

## HUMAN CAPITAL INITIATIVE

# Curse of the Mummy-ji: The Influence of Mothers-in-Law on Women's Social Networks, Mobility, and Reproductive Health in India

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## ABSTRACT

Restrictive social norms and strategic constraints imposed by family members can limit women's access to and benefits from social networks, especially in patrilocal societies. We characterize young married women's social networks in rural India and analyze how inter-generational power dynamics within the household affect their network formation. Using primary data from Uttar Pradesh, India, we find that co-residence with the mother-in-law restricts her daughter-in-law's mobility and ability to form social connections outside the household, especially those related to health, fertility, and family planning. These restrictions are mainly motivated by the misalignment of fertility preferences between the mother-in-law and the daughter-in-law. Using an instrumental variables approach, we show that women who have fewer peers outside the household due to co-residence with the mother-in-law are less likely to visit a family planning clinic and to use modern contraception. We find suggestive evidence that these results operate through at least two channels of peer influence: outside peers alter a woman's beliefs about the social acceptability of family planning ("information channel") and help her overcome the mobility constraints imposed by her mother-in-law by accompanying her to the clinic ("companionship channel").



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Social networks influence individuals in a myriad of ways. In developing countries, where formal institutions are missing or may function imperfectly, informal community networks, such as caste-based networks in India, provide a range of benefits and services to their members (Munshi and Rosenzweig 2006; Munshi 2014). However, in traditional patriarchal societies, women may have limited ability to access and benefit from existing networks due to restrictive social norms and strategic constraints that are imposed on them by their family members. In this article, we characterize the social networks of young married women in rural India—a population with extremely low levels of empowerment (Duflo 2012; Jayachandran 2015)—and analyze how inter-generational power dynamics within the household affect their ability to access and form social networks. We find that these women have remarkably few social connections outside their homes, and co-residence with the mother-in-law (MIL) is a significant barrier to a woman's mobility and ability to tap into her caste-based village networks, resulting in detrimental impacts on her access and utilization of reproductive health services.

We collected primary data on the social networks of 18-30-year-old married women in Jaunpur district, Uttar Pradesh, in 2018.<sup>1</sup> We find that women in our sample are quite isolated—besides her husband and MIL, an average woman interacts with 1.6 individuals in Jaunpur about issues that are important to her (“general peers”) and with 0.7 individuals in Jaunpur about more private matters like reproductive health, fertility, and family planning (“close peers”). Nearly 36 percent of women in our sample have no close peers in Jaunpur, and the modal woman has only one close peer in Jaunpur. In fact, the proportion of women in our sample who have no close peers anywhere (inside or outside Jaunpur) is also substantial (22 percent). The mobility restrictions experienced by these women are severe—only 14 percent of the women are allowed to go alone to a health facility and only 12 percent are permitted to visit the homes of friends or relatives in their village by themselves. In addition, consistent with other empirical evidence from India (e.g., Kandpal and Baylis 2013; Kandpal and Baylis 2019), we find that the social network of our sample women displays homophily by caste, gender, marital status, and religion.

We then examine if co-residence with the MIL affects a daughter-in-law's ability to form social connections outside the home. In patrilocal-patrilineal societies where extended families are common, such as India, household members other than the husband can play a crucial role in determining a woman's level of autonomy and well-being. Several sociological and anthropological studies have found that a woman's MIL plays an especially significant role in shaping her decision-making in such societies (see Gram et al. 2019 for a review)<sup>2</sup>. Arguably, the MIL may be an even stronger influence on a woman than her husband, especially during the early years of the marriage. However, the extent to which the MIL plays a constraining or supporting role in shaping the social network of her daughter-in-law (DIL) is, a priori, unclear and requires empirical investigation. On the one hand, the MIL may restrict the DIL's social circle aiming to prevent outside influence from deviating the DIL's behavior and outcomes from the MIL's preferences. On the other hand, co-residence with the MIL may enable the DIL to tap into the MIL's social network, who is likely to be larger and more connected, given her age and length of residence in the village.

We find that a woman who lives with her MIL has 18 percent fewer close peers in her village, with whom she interacts about issues related to health, fertility, and family planning, and 36 percent fewer such peers outside the home (i.e., “close outside peers”). The MIL restricts her DIL's social network by not permitting her to visit places outside the home alone, in an attempt to control the DIL's fertility and family planning behavior. The negative influence of the MIL on a DIL's number of close outside peers is stronger if the MIL does not approve of family planning, if she wants more children than the DIL desires, and if she wants her DIL to have more sons than she already has. These findings suggest that the MIL's restrictive behavior is ultimately driven by her preferences and attitudes about fertility and family planning.

<sup>1</sup> With an estimated population of 200 million people in 2012, Uttar Pradesh would be the world's fifth most populated country by itself.

<sup>2</sup> Other prominent studies on this topic include Merrill 2007; Simkhada et al. 2008; Char, Saavala, and Kulmala 2010; Shih and Pyke 2010; and Gangoli and Rew 2011.

The restrictions that are imposed by the MIL on her DIL's access to social networks have significant detrimental impacts on the DIL. In our setting, women who have fewer close outside peers are less likely to visit health facilities to receive reproductive health, fertility, or family planning services, and are less likely to use modern contraceptive methods. As a MIL can influence these outcomes through several channels, we use an instrumental variables (IV) strategy to identify the causal effects of co-residing with the MIL that operate through the restrictions that she imposes on her DIL's number of close outside peers. We instrument a woman's number of close peers outside the household with the interaction of two variables: 1) the proportion of married women in a woman's village who belong to her caste group, and 2) an indicator for whether a woman co-resides with her MIL. We use the former as a *proxy* for the pool of individuals from which a woman's outside peers can be drawn since social interactions in India tend to be gender and caste-based—this has been argued in previous literature (Hoff and Pandey 2006; Munshi and Rosenzweig 2006; Mukherjee 2017; Kandpal and Baylis 2019) and is demonstrated by our data. Thus, the interaction term seeks to capture the negative effect of the MIL on women's access to the pool of potential close peers in her village. In our preferred regression specification, we control for women's socio-economic characteristics and for village-by-caste group fixed effects, thereby leveraging the variation in MIL-co-residence among women who belong to the same caste-group in the same village for the first-stage of the IV analysis. We conduct several robustness checks and placebo tests to support the validity of our instrument and to address the potential selection into co-residence with the MIL.

We then demonstrate that living with the MIL impacts a woman's access and utilization of reproductive health services, and her autonomy *through the reduction in the number of her close outside peers in the village*. Our IV estimates imply that living with the MIL decreases a woman's likelihood of visiting a family planning clinic by 15 percentage points (p.p.) or by 50 percent, relative to the 30 percent probability among women who do not live with the MIL. Similarly, living with a MIL reduces a woman's likelihood of using modern contraceptive methods by 2 p.p., or by 12.5 percent. We present suggestive evidence that the peer effects underlying these IV results operate through at least two channels: information diffusion and peer support through companionship. First, women who have more close outside peers believe that a larger proportion of women in their village are using family planning, suggesting that peers affect women's beliefs about the social acceptability of family planning. This mechanism is consistent with prior evidence on the role of social networks in information diffusion.<sup>3</sup> Second, a woman's close outside peers accompany her to seek care at a family planning clinic, thereby enabling her to overcome the mobility constraints that are imposed on her by the MIL. Furthermore, we find that a woman who has more close outside peers in her village has greater ability to visit places outside the home by herself which demonstrates the role of peers in boosting women's self-confidence and aspirations (Field et al. 2016; Jayachandran 2019).

Our paper makes several important contributions to the literature in family economics as well as to the economics of networks in developing countries. Although collective models of household behavior have recognized the importance of interactions among family members in determining individual welfare (see Chiappori and Mazzocco 2017, and the studies cited therein), this literature has primarily focused on bargaining between husbands and wives, and that too predominantly within a nuclear household structure. Therefore, the role and the influence of household members other than the husband on women's welfare has largely been ignored in economics. However, several descriptive studies in other disciplines, mostly in the South Asian context, have documented the significant role of the MIL in affecting women's autonomy. The bulk of this work finds a negative correlation between female autonomy and the presence of the MIL in the household (Cain, Khanam, and Nahar 1979; Jejeebhoy 1991; Bloom, Wypij, and Gupta 2001; Jejeebhoy and Sathar 2001; Gram et al. 2018), except for some studies that have found that living with the MIL can also be beneficial for women in some dimensions, such as health during pregnancy (Allendorf 2006; Varghese and Roy 2019).<sup>4</sup> To the best of our knowledge, ours is the first study to explore the influence of the MIL on the

<sup>3</sup> See Breza (2016) for a review.

