber, N. (2001). On the relationship between marital opportunity and teen pregnancy: The sex ratio question. *Journal of Cross-Cultural Psychology*, 32, 259-267.
- Bhat, P. N., & Halli, S. S. (1999). Demography of brideprice and dowry: Causes and consequences of the Indian marriage squeeze. *Population Studies*, 53, 129-148.

- Billy, J. O. G., Brewster, K. L., & Grady, W. R. (1994). Contextual effects on the sexual behavior of adolescent women. *Journal of Marriage and the Family*, 56, 387-404.
- Billy, J. O. G., & Moore, D. E. (1992). A multilevel analysis of marital and nonmarital fertility in the U.S. *Social Forces*, 70, 977-1011.
- Blau, P. M. (1977). *Inequality and heterogeneity: A primitive theory of social structure*. New York: Free Press.
- Blau, P. M., & Golden, R. M. (1986). Metropolitan structure and criminal violence. *Sociological Quarterly*, 27, 15-26.
- Boorah, V. K. (2004). Gender bias among children in India in their diet and immunisation against disease. *Social Science & Medicine*, 58, 1719-1731.
- Brewster, K. L. (1994). Neighborhood context and the transition to sexual activity among young black women. *Demography*, 31, 977-1011.
- Census of India. (2011). Provisional population totals, paper 1, http://www.censusindia.gov.in/2011-prov-results/prov_results_paper1_india.html
- Chakraborty, T., & Kim, S. (2010). Kinship institutions and sex ratios in India. *Demography*, 47, 989-1012.
- Clark, S. (2000). Son preference and sex composition of children: Evidence from India. *Demography*, 37, 95-108.
- D'Alessio, S. J., & Stolzenberg, L. (2010). The sex ratio and male-on-female intimate partner violence. *Journal of Criminal Justice*, 38, 555-561.
- Das Gupta, M. (1987). Selective discrimination against female children in rural Punjab, India. *Population and Development Review*, 13, 77-100.

- Das Gupta, M., Zhenghua, J, Li, B., Xie, Z., Chung, W., & Bae, H. (2003). Why is son preference so persistent in East and South Asia? A cross-country study of China, India, and the Republic of Korea. *Journal of Development Studies*, 40, 153-187.
- Desai, S., & Andrist, L. (2010). Gender scripts and age at marriage in India. *Demography*, 47, 667-687.
- Doshi, S. R., & Gandhi, B. (2008). Women in India: The context and impact of HIV/AIDS. *Journal of Human Behavior in the Social Environment*, 17, 413-442.
- Dyson, T. (2001). The preliminary demography of the 2001 Census of India. *Population and Development Review*, 27, 341-356.
- Dyson, T. (2012). Causes and consequences of skewed sex ratios. *Annual Review of Sociology* (in press).
- Ebenstein, A. Y., & Sharygin, E. J. (2009). The consequences of the “missing girls” of China. *World Bank Economic Review*, 23, 399-425.
- Fossett, M. A., & Kiecolt, K. J. (1993). Mate availability and family structure among African Americans in U.S. metropolitan areas. *Journal of Marriage and the Family*, 55, 288-301.
- Fuller, C. J., & Narasimhan, H. (2008). Companionate marriage in India: The changing marriage system in a middle-class Brahman subcaste. *Journal of the Royal Anthropological Institute*, 14, 736-754.
- George, S. M. (2002). Sex selection/determination in India: Contemporary developments. *Reproductive Health Matters*, 10, 184-197.
- Guillot, M. (2002). The dynamics of the population sex ratio in India, 1971-96. *Population Studies*, 56, 51-63.

- Guilmoto, C. Z. (2008). Economic, social and spatial dimensions of India's excess child masculinity. *Population-E*, 63, 91-118.
- Guilmoto, C. Z. (2009). The sex ratio transition in Asia." *Population and Development Review*, 35, 519-549.
- Guilmoto, C. Z. (2012). Skewed sex ratios at birth and future marriage squeeze in China and India, 2005-2100. *Demography*, 49, 77-100.
- Guttentag, M., & Secord, P. F. (1983). *Too many women? The sex ratio question*. Beverly Hills, CA: Sage.
- Haub, C. (2011). Update on India's sex ratio at birth. Download from the Population Reference Bureau, <http://prbblog.org/index.php/2011/02/09/india-sex-ratio-at-birth/>. Accessed October 12, 2011.
- Hvistendahl, M. (2011). *Unnatural selection: Choosing boys over girls, and the consequences of a world full of men*. New York: PublicAffairs.
- Indiastat. 2011. <http://www.Indiastat.com/demographics/7/sexratio/251/stats.aspx>. Accessed September 26, 2011.
- Jha, P., Kumar, R., Vasa, P., Dhingra, N., Thiruchelvam, D., & Moineddin, R. (2006). Low male-to-female sex ratio of children born in India National Survey of 1.1 million households. *Lancet*, 367, 211-218.
- Kravdal, Oystein. 2006. "A simulation-based assessment of the bias produced when using averages from small DHS clusters as contextual variables in multilevel models." *Demographic Research*, 15, 1-20.
- Lichter, D. T., Anderson, R. N., & Hayward, M. D. (1995). Marriage markets and marital choice. *Journal of Family Issues*, 16, 412-431.

