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DEMOGRAPHIC OPPORTUNITY AND THE MATE SELECTION PROCESS IN INDIA

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Abstract

We merged individual-level data from the 2004–2005 India Human Development Survey with district-level data derived from the 1991 and 2001 Indian population censuses to examine how the numerical supply of men to which married women were exposed during late adolescence is associated with women's agency in the mate selection process and the duration of courtships. Multilevel models that control for an array of both individual and contextual factors showed that exposure to a relative surplus of potential mates is associated with a higher likelihood that women will have little or no say in the selection of their husband and an increased probability that women will meet their husband for the first time on their wedding day. Women's educational attainment, birth cohort, religion, caste, and region of residence also emerged as significant correlates of women's marital agency and courtship duration. The implications of these findings for India's growing sex ratio imbalance are discussed.

Keywords

sex ratio; India; mate selection; marriage; agency

To Western observers, the process of selecting a mate in India may appear quite distinctive. Almost all Indian women marry, and most do so early in life (Das & Dey, 1998). Child marriage is not uncommon, even though actual cohabitation with a spouse may not begin until years after the initiation of the marriage contract (Raj, Saggurti, Balaiah, & Silverman, 2009; Singh, 2008). Marriages are very often arranged by children's parents or other family members, with young women and men frequently having little or no say in the selection of

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their spouse (Dommaraju, 2011). And, most newlyweds first meet their spouse in person on or about their wedding day (Desai & Andrist, 2010). Although currents of modernization and globalization may have eroded these practices slightly, they remain widespread, particularly in rural areas of the country (Desai et al., 2010).

These marriage practices are deeply embedded in a largely patriarchal cultural system in which families' exchanges of daughters and sons through marriage result from, and further solidify, familial, community, and kinship bonds. Arranged marriages typically form alliances between two families that are aimed to enhance family prestige, status, and normative kinship order (Fuller & Narasimhan, 2008, Mason, 1995). In this paper we ask whether these longstanding and deeply-rooted facets of the mate selection process are influenced as well by the demographic opportunities available to young people to locate and choose—or have chosen for them—a marriage partner. Although several studies have explored the influence of social context, broadly construed, on marital dynamics in South Asia (Barber, 2004; Yabiku, 2006), the possible influence of the local sex ratio has thus far been ignored. Our research question is motivated in part by concerns over the consequences of India's growing imbalance in its numbers of young women and men. But while the causes of sex ratio imbalances in India, China, and other Asian countries have been explored in considerable detail, much less is known about the *consequences* of skewed sex ratios for familial behaviors and the well-being of young women and men (Dyson, 2012).

Our analysis merges individual-level data from the 200–05 India Human Development Survey (IHDS) with full-count data from the 1991 and 2001 Indian population censuses to examine how the community sex ratio to which young women were exposed during late adolescence is associated with the amount of agency they had in choosing a husband and the amount of time they knew their husband prior to the wedding. We estimate multilevel models that control for a host of individual-level and community-level determinants of the outcome variables and that adjust for the clustering of observations within geographic districts. At a broad level, our findings suggest that a key dimension of social structure—the relative numbers of women and men in the population—helps shape in largely predictable ways these mate selection practices. Moreover, our findings raise important questions about the trajectory of change in women's agency in light of India's ostensibly looming increase in the relative numbers of young men in its population.

BACKGROUND

Our study of the impact of India's imbalanced sex ratio on women's mate selection practices is motivated by two considerations. First is concern over the social consequences of India's numerical surplus of men and attendant deficit of women. India's population has historically displayed an imbalance between the numbers of men and women (Agnihotri, 2000; Guilmoto, 2008). The current male-to-female sex ratio of 106.4 indicates women are moderately underrepresented in India's total population. However, the numerical deficit of young girls is particularly acute. Sex ratios at birth (the number of male to female births) normally range between 103 and 107. India's current sex ratio at birth is currently 111 (Haub, 2011) and has changed little over recent years (Ramaiah, Chandrasekarayya, & Murthy, 2011). India's child sex ratio has actually become more masculine over time. The

ratio of boys to girls ages 0 to 6 was 102.5 in 1961, rose to 104.0 in 1981 and now stands at 109.4 according to the most recent census of 2011 (Census of India, 2011). The aging of these cohorts will lead to a sex ratio imbalance and attendant marriage squeeze among adults, albeit likely one less severe than found in other Asian countries (Ram, 2012).

Several factors are thought to contribute to India's numerical deficit of females. A long-standing preference for sons over daughters reflects a patriarchal culture that values the familial and economic contributions of males over females (Clark, 2000; Das Gupta et al., 2003; Pande & Astone, 2007). This deeply-rooted preference for sons has recently become easier to fulfill because of widespread use of sex-selective abortion (Arnold, Kishor, & Roy, 2002; Hvistendahl, 2011; Jha et al., 2006). A surplus of boys and attendant deficit of girls is also generated by differential survival rates. Discrimination against girls in immunization (Borooah, 2004), nutrition (Pande, 2003), and other health care practices (Mishra, Roy, & Retherford, 2004) leads to greater female mortality relative to male mortality during early childhood (Oster, 2009).