<sup>4</sup> Unlike other correlational studies on this topic, Varghese and Roy (2019) estimate the causal impacts of co-residence with the MIL on health during pregnancy.



formation of women's social networks and the resulting effects on their autonomy, access to health services, care-seeking behavior, and health outcomes in a causal manner. While previous research has shown that disagreements between spouses on desired fertility can affect contraceptive use (Ashraf, Field, and Lee 2014; McCarthy 2019), we demonstrate that the misalignment of fertility preferences between the MIL and the DIL is also a crucial determinant of the DIL's family planning outcomes.

More broadly, despite rapid growth in research on social networks in economics (Jackson 2007; Jackson 2008; Jackson 2014; Breza 2016; Jackson, Rogers, and Zenou 2016; Banerjee et al. 2019), the literature on the role of gender in network formation and peer effects is relatively limited, especially in developing country contexts. We contribute to this literature in several ways. First, through our primary data collection effort, we shed light on women's networks in the domain of reproductive health, which have not received much attention in prior research. Given the private nature of interactions about fertility and family planning, the members of such networks are potentially the most influential, and hence the most policy-relevant, peers or individuals for young married women in settings such as ours. Second, we add to the literature on the role of peers in affecting women's well-being in developing countries by focusing on a new set of outcomes—utilization of reproductive health services and modern contraceptive use; prior work has examined peer effects in the adoption of new women's health technology (Oster and Thornton 2012), female entrepreneurship (Field et al. 2016), job referrals (Beaman, Keleher, and Magruder 2018), freedom of movement, and investments in children (Kandpal and Baylis 2019). Furthermore, our finding that women have few outside peers with whom they discuss private matters also contributes to the narrow set of studies that examine the consequences of women's social isolation, for instance, on female empowerment (Kandpal and Baylis (2019) in India) and agricultural adoption (Beaman and Dillon (2018) in Mali). Third, as previously mentioned, we are the first to examine how co-residence with the MIL influences the formation of her DIL's social network and thereby prevents her from experiencing beneficial peer effects. In this manner, we highlight an under-appreciated explanation for the relative sparsity of women's social networks in contexts where patrilocality and restrictive social norms are prominent.

## Data

The data that we use in this study comes from a unique household survey that we designed to specifically characterize the social networks of young married women in Uttar Pradesh, India. This survey is the baseline wave of a randomized controlled trial that aims to increase women's access to family planning services. Therefore, our sample is comprised of women who are currently married, are aged 18 to 30, have at least one living child, are not sterilized nor have had a hysterectomy, and are neither currently pregnant nor more than six months postpartum at the time of the baseline survey. These inclusion criteria were chosen to identify a sample of young married women of reproductive ages, with a potential unmet need for family planning, and for whom we believe that a family planning intervention would be appropriate and effective. We excluded married women who have not begun childbearing from our study due to the presence of cultural norms that dictate that newly married couples should prove their fertility as soon as possible after marriage (Jejeebhoy, Santhya, and Xavier 2014)<sup>5</sup>.

We conducted a complete household listing in 28 Jaunpur villages that were located within a 10-kilometer radius from the family planning clinic that we partnered with for the randomized experiment. Our fieldwork team screened a total of 2,781 households and a total of 698 households were identified to have at least one eligible woman. We contacted the youngest eligible woman from each of these households; a total of 671 eligible women consented to participate in the study and were administered the baseline survey between

5 Since we are interested in the impact of the MIL on women's social networks, the relevant group for this article is the population of married women. Our sample-selection criteria mean that two types of married women are missing from our analysis: those who have no children and those who are older than 30. The direction in which the omission of these two groups could bias our results is, *a priori*, unclear. On the one hand, childless married women are likely to have moved into their marital villages more recently than our sample women, and may, therefore, have fewer close outside peers and weaker bargaining power with respect to the MIL. On the other hand, women who are older than 30 are likely to have resided in their villages for a longer duration and, hence, may have more peers and greater bargaining power with respect to the MIL, in comparison to our sample women.



June and August in 2018.

To map the social network of our sample women, we first asked each of them to name up to five individuals in Jaunpur, besides her husband and her MIL, with whom she discusses her personal affairs related to issues such as children's illness, schooling, health, work, and financial support. We call these individuals her "*general peers*." We then asked each woman to name up to five individuals in Jaunpur with whom she discusses issues around family planning, fertility, and reproductive health; we name these individuals her "*close peers*."<sup>6</sup> We collected detailed socio-economic, demographic, family planning related, and network related information (e.g., measures of trust and connectedness) from the surveyed woman for each of her close peers in Jaunpur<sup>7</sup>. We also asked about her interactions with her husband, with her MIL, and with other close peers outside Jaunpur.

As part of the survey, we also collected information on women's socio-economic characteristics, birth history, marriage, fertility preferences, decision-making, and freedom of movement. Our survey instrument also gathered data on health services utilization in which we asked each woman about her access to health clinics, including whether she has ever visited a health clinic; the distance and the travel-time to the closest clinic; and whether she goes to the clinic with others (relatives, friends, etc.).

Table 1 shows that the average woman in our sample is 26 years old, while her husband is 33 years old. On average, women in our sample, as well as their husbands, have completed roughly nine years of schooling. Almost 43 percent of women belong to a Scheduled Caste (SC), 44 percent belong to Other Backward Classes (OBC), and 12 percent belong to Upper castes. The vast majority (93 percent) of our sample is Hindu, and nearly 60 percent of the households own agricultural land. The average age at marriage is 18, and women have been married for an average of seven years. Over 67 percent of the sample women live with their mothers-in-law. About 52 percent of women have at least one son, and on average, women have two children. The lack of women's mobility in our study area is striking: a very low proportion of women are allowed to go alone to the market (19 percent), to a health facility (14 percent), and to the homes of friends or relatives in the village (12 percent). Moreover, only 14 percent of the women worked in the last seven days and 88 percent practice *ghunghat* or *purdah*, which reflect the conservative norms that are practiced within our study area. Lastly, 18 percent of the women were using a modern contraceptive method at the time of the survey, and 35 percent of them had visited a health facility for reproductive health, fertility, or family planning services at some point in their lives.

## Characterization of Women's Social Networks

We find that young married women in rural India interact with very few individuals, besides their husbands and mothers-in-law, about their personal affairs or private concerns. An average woman in our sample mentions 1.6 general peers in Jaunpur district; in contrast, an average woman in the United States reported having eight close friends in a 2004 Gallup poll (Gallup Inc 2004). About 9 percent of women have no such peers; 40 percent of women mention one person, and 33 percent of women mention two people. Women's interactions with others are even more limited within the domains of family planning, fertility, and reproductive health. Nearly 36 percent of women speak to no one in Jaunpur district, besides their husband and MIL, about these issues. The modal woman has only one such close peer, and the proportion of women in our sample who have no close peers anywhere (inside or outside Jaunpur) is also substantial (22 percent).

Most (86 percent) of women's close peers in Jaunpur are relatives. The average duration of a woman's close-peer relationships in Jaunpur is highly correlated with her marital duration, which is consistent with the fact that most women in our sample moved to their marital villages from elsewhere after their marriage.

<sup>6</sup> Chandrasekhar and Lewis (2011) show that a large downward bias can result when top-coding is used to sample peer networks. However, in our survey, all participants reported fewer than five close peers, besides their husband and MIL; in fact, the modal woman listed only one close peer. Thus, five appears to be an effective upper limit on network size in our sample.

<sup>7</sup> We did not collect such information about general peers since the primary focus of our experiment is on women's health, fertility, and family planning related networks.

Almost 60 percent of the close-peer relationships in Jaunpur were formed more than 5 years ago, and 62 percent of the women report talking with their close peers every day, while 27 percent of them talk with their close peers every other week. Furthermore, 58 percent of the women reported that they would feel very comfortable leaving their children for an afternoon with their close peers, while 50 percent of them reported having discussed marital problems and intra-household conflicts with their close peers. Thus, women's social networks in our context are strongly embedded within their extended households, which is not surprising given the severe mobility constraints that they face. These results are consistent with the evidence from other contexts indicating that women's networks tend to be comprised of a larger proportion of kin-ties compared to men's networks (Fischer and Oliker 1983; Moore 1990; Gillespie et al. 2015).