- Lichter, D. T., McLaughlin, D. K., Kephart, G., & Landry, D. J. (1992). Race and the retreat from marriage: A shortage of marriageable men? *American Sociological Review*, 57, 781-799.
- Malhotra, A., Vanneman, R., & Kishor, S. (1995). Fertility, dimensions of patriarchy, and development in India. *Population and Development Review*, 21, 281-305.
- McKinnish, T. G. (2004). Occupation, sex-integration, and divorce. *American Economic Review*, 94, 322-325.
- McLaughlin, D. K., Lichter, D. T., & Johnston, G. M. (1993). Some women marry young: Transitions to first marriage in metropolitan and nonmetropolitan areas. *Journal of Marriage and the Family*, 55, 827-838.
- Merli, M. G., & Hertog, S. (2010). Masculine sex ratios, population age structure and the potential spread of HIV in China. *Demographic Research*, 22, 63-94.
- Messner, S. F., & Blau, J. R. (1987). Routine leisure activities and rates of crime: A macro-level analysis. *Social Forces*, 65, 1035-1052.
- Mishra, V., Roy, T. K., & Retherford, R. D. (2004). Sex differentials in childhood feeding, health care, and nutritional status in India. *Population and Development Review*, 30, 269-295.
- Netting, N. S. (2010). Marital ideoscapes in 21st-century India: Creative combinations of love and responsibility. *Journal of Family Issues*, 31, 707-726.
- O'Brien, R. M. (1991). Sex ratios and rape rates: A power-control theory. *Criminology*, 29, 99-114.
- Oster, E. (2009). Proximate sources of population sex imbalance in India. *Demography*, 46, 325-340.
- Pallikadavath, S., Garda, L., Apte, H., Freedman, J., & Stones, R. W. (2005). HIV/AIDS in rural India: Context and health care needs. *Journal of Biosocial Sciences*, 37, 641-655.

- Pande, R. P. (2003). Selective gender differences in childhood nutrition and immunization in rural India: The role of siblings. *Demography*, 40, 395-418.
- Pande, R. P., & Astone, N. M. (2007). Explaining son preference in rural India: The independent role of structural versus individual factors. *Population Research and Policy Review*, 26, 1-29.
- Ramaiah, G. J., Chandrasekarayya, T., & Murthy, P. V. (2011). Declining child sex ratio in India: Trends, issues, concerns. *Asia-Pacific Journal of Social Sciences*, 3, 183-198.
- Rao, V. (1993). Dowry 'Inflation' in rural India: A statistical investigation. *Population Studies*, 47, 283-293.
- Rodrigues, J., Mehendale, S. M., Shepherd, M. E., Divekar, A. D., Gangakhedkar, R. R., Thomas Quinn, T. C., Paranjape, R. S., Risbud, A. R., Brookmeyer, R. S., Gadkari, D. A., Gokhale, M. R., Rampalo, A. M., Deshpande, S. G., Khalandkar, M. M., Mawar, N., & Bollinger, R. C. (1995). Risk factors for HIV infection in people attending clinics for sexually transmitted diseases in India." *British Medical Journal* 311: 283-286.
- Sharma, O. P., & Haub, C. (2008). Sex ratio at birth begins to improve in India. Download from the Population Reference Bureau, <http://www.prb.org/Articles/2008/indiasexratio.aspx>. Accessed August 27, 2008.
- Singh, J. P. (2005). The contemporary Indian family. In B. Adams & J. Trost (Eds.), *Handbook of world families* (pp. 129-166). Thousand Oaks, CA: Sage.
- South, S. J., & Lloyd, K. M. (1992). Marriage markets and nonmarital fertility in the United States. *Demography*, 29, 247-264.
- South, S. J., & Trent, K. (1988). Sex ratios and women's roles: A cross-national analysis. *American Journal of Sociology*, 93, 1096-1115.

