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## THE EFFECT OF A MALE SURPLUS ON INTIMATE PARTNER VIOLENCE IN INDIA

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### Abstract

Theories of the social consequences of imbalanced sex ratios posit that men will exercise extraordinarily strict control over women's behaviour when women's relationship options are plentiful and men's own options are limited. We use data from the third wave of the Indian National Family and Health Survey, conducted in 2005–06, to explore this issue, investigating the effect of the community sex ratio on women's experience of intimate partner violence in India. Multilevel logistic regression models show that a relative surplus of men in a community increases the likelihood of physical abuse by husbands even after adjusting for various other individual, household, and geographic characteristics. Further evidence of control over women when there is a sex ratio imbalance is provided by the increased odds of husbands distrusting wives with money when there is a male surplus in the local community.

### INTRODUCTION

India's long history of son preference has resulted in imbalanced sex ratios favouring males (Miller 1997; Phillip and Bagchi 1995). Despite a slight increase in the female to male sex ratio for the total population reported in the most recent Indian census (Census of India 2011), the numerical deficit of women has generally been growing since the turn of the twentieth century (Agnihotri 2000; Griffiths, Matthews and Hinde 2000). While some of the temporal change in the recorded sex ratio may be exaggerated by undercount of women in past censuses, the 2011 census surprised observers by showing continuing masculinization of the sex ratio at younger ages (Census of India 2011). Disturbingly, the sex ratio at birth as well as the child sex ratio shows a significant deficit of females. While illegal since 1994, the widespread availability of sex selective abortions has led to millions of foregone female births (Cohen 2000; George 2002; Jha et al 2006; Miller 2001; Phillip and Bagchi 1995). Discrimination against daughters in healthcare and nutrition (Borooah 2004; Bose 2011; Mishra, Roy, and Retherford 2004; Murthi, Guio, and Dreze 1995; Oster 2009; Pande 2003)

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has also contributed to a skewed sex ratio characterized by a surplus of males (Ghosh 1995; Miller 1997; Velkoff and Adlakha 1998).

There is a considerable volume of research on the levels and trends in India's imbalanced sex ratio as well as the proximate and distal causes of India's "missing women" (Bhat and Sharma 2006, Chakraborty and Kim 2010; Clark 2000; Das Gupta and Bhat 1997; Guilmoto 2008; Klasen and Wink 2003; Pande and Astone 2007; Premi 2001; Sen 1992). Far less is known about the consequences of the sex ratio imbalance for critical social behaviours and familial outcomes. One possible consequence of a numerical excess of males is a greater prevalence of intimate partner violence (IPV). Violence against women has been documented as a pervasive global phenomenon and a significant human rights violation (Garcia-Moreno et al. 2006; Heise, Pitanguy, and Germain 1994; Heise, Ellsberg, and Gottmoeller 2002). Among other factors, it is possible that a relative shortage of women may lead to increased competition for and stricter controls on married women, potentially resulting in increased IPV. In India, in spite of a large body of work that looks at the causes and consequences of violence against women, there is virtually no research that investigates the effect of a relative oversupply of men on the likelihood of spousal abuse. The purpose of this paper is to examine the effect of the community sex ratio on IPV in India. India's unusually skewed sex ratio, combined with high levels of violence against women, presents an urgent case to investigate this association. We use data from the third Indian National Family Health Survey (NFHS-3) conducted in 2005–06 to explore the association between the community sex ratio and women's victimization through IPV in India.

## SEX RATIO AND IPV

India has long been characterized by a numerical deficit of women leading to concerns about tens of millions of "missing women" (Klasen and Wink 2002; Sen 1992). The most recent population census recorded nearly 37.3 million more men than women resulting in a female to male sex ratio of 940, far below the unfavourable sex ratio of 970 recorded at the turn of the last century (Census of India 2011). While the consistent steep decline in the first half of the twentieth century was arrested in subsequent years with some slight increases in the latest censuses, Kerala is the only state to currently exhibit a sex ratio that is favourable to females. Further analysis of the regional variation in sex ratio has shown some consistent patterns with the most unfavourable sex ratios for women being concentrated in north and northwestern India. In contrast, while still somewhat unfavourable to women, the south has historically shown more balanced sex ratios (Agnihotri 2000; Agnihotri, Palmer-Jones, and Parikh 2002; Guillot 2002; Kishor 1995). Data from the 2011 census show that the top three states with the highest female-to-male sex ratios are the southern states of Kerala (1084), Tamil Nadu (995), and Andhra Pradesh (992) while the lowest sex ratios are recorded in the northern states of Haryana (877), Jammu and Kashmir (883), and Sikkim (889).