If we narrow our focus geographically to the woman's village, an average woman has only 0.55 close peers in her village, roughly half of whom live in her household while the other half live *outside* her household.<sup>8</sup> Only 49 percent of the women have at least one close peer in their respective villages, and the proportion of women who have such a close peer outside her household is even smaller (24 percent). Thus, our sample women have severely limited interaction with people outside their homes. Our results are similar to the evidence in Kandpal and Baylis (2019), who find that a modal woman in Uttarakhand, a neighboring state of Uttar Pradesh, has on average three friends who live outside her household. Although the estimates in Kandpal and Baylis (2019) are larger than ours, we note that our sample is younger and that Uttar Pradesh is a more conservative state relative to Uttarakhand, especially in terms of gender norms.

Consistent with previous evidence on social networks in India (Munshi and Rosenzweig 2006, Banerjee et al. 2013; Jackson 2014), we find that the social network of women in our sample displays caste-homophily: 94 percent of a woman's close peers in Jaunpur are of the same caste. Moreover, we observe homophily in terms of gender, marital status, and religion: almost all of the close peers are women; 90 percent of them are married; and all of them are from the same religion. These findings reflect the strong homophilous ties that are typically observed within women's social networks and which have been observed in other contexts (Brashears 2008). Nonetheless, we also note that women in our sample differ from their close peers in Jaunpur in terms of age, education, and economic status. For instance, close peers appear to be older; the average age of these peers is 30, and 40 percent of them are older than 30. This may be due in part to the design of our survey, given that we selected the youngest eligible woman from our sampled households to participate. Only 26 percent of the close peers were reported to have the same level of education as the sample woman, while 50 percent of close peers were reported to be more educated. Lastly, our sample women reported that 75 percent of their close peers have the same economic status as them, while 21 percent of the close peers were reported to be economically better-off. We note that this social network characterization is based on peer characteristics as reported by the surveyed woman, who may have imperfect information on her peers' age, education, and economic status. In this sense, these descriptive statistics capture the perceptions of surveyed women about their peers.<sup>9</sup>

## The Influence of the Mother-in-Law

We now examine how co-residence with the MIL restricts her DIL's social network; why and how the MIL exerts her influence; and the consequences of these restrictions for the DIL. We begin by estimating the correlation between living with the MIL and her DIL's number of close peers who reside in her village. We focus on the number of peers in the same village for various reasons. Physical proximity has been shown to be important for developing close friendships or relationships as it enables more frequent interactions (Hipp and Perrin 2009; Beaman and Dillon 2018). Moreover, for outcomes such as mobility and access to health services, a woman's peers who live in the same village are likely to be more relevant than her peers who

<sup>8</sup> The average number of close peers in the village among women who have at least one such peer is 1.14

<sup>9</sup> In our baseline data, all social network information about the peers is self-reported by the surveyed woman, and we are unable to construct the reciprocal links between women and their close peers, except for a few cases where the close peers turned out to be a part of our sample. It is plausible that these "out-degree" measures of social ties are less reliable as they cannot be corroborated by the "in-degree" measures, i.e., where others report having a link with the individual in question. Thus, it is worth noting that the variables used to characterize the close peers might induce some bias in our network depiction.

live outside the village since the former can more easily offer companionship and support. Lastly, given that mobile phone ownership among women in India is generally low—only 33 percent of women own mobile phones (Barboni et al. 2018)—women’s interactions with long-distance peers are limited, making peers who live in the same village even more relevant.

We estimate the following OLS specification for a woman  $i$  from caste-group  $c$  living in village  $v$ :

$$Y_{icv} = \alpha + \beta MIL_i + X_i' \gamma + \theta_v + \theta_c + \varepsilon_{icv} \quad (1)$$

The variable  $Y_{icv}$  denotes the outcome of interest;  $MIL_i$  is a dummy variable that equals one if the woman’s MIL lives in the same household as her;  $X_i$  is a vector of individual-level controls that includes the woman’s age and years of education, an indicator for her being Hindu, and the amount of land her household owns. We also control for indicators for caste category (SC-ST, OBC, Upper caste),  $\theta_c$ , and include village fixed effects ( $\theta_v$ ). We use heteroskedasticity-robust standard errors to make inference.<sup>10</sup>

Column (1) in Panel A of Table 2 shows that living with the MIL significantly decreases the number of close peers that a woman has in her village by 0.120, or by 20 percent, relative to the outcome mean for women who do not reside with their MIL. The negative effect on the number of a woman’s close peers outside her household, but in the same village, is even larger—the coefficient of -0.133 in column (1) of Panel B in Table 2 implies that a woman who co-resides with her MIL has 37 percent fewer close peers outside her household relative to women who do not reside with their MIL.

Columns (2) – (5) of Table 2 demonstrate that the influence of the MIL on her DIL is significantly larger and more negative relative to the influence of other household members. Co-residence with the father-in-law is not significantly correlated with a woman’s number of close peers inside or outside the household. The presence of other adult women in the household (for example, sisters-in-law) is positively correlated with a woman’s number of close peers in the village but not with her number of close peers outside the household. This finding implies that although the presence of these more proximate women expands the pool of individuals with whom a woman can discuss private matters within the household, it does not result in more outside peers.<sup>11</sup> This suggests that a woman’s sisters-in-law may be also affected by the dominant position of the MIL.

Exploring proximate channels for the results in Table 2, we find that the MIL prevents her DIL from forming social connections by imposing constraints on her mobility. Although the ability to access spaces outside the home is low even for women in our sample who do not live with their MIL, those who reside with their MIL fare much worse in terms of their freedom of movement. Table 3 (using specification (1)) shows that living with the MIL significantly lowers the ability of a woman to visit alone the homes of relatives or friends in the village or neighborhood by 17 p.p., or by 77 percent, relative to the women who do not reside with their MIL. Similarly, a woman who lives with her MIL is 53 percent less able to visit a health facility alone than a comparable woman who does not live with her MIL. The pattern is similar for mobility restrictions on visiting alone other places outside the home, such as, the market, the grocery store, and places outside the village or community. These results are consistent with our previous finding that the negative influence of living with the MIL on a woman’s number of close peers in her village is even greater if we examine such peers who live outside the woman’s home (37 percent *versus* 20 percent in Table 2).

One main concern with the results in Tables 2 and 3 is that these are correlations and, therefore, may not identify the true causal effect of co-residence with the MIL. A key source of bias would be the possible selection into living with the MIL, i.e., if it were the case that women who live with the MIL are different from women who do not live with the MIL, in terms of unobservables that are correlated with our outcomes of interest. For instance, if women whose husbands are more conservative are more likely to live with their

<sup>10</sup> Our results are robust to clustering the standard errors at the village level. These results are available upon request.

<sup>11</sup> We do not make a causal claim here as the number of close peers in the household may be simultaneously determined with the number of close peers outside the household.



parents-in-law, then such women would have fewer close peers and have lower mobility even in the absence of living with the MIL. Reverse causality is unlikely to be a major concern here. Therefore, in Table 4, we compare the observable socio-economic and demographic characteristics of women who live with their MIL with those who do not live with their MIL. These two types of women do not have statistically significant differences in terms of caste, religion, husband age, employment status, the spousal gap in educational attainment, the amount of land owned by the household, and the number of living sons. However, women who live with their MIL are younger, have been married for a shorter duration, and are more educated than those who do not live with their MIL. On the one hand, the bias due to the differences in age and marital duration is likely to be in the same direction as our results in Tables 2 and 3 as younger women and women who have lived in their village for a shorter duration are likely to have fewer social connections irrespective of their co-residence with the MIL. On the other hand, the differences in educational attainment are likely to bias us against finding a negative effect on the number of close outside peers if more educated women enjoy greater autonomy irrespective of living with the MIL. Thus, *a priori*, the direction of selection bias is unclear. To address the potential bias due to these observable differences, we control for women's age and education in our specifications.

Although it is difficult to establish causality without a credible source of exogenous variation in co-residence with the MIL, we present two pieces of evidence to support a plausible causal interpretation of our OLS estimates. First, as Table 5 shows, our findings remain qualitatively the same if we restrict the sample to households where the father-in-law is a member of the household. Since divorce is highly unlikely in our context, especially among older generations, the absence of MIL in households where the father-in-law is present is almost certainly due to her death, a likely exogenous event. Thus, the coefficients of  $MIL_i$  in Table 5 are likely to be closer to the true causal impact of co-residence with the MIL. The 55 percent decline in a woman's number of close outside peers due to co-residence with her MIL in Table 5 is even larger than the 37 percent decrease that we observe in Table 2, demonstrating that any potential selection-bias makes us *underestimate* the true effect of the MIL on her DIL's number of close outside peers in Table 2. Second, our sample comprises of relatively young (18-30-year-old) women, who are unlikely to have a choice in whether or not to live with the parents-in-law, particularly during the early years of their marriage. The decision to leave the extended household is typically made by the couple several years after marriage. In column (1) of Table A.1, we confirm that our results hold when we restrict the sample to women who have been married for no more than five years; co-residence with the MIL is more likely to be exogenous for these women.