A second motivation for studying the impact of India's skewed sex ratio on women's mate selection practices derives from an emerging literature linking women's marital agency to their autonomy, household power, health, victimization, and other dimensions of well-being. Although the findings are complex, in general women in self-arranged or companionate marriages generally enjoy greater household power, autonomy, and independence (Banerji & Vanneman, 2011), more frequent contact with natal kin (Niraula & Morgan, 1996), and more satisfying marital communication and interaction (Allendorf & Ghimire, 2013; Jejeebhoy et al., 2009) than women who had no say in the selection of their spouse, even though overall differences in marital satisfaction are modest (Bowman & Dollahite, 2013). Women who chose their spouse are also less likely to experience domestic violence than women who had little or no agency in partner choice (Sahin et al., 2010).

THEORETICAL FRAMEWORK

Our theoretical point of departure for exploring the impact of India's sex ratio imbalance on mate selection patterns is a perspective variously referred to as "demographic-opportunity theory" (Trent & South, 2011), "macrostructural-opportunity theory" (South, Trent, & Shen, 2001), or simply "opportunity" theory (Uecker & Regnerus, 2010). Demographic-opportunity theory views the distribution of the population by sex, as well as by other pivotal demographic and social characteristics such as age, race, and social class, as a defining characteristic of social structure (Blau, 1977). Indeed, for Blau (1977; 1994), the univariate and joint distributions of the population across these salient individual characteristics *constitute* social structure. A fundamental premise of demographic-opportunity theory is that the likelihood of forming inter-group associations, including cross-sex associations such as marriage, is determined to a substantial degree by the number of available out-group members with whom such associations can be formed.

A somewhat complementary theoretical perspective on the consequences of imbalanced sex ratios for women's marital decision-making is Guttentag and Secord's (1983) thesis on *Too Many Women? The Sex Ratio Question*. Guttentag and Secord (1983) argue that when

women are scarce and women lack structural power in society, men will use their own superior structural power to constrain women's familial autonomy and agency. In predominantly patriarchal societies like India, women's numerical scarcity will lead to diminished power in personal and household decision-making. Women will be highly valued for their traditional roles as wives and mothers and young women may have limited choice in the face of offers of arranged marriages from families of potential grooms. In contrast, in the societies of Western Europe and North America where women hold somewhat greater structural power (albeit still less than men), women may be able to leverage their numerical scarcity to attain more autonomy and agency in their lives (South, 1988). Demographic-opportunity theory elaborates upon Guttentag and Secord's (1983) sex ratio thesis by identifying a mechanism—the ease of locating a husband—through which a numerical excess of men (and attendant shortage of women) influences women's power to choose a marital partner.

One fairly straightforward hypothesis derivable from both demographic-opportunity theory and Guttentag and Secord (1983) is that an abundant supply of potential mates in women's local marriage market will hasten their transition to marriage. Prior studies have found support for this hypothesis in India (Trent, South, & Bose 2015), the United States, (e.g., Guzzo, 2006; Lichter, McLaughlin, Kephart, & Landry, 1992), and China (Trent & South, 2011), which like India has also been experiencing a growing surplus of men (Banister, 2004). We extend this reasoning to suggest that an ample supply of available husbands also impacts the amount of agency women have in choosing a marital partner. In India, parents and other adults often choose a mate for their children (Singh, 2005), sometimes when their children are very young. When young men are plentiful, parents and other adult family members will find it easier to locate a suitable and attractive husband for the family's daughters, one that is likely to improve the family's social status in the community. Under these circumstances, the selection of a husband for a young woman will reside mainly, if not entirely, in the hands of parents and other adults, leaving daughters with little discretion or agency over whom to marry. In contrast, when men are relatively scarce, parents will find it more difficult to locate a desirable husband for their daughters. In some cases, the selection of a husband may be postponed until daughters are old enough to demand at least some involvement in the selection of a spouse. In other cases, parents may simply forego their role as matchmaker, leaving the mate selection process mostly up to their daughters. In either case, this extension of demographic-opportunity theory leads us to hypothesize that the greater the numerical supply of men in young women's local marriage market, the more say parents will have, and the less say young women themselves will have, in whom to marry.

For essentially similar reasons, we expect the supply of available men to be related to the duration of courtship. When men are abundant and consequently marriages are more likely arranged by parents, young women will have little if any opportunity to interact with their prospective husband prior to the wedding. Having not participated directly in the marital search, and in a context where most marriages are to persons residing outside of the village or urban neighborhood, young women will experience at most an abbreviated courtship period and many will not have even met their betrothed prior to marrying him (Desai & Andrist, 2010). But if, as argued above, women are more likely to participate in the selection of a husband when men are numerically scarce, then we would expect that women will be

more likely to have known their husband prior to the wedding day in a low-sex-ratio context. Indeed, women's selection of a husband in this context is likely to be partly based on the quality of her encounters with him, even if these encounters are not necessarily components of the traditional Western courtship process. For these reasons we hypothesize that the relative supply of men in the local marriage market will be inversely associated with the length of time women have known their husband prior to marrying him.

Other individual and community characteristics are also likely to influence women's marital agency and courtship duration. Moreover, inferring a causal effect of the sex ratio on mate selection practices is challenging in part because both variables may be related to causally prior characteristics. The gender-biased parental interventions, such as son preference and gender discrimination, that help to create a surplus of boys and a deficit of girls are also likely to reflect a patriarchal system that may limit women's agency in marriage decision-making. Accordingly, our models include several control variables at both the individual (or household) level and the district level.