Of greater concern for the future is the sex ratio at birth and the child sex ratio in India. The sex ratio at birth, currently at 904 (female births per 1000 male births), is far below a "normal" sex ratio of 950 and has shown little to no sign of improvement over several years (Haub 2011; Ramaiah, Chandrasekarrayya, and Murthy 2011). Sex selective abortion, while illegal in India, is nonetheless widely available (Abrejo, Shaikh, and Rizvi 2009; Arnold, Kishor, and Roy 2002; Bhat and Zavier 2003) and is thought to account for several million "missing female births" in the last twenty years (Jha et al 2006: 217). Daughter neglect in childhood, particularly in the area of health care, has also led to excess female mortality during childhood (Basu 1998; Das Gupta 1990; Ghosh 1995). The child sex ratio has become more masculine over time with the 2011 census recording a juvenile sex ratio (ages 0–6) of only 914 girls per 1000 boys, a steep decline from 976 in 1961. The regional distribution of the child sex ratio and the trends over time show that it has declined in much

of India with the lowest levels and the sharpest declines concentrated in the north and northwestern regions (Census of India 2011).

As the children in these birth cohorts age, India will be faced with a severe shortage of women in the adult population, leading to, among other things, a marriage squeeze and accompanying social consequences (Guilmoto 2012; Kaur 2004). One such consequence may be an increase in violence against women as men find it harder to gain desirable wives. Historically, India has had high levels of IPV cutting across region, caste, and class. More disturbingly perhaps, there appears to be a rising trend in violence against women despite legal gains made by advocacy groups (Ghosh and Chouduri 2011). State-level statistics show that with a few exceptions, cruelty by husbands or husbands' relatives has increased in most states and union territories (Kethineni and Srinivasan 2009; Sev'er 2008). While rape and dowry deaths are the most publicized forms of violence against women (Bhatt 1990; Jaisingh 1995; Kelkar 1992; Nelson 1996; Sarkar 1994), wife battering is the most common form of violence (Bhatt 1990; Jejeebhoy 1998; Kelkar 1992; Sood 1990), experienced by more than a third of all married women nationally (International Institute for Population Studies (IIPS) and Macro International 2007). Table 1 breaks down data on physical abuse perpetrated by husbands by state. The prevalence of physical violence ranges from 6 per cent in Himachal Pradesh to nearly 56 per cent in Bihar. It is noteworthy that high levels of IPV are evident in every region of the country with some of the north and northeastern states having rates higher than the national average of 35 per cent. Among the southern states, Tamil Nadu and Andhra Pradesh stand out with 42 per cent and 35 per cent of ever-married women aged 15–49 reporting that they have ever been victims of physical abuse by their husbands.

Such high levels of IPV have generated much research that documents severe adverse physical, mental, and reproductive health outcomes for women and their children (Ahmed, Koenig, and Stephenson 2006; Bhatt 1990; Desai 2005; Jejeebhoy 1998; Jejeebhoy, Santhya, and Acharya 2010; Stephenson et al 2008; Stephenson, Koenig, and Ahmed 2006; Verma and Collumbien 2003). In a patriarchal society, wife abuse is a reflection of a societal structure that defines women as subordinate, reaffirms dominance and aggression of men, and underrepresents women in all spheres of social, economic or political life (Dobash and Dobash 1992; Kelkar 1992; Pagelow 1984; Sood 1990). Wife abuse is a product of a patriarchal tradition of men's right to control women (Johnson 1995; Sood 1990). In India, some physical or verbal abuse by husbands is often accepted as a husband's prerogative and considered a woman's due (Jejeebhoy 1998; Sinha 1989). Large percentages of both men and women believe that a husband has the right to chastise, and even physically punish, his wife if she fails to undertake her household responsibilities properly or does not obey her husband (Jejeebhoy and Cook 1997; IIPS and Macro International 2007; Sood 1990). The question then is, what effect, if any, will a numerical oversupply of men—and attendant scarcity of women—have on men's attempts to control women's behaviour?