In order to understand why the MIL restricts her DIL's interactions with outsiders about matters related to health, fertility, and family planning, we examine the heterogeneity in our previous results by the MIL's preferences and attitudes about fertility and family planning. As we show in Table 6, the negative influence of the MIL on her DIL's number of close peers is stronger, both in magnitude and in significance, when she disapproves of family planning (columns 1-2)), when her ideal number of children for her DIL is larger than the DIL's own ideal number of children (columns 3-4)), and when she desires more sons for the DIL than the DIL's current number of living sons (columns 5-6)). This heterogeneity suggests that the MIL fears that outside influence may cause her DIL's fertility outcomes and family planning use to deviate from her, i.e., the MIL's, preferences. In fact, among the sample of women whose mothers-in-law disapprove of family planning, 71 percent believe that this is because the MIL wants them to have (more) children—this is by far the most cited reason, followed by 25 percent of women who believe that their MIL is worried about the side effects from using contraceptive methods. Moreover, Table A.1 demonstrates that the ability of the MIL to restrict her DIL from interacting with outsiders is stronger when her son (i.e., the DIL's husband) also disapproves of family planning (columns (3)-(4)) and when he is a migrant, i.e., has been away from home for one month or more at a time (columns (5)-(6)). These findings imply that the MIL's authority is even stronger when the woman's husband is often away from home and when his family planning attitudes are aligned with those of his mother.

In Table 7, we find that women who have fewer close outside peers in their village are significantly less likely to have ever visited a health facility for reproductive health, fertility, or family planning services (column

(1)). They are also less likely to use a modern method of contraception (column (2)). Thus, the mobility restrictions imposed by the MIL, and the subsequently fewer number of close peers that her DIL has, might have additional significant detrimental impacts on her DIL in terms of her access to health clinics and contraceptive choices.

## Instrumental Variables Estimation

Our results so far have shown two main patterns: (1) a MIL curtails her DIL's ability to form close social connections outside the home, and (2) women who have fewer close outside connections are less likely to visit a family planning clinic and have lower modern contraceptive use. In this section, we bring these two stories together by estimating the effect that a MIL has on the DIL's family planning related outcomes, *through her influence on the DIL's social network*. The estimates in Table 7 may not capture the causal effect of close outside peers as women who have more such peers may be more likely to visit health clinics and to use modern contraception for reasons other than peer effects. Therefore, we adopt an instrumental variables (IV) approach to causally estimate the coefficients of interest.

We instrument a woman's number of close peers in her village who live outside her household with the interaction of two variables: 1) the fraction of women in her village  $v$  who belong to her caste group  $c$ , which we denote as  $Prop_{cv}$ <sup>12</sup> and 2) an indicator variable that equals one if the woman co-resides with her MIL,  $MIL_i$ . Then, we estimate the following two-stage least squares (2SLS) model:

$$ClosePeers_{icv} = \mu + \delta(Prop_{cv} MIL_i) + X_i' \gamma + \theta_c + \theta_v + \theta_{cv} + \varepsilon_{icv} \quad (2)$$

$$Y_{icv} = \alpha + \beta (ClosePeers_{icv}) + X_i' \phi + \lambda_c + \lambda_v + \lambda_{cv} + u_{icv} \quad (3)$$

The variable  $Y_{icv}$  is the outcome of interest (e.g., the likelihood of visiting a family planning clinic) and  $ClosePeers_{icv}$  is the number of a woman's close peers who live outside the household in her village  $v$ . In the first stage, we exploit the variation in the number of close outside peers that is driven by the interaction term,  $Prop_{cv} * MIL_i$ , after controlling for a woman's socio-economic characteristics ( $X_i$ ) and fixed effects for village ( $\theta_v$ ), for caste-group ( $\theta_c$ ), and for their interaction ( $\theta_{cv}$ ). Subsequently, we use the predicted number of close outside peers from the first stage,  $(ClosePeers_{icv})$  to explain a woman's outcomes in the second stage.

The variable  $Prop_{cv}$  is a proxy for the available pool or the supply of individuals in the village from which a woman's close outside peers are likely to be drawn. In our preferred definition of  $Prop_{cv}$ , we focus on the pool of 18-30-year-old married women in the village, and calculate the fraction of such women who belong to various caste groups. The exact formula is as follows, where  $N_v^{1830,married}$  denotes the total number of married 18-30-year-old women in the village and  $N_v^{1830,married}$  is the number of such women who belong to the caste-group  $c$ :

$$Prop_{cv}^{1830, married} = N_{cv}^{1830,married} / N_v^{1830,married}$$

We define the peer-pool in terms of caste because social networks in India have been shown to be predominantly caste based (Hoff and Pandey 2006; Munshi and Rosenzweig 2006; Mukherjee 2015; Kandpal and Baylis 2019). Moreover, the social norms in our setting are such that they prevent young married women from forming peer-relationships with men other than their husbands or male kin such as fathers and brothers. Similarly, taboos surrounding discussions about conjugal relations imply that unmarried women are less likely to participate in interactions about issues such as reproductive health and family planning with married women. In fact, as we described in the earlier section, our network exhibits significant homophily by caste, gender, and marital status. We also focus on the 18-30 age group because 60 percent of the close peers of our sample women fall within this age range. Nevertheless, we also estimate our models by defining the caste-based pool in terms of the number of all 18-30-year-old women in the village (i.e., ignoring their

<sup>12</sup> We divide the sample into three distinct caste groups: scheduled castes or tribes (SC-ST), OBC, and upper castes. As previously mentioned, 44 percent of the sample is OBC, 11 percent belongs to an upper caste, and the rest are SC-ST, with the ST share being negligible (1.5 percent).

marital status) and in terms of the number of all women in the village (i.e., ignoring both age and marital status) as robustness checks.<sup>13</sup>

The interaction variable,  $Prop_{cv} * MIL_i$ , captures the differential effect of the available pool in the village on a woman's number of close outside peers in the village by co-residence with the MIL. Through this interaction, we seek to capture the constraints imposed by the MIL on her DIL's access to the pool of available outside peers. The village-level fixed-effects control for village-specific factors that are correlated with the outcomes and that affect women from all castes in the village. For instance, women who live in less populated or more conservative villages may have fewer close outside peers irrespective of whether or not they co-reside with their MIL. Similarly, caste-level fixed-effects incorporate differences across caste groups that are common across villages; e.g., if upper-caste families are more conservative, women who belong to upper castes may face more severe constraints independently of whether or not they live with their MIL. Lastly, in our preferred specification, we allow for caste-by-village fixed effects to flexibly control for all factors that vary at the caste-village level and that are correlated with our outcomes of interest. We present our results with and without clustering the standard errors at the village level.<sup>14</sup>

The identifying assumption underlying our IV approach is that, conditional upon  $X_i$  and the extensive set of fixed effects, our instrument affects the outcomes, such as a woman's likelihood of visiting a family planning clinic, only through her interactions with close outside peers. The interaction term, i.e.,  $Prop_{cv} * MIL_i$ , allows us to control for caste-by-village fixed effects, which implies that the variation in our first-stage is obtained from a comparison of women who belong to the same caste group and who live in the same village, but who differ in terms of co-residence with the MIL. The exclusion restriction will be violated if there are unobservable individual- or household-level differences in women belonging to the same caste-group and village but who differ in terms of living with the MIL. Earlier, in Table 4, we have already shown that co-residence with the MIL does not significantly differ by caste, religion, husband age, employment status, the spousal gap in educational attainment, the amount of land owned by the household, and the number of living sons. There are some differences in terms of woman's age and education, so we include woman's age fixed effects and control for woman's years of schooling in both stages of the 2SLS regressions. Additionally, we control for the distance from the woman's home to the closest health facility as a proxy for household-level availability of health services. While it is always difficult to prove that the exclusion restriction is never violated, later, we perform a series of robustness checks to further validate our findings.