Women's educational attainment has been shown to be a potent predictor of marital choice (Ghimire, Axinn, Yabiku, & Thornton, 2006), as well as family-related attitudes and behaviors more generally (Allendorf, 2013; Hoelter, Axinn, & Ghimire, 2004), in South Asia. Modernization, westernization, and urbanization are likely to have facilitated greater marital choice among younger than older cohorts and among urban than rural residents. More traditional religions and castes are likely to retain conservative attitudes toward women's marital agency. For example, Hindus and Muslims are likely to have more traditional notions about arranged marriages than people of other religions. In particular, upper caste Hindus are most likely to follow Brahmanism, which recommends *kanyadan*, the gift of a virgin daughter in marriage, leading to more strict control over unmarried daughters and their marital choices. India's marriage practices, patriarchal structures, and kinship organization exhibit sharp regional variation (Dyson & Moore, 1983; Malhotra, Vanneman, & Kishor, 1995), with the Northeastern region of the country characterized by higher levels of female autonomy and lower levels of patriarchy than the South, which in turn is less traditional than the North. More generally, communities in which women exercise greater power in economic and familial spheres are likely to extend greater choice to women in the marital search process.

DATA AND METHODS

Data for this study come from two sources: the 2004–2005 India Human Development Survey (IHDS) and the 1991 and 2001 India population censuses. The IHDS is a multi-purpose, nationally-representative survey of 41,554 households interviewed in 2004 and 2005 (Desai et al. 2009). Surveyed households are distributed across 382 of India's 602 districts. The administration of the IHDS consisted of two one-hour interviews in each household, with separate questionnaire modules administered to the household head and to an ever-married woman between the ages of 15 to 49 ($N = 33,510$).

From the 1991 and 2001 full-count Indian census files, we extract district-level population counts by sex and single years of age. Using the IHDS district codes, we then attach these

age/sex distributions to the household records of the IHDS. India population censuses are considered to be of high quality; net undercount rates estimated via post-enumeration survey are quite low. More importantly for the accurate computation of sex ratios, the sex difference in undercount appears negligible (Census of India, 2008). Districts have long been used to study the causes (e.g., Agnihotri, 2000) and consequences (e.g., Dreze & Khera, 2000) of variation in India's sex ratio. India's districts are both administrative and statistical units that are thought to circumscribe the relevant social contexts for a wide range of behaviors, including mate selection practices (e.g., Desai & Andrist, 2010; Malhotra, Vanneman, & Kishor, 1995).

Because we are interested in estimating the sex ratio to which the IHDS women were exposed to when these women were reaching marriageable age, we generate estimates of the sex ratio these women were exposed to at age 18, which is approximately the mean age at marriage for women, as well as the legal (if often violated) age for marriage. We use standard demographic techniques of linear interpolation and cohort reverse and forward extrapolation to estimate district-level, sex-specific, single-year-of-age population counts for each calendar year from 1984 to 2005. We then use these population counts to construct a male-to-female sex ratio based on the typical ages of husbands and wives. We limit our sample to women who were between the ages of 18 and 39 at the time of the survey. We exclude women younger than 18 because we cannot observe the sex ratio to which they will be exposed to when they turn age 18. We exclude women older than 39 because estimating the sex ratio to which these women were exposed at age 18 would necessitate backward extrapolation from the 1991 census beyond what we feel is a reasonable time span (e.g., women age 49 at the time of the survey turned age 18 in 1974, well before the 1991 census). Our maximum sample size consists of 24,029 ever-married women ages 18 to 39.

Dependent Variables

Following the work of Banerji and Vanneman (2011), the amount of say women have in the choice of a partner is captured by a four-category polytomous variable. In the IHDS, women were asked "Who chose your husband?" The possible response categories included "respondent herself"; "respondent and parents/other relatives together"; and "parents or other relatives alone." Women who responded "parents or other relatives alone" were further asked: "Did you have any say in choosing him?" with possible response categories of "yes" or "no," thereby permitting a subdivision of this category. The four categories of marriage type are thus: "self-arranged"; "jointly arranged with parents"; "parent-arranged with consent of respondent;" and "parent-arranged with no consent of respondent." In the multinomial regression models to follow, the latter group serves as the base, or reference, category.

To measure courtship duration we construct another four-category variable based on the length of time the IHDS women knew their husband prior to marrying him. The IHDS women were asked: "How long had you known your husband before marrying him?" Response categories included: "on wedding/*gauna* day only"; "less than one month"; more than one month but less than one year"; "more than one year"; and "since childhood." To simplify the analysis, and because relatively few observations fell into the latter two

categories, we combine these categories and label it “more than one year.” In the multinomial regression models, meeting the husband for the first time on the wedding (or *gauna*) day serves as the reference category. While we acknowledge that not all of the time that women knew their husband before marrying him was necessarily part of the courtship process, it is clear that women who first met their husband on their wedding day experienced no courtship period at all.