An answer may lie in Guttentag and Secord's (1983) seminal work on the effect of sex ratios on social behaviour. Guttentag and Secord theorize that members of the sex in short supply have greater *dyadic power* because they are less dependent on their partners. Presumably, if they are dissatisfied in their current relationship they can more easily look for other members of the opposite sex to form alternative relationships with. However, the extent to which dyadic power shapes gender identities is dependent on structural power, which is "associated with the political, economic, and legal structures of the society" (Guttentag and Secord 1983: 26). Because structural power usually resides with men, it enables them to influence and shape social customs and mores and thereby limit women's use of dyadic power when they are in short supply. In male surplus societies then, a "protective morality" (Guttentag and Secord 1983: 231) develops that favours monogamy and traditional domestic

roles for women. Women are more valued as wives and mothers, and their interactions with other men, as well as alternatives to the domestic roles, are more limited under low sex ratio (female to male) population regimes.

Guttentag and Secord's arguments should be particularly salient in a male surplus patriarchal society like India where men continue to hold much of the structural power. A relative scarcity of women implies that husbands would be vigilant about controlling their wives' access to other men when such men (adult, non kin) are plentiful in the local community. The power imbalance, combined with competition for the scarce number of women and a social tolerance for chastising "errant" wives, suggest that men may be likely to use violence to control women in order to limit their ability to form relationships or interact with other men who are in copious supply in the community.

Past empirical research provides some support for Guttentag and Secord's sex ratio thesis that women in male surplus societies are more constrained to traditional roles. Cross-nationally, male surpluses (and concomitant female shortages) are associated with more marriage, less divorce and nonmarital childbearing, and lower female literacy and labour force participation (Barber 2003; South and Trent 1988; Trent and South 1989). Several studies in the United States find women's marriage rates and propensities are higher in communities with more men (Angrist 2002; Fossett and Kiecolt 1993; McLaughlin, Lichter, and Johnston 1993). Recent research in China also finds a positive association between community-level sex ratios and women's likelihood of marriage (Trent and South 2011).

There is also some evidence of a relationship between the sex ratio and violence against women. In the United States, there is evidence of an increase in violence against women, including female homicide victimization and forced sex within marriage, when there is a relative male surplus (Avakame 1999, Blau and Golden 1986; D'Alessio and Stolzenberg 2010; Messner and Blau 1987). In a recent study, D'Alessio and Stolzenberg (2010) theorize that the increase in intimate partner violence in male surplus communities reflects the use of IPV to control sexual behaviour of one's partner. Similar results have been found in China where women living in communities with a male surplus are more likely than other women to be forced to have sexual intercourse (Trent and South 2012).

Empirical research on domestic violence in India has primarily concentrated on individual and household level risk factors. While there are some inconsistencies in findings, in general, women with higher levels of education, age, and socio-economic status are less likely to be victims of IPV (Ackerson and Subramanian 2008; Jejeebhoy and Cook 1997; Koenig et al 2006; Pande 2003; Prakash 2011). Given the importance of social context, it is perhaps surprising that there is much less research into the ways that community characteristics may shape a man's response to widely held beliefs regarding a woman's place in his household. In particular, in spite of the attention generated by the sex ratio imbalance in India, there is little to no research on the association between the sex ratio and IPV. A few studies have shown a weak-to- moderate relationship between the state-level sex ratio and crimes of violence against women such as female homicide and dowry violence (Mukherjee, Rustagi, and Krishnaji 2001; Sev'er 2008). However, to our knowledge, there is no prior study that explores the effect of the community sex ratio on intimate partner victimization among Indian women. Our study fills this gap in existing research by investigating this critical consequence of the sex ratio imbalance for women's health and well-being.

## DATA AND METHODS

The data for this study are from the NFHS-3, conducted in 2005–06. The NFHS-3 is a nationally representative survey of 109,041 households that also administered separate questionnaires to women between the ages of 15–49 years and men ages 15–54. The survey provides data on demographic, health, and socio-economic indicators including reproductive and sexual behaviour, women's empowerment, and domestic violence. Our analysis draws primarily on data from the women's questionnaire along with a community level measure of the sex ratio created from the household dataset. The domestic violence module was administered to 83,703 women, including 69,704 ever-married women. Our sample is further restricted to currently married women who are usual residents of the household. Applying these restrictions along with some missing data results in a sample of 63,330 married women distributed across 3,850 primary sampling units (PSUs). These PSUs 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 while in urban areas, the PSUs are census enumeration blocks, making them reasonable approximations of communities.