For the instrument to be valid, it needs to be strongly correlated with the number of close outside peers. Table 8 presents the estimates from the first-stage regression specification (2) using the three definitions of the peer-pool that was described earlier. We present the standard errors without clustering in parentheses and with clustering at the village-level in square brackets. In all columns, the coefficient of the interaction term, i.e., of our instrument, is negative and highly significant. In columns (1), (3), and (5), we exclude the caste-by-village fixed effects so that we can also estimate the main effect of  $Prop_{cv}$ . We find that if a woman does not live with her MIL, her number of close peers outside the household increases with the proportion of women in the village that belong to her caste, but living with the MIL decreases the positive effect of  $Prop_{cv}$ . As column (1) shows, when there is no MIL present, a unit (or a 100 percent) increase in  $Prop_{cv}$  (i.e., going from having no other woman from one's caste group in the village to living in a village where all other women belong to one's caste group), increases the number of close outside peers by 0.16. Co-residence with the MIL reduces the influence of the pool on a woman's number of close outsider peers, which is consistent with our hypothesis that the MIL prevents her DIL from accessing or forming outside networks. In all columns, the

13 The exact definitions are as follows:  $Prop_{cv}^{1830} = N_{cv}^{1830} / N_v^{1830}$  and  $Prop_{cv} = N_{cv} / N_v$ , where  $N_{cv}^{1830}$  and  $N_v^{1830}$  respectively denote the total number of 18-30-year-old women in the village and the number of such women who belong to the caste-group  $c$ , while  $N_v$  and  $N_{cv}$  respectively denote the total number of women in the village and the total number of women who belong to caste-group  $c$  in the village.

14 Although standard errors clustered at the village-level control for within-village error correlation, they are less reliable when the number of clusters is small. As our sample comprises only 28 villages, we also present standard errors without clustering for comparison; our findings remain similar with either mode of inference.



coefficient of the instrument is statistically significant at the one percent level and is of a similar magnitude; the F-statistic of the first stage is also above the standard threshold of 10 used in the literature (Staiger and Stock 1997), re-assuring us about the strength of our instrument. Our preferred specification is presented in column (6), where the interaction coefficient of -0.229 implies that for the average value of  $Prop_{cv}$ , which is 0.50, living with the MIL decreases a woman's number of close outside peers by 0.11. This translates into a 31 percent decline in a woman's number of close outside peers, relative to an average woman who does not live with her MIL (who has 0.36 close outside peers).

Table 9 presents the second-stage and reduced-form estimates from our IV analysis using our preferred definition of  $Prop_{cv}$  (i.e., peer-pool of 18-30 married women). Among women who do not have any close outside peers in their village, the average likelihood of having visited a family planning clinic is 30 percent. The statistically significant 2SLS coefficient of 0.664 in column (1) of Table 9 implies that if such women get just one close outside peer in their village, their average likelihood of visiting a family planning would go up by 67 p.p. to 96 percent. Moreover, consistent with our OLS results, column (2) shows that women who have more close outside peers in their village are more likely to use modern methods of contraception; although the point estimate is large, it is not statistically significant at conventional levels.

The reduced form coefficients in Panel B of Table 9 not only validate the relevance condition of our instrument (Angrist and Pischke 2009), but also measure the impact of the MIL on her DIL's outcomes through the influence on her close outside peers in the village. We estimate that for the average value of  $Prop_{cv}$ , which is 0.50, living with the MIL decreases the likelihood of visiting a family planning clinic—through the reduction in the number of close outside peers—by 15 p.p., or by 50 percent, relative to the 30 percent probability for women who do not live with the MIL. Similarly, the probability of using a modern contraceptive method decreases by 2 p.p., or by 12.5 percent relative to women who do not live with the MIL.

There are several channels through which peers may influence a woman's family planning outcomes. First, a woman's peers may accompany her to a family planning clinic, thereby enabling her to overcome the mobility constraints imposed on her by her MIL, and improving her access to reproductive health services. This is consistent with the positive and significant OLS and IV coefficients in columns (4) of Tables 7 and 9, respectively, which show that women who have more close outside peers in their village are more likely to be permitted to visit a health facility with someone. We term this the “companionship” channel. This mechanism is especially important in settings such as ours where women's physical mobility is severely curtailed.

Second, women who have more outside peers may be better informed about the true contraceptive prevalence rates in their villages, either because their peers provide this information directly or because they learn about it during their visits to the family planning clinics (“information” channel). If we assume that women who have limited interaction with individuals outside their homes underestimate family planning use in their communities, then having more close outside peers can correct their beliefs. In fact, empirical evidence has extensively shown that in contexts where formal sources of information are missing, peers can play an important role in disseminating information about new health technologies (H. P. Kohler, Behrman, and Watkins 2001; Miguel and Kremer 2004; Godlonton and Thornton 2012), including family planning (H.-P. Kohler, Behrman, and Watkins 2000, 2002; Behrman, Kohler, and Watkins 2002), employment opportunities (Munshi and Rosenzweig 2006), and agricultural technologies (Foster and Rosenzweig 1995; Conley and Udry 2010; Magnan et al. 2015), among other issues in developing countries (for a review, see Breza 2016).

Consistent with the information channel, the OLS and IV results in columns (3) of Tables 7 and 9, respectively, show that women who have more close outside peers in their village believe that more women in their village use family planning.<sup>15</sup> Since our 2SLS specifications control for caste-by-village fixed effects, this result cannot be driven by women with more close outside peers living in villages with higher actual

<sup>15</sup> The outcome variable is a categorical variable that takes values 0 to 6 with higher values indicating a woman's belief that more women in her village use family planning.

contraceptive prevalence. To further test for this channel, we utilize the information that we collected on whether a woman in our sample thinks that each of her peers approves or disapproves of family planning. We find that the 2SLS estimate of the effect of the number of close outside peers on beliefs about contraceptive prevalence in the village is larger for women who have more close outside peers who approve of family planning (results available upon request). However, we cannot say how much closer the beliefs of our sample women are to the actual contraceptive prevalence rates in their villages because we do not have data on the latter.

Lastly, in Table 10, we also analyze the effect of close outside peers on other related mobility outcomes using our 2SLS framework. The results are similar to our OLS findings in Table 3: having more close outside peers increases the ability of a woman to visit alone places outside the home, such as, health facilities and the market, and decreases the likelihood of wearing *ghunghat* or *purdah*. The reduced form coefficients imply that, for the average value of  $Prop_{cv}$ , which is 0.50, living with the MIL decreases the DIL's ability to visit a health facility alone—through the reduction in her number of close outside peers—by 20 p.p. or by 78 percent relative to the 25.5 percent likelihood for women who do not live with their MIL.

The results in Table 10 suggest that apart from providing companionship to places outside home, close outside peers also empower women to visit these places alone. This “empowerment effect” of peers could occur through several channels. For instance, Kumar et al. (2019) show that women who belong to a self-help-group in India are less likely to need permission from their husband or other household members to attend meetings outside their homes, indicating an improvement in a woman's self-confidence in interacting with individuals outside their household. Field et al. (2016) provide suggestive evidence that greater freedom of movement and the ability to more freely form social connections can improve women's aspirations. Our results are also consistent with Kandpal and Baylis (2019), who show that having more empowered friends increases a woman's mobility in rural Uttarakhand, India.

The omitted-variable bias in the OLS regressions of outcomes, such as the likelihood of visiting a family planning clinic, on the number of close outside peers is likely to be positive, which would suggest that our OLS estimates should be larger than the IV estimates. However, in our case, the opposite is true. This could be due to the fact that the IV estimates capture the local average treatment effect (LATE), which is the response for those women whose number of close outside peers is affected by the instrument (“compliers”), while the OLS captures the average effect of an additional close outside peer for the entire sample (Imbens and Angrist 1994). If compliers are women who face stronger mobility constraints due to co-residence with the MIL, they might benefit more from having outside peers than the average woman, explaining the larger magnitude of the IV coefficients.

## Robustness Checks

In this sub-section, we perform a series of tests to further establish that our IV approach identifies the causal effect of co-residence with the MIL on a woman's outcomes through her interactions with close peers outside the home.

We have already demonstrated that women who live with the MIL are similar to women who do not live with the MIL along several dimensions; moreover, we flexibly control for variables such as woman's age and education that differ across the two groups. As our IV specifications include fixed effects for caste category, village, village-by-caste category, and a vector of individual and household characteristics, the exclusion restriction will be violated only if there are any remaining individual- or household-level differences between women belonging to the same caste-group and village but who differ in terms of living with the MIL. In column (1) of Table A.2, we show that our IV results for visiting a family planning clinic in Table 9 are also robust to further controlling for the fertility preferences of the woman, of her husband, and of her MIL. In the next two columns, we show that our results hold even when we use the two alternate definitions of the pool. In column (4), we restrict our sample to villages that have at least 10 sample women; the results continue to hold. In the bottom panel of the same table, we present the same robustness checks for our empowerment

effect results—instead of presenting the results for each type of mobility constraint separately, we sum up the outcome variables in Table 10 into a “Mobility Score” index and show the results for this index variable in Panel B of Table A.2 for conciseness.