Not surprisingly, the amount of say women have in choosing their husband and the length of time they knew their husband prior to marrying him are related to each other. For example, 85% of women who had no say in the selection of their husband met him for the first time on the wedding day, compared to 30% of women in self-arranged marriages. And almost half of women in self-arranged marriages knew their husband for more than a year before marrying him, compared to less than 6% of women whose husband was selected entirely by their parents. But the association is far from perfect ($\gamma = .40$, $p < .001$), suggesting that these two outcomes are tapping somewhat different dimensions of the mate selection process.

Independent Variables

Our focal independent variable is a district- and single year cohort-specific sex ratio, expressed here as the number of men per 100 women. The relevant pool of men available to serve as marriage partners for women is minimally circumscribed both by geography and by age. As noted above, to circumscribe marriage markets geographically, we compute the sex ratio at the district level. To circumscribe the relevant pool of eligible men by age, and to take into account the fact that women’s marriages may have occurred years before the administration of the IHDS, we assign to each woman respondent a seven-year sex ratio with a four-year staggering of the numerator (number of males) and denominator (number of females) when the respondent was age 18. This four-year staggering corresponds roughly to the age difference between spouses in India. More specifically, then, the sex ratio is defined as the district-level number of men ages 19 to 25 divided by the number of women ages 15 to 21, estimated for when the respondent was age 18. To limit the influence of extreme values of the sex ratio, we bottom-code values below 50 to that value, and we top-code values above 150 to that value. While ideally we would also circumscribe the pool of eligible men by caste, religion, and other characteristics, it is unfortunately not possible to do so with these data.

We acknowledge that the sex ratio at age 18 provides only a snapshot of the number of men women are exposed to during the period when marital decisions are being made. For some women, the decision about whom they will marry may be made by their parents soon after their daughter’s birth. We assume that the sex ratio measured at age 18 is a reasonable proxy for the unobserved sex ratio at other points in childhood and early adulthood. In the absence of sex differences in mortality and migration, the sex ratio will of course be constant across a cohort’s life-course.

We also acknowledge that because many Indian women move to live with their husbands following marriage (Singh et al., 2011), the district of residence at the time of the IHDS administration may not always be identical to the district women lived in when they—or

their parents—were searching for a husband. The IHDS unfortunately does not provide complete residential histories that would identify women's district of residence prior to marriage. However, in India most residential moves, even those in the form of "marriage migration," are within rather than between districts (Kumar, 2012), and thus the vast bulk of women will have searched for a spouse in the same district that they lived in at the time of the IHDS. In the 2001 India census, 85 percent of enumerated females were residing in the same district in which they were born (Census of India, 2001). Consequently, migration following marriage is not likely to seriously impair our measurement of women's marriage opportunities.

Women's educational attainment is measured by years of schooling. Secular changes in the outcome variables are captured by dummy variables for decadal birth cohort, contrasting women born in the 1980s (and who were thus ages 18–24 at the time of the IHDS administration) with women born in the 1970s (ages 25–34 at the time of the IHDS) and women born in the 1960s (ages 35–39 at the time of the IHDS), with the latter group serving as the reference category. A dummy variable distinguishes residents of urban areas from residents of rural areas. To capture possible religious differences in mate selection practices, we include separate dummy variables for Hindus and Muslims, with all other religious categories serving as the reference. To capture possible caste differences in the outcomes, we include separate dummy variables for members of scheduled castes, scheduled tribes, and other backward castes (OBCs), with other castes serving as the reference category. The regression models contrast residents of Northern states and union territories (Chandigarh, Chhattisgarh, Delhi, Gujarat, Haryana, Himachal Pradesh, Jammu and Kashmir, Madhya Pradesh, Punjab, Rajasthan, Uttaranchal, Uttar Pradesh), Southern states (Andhra Pradesh, Dadra and Nagar Haveli, Daman and Diu, Goa, Karnataka, Kerala, Maharashtra, Pondicherry, Tamil Nadu), Eastern states (Bihar, Jharkhand, Orissa, West Bengal), and Northeastern states (Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, Tripura), with the Northeastern region serving as the reference category.

To capture further inter-area variation in contextual characteristics that might be related to both the sex ratio and the mate selection process, we create indicators of areal average educational attainment and women's empowerment by aggregating the responses of all IHDS sample members to the district level. District educational attainment is measured by the mean of the most highly educated adult household member. To more directly control for the possible influence of a patriarchal culture, we include two indicators developed by Desai and Andrist (2010) of arguably patriarchy's opposite—women's empowerment. As an indicator of women's control over family resources, we include the district-level proportion of women who have their names on the home title or rental papers. And as an indicator of participation in household decisions, we use the district-level mean of the number of the following five areas in which women say they have at least some say: 1) what to cook on a daily basis; 2) whether to buy an expensive item such as a television or refrigerator; 3) how many children to have; 4) what to do if a child is sick; and 5) whom children should marry.

Analytic Strategy

To examine the association between the cohort- and district-specific sex ratio and the two dimensions of India's mate selection process, we estimate multinomial logistic regression models. We estimate multinomial rather than ordered logistic models in order to allow for possible non-monotonic effects of the sex ratio and other predictors on the outcomes. We adjust for the clustering of observations within districts by computing robust standard errors of the regression coefficients (Wooldridge, 2002). Although multilevel models might be preferred in this instance, difficulties encountered with the estimation of multilevel, multinomial models rendered this option infeasible. However, in supplementary analyses we estimated binomial logistic random intercept models (Guo & Zhao, 2000), contrasting self-arranged marriages with all other marriage types and contrasting marriages in which spouses first met on the wedding day with all other courtship durations; the results of these analyses (available upon request) were similar to the results from the multinomial models with cluster-adjusted standard errors. Models are estimated using STATA's *mlogit* procedure (StataCorp, 2005).