### Dependent variables

We use a series of questions in the NFHS-3 about wife abuse in the twelve months preceding the survey to create several dichotomous dependent variables (1=yes, 0=otherwise). The dependent variable *kick/drag/beat* is coded 1 for wives who responded yes to whether their husbands kicked, dragged, or beat them up in the past twelve months; *punch* is coded 1 for women whose husbands punched them with a fist or with something that could hurt them; *slap* is coded 1 for women whose husbands have slapped them in the preceding twelve months; *push/shake/throw* is coded 1 for wives who said yes to a question about whether their husbands had pushed, shaken, or thrown something at them; finally, *twist/pull* is coded 1 for wives whose husbands twisted their arm or pulled their hair.

An important component of IPV is controlling a woman by isolating her from her social network and limiting her access to money. Therefore, in addition to the above measures of physical abuse, we also looked at the level of control exerted by a husband over his wife. The Domestic Violence module in the NFHS-3 asks respondents about several controlling behaviours exhibited by her husband. We created three dichotomous variables based on the following items (1=yes, 0 otherwise):

- a. Husband does not permit her to meet her female friends;
- b. Husband tries to limit her contacts with her family;
- c. Husband does not trust her with money.

### Independent variables

Our primary independent variable is the community *sex ratio*. We measure the sex ratio as the number of women per 100 men at ages 15–59. We calculate this sex ratio from the NFHS-3 household dataset that provides the age and sex of all members of sampled households, aggregating them across the PSUs. To limit the influence of extreme values, likely as a result of a small number of individuals in some PSUs, we bottom code sex ratios below 50 to that value and top code sex ratios above 150 to that value.

Inferring a causal effect of sex ratio on domestic violence is challenging, partly because there may be other factors that are causally linked to both. Patriarchal norms and values that result in son preference (and therefore a sex ratio imbalance) can also differ by other geographic, individual and household characteristics that may be associated with IPV. In

order to control for other macro-level influences that may have an effect on IPV, we include three regional dummy variables contrasting the South (Andhra Pradesh, Goa, Karnataka, Kerala, Maharashtra, Tamil Nadu), East (Bihar, Jharkhand, Orissa, West Bengal), Northeast (Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, Tripura), and North (rest of India), with the latter serving as the reference category.

We also include several individual-level (i.e. level 1) control variables in our multivariate models. Previous research has shown that indicators of women's status may be associated with spousal abuse. Thus, we control for the respondent's completed years of *education*, *the difference between husband and wife's education*, whether she engages in *paid work*, *age*, and the *number of sons*. Our level 1 control variables also include measures for socio-economic class represented through a pre-created standard of living index and caste. The standard of living index is constructed from data on housing characteristics and household possessions. Examples of housing characteristics include building material, toilet facilities, and sources of lighting and water. Household possessions include ownership of durable goods such as tractors, cars, bicycles, bullock carts, televisions, beds, tables, clocks, etc. From this index, women with a *low standard of living* are coded 1 (and 0 if not), those with a *medium standard of living* are coded 1 (and 0 if not), and the reference category is *high standard of living*. Social class is operationalized through three dummy variables, *scheduled caste* (1=scheduled caste, 0 otherwise), *scheduled tribe* (1=scheduled tribe, 0 otherwise), and *other backward caste* (1= other backward caste, 0 otherwise).

### Analytical Strategy

Since the observations for women from the same community are not independent of each other we use hierarchical linear modelling (HLM) as the appropriate method of analysis (Raudenbush and Bryk 2002). The micro-level measurements are at the individual and household level and the macro-level measurements are at the PSU level. We estimate a series of multilevel logistic regression (random intercept) models for each dependent variable in order to investigate the effect of the community sex ratio on physical abuse and controlling behaviours by husbands.

## RESULTS

Table 2 provides the descriptive statistics for the dependent and independent variables used in this study. In the twelve months preceding the survey, almost 18 per cent of the respondents were slapped by their husbands, the most common form of physical abuse reported; Between 5–6 per cent have been victims of severe violence where they were punched, kicked, dragged or beaten. About 7 per cent had their husbands push, shake, or throw something at them. Almost 8 per cent had their arms twisted and hair pulled by their husbands. Overall, almost a fifth (19 per cent) of the married women in our sample had been physically abused by their husbands in the past twelve months.

The results from Table 2 also show that there are a large number of wives whose actions outside the home are limited or controlled by their husbands. Almost 16 per cent of husbands do not trust their wives with any money. A fairly large percentage of wives have limited contact with their natal family and friends with 14 per cent of wives not being permitted to visit their female friends and 8 per cent being allowed only limited contact with their natal family.