Lastly, in Table 11, we conduct several placebo tests. If our IV approach truly captures the causal effect of living with the MIL on a woman’s mobility and health outcomes through her number of close outside peers, we should not observe significant “effects” if we replace the outcomes with variables that are unrelated to our hypothesized channels. We examine four such placebo indicator outcomes—a woman’s firstborn-child being a son, whether the woman’s household is involved in a land dispute, whether the woman’s mother attended school, and whether the woman father’s attended school. It is well-established that the sex of a first child is as-good-as-random in India (Das Gupta and Bhat 1997; Visaria 2005; Bhalotra and Cochrane 2010; Anukriti, Bhalotra, and Tam 2016). Moreover, we do not expect that living with the MIL or having more close outside peers should impact the household’s probability of being involved in a land dispute or a woman’s parents’ school attendance in the past. Reassuringly, none of the second-stage or the reduced form coefficients in Table 11 are significantly different from zero.

## Policy Implications and Conclusion

In traditional patrilocal societies, such as India, restrictive social norms and co-residence with the MIL are ubiquitous. Using primary data, we first characterize the social networks of young married women in Uttar Pradesh, and then analyze how inter-generational power dynamics within the household influence women’s network formation. We find that co-residence with the MIL restricts her DIL’s mobility and ability to form close social connections outside the home. These restrictions deprive the DIL of the beneficial impacts that social networks can have on women’s care-seeking behavior and health outcomes.

Although the social networks of our sample women are sparse, the benefits of having even a few close peers outside the household are substantial in terms of women’s health-seeking behavior. We find that women with a higher number of close peers outside their household are more likely to visit a family planning clinic and to use modern contraceptive methods. These outside connections influence women’s beliefs about family planning use in their community and help them overcome the physical mobility restrictions that are imposed by the MIL.

Our results are informative for the design of policies that leverage social networks to increase women’s access and uptake of family planning and reproductive health services. First, if women have few close peers, it would be more challenging to reach them and to diffuse information or other policy interventions through their networks. This issue is even more relevant in the context of India, where we observe that at-home reach of health workers is quite low—only 8 percent of health workers have ever talked to female non-users about family planning in Jaunpur district (Indian Institute of Population Sciences and Ministry of Health and Family Welfare 2016), implying that a woman’s inability to access a family planning clinic effectively translates into no interaction with a family planning provider. Second, our results point out that the MIL acts as a gatekeeper for women’s social interactions and the potential benefits that networks provide their members. Thus, future interventions that aim to reach women would benefit from addressing the gatekeeper-role of the MIL into their targeting strategies, or by directly targeting the MIL in a joint family to inform her about the benefits of family planning and reproductive health services (Varghese and Roy 2019).

Future work should extend our analysis to other Indian states and to other developing countries to identify potential heterogeneity in the characteristics of women’s social networks and in the influence of the MIL. Whether and what types of policies can counter the negative influence of the MIL and expand women’s networks also remains to be explored. For instance, Kumar et al. (2019) find that women’s self-help groups expand women’s social networks and improve their mobility. With this in mind, there is a need for further research that would inform policymakers on the relative importance of other household members in determining women’s autonomy and well-being, particularly in patrilocal societies like India where extended households continue to remain prevalent.



## TABLES

**Table 1: Summary statistics**

| Variable                           | N   | Mean  | Std. Dev. | Min | Max |
|------------------------------------|-----|-------|-----------|-----|-----|
|                                    | (1) | (2)   | (3)       | (4) | (5) |
| Age                                | 671 | 25.67 | 2.65      | 18  | 30  |
| Husband age                        | 644 | 32.57 | 9.45      | 18  | 73  |
| SC                                 | 671 | 0.43  | 0.50      | 0   | 1   |
| ST                                 | 671 | 0.01  | 0.12      | 0   | 1   |
| OBC                                | 671 | 0.44  | 0.50      | 0   | 1   |
| Upper caste                        | 671 | 0.12  | 0.32      | 0   | 1   |
| Hindu                              | 671 | 0.93  | 0.25      | 0   | 1   |
| Years of schooling                 | 671 | 9.53  | 4.47      | 0   | 15  |
| Marriage duration (years)          | 655 | 7.31  | 3.61      | 0   | 21  |
| Age at marriage                    | 655 | 18.36 | 2.52      | 6   | 28  |
| Live with MIL                      | 671 | 0.68  | 0.47      | 0   | 1   |
| Own land                           | 638 | 0.60  | 0.49      | 0   | 1   |
| Amount of land owned (acres)       | 671 | 5.43  | 2.72      | 1   | 26  |
| No. of living sons                 | 671 | 0.96  | 0.76      | 0   | 4   |
| No. of living children             | 671 | 1.95  | 0.92      | 1   | 5   |
| Firstborn is a son                 | 671 | 0.50  | 0.50      | 0   | 1   |
| <i>Allowed to visit alone:</i>     |     |       |           |     |     |
| Home of relatives/ friends         | 671 | 0.12  | 0.32      | 0   | 1   |
| Health facility                    | 671 | 0.14  | 0.35      | 0   | 1   |
| Grocery store                      | 671 | 0.16  | 0.37      | 0   | 1   |
| Short distance train/ bus          | 671 | 0.08  | 0.27      | 0   | 1   |
| Market                             | 671 | 0.19  | 0.39      | 0   | 1   |
| Outside village/ community         | 671 | 0.21  | 0.40      | 0   | 1   |
| Wears <i>ghunghat/ purdah</i>      | 671 | 0.88  | 0.32      | 0   | 1   |
| Worked in the last 7 days          | 666 | 0.14  | 0.35      | 0   | 1   |
| Using modern contraception         | 670 | 0.18  | 0.38      | 0   | 1   |
| Has visited family planning clinic | 671 | 0.35  | 0.48      | 0   | 1   |

NOTES: This table describes the characteristics of our sample. Columns (1)-(5) report, respectively, the number of observations, the mean, and the standard deviation, the minimum, and the maximum value for each variable. SC, ST, and OBC denote, respectively Scheduled Caste, Scheduled Tribe, and Other Backward Class.

Table 2: Influence of the MIL on DIL's number of peers, OLS

| <i>Co-residence with:</i>                               | (1)                  | (2)                 | (3)                 | (4)                 | (5)                 |
|---|----------------------|---------------------|---------------------|---------------------|---------------------|
| <b>A. Outcome: # close peers in the village</b>         |                      |                     |                     |                     |                     |
| Mother-in-law   | -0.120**<br>[0.056]  | -0.114*<br>[0.062]  | -0.117*<br>[0.063]  | -0.128**<br>[0.063] | -0.129**<br>[0.062] |
| Father-in-law   |                      | -0.0004<br>[0.056]  | -0.020<br>[0.057]   | -0.010<br>[0.057]   | -0.011<br>[0.056]   |
| # other women > age 18                                  |                      |                     | 0.072**<br>[0.028]  |                     |                     |
| # other 18-30 women                                     |                      |                     |                     | 0.079*<br>[0.041]   |                     |
| # other 18-30 married women                             |                      |                     |                     |                     | 0.129***<br>[0.045] |
| Control mean  | 0.606                | 0.606               | 0.606               | 0.606               | 0.606               |
| <b>B. Outcome: # close outside peers in the village</b> |                      |                     |                     |                     |                     |
| Mother-in-law   | -0.133***<br>[0.045] | -0.138**<br>[0.053] | -0.137**<br>[0.053] | -0.133**<br>[0.053] | -0.134**<br>[0.054] |
| Father-in-law   |                      | 0.003<br>[0.048]    | 0.01<br>[0.048]     | 0.007<br>[0.048]    | 0.005<br>[0.048]    |
| # other women > age 18                                  |                      |                     | -0.028<br>[0.018]   |                     |                     |
| # other 18-30 women                                     |                      |                     |                     | -0.032<br>[0.024]   |                     |
| # other 18-30 married women                             |                      |                     |                     |                     | -0.035<br>[0.027]   |
| Control mean  | 0.361                | 0.361               | 0.361               | 0.361               | 0.361               |
| N   | 671                  | 653                 | 653                 | 653                 | 653                 |