RESULTS

Table 1 presents descriptive statistics for all variables used in the analysis. As indicated by the frequency distribution for marriage type, Indian women often have little say in the choice of their husband. Only about 5% of marriages are self-arranged by women with no input from parents or other adults. Thirty-seven percent of marriages are jointly arranged with parents, and in 24% of marriages parents make the decision but with the consent of their daughter. For a full third of the women in the sample, however, the choice of husband is entirely the prerogative of parents, with women having no say in the matter.

Given women's lack of agency in the selection of a spouse, it is perhaps not surprising that most women in the sample experienced either no courtship period at all or only a very brief one. Indeed, over 65% of women first met their husband on the day of the wedding, and another 10% had known him for less than a month. About 13% of respondents knew their husband for more than a month but for less than a year, and only 12% of respondents knew him for longer than a year.

Turning to the independent variables, the mean number of men ages 19 to 25 per 100 women ages 15 to 21, estimated at the district level for when these respondents were age 18, is 101.06, indicating a close to even gender distribution. This parity in the numbers of women and men may appear surprising in light of concerns noted above about India's historically masculine sex ratio. This figure is somewhat misleading, however, because of the age staggering of numerator (number of men) and denominator (number of women). Because the 15 to 21 year age group is large relative to older age groups (as is typical of developing countries with high fertility), and because only females in this age group figure into the computation of the age-staggered sex ratio, the ratio of men ages 19 to 25 to women ages 15 to 21 is deflated. The sex ratio computed using the age range of 15 to 21 for both numerator and denominator has a mean of 109, indicating at least a moderate surplus of young men relative to young women.

The respondents average slightly fewer than five years of schooling. Twenty-seven percent were born in the 1960s, 51% were born in the 1970s, and 22% were born in the 1980s. A little more than a third of respondents resided in an urban area at the time of the survey. The bulk of respondents—over 80%—are Hindu, with Muslims (11%) and members of other religions (7%) comprising the remainder. Members of scheduled castes, scheduled tribes, and other backward castes (OBCs) constitute 21%, 8%, and 40% of the sample, respectively. Almost half of respondents reside in Northern India and one-third resides in the South, with smaller representations from the Eastern (17%) and Northeast (5%) regions. In the typical district, only 16% of women have their names on house documents. On average, women have a say in four of five common household decisions. The mean years of schooling of the most educated household member is 7.5 years.

Multivariate Models

Table 2 presents the results of the multinomial logistic regression model of marriage type, contrasting women whose husband was chosen entirely by their parents without their daughter's consent with 1) women in self-arranged marriages; 2) women who chose their husband jointly with their parents; and 3) women whose parents chose her husband but in which the woman could consent. As shown in the first contrast, the sex ratio is negatively and significantly related to the odds that women will select their husband entirely by themselves rather than having no say at all in the matter. The effect is at least moderate in strength. For example, the odds of having selected one's own husband among women exposed to a sex ratio two standard deviations above the mean (130) are only 28% of the corresponding odds for women exposed to a sex ratio two standard deviations below the mean (72) [$.28 = e^{(-.022)(130-72)}$]. While expectedly negative, the coefficient for the sex ratio is not significant at conventional levels for the contrasts between having no consent in husband choice and either selecting a husband jointly (contrast 2) with parents or being able to consent to the parents' choice (contrast 3), although the coefficient for the latter contrast comes very close to reaching significance ($z = -1.92, p = .055$). In any event, the main ramification of being exposed to a relative surplus of men in the local marriage market is a marked reduction in the likelihood that women will choose their own husband and an attendant increase in the likelihood that parents will make this decision entirely without their daughter's input or approval.

Other independent variables are also significantly associated with women's say in the choice of a husband. Educational attainment is strongly related to women's agency in this matter, with more educated women significantly more likely to have at least some say in choosing a husband. The coefficients for the cohort dummy variables indicate secular increases in the proportion of self-arranged marriages and marriages arranged by parents but in which women have some say, both relative to marriages arranged by parents without women's consent. Urban residents are significantly more likely than their rural counterparts to consent to their parents' choice of husband, relative to having no say. Compared to women of other religions, Hindu and Muslim women are less likely to choose their own husband or have the option of consenting (and presumably vetoing) their parents' choice. Members of scheduled tribes are especially likely to select their own husband or to do so jointly with parents, while members of scheduled castes and other backward castes (OBCs) are especially unlikely to

have the opportunity to consent to their parents' decision. Compared to residents of the Northeast, residents of other regions are significantly less likely to be solely responsible for choosing their husband. Although the effects are not consistent across all contrasts, for the most part women living in districts in which women are more empowered (as indicated by having their names on house papers and participating in key household decisions) and in districts with higher levels of educational attainment tend to have greater agency in husband choice.

Table 3 presents a largely parallel analysis of courtship duration, contrasting women who first met their husband on the wedding day with 1) women who knew their husband for less than one month; 2) women who knew their husband for more than a month but less than one year; and 3) women who knew their husband for at least a year.