The results for our key explanatory variable show that the mean female-to-male sex ratio is 103.6. Further, a standard deviation of 20.3 shows considerable variation across communities. The regional distribution shows that about two-fifths of the sample resides in the north while a little under 30 per cent are from the south. The rest are divided between the

east and the northeast. The means for the level 1 independent variables show that the average age of our respondents is 32 years and with a mean education of 5.2 years. On average, a husband has almost 2 more years of education than his wife. About two-fifths of the sample works for pay and they have 1.3 sons on average. Our sample is somewhat unevenly distributed in terms of standard of living with a fifth residing in low standard of living families and less than a third with a medium standard of living. A little under half the respondents are from households that have a high standard of living. About three-fifths of the women belong to the lower castes consisting of scheduled caste (17 per cent), tribe (13 per cent) or other backward caste (32 per cent).

Table 3 presents the results from a series of multi-level logistic regression analyses, each with a different dependent variable, in order to test the relationship between the community sex ratio and IPV. The fixed effects from Model 1 show that the community sex ratio is not significantly associated with the likelihood of being kicked, dragged, or beaten. However, several other independent variables are significantly associated with the likelihood of this type of severe abuse. Women in southern and eastern India are more likely to be victims of this kind of abuse compared to women in northern India. The women's status variables show mixed results with years of education, difference with husband's education, and age being negatively associated with being kicked, dragged, or beaten while paid work and the number of sons is positively associated with this dependent variable. As expected, the odds of being kicked, dragged, or beaten decrease across household standard of living categories with women in poorer households more likely to be victims of this kind of severe physical abuse as compared to richer households. Women in the low castes (Scheduled Caste and Other Backward Caste) are more likely to be victims of violence compared to other castes but Scheduled Tribe members are not significantly different from other castes.

The results from Model 2 show that the community female-to-male sex ratio is significantly and negatively associated with the likelihood of being punched. In other words, the greater the relative supply of men in a community, the higher the likelihood of wives being punched by their husbands. However, the effect of the sex ratio on physical violence is rather weak. For example, we can look at the regional differences in the sex ratio to see how the odds of domestic violence change from high to low sex ratio regions. In 2011, there was a 20.7 points difference between the highest (Kerala: 108.4) and the lowest (Haryana: 87.7) female-to-male statewide sex ratio. A drop in the sex ratio of this magnitude would increase women's odds of experiencing spousal abuse by only about 4 per cent  $[= (e^{[-.002][-20.7]} - 1) \times 100]$ .

The other independent variables show results that are similar to Model 1. Educated, older women and those with a greater difference in years of education from their husbands are less likely to be punched. Working wives, wives from lower class and caste (Scheduled Caste), and those with more sons are more likely to be victimized in this way by their husbands. In contrast to Model 1, the coefficients for the south and Other Backward Caste do not attain significance in Model 2.

Models 3, 4, and 5 show that the female-to-male community sex ratio is also negatively associated with the likelihood of each of the other types of less severe physical abuse in the twelve months preceding the survey. Wives in communities with a male surplus are more likely to be slapped, pushed or shaken, and have arms twisted or hair pulled by their husbands. As in Model 2, the strength of the relationship is quite weak although the coefficient for twist/pull is slightly larger than the rest. Using the same logic as before, a drop in the sex ratio by 20.7 points increases the likelihood of wives having their arms twisted or hair pulled by 6.4 per cent  $[= (e^{[-.003][-20.7]} - 1) \times 100]$ .

Many of the other independent variables show results that are similar to Models 1 and 2. Among the regional differences, women in the south (except Model 4) and east are more likely to be victims of less severe IPV compared to women in the north. Women in the northeast are not significantly different from northern women except in Model 3; wives in the northeast are significantly more likely to be slapped than women in the north. While the coefficient for Scheduled Tribe is negative in all five models, it never achieves statistical significance. In most cases women from Other Backward Castes are also not significantly different from higher castes. However, they are more likely to be pushed, shaken, or have something thrown at them by their husbands compared to higher caste women (Model 4).