- South, S. J., & Trent, K. (2010). Imbalanced sex ratios, men's sexual behavior, and risk of sexually transmitted infection in China. *Journal of Health and Social Behavior*, 51, 376-390.
- South, S. J., Trent, K., & Shen, Y. (2001). Changing partners: Toward a macrostructural-opportunity theory of marital dissolution. *Journal of Marriage and Family*, 63, 743-754.
- Srinivasan, P., & Lee, G. R. (2004). The dowry system in northern India: Women's attitudes and social change. *Journal of Marriage and Family*, 66, 1108-1117.
- StataCorp. (2005). *Stata statistical software: Release 9.0*. College Station, TX: Stata Corporation.
- Trent, K., & South, S. J. (2011). Too many men? Sex ratios and women's partnering behavior in China. *Social Forces*, 90, 247-268.
- Trent, K., & South, S. J. (2012). Mate availability and women's sexual experiences in China. *Journal of Marriage and Family*, 74, 201-214.
- Uecker, J. E., & Regnerus, M. D. (2010). Bare market: Campus sex ratios, romantic relationships, and sexual behavior. *The Sociological Quarterly*, 51, 408-435.
- United Nations Population Fund, India. (2009). Declining child sex ratio (0-6 years) in India, a review of literature and annotated bibliography. (<http://india.unfpa.org/?reports=755>)
- Whaley, R. B. (2001). The paradoxical relationship between gender inequality and rape: Toward a refined theory. *Gender & Society*, 15, 531-555.

**Table 1. Descriptive Statistics for Variables Used in Analysis of Women's Partnering and Sexual Experiences:
India National Family and Health Survey, 2005-2006**

<u>Dependent Variables</u>	<u>Description</u>	<u>%/Mean</u>	<u>SD</u>	<u>N</u>
Marry before Age 16	R married before turning age 16 (1=yes)	23.52		96,762
2+ Partners	R reports having had sexual intercourse with 2 or more different partners (1=yes)	1.37		101,264
Forced Sex	R reports ever having been forced to have sexual intercourse or perform any other sexual acts (1=yes)	2.20		68,728
STD	R reports having been diagnosed with a sexually-transmitted disease or displays associated symptoms in past year (1=yes)	7.12		100,879
<u>Independent Variables</u>				
Sex Ratio	Community (PSU) male-to-female sex ratio ages 15-59	97.87	16.75	101,264
Birth Cohort				101,264
1960	R was born 1960-1969 (1=yes)	10.35		
1970	R was born 1970-1979 (1=yes)	37.15		
1980	R was born 1980-1989 (1=yes)	52.50		
Education	R's years of school completed	6.48	5.13	101,264
Wealth	Multi-item index of household possessions	.50	9.82	101,264
Religion				101,264
Hindu	R is Hindu (1=yes)	71.93		
Muslim	R is Muslim (1=yes)	13.99		
Other	R is other religion (1=yes)	14.08		

Table 1. (continued)

<u>Independent Variables</u>	<u>Description</u>	<u>%/Mean</u>	<u>SD</u>	<u>N</u>
Caste/Tribe				101,264
Scheduled Caste	R belongs to scheduled caste (1=yes)	16.58		
Scheduled Tribe	R belongs to scheduled tribe (1=yes)	13.54		
Other Backward Caste (OBC)	R belongs to other backward caste (1=yes)	31.57		
Other Caste/Tribe	R belongs to other or no caste/tribe (1=yes)	38.30		
Region				101,264
North	R lives in North India (1=yes)	42.24		
Northeast	R lives in Northeast India (1=yes)	17.87		
East	R lives in East India (1=yes)	12.17		
South	R lives in South India (1=yes)	27.72		
Urban Area	R's community is in an urban area (1=yes)	45.60		101,264
Women's Education	Community (PSU) mean of adult women's years of school completed	4.24	3.12	101,264
Women's Labor Force Participation	Community (PSU) proportion of adult women who work for pay	.28	.18	101,264
Women's Decision-Making	Community (PSU) mean of number of household decisions (health care, household purchases, daily needs, visiting, spending husband's earnings) in which women have some say	2.31	.62	101,264
Women's Mobility	Community (PSU) mean of number of locations (market, health facility, places outside village/community) to which women can travel alone	1.54	.64	101,264
Women's Access to Cash	Community (PSU) proportion of women who report having access to a bank account	.18	.16	101,264