For two of these three contrasts, the coefficient for the sex ratio is, as hypothesized, negative and statistically significant. The more men in their local marriage market, the less likely women are to have known their husband for at least a month prior to marrying him. Put another way, when young women are exposed to a numerical surfeit of men, they are more likely to have first met their husband on their wedding day than to have known him for more than a month. The effect appears moderately strong. The odds of having known their husband for more than a month but less than one year, relative to meeting on the wedding day, among women exposed to a sex ratio two standard deviations above the mean are less than half the corresponding odds for women exposed to a sex ratio two standard deviations below the mean [$.44 = e^{(-.014) (130-72)}$]. And the odds of having known their husband for more than a year, relative to having met on the wedding day, among women exposed to a sex ratio two standard deviations above the mean are slightly more than half the corresponding odds for women exposed to a sex ratio two standard deviations below the mean [$.53 = e^{(-.011) (130-72)}$]. Thus, a "favorable" marriage market for young women serves to eliminate a period of courtship between wife and husband.

Other individual and contextual characteristics are also important predictors of courtship duration. Higher levels of education significantly increase the likelihood that women will have known their husband prior to the wedding day. Longer courtships (or at least familiarity with one's husband-to-be), particularly ones lasting more than a year, are more common among younger birth cohorts. Urban women are more likely than their rural counterparts to have known their husband for more than a year rather than to have first met him on the wedding day. Hindu women are significantly less likely than (non-Muslim) women of other religions to have known their husband for between one month and a year, and Muslim women are more likely than (non-Hindu) women of other religions to have known their husband for more than a year. Women belonging to scheduled tribes and other backward castes (OBCs) are generally more likely than women of other castes and tribes to have known their husband prior to the wedding day. Residents of the Northern and Eastern regions, but not the South, are significantly less likely than residents of the Northeast to have known their husband prior to the wedding. District-level educational attainment is positively associated with women's likelihood of having known their husband for between one month and one year, relative to first meeting on the day of the wedding.

To illustrate further the strength of the association between the number of potential husbands available to women and mate selection practices, Figures 1 and 2 present predicted values of the outcome variables for selected values of the sex ratio. These predicted values are derived from the coefficients in the regression models shown in Tables 2 and 3, holding all other covariates constant at their sample means.

With regard to marriage type, women who are exposed to 80 men per 100 women in their local marriage market are predicted to be almost twice as likely as women exposed to 120 men per 100 women to choose their husband entirely by themselves (.071 vs. .038). This difference is counterbalanced by almost a five point difference in the predicted proportion of women whose marriage is arranged entirely by their parents with the daughter having no consent in the selection process (.308 vs. .356).

As shown in Figure 2, women exposed to a sex ratio of 80 are predicted to be about eight percentage points less likely than women exposed to a sex ratio of 120 to meet their husband for the first time on their wedding day (.610 vs. .694). This difference is largely counterbalanced by a four percentage point difference in the likelihood of having known their husband for between one month and one year (.149 vs. .107) and almost a three percentage point difference in the likelihood of having known their husband for more than one year (.133 vs. .106).

Admittedly, these differences are not overwhelming in magnitude, and whether they are large enough to materially influence women's autonomy and household power is a matter for future research. Contextual effects of this type are rarely very strong (Liska, 1990). But the findings are generally consistent with our expectation that the process by which Indian women "choose" a spouse is shaped to some degree by the availability of potential husbands in the local marriage market.

DISCUSSION AND CONCLUSION

Motivated in part by the impending masculinization of India's already skewed adult population sex ratio, in this paper we ask whether some of India's distinctive marital selection processes are influenced by the availability of men to serve as partners for women. Our meta-theoretical framework adopts a Blauian conceptualization of social structure, in which the distribution of the population along salient sociodemographic characteristics such as biological sex is posited to facilitate and constrain the opportunity to form intergroup associations (Blau, 1977). Coupled with a gendered theory of the consequences of imbalanced sex ratios (Guttentag and Secord 1983) and more specific knowledge of family exchange strategies in India, we derive hypotheses linking the sex ratio to which women were exposed during their marriage-forming years to several dimensions of the mate selection process. We then test these hypotheses by merging district-level census data with individual-level marital history data among married women respondents to the India Human Development Survey. The results from multinomial logistic regression models show that exposure to a relative surplus of potential mates is associated with a greater likelihood that women will have little or no say in the selection of their husband and an increased probability that women will meet their husband for the first time on their wedding day. Thus,

even longstanding and ingrained cultural practices involving mate selection are affected (if only moderately) by a simple and fundamental characteristic of social structure—the relative numbers of women and men in the population.

Our results portend generally detrimental effects of India's ostensible looming surplus of young adult men for women's marital power, autonomy, and well-being. This impact of an increasingly masculine sex ratio is likely to prove problematic for women given evidence that a lack of say in husband choice and an abbreviated or nonexistent courtship period are associated with diminished autonomy, power, and well-being among married women. India's problem of "missing women" (Sen, 1992) may not only reflect women's disadvantaged status but may also feed back to further limit their life chances, particularly regarding mate selection.