Table 4 provides the results from multilevel logistic regression analysis of the three controlling behaviours of husbands as reported by wives. The female-to-male community sex ratio is inversely and significantly associated with only one of these behaviours. The fixed effects from Models 1 and 2 show that the community sex ratio is not significantly associated with permission to visit female friends or with limitations on visits to natal family. Thus, a relative surplus of men in a community does not appear to threaten husbands enough to limit their wives' interactions with their family and friends. Perhaps this is because when wives visit their families or female friends, they are not at much risk of encountering non kin men who could serve as possible competitors to their husbands. In both cases, however, several other independent variables are associated with the dependent variables. Women from the south and northeast are less likely to have restrictions on visits to their natal family and friends compared to women in the north. In contrast, women in the east are more likely to only be allowed limited contact with their natal family compared with northern women. Older women, those with more education and those with a greater educational difference with their husbands are less likely to be restricted in this way. In contrast, the odds of restrictions on visits to family and friends are higher for women engaged in paid work compared to non-working women. The number of sons, class, and caste are not associated with restrictions placed by a husband on his wife's visits to her female friends (Table 4, Model 1). However, the odds of a husband limiting contact with a wife's natal family increase as standard of living decreases. Caste shows mixed results with Scheduled Caste women being allowed only limited contact with their family compared to women from other castes. However, Scheduled Tribe women are less likely to have limits placed on their contact with family, while women from Other Backward Castes are not significantly different from higher caste women (Table 4, Model 2).

The third and final controlling behaviour exhibited by husbands that we investigated is distrust with money. The results from Model 3 demonstrate a negative and statistically significant association between the community sex ratio and wives' reports of not being trusted with money. Wives residing in communities with a relative surplus of men are more likely to have husbands who do not trust them with money. The effect is modest in strength but stronger than the previous effects (Table 3). For example, a drop in the sex ratio by 20.7 points would increase women's odds of experiencing husband's controlling behaviour over money by 8.6 per cent  $[= (e^{[-.004][-20.7]} - 1) \times 100]$ . The effects of some of the other variables are similar to Models 1 and 2. Women are more likely to be trusted with money in the south and northeast compared to the north while they are less likely to be trusted with money in the east. More educated women and women with higher standards of living are more likely to be trusted with money as are women who exhibit a greater educational difference from their husbands.

## DISCUSSION

In India, a potentially critical consequence of son preference and daughter neglect is a masculine sex ratio that has persisted in spite of significant gains in healthcare and life



expectancy. The growing shortage of women can have serious repercussions for women's lives and their familial relationships. Of special concern for the continued health and well-being of married women is the association between the population sex composition and IPV. In this paper, we use data from the NFHS-3, conducted in 2005–06, to investigate whether expected limitations on women's roles as a result of the sex ratio imbalance translates to physical chastisement and controls over a woman's movements in the public sphere. Following Guttentag and Secord's (1983) early work, we hypothesize that in a patriarchal society such as India a relative shortage of women will encourage men to resort to violence and control in order to constrain women's interactions with other nonrelated men and to confine women to traditional roles as wives and mothers.

We define domestic violence broadly, including physical abuse and controlling behaviours by husbands. Our data suggest that physical abuse by a husband continues to be a major problem in India with 35 per cent of ever-married women having experienced it in their lifetime (IIPS and Macro International 2007). About one in five currently married women has been a victim of physical abuse in the twelve months preceding the survey. The most common form of self-reported physical abuse is slapping, suffered by 18 per cent of our sample of currently married women. Additionally, about a quarter of the wives have been subjected to controlling behaviours by their husbands in the past twelve months with the percentages for each type of controlling behaviour ranging from a low of 8 per cent of women whose husbands limit contact with their natal families to a high of 16 per cent of women with husbands who do not trust them with money.

The results from the multilevel logistic regression models provide partial support for the hypothesized association between the community sex ratio and domestic violence. Consistent with our expectations, we find that for four out of five types of physical abuse (punch, slap, push/shake, twist/pull), wives in male surplus communities are more likely to be victimized by their husbands, even after adjusting for several other individual and household characteristics. Moreover, for one out of the three types of controlling behaviours by husbands, wives are more likely to experience control over their behaviour when they live in male surplus communities. When men are plentiful relative to women, wives report that their husbands are less likely to trust them with money of their own. Although the effects are modest, our findings confirm that in a patriarchal society such as India where structural power primarily resides with men, men exercise stricter controls over women's behaviour when men are relatively plentiful and women are in short supply. Since women are valued more for their traditional domestic roles when they are scarce, our findings suggest that husbands are more likely to engage in forms of chastisement and control over women who do not fulfil spousal, and indeed perhaps community-wide, expectations.