NOTES: This table reports coefficients from specification (1). Each column is a separate OLS regression. The outcome variables in panels A and B are the DIL's number of close peers in the same village and the number of close peers that are not household members, respectively. In all cases, we control for the DIL's age, years of schooling, Hindu dummy, amount of land owned by the household, and fixed effects for her caste category (SC-ST, OBC, or Other caste) and village. In addition, we gradually add an indicator for residence with the FIL, the number of other women in the HH that are above 18, in the 18-30 age group, and in the married 18-30 group, as controls across columns. Control mean refers to the dependent variable mean for women who do not live with their MIL. Robust standard errors are in brackets. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

**Table 3: Influence of the MIL on DIL's mobility, OLS regressions**

|                | Outcome: DIL is usually allowed to visit the following places alone: |                      |                      |                           |                      |                            |                        |
|----------------|--|----------------------|----------------------|---------------------------|----------------------|----------------------------|------------------------|
|                | Home of relatives/ friends   | Health facility      | Grocery store        | Short distance bus/ train | Market               | Outside village/ community | Wears ghunghat/ purdah |
|                | (1)  | (2)                  | (3)                  | (4)                       | (5)                  | (6)                        | (7)                    |
| Lives with MIL | -0.167***<br>[0.036]   | -0.134***<br>[0.033] | -0.157***<br>[0.034] | -0.043*<br>[0.026]        | -0.096***<br>[0.031] | -0.083**<br>[0.036]        | 0.064**<br>[0.028]     |
| N              | 671  | 671                  | 671                  | 671                       | 671                  | 671                        | 671                    |
| Control Mean   | 0.218  | 0.255                | 0.310                | 0.125                     | 0.329                | 0.296                      | 0.838                  |

NOTES: This table reports coefficients from specification (1). Each column is a separate regression. The outcome variables are indicators that equal one if the DIL is usually allowed to visit the respective places alone. In all cases, we control for the DIL's age, years of schooling, Hindu dummy, amount of land owned by the household, and fixed effects for her caste category (SC-ST, OBC, or Other caste) and village. Control mean refers to the dependent variable mean for women who do not live with their MIL. Robust standard errors are in brackets. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

**Table 4: Test for selection into living with MIL**

| Variables:                   | Live with MIL = 0 |        | Live with MIL = 1 |        | Difference |
|------------------------------|-------------------|--------|-------------------|--------|------------|
|                              | N                 | Mean   | N                 | Mean   | (2)-(4)    |
|                              | (1)               | (2)    | (3)               | (4)    | (5)        |
| Age                          | 216               | 26.38  | 455               | 25.336 | 1.043***   |
| Husband age                  | 211               | 31.938 | 433               | 32.875 | -0.937     |
| Marriage Duration            | 210               | 8.595  | 445               | 6.697  | 1.899***   |
| Years of schooling           | 216               | 8.102  | 455               | 10.207 | -2.105***  |
| Spousal schooling gap        | 211               | 0.275  | 432               | -0.155 | 0.430      |
| SC                           | 216               | 0.472  | 455               | 0.429  | 0.044      |
| ST                           | 216               | 0.014  | 455               | 0.033  | -0.019     |
| OBC                          | 216               | 0.454  | 455               | 0.431  | 0.023      |
| Hindu                        | 216               | 0.926  | 455               | 0.938  | -0.013     |
| Amount of land owned (acres) | 216               | 5.374  | 455               | 5.460  | -0.085     |
| Employed                     | 213               | 0.131  | 453               | 0.146  | -0.014     |
| No. of living sons           | 216               | 1.028  | 455               | 0.925  | 0.103      |

NOTES: This table compares the average characteristics of women who do not live with the MIL (columns (1)-(2)) and women who do (columns (3)-(4)). Column (5) reports the difference in the sample mean for the two groups. SC, ST, and OBC denote, respectively Scheduled Caste, Scheduled Tribe, and Other Backward Class. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

**Table 5: Influence of the MIL on DIL's mobility if FIL is co-resident, OLS regressions**

|              | Outcome: DIL is usually allowed to visit the following places alone: |  |                    |                      |                           |                      |                               |                           |
|--------------|--|--|--------------------|----------------------|---------------------------|----------------------|-------------------------------|---------------------------|
|              | # Close outside peers  | Home of relatives/<br>friends in village | Health facility    | Grocery store        | Short distance bus/ train | Market               | Outside village/<br>community | Wears ghunghat/<br>purdah |
|              | (1)  | (2)                                      | (3)                | (4)                  | (5)                       | (6)                  | (7)                           | (8)                       |
|              | Sample restriction: FIL co-resident                                  |  |                    |                      |                           |                      |                               |                           |
| MIL          | -0.234***<br>[0.084]   | -0.134***<br>[0.052]                     | -0.098*<br>[0.050] | -0.131***<br>[0.050] | -0.054<br>[0.042]         | -0.168***<br>[0.056] | -0.091*<br>[0.055]            | 0.020<br>[0.041]          |
| N            | 406  | 406                                      | 406                | 406                  | 406                       | 406                  | 406                           | 406                       |
| Control mean | 0.422  | 0.234                                    | 0.203              | 0.250                | 0.109                     | 0.312                | 0.436                         | 0.891                     |

NOTES: This table reports coefficients from specification (1). Each column is a separate regression. The outcome variables are indicators that equal one if the DIL is usually allowed to visit the respective places alone. In all cases, we control for the DIL's age, years of schooling, Hindu dummy, amount of land owned by the household, and fixed effects for her caste category (SC-ST, OBC, or Other caste) and village. Control mean refers to the dependent variable mean for women who do not live with their MIL. Robust standard errors are in brackets. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.





**Table 6: Heterogeneity in the influence of the MIL on DIL's number of peers, by MIL's fertility preferences, OLS regressions**

| A. Outcome: # close peers in the village         |                       |                    |   |   |  |  |
|--|-----------------------|--------------------|---|---|--|--|
|  | MIL disapproves of FP | MIL approves of FP | Ideal Kids <sup>MIL</sup> > Ideal Kids <sup>DIL</sup> | Ideal Kids <sup>MIL</sup> ≤ Ideal Kids <sup>DIL</sup> | Ideal Sons <sup>MIL</sup> > DIL's sons | Ideal Sons <sup>MIL</sup> ≤ DIL's sons |
|  | (1)                   | (2)                | (3)   | (4)   | (5)                                    | (6)                                    |
| Lives with MIL                                   | -0.160**<br>[0.074]   | -0.115<br>[0.090]  | -0.117*<br>[0.065]                                    | 0.0003<br>[0.154]                                     | -0.127**<br>[0.065]                    | 0.074<br>[0.145]                       |
| Control Mean                                     | 0.556                 | 0.691              | 0.572   | 0.744   | 0.573                                  | 0.733                                  |
| B. Outcome: # close outside peers in the village |                       |                    |   |   |  |  |
| Lives with MIL                                   | -0.149**<br>[0.060]   | -0.119<br>[0.073]  | -0.103**<br>[0.051]                                   | -0.169<br>[0.121]                                     | -0.098*<br>[0.050]                     | -0.164<br>[0.136]                      |
| Control Mean                                     | 0.348                 | 0.383              | 0.329   | 0.488   | 0.316                                  | 0.533                                  |
| N  | 320                   | 351                | 519   | 152   | 530                                    | 141                                    |

NOTES: This table reports coefficients from specification (1). Each column within a panel is a separate regression. The outcome variable is the number of close peers a woman has in her village in Panel A and the number of such peers outside the household in Panel B. Columns (1) and (2) split the sample by whether the MIL approves of using FP or not. Columns (3) and (4) compare the number of children the MIL would like the DIL to have (Ideal Kids<sup>MIL</sup>) and the DIL's ideal number of children (Ideal Kids<sup>DIL</sup>). Columns (5) and (6) compare the number of sons the MIL would like the DIL to have (Ideal Sons<sup>MIL</sup>) and the DIL's number of sons at the time of the survey (DIL's sons). In all cases, we control for the DIL's age, years of schooling, Hindu dummy, amount of land owned by the household, and fixed effects for her caste category (SC-ST, OBC, or Other caste) and village. Control mean refers to the dependent variable mean for women who do not live with their MIL. Robust standard errors are in brackets. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

**Table 7: The influence of peers on women's access and use of family planning, OLS regressions**

|                       | Has visited FP clinic | Uses modern method | Beliefs about FP use in village | Allowed to visit health facility with someone |
|-----------------------|-----------------------|--------------------|---------------------------------|---|
|                       | (1)                   | (2)                | (3)                             | (4)   |
| # close outside peers | 0.130***<br>[0.041]   | 0.067*<br>[0.035]  | 0.233*<br>[0.135]               | 0.024**<br>[0.010]                            |
| N                     | 671                   | 670                | 671                             | 671   |
| Control mean          | 0.303                 | 0.164              | 2.295                           | 0.971   |