Of course, this potential impact of an increasingly masculine sex ratio needs to be viewed against a backdrop of enhanced participation of Indian women in the mate selection process. We find that younger women tend to have substantially greater say than older women in the selection of their husband and that younger women are much less likely than older women to first meet their husband on the wedding day. Both trends are likely a reflection of the modernization of marriage practices in Indian society. An increase in the supply of potential husbands is likely to dampen or temper but not reverse these trends toward greater agency in women's choice of husband and longer courtships periods.

We acknowledge several important limitations to our analysis. Paramount, of course, is the problem of causal inference. Our hypotheses posit effects of the sex ratio on mate selection practices, but imbalances in the numbers of women and men may be driven at least in part by behaviors and group characteristics that also influence how women and men form marital relationships. A patriarchal culture, for example, might generate a masculine sex ratio via high levels of son preference, sex-selective abortion, and discrimination against girls, while simultaneously restricting women's agency regarding when and whom they marry. Our models attempt to isolate a causal effect of the sex ratio that women are exposed to during late adolescence by controlling for several individual-level sociodemographic characteristics, such as religion and caste, and areal characteristics, such as urban residence, geographic region, and women's empowerment. Yet, the extent to which the observed associations between the sex ratio and the mate selection outcomes have been fully purged of confounding influences remains unclear.

We also acknowledge that our measure of the focal independent variable—the sex ratio—is rather crude. Although the measure is sensitive to the age range from which women typically choose their husbands and to geographic constraints on mate selection, mainly because of data constraints it does not impose other restrictions on partner choice, such as caste, religion, or social class, even though most Indian marriages are homogamous on these traits. Presumably, however, a more refined measure of mate availability that incorporates spousal matching along these dimensions of partner choice would yield stronger, rather than weaker, observed associations between the sex ratio and mate selection practices. Future research might profit by attempting to develop such measures.

Beyond shaping individual women's marital opportunities, the population sex ratio could also influence more general social and normative views about marriage not examined here. These broader cultural responses to changes in the sex ratio could lag behind changes in, and more immediate effects of, the sex ratio itself, as it may take time for such attitudinal and normative changes to evolve and disseminate throughout society. Future research might attempt to study broader influences of changes in the population sex ratio through the lens of cultural lag.

Future research might also benefit from exploring a broader range of possible responses to imbalanced sex ratios in India. For example, a numerical surplus (or deficit) of men might affect patterns of assortative mating by age, caste, and social class, and heterogamy along these characteristics may have implications for women's status, power, and well-being. Exposure to a surfeit of men may also have implications for women's sexual health, reproductive behavior, and exposure to violence (Trent & South, 2012). And of course, a comprehensive accounting of the impact of skewed sex ratios will require attention to the implications of a numerical deficit of women for men's marital behavior and well-being. Our study, along with related work by others (Dyson, 2012), suggests that a rather simple facet of social structure—the relative numbers of women and men in a population—may have far-reaching implications for individuals' well-being and, as such, represents a fundamental way in which macrolevel population structure shapes individual behavior.

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Figure 1. Predicted Probabilities of Marriage Type by Selected Values of the Sex Ratio: Ever-Married Women in the India Human Development Survey

Note: Predicted values derived from regression models in Tables 2 and 3, holding all other variables constant at the sample mean. Sex ratio is measured by the estimated number of men ages 19 to 25 per 100 women ages 15 to 21 in respondent's district when she was age 18.

Figure 2. Predicted Probabilities of Courtship Duration by Selected Values of the Sex Ratio: Ever-Married Women in the India Human Development Survey

Note: Predicted values derived from regression models in Tables 2 and 3, holding all other variables constant at the sample mean. Sex ratio is measured by the estimated number of men ages 19 to 25 per 100 women ages 15 to 21 in respondent's district when she was age 18.

Table 1

Descriptive Statistics for Variables Used in Analysis of Mate Selection: Ever-married Women in the India Human Development Survey

<u>Dependent Variables</u>	<u>% (Mean)</u>	<u>SD</u>	<u>N</u>
Marriage Type:			
Self-arranged	5.25%		1,258
Joint with parents	37.03		8,867
Parents with R's consent	24.33		5,826
Parents no consent	33.39		7,996
Courtship Duration:			
Met on wedding day	65.33%		15,698
Less than one month	10.00		2,404
One month to one year	12.72		3,057
More than one year	11.94		2,870
<u>Independent Variables</u>			
Sex Ratio ^a	101.06	14.47	24,029
Education	4.92	4.84	24,029
Birth Cohort:			
1960s	26.61%		6,394
1970s	51.45		12,364
1980s	21.94		5,271
Type of Residence:			
Rural	64.60%		15,523
Urban	35.40		8,506
Religion:			
Hindu	81.42%		19,564
Muslim	11.27		2,708
Other	7.31		1,757
Caste/Tribe:			
Scheduled caste	21.31%		5,121
Scheduled tribe	8.13		1,954
Other backward caste (OBC)	39.88		9,583
Other caste/tribe	30.68		7,371
Region:			
North	44.39%		10,667
South	33.69		8,095
East	17.36		4,171
Northeast	4.56		1,096
District-Level Characteristics:			
Proportion of women with names on house papers	.16	.17	24,029
Women's participation in household decisions	4.16	.84	24,029
Education of most-educated household member	7.49	2.08	24,029

^aEstimated number of men ages 19 to 25 per 100 women ages 15 to 21 in respondent's district when she was age 18.