Our study also confirms the importance of individual and household characteristics as determinants of IPV. Most notably, higher levels of education, class and caste are associated with decreased odds of IPV. However, some of the variables that control for women's status did not have the expected results with paid work and number of sons (both measures of higher status for women) consistently showing a positive association with physical abuse. Perhaps this is because working women are unable to take care of all their household responsibilities and are therefore more likely to be physically chastised by their husbands. Similarly, while mothers of sons are considered to have higher status, there may also be greater expectations regarding childcare (and less help around the house in the absence of daughters).

Although many of the level 1 variables show stronger associations with physical abuse and controlling behaviours than the community sex ratio, the increasing masculinization of India's population portends a higher incidence of intimate partner violence. However, this

scenario is predicated on the assumption of little to no shift in the structural power that currently resides primarily with men. With greater development and urbanization, as well as governmental and nongovernmental interventions and assistance, women are likely to continue the trend towards greater participation in the public sphere. Our study thus makes a case for creating more opportunities for women (for example, through higher education) so that they can be less dependent on their husbands and more able to resist controls imposed upon them. The more women take on extra familial roles, the more normative these roles become for women and provide the basis for greater economic, political, and legal (i.e. structural) power for women. As women gain structural power, combined with their greater dyadic power when there is a deficit of women, the mode and degree of control exercised by husbands may change as well. We expect that increasing structural power for women will be accompanied by changes in what is considered normative for women and violence will no longer be considered a socially acceptable method of control of wives.

We acknowledge several limitations to our study. While the NFHS-3 tried to increase the validity and reliability of the domestic violence module by using questions on specific acts of violence and ensuring effective privacy for the respondents, it is possible that the self reports on violence understate the actual incidence of violence (IIPS and Macro International 2007). Victims may not remember accurately or they may be too embarrassed to acknowledge violence. There is also the possibility that there is differential underreporting by subgroups, such as by caste or class. Our measure of the focal explanatory variable, the community sex ratio, is also not without weaknesses. Sample sizes used to compute PSU level sex ratios are fairly small and may yield sex ratios that are not consistent with census data. There are also potential problems of causal inference. While we control for the confounding effects of other variables, it is possible that we have not isolated all major factors that affect both the community sex ratio and IPV.

Despite these limitations, our study provides suggestive evidence that the increasing masculinization of India may be detrimental to married women's well-being because they are at greater risk of experiencing IPV and controlling behaviours by their husbands. Future research may benefit from expanding our study to consider other possible pathways through which a shortage of women translates into increased spousal violence. For example, a shortage of women in the local area may cause men to expand the search for a wife to areas outside of the preferred marriage market. Women may be kidnapped or bought from their families and forced into marriage with men who are culturally and linguistically different from them. An undesirable bride, who has no access to her natal family, is more likely to be isolated and abused by her husband and his family, particularly since her loyalty will be suspect and her cultural background will be unfamiliar to her husband's household. Another possible impact of sex ratio imbalances is on age at marriage. When there is a shortage of similar aged women, families may draw upon younger and younger women as potential mates for men, which in turn could also have an undesirable effect on the prevalence of domestic violence and controlling behaviours wives experience at the hands of their husbands.

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**Table 1**

Percentage of ever married women aged 15–49 who have ever experienced physical violence by husbands, by state, NFHS-3, India

State	Physical violence
Bihar	55.6
Madhya Pradesh	44.0
Tamil Nadu	41.9
Uttar Pradesh	41.2
Tripura	40.9
Manipur	40.7
Rajasthan	40.3
Arunachal Pradesh	37.5
Assam	36.7
Andhra Pradesh	35.0
Jharkhand	34.7
Orissa	33.5
West Bengal	32.7
Chhattisgarh	29.2
Uttaranchal	27.3
Haryana	25.5
Punjab	24.4
Mizoram	22.0
Karnataka	19.5
Delhi	16.1
Kerala	15.3
Sikkim	14.8
Nagaland	14.0
Meghalaya	12.6
Jammu & Kashmir	11.5
Himachal Pradesh	5.9
India	35.1

Source: IIPS and Macro International 2007

**Table 2**

Descriptive Statistics for Variables Used in Analyses of Sex Ratio and Violence against women in India:  
Indian National Family Health Survey, 2005–2006 (N=63,330)