Table 2. Multilevel Logistic Regression Analyses of Women's Partnering and Sexual Experiences: India National Family and Health Survey, 2005-2006

<u>Independent Variables</u>	<u>Model 1</u> <u>Marry by age 16</u>			<u>Model 2</u> <u>2+ Partners</u>			<u>Model 3</u> <u>Forced Sex</u>			<u>Model 4</u> <u>STD</u>		
	<u>b</u>	<u>se</u>	<u>e^x</u>	<u>b</u>	<u>se</u>	<u>e^x</u>	<u>b</u>	<u>se</u>	<u>e^x</u>	<u>b</u>	<u>se</u>	<u>e^x</u>
Sex Ratio	.004**	.001	1.004	.002	.002	1.002	.006*	.003	1.006	.000	.001	1.000
Birth Cohort	Reference			Reference			Reference			Reference		
1960												
1970	-.101**	.029	.904	-.021	.079	.979	.045	.097	1.046	.036	.041	1.037
1980	-.763**	.030	.466	-1.123**	.090	.325	.048	.098	1.049	-.794**	.043	.452
Education	-.201**	.003	.818	-.091**	.009	.913	-.030**	.009	.970	-.044**	.004	.957
Wealth	-.017**	.002	.983	-.039**	.005	.962	-.026**	.006	.974	-.013**	.003	.987
Religion	Reference			Reference			Reference			Reference		
Hindu												
Muslim	.513**	.046	1.670	-.783**	.099	.457	-.198	.127	.820	.257**	.063	1.293
Other	.365**	.057	1.441	-.314*	.132	.731	-.024	.161	.976	.532**	.077	1.702
Caste/Tribe	Reference			Reference			Reference			Reference		
Scheduled Caste												
Scheduled Tribe	.260**	.032	1.297	.279**	.099	1.322	.115	.097	1.122	.036	.045	1.037
Other Backward Caste (OBC)	.030	.043	1.030	.456**	.105	1.578	.280*	.122	1.323	-.105	.061	.900
Other Caste/Tribe	.217**	.028	1.242	.097	.089	1.102	.103	.090	1.108	.049	.039	1.050
Region	Reference			Reference			Reference			Reference		
North												
Northeast	-.222**	.055	.801	.444**	.105	1.559	.482**	.140	1.619	-.188**	.071	.829
East	.054	.055	1.055	-.276*	.121	.759	1.046**	.131	2.846	-.186**	.072	.830
South	.015	.045	1.015	-.771**	.110	.463	-1.345**	.151	.261	-1.040**	.064	.353

Table 2. (continued)

Urban Area	.151**	.045	1.163	.255**	.094	1.290	.110	.126	1.116	-.133*	.061	.875
Women's Education	-.112**	.010	.894	.018	.021	1.018	.031	.027	1.031	-.007	.013	.993
Women's Labor Force Participation	-.258*	.100	.773	.554**	.200	1.740	.918**	.272	2.504	.154	.134	1.166
Women's Decision-Making	.095**	.028	1.100	.076	.058	1.079	-.163*	.077	.850	.121**	.038	1.129
Women's Mobility	-.357**	.031	.700	.156*	.061	1.169	-.219*	.085	.803	-.201**	.042	.818
Women's Access to Cash	.800**	.167	2.226	.024	.353	1.024	.829	.460	2.291	.324	.222	1.383
Constant		-.312			-4.369**			-5.234**		-2.386**		
N		96,762			101,264			68,728		100,879		
Log-Likelihood		-39,184.054			-6,468.947			-6,217.401		-23,236.048		

**p < .01 * p < .05

Note: All models include a random intercept for PSU (n=3,827).

Table 3. Predicted Probabilities of Women’s Partnering and Sexual Experiences by Selected Values of the Community Male-to-Female Sex Ratio Ages 15 to 59

<u>Outcome</u>	<u>70</u>	<u>80</u>	<u>90</u>	<u>Sex Ratio</u> <u>100</u>	<u>110</u>	<u>120</u>	<u>130</u>
Marry before Age 16	.210	.215	.220	.225	.230	.236	.241
2+ Partners	.009	.009	.009	.010	.010	.010	.010
Forced Sex	.007	.008	.008	.008	.009	.009	.010
STD	.051	.051	.051	.051	.051	.051	.051

Note: Predicted probabilities derived from Models 1-4 of Table 2 holding all other variables constant at the sample mean.