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Multinomial Logistic Regression Model of Marriage Type: Ever-married Women Ages 18 to 39 in the India Human Development Survey

Table 2

Independent Variables	Self-arranged vs. Parents, no consent			Joint with parents vs. Parents, no consent			Parents with R's consent vs. Parents, no consent		
	b	se	e ^b	b	se	e ^b	b	se	e ^b
Sex Ratio ^a	-.022**	.007	.978	-.003	.004	.997	-.009	.005	.991
Education	.113***	.010	1.120	.089***	.007	1.093	.116***	.007	1.123
Birth Cohort									
1960s			reference			reference			reference
1970s	.268**	.084	1.307	.061	.048	1.063	.158*	.065	1.171
1980s	.438***	.115	1.550	.056	.059	1.058	.340***	.072	1.405
Urban residence	.309	.173	1.362	-.012	.137	.988	.259*	.131	1.296
Religion									
Hindu	-.560*	.251	.571	.007	.195	1.007	-.350*	.137	.705
Muslim	-.780*	.308	.458	.136	.231	1.146	-.392*	.174	.676
Other			reference			reference			reference
Caste/Tribe									
Scheduled caste	.138	.132	1.148	-.062	.086	.940	-.242**	.086	.785
Scheduled tribe	.751**	.245	2.119	.386*	.179	1.471	-.202	.175	.817
Other backward caste (OBC)	-.128	.152	.880	-.100	.094	.905	-.593***	.097	.553
Other caste/tribe			reference			reference			reference
Region									
North	-2.969***	.484	.051	-.955	.558	.385	-1.612***	.384	.199
South	-1.447**	.507	.235	.409	.579	1.505	.198	.403	1.219
East	-2.045***	.485	.129	-1.440*	.578	.237	-1.136**	.420	.321
Northeast			Reference			reference			reference
District-level Characteristics									
Proportion of women with names on house papers	2.721***	.725	15.196	1.603*	.692	4.968	1.320*	.549	3.743
Women's participation in household decisions	.101	.133	1.106	.294**	.100	1.342	-.130	.092	.878

	Self-arranged vs. Parents, no consent	Joint with parents vs. Parents, no consent	Parents with R's consent vs. Parents, no consent
Education of most-educated household member	.097	.102	.092
Constant	.498		1.036
N			
Pseudo R ²			

Note: Standard errors adjusted for the clustering of observations within districts (n=381).

^a Estimated number of men ages 19 to 25 per 100 women ages 15 to 21 in respondent's district when she was age 18.

* $p < .05$

** $p < .01$

*** $p < .001$

Multinomial Logistic Regression Model of Courtship Duration: Ever-married Women Ages 18 to 39 in the India Human Development Survey

Table 3

Independent Variables	Less than one month vs. Wedding Day			One month to one year vs. Wedding Day			More than one year vs. Wedding Day		
	b	se	e ^b	b	se	e ^b	b	se	e ^b
Sex Ratio ^a	-.010	.006	.990	-.014 *	.007	.986	-.011 *	.004	.989
Education	.047 ***	.008	1.049	.044 ***	.008	1.045	.021 **	.007	1.021
Birth Cohort									
1960s				reference			reference		
1970s	.127 *	.062	1.135	.111	.062	1.117	.149 *	.062	1.161
1980s	.057	.087	1.059	.136	.082	1.146	.255 **	.078	1.290
Urban residence	.021	.159	1.021	.300	.174	1.350	.429 **	.126	1.536
Religion									
Hindu	-.282	.199	.754	-.465 **	.170	.628	-.289	.159	.749
Muslim	.192	.219	1.212	-.087	.227	.917	.456 *	.199	1.578
Other				reference			reference		
Caste/Tribe									
Scheduled caste	-.035	.121	.966	.068	.123	1.070	.173	.099	1.189
Scheduled tribe	.489 *	.228	1.631	1.006 ***	.200	2.735	.693 ***	.173	2.000
Other backward caste (OBC)	.173	.107	1.189	.313 **	.108	1.368	.182	.096	1.200
Other caste/tribe				reference			reference		
Region									
North	-2.266 ***	.497	.104	-2.102 ***	.465	.122	-1.925 ***	.392	.146
South	-.456	.503	.634	-.331	.468	.718	-.225	.400	.798
East	-2.603 ***	.519	.074	-2.300 ***	.495	.100	-1.847 ***	.403	.158
Northeast				reference			reference		
District-level Characteristics									
Proportion of women with names on house papers	.020	.755	1.020	.730	.847	2.333	-.114	.681	.892
Women's participation in household Decisions	.117	.106	1.124	-.129	.108	.879	-.014	.088	.986

	Less than one month vs. Wedding Day	One month to one year vs. Wedding Day	More than one year vs. Wedding Day
Education of most-educated household member	.146**	1.157	1.121
Constant	-1.308	.339	-.061
N		24,029	.941
Pseudo R ²		.123	.721

Note: Standard errors adjusted for the clustering of observations within districts (n=381).

^a Estimated number of men ages 19 to 25 per 100 women ages 15 to 21 in respondent's district when she was age 18.

*

p < .05

**

p < .01

p < .001