Variable	Mean	SD
<u>Dependent Variables</u>		
Physical abuse in past 12 months *		
Kick/drag/beat	5.59	.23
Punch	5.42	.23
Slap	17.84	.38
Push/shake/throw	7.16	.26
Twist/pull	7.81	.27
Husband controlling*		
Not permitted to visit female friends	13.85	.35
Limits contact with family	8.13	.27
Not trust with money	15.76	.36
<u>Independent variables (Level 1)</u>		
Woman's status		
Years of education	5.26	5.20
Educ diff (husband–wife)	1.92	4.11
Paid work *	41.02	.49
Age	31.87	7.92
# of sons	1.32	1.08
Household Standard of living (ref=high) *		
Low	20.61	.40
Medium	31.49	.46
Caste (ref=other caste) *		
Scheduled caste	17.05	.38
Scheduled tribe	13.06	.34
Other backward caste *	31.83	.47
<u>Independent Variables (Level 2)</u>		
PSU female-to-male sex ratio ages 15–59	103.64	20.29
Region (ref=North) *		
South	29.21	.45
East	14.80	.35
Northeast	16.72	.37

\* In percentage



**Table 3**

Multilevel analysis of sex ratio and physical violence against women in India, National Family Health Survey, India, 2005–06 (N = 63,330)

	Model 1 Kick/drag/beat	Model 2 Punch	Model 3 Slap	Model 4 Push/shake/throw	Model 5 Twist/pull	
	b	SE	b	SE	b	SE
<b>FIXED EFFECTS:</b>						
<b>Explanatory variables</b>						
<u>Level 2</u>						
Female-to-male sex ratio	-.002	.001	-.002*	.001	-.002*	.001
Region (ref=north)						
South	.287**	.060	.031	.059	.248**	.045
East	.308**	.071	.370**	.068	.319**	.056
Northeast	.019	.073	.008	.070	.122*	.054
<u>Level 1</u>						
Woman's status						
Years of education	-.087**	.005	-.096**	.005	-.086**	.003
Educ diff (husb-wife)	-.356**	.004	-.037**	.004	-.031**	.003
Paid work	.373**	.033	.316**	.034	.239**	.024
Age	-.022**	.002	-.016**	.002	-.028**	.001
# of sons	.093**	.014	.078**	.014	.090**	.010
Household Standard of living (ref=high)						
Low	.729**	.049	.629**	.050	.507**	.035
Medium	.482**	.042	.425**	.043	.325**	.029
Caste (ref=other caste)						
Scheduled caste	.358**	.047	.252**	.047	.230**	.034
Scheduled tribe	-.026	.063	-.103	.063	-.051	.045
Other backward caste	.164**	.044	.081	.044	.049	.031
Intercept	-2.717**	.147	-2.595**	.143	-836**	.108
-2 Log likelihood	371088		371090		312867	
					353871	

\*\*\*  
p < .01  
\*  
p < .05

**Table 4**

Multilevel analysis of sex ratio and husband's controlling behaviour in India, National Family Health Survey, India, 2005–06 (N = 63,330)

	Model 1 Not permitted to visit female friends		Model 2 Limits contact with family		Model 3 Not trust with money	
	b	SE	b	SE	b	SE
<b>FIXED EFFECTS:</b>						
<b>Explanatory variables</b>						
<u>Level 2</u>						
Female-to-male sex ratio	-.002	.001	-.001	.001	-.004**	.001
Region (ref=north)						
South	-.854**	.072	-.308**	.061	-.728**	.074
East	-.032	.088	.284**	.073	.304**	.090
Northeast	-.737**	.083	-.262**	.073	-.561**	.086
<u>Level 1</u>						
Woman's status						
Years of education	-.028**	.003	-.046**	.004	-.027**	.003
Educ diff (husb-wife)	-.011**	.003	-.012**	.004	-.011**	.003
Paid work	.079**	.026	.202**	.029	.033	.025
Age	-.008**	.002	-.010**	.002	-.002	.002
# of sons	.018	.012	.010	.013	-.003	.011
Household Standard of living (ref=high)						
Low	.074	.039	.196**	.044	.090*	.038
Medium	.055	.031	.151**	.036	.068*	.030
Caste (ref=other caste)						
Scheduled caste	.057	.036	.133**	.042	.038	.035
Scheduled tribe	-.034	.052	-.185**	.058	-.052	.051
Other backward caste	-.058	.034	.059	.038	-.042	.033
Intercept	-1.451**	.157	-2.407**	.143	-1.421**	.161
-2 Log likelihood	337628		349,506		333,893	

\*,  
\*\*  
p < .01  
\*  
p < .05