NOTES: This table reports coefficients from specification (1). Each column is a separate regression. The key explanatory variable is a woman's number of close peers who live in her village but not in her household. The outcome variables are: an indicator for whether a woman has visited a health facility for reproductive health, fertility, or family planning services in column (1); an indicator for whether a woman is using a modern method of contraception at the time of survey in column (2); a categorical variable that takes values 0 to 6 with higher values indicating a woman's belief that more women in her village use family planning in column (3); and an indicator for whether a woman is usually allowed to visit a health facility with someone in column (4). In all cases, we control for the DIL's age, years of schooling, Hindu dummy, amount of land owned by the household, and fixed effects for her caste category (SC-ST, OBC, or Other caste) and village. Control mean refers to the dependent variable mean for women who do not have a close outside peer in their village. Robust standard errors are in brackets.\*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

**Table 8: First-stage results from 2SLS regressions**

| Outcome: No. of close outside peers in village |                                    |                                    |                                    |                                    |                                    |                                    |
|--|------------------------------------|------------------------------------|------------------------------------|------------------------------------|------------------------------------|------------------------------------|
|  | $Prop_{cv}$                        |                                    | $Prop_{cv}^{1830}$                 |                                    | $Prop_{cv}^{1830,married}$         |                                    |
|  | (1)                                | (2)                                | (3)                                | (4)                                | (5)                                | (6)                                |
| $Prop_{cv} * MIL_i$                            | -0.256<br>[0.066]***<br>(0.076)*** | -0.214<br>[0.068]***<br>(0.076)*** | -0.261<br>[0.066]***<br>(0.072)*** | -0.232<br>[0.066]***<br>(0.072)*** | -0.260<br>[0.069]***<br>(0.072)*** | -0.229<br>[0.068]***<br>(0.073)*** |
| $Prop_{cv}$                                    | 0.162<br>[0.094]*<br>(0.095)       |                                    | 0.134<br>[0.098]<br>(0.093)        |                                    | 0.130<br>[0.099]<br>(0.093)        |                                    |
| N  | 671                                | 671                                | 671                                | 671                                | 671                                | 671                                |
| First stage F-stat                             | 14.93                              | 10.05                              | 15.70                              | 12.51                              | 14.22                              | 11.35                              |
| $X_i$  |                                    | x                                  |                                    | x                                  |                                    | x                                  |
| Caste FE                                       |                                    | x                                  |                                    | x                                  |                                    | x                                  |
| Village FE                                     |                                    | x                                  |                                    | x                                  |                                    | x                                  |
| Caste x village FE                             |                                    | x                                  |                                    | x                                  |                                    | x                                  |

NOTES: This table reports coefficients from two versions of specification (2); in columns (1), (3), and (5), we only include  $Prop_{cv} * MIL_i$  and  $Prop_{cv}$  as explanatory variables, while the rest of the columns estimate the full version of specification (2). Each column is a separate regression. The outcome variable is a woman's number of close peers who live in her village but not in her household. Across columns, we use the three definitions of the peer-pool described in the text. Standard errors in brackets are clustered at the village level, while those in parentheses are not clustered. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

**Table 9: Second stage and reduced form results from 2SLS regressions**

|                        | Visited<br>FP clinic            | Uses modern<br>method        | Beliefs about FP<br>use in village | Allowed to visit health<br>facility with someone |
|------------------------|---------------------------------|------------------------------|------------------------------------|--|
|                        | (1)                             | (2)                          | (3)                                | (4)  |
| <b>A. Second stage</b> |                                 |                              |                                    |  |
| # close outside peers  | 0.664<br>[0.345]*<br>(0.323)**  | 0.111<br>[0.350]<br>(0.249)  | 2.607<br>[0.966]***<br>(1.367)*    | 0.103<br>[0.072]<br>(0.101)                      |
| <b>B. Reduced form</b> |                                 |                              |                                    |  |
| $Prop_{cv} * MIL_i$    | -0.152<br>[0.083]*<br>(0.069)** | -0.024<br>[0.082]<br>(0.059) | -0.596<br>[0.321]*<br>(0.286)**    | -0.024<br>[0.017]<br>(0.024)                     |
| N                      | 671                             | 670                          | 671                                | 671  |

NOTES: This table reports coefficients from specification (3) in Panel A and the reduced form estimates for our IV estimation in Panel B. Each coefficient is from a separate regression. The outcome variables are: an indicator for whether a woman has ever-visited a health facility for reproductive health, fertility, or family planning services in column (1); an indicator for whether a woman is using a modern method of contraception at the time of survey in column (2); a categorical variable that takes values 0 to 6 with higher values indicating a woman's belief that more women in her village use family planning in column (3); and an indicator for whether a woman is usually allowed to visit a health facility with someone in column (4). Standard errors in brackets are clustered at the village level, while those in parentheses are not clustered. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

**Table 10: Influence of the MIL on DIL's mobility, 2SLS regressions**

| Outcome: DIL is usually allowed to visit the following places alone: |  |                                   |                                   |                                 |                                   |                                  |                               |
|--|--|-----------------------------------|-----------------------------------|---------------------------------|-----------------------------------|----------------------------------|-------------------------------|
|  | Home of<br>relatives/<br>friends in<br>village | Health<br>facility                | Grocery<br>store                  | Short<br>distance<br>bus/ train | Market                            | Outside<br>village/<br>community | Wears<br>ghunghat/<br>purdah  |
|  | (1)  | (2)                               | (3)                               | (4)                             | (5)                               | (6)                              | (7)                           |
| <b>A. Second stage</b>   |  |                                   |                                   |                                 |                                   |                                  |                               |
| # close outside peers  | 0.302<br>[0.306]<br>(0.217)                    | 0.863<br>[0.400]**<br>(0.325)***  | 0.773<br>[0.315]**<br>(0.309)**   | 0.119<br>[0.228]<br>(0.175)     | 0.855<br>[0.349]**<br>(0.324)***  | 0.418<br>[0.291]<br>(0.270)      | -0.297<br>[0.159]*<br>(0.212) |
| <b>B. Reduced form</b>   |  |                                   |                                   |                                 |                                   |                                  |                               |
| $Prop_{cv} * MIL_i$  | -0.069<br>[0.066]<br>(0.048)                   | -0.197<br>[0.073]**<br>(0.052)*** | -0.177<br>[0.062]**<br>(0.054)*** | -0.027<br>[0.053]<br>(0.042)    | -0.196<br>[0.053]**<br>(0.057)*** | -0.096<br>[0.061]<br>(0.061)     | 0.068<br>[0.026]**<br>(0.047) |
| N  | 671  | 671                               | 671                               | 671                             | 671                               | 671                              | 671                           |

NOTES: This table reports coefficients from specification (3) in Panel A and the reduced form estimates for our IV estimation in Panel B. Each coefficient is from a separate regression. The outcome variables are indicators that equal one if the DIL is usually allowed to visit the respective places alone. Standard errors in brackets are clustered at the village level, while those in parentheses are not clustered. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

**Table 11: Placebo tests**

|                        | Firstborn is a son | Involved in land dispute | Mother attended school | Father attended school |
|------------------------|--------------------|--------------------------|------------------------|------------------------|
|                        | (1)                | (2)                      | (3)                    | (4)                    |
| <b>A. Second stage</b> |                    |                          |                        |                        |
| # close outside peers  | -0.204<br>[0.353]  | -0.038<br>[0.182]        | 0.320<br>[0.304]       | -0.489<br>[0.308]      |
| <b>B. Reduced form</b> |                    |                          |                        |                        |
| $Prop_{cv} * MIL_i$    | 0.047<br>[0.083]   | 0.009<br>[0.045]         | -0.073<br>[0.075]      | 0.112<br>[0.075]       |
| N                      | 451                | 671                      | 671                    | 671                    |

NOTES: This table reports coefficients from specification (3) in Panel A and the reduced form estimates for our IV estimation in Panel B. Each column is a separate regression. The outcome variables are indicators that equal one if the firstborn child of the woman is a son in column (1), if her household is involved in a land dispute in column (2), if her mother attended school in column (3), and if her father attended school in column (4). Standard errors in brackets are clustered at the village level. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.



**Table A.1: Heterogeneity in the influence of the MIL on DIL's number of peers, OLS**

|                | Outcome: # close outside peers in the village |                        |                           |                        |                      |                     |
|----------------|---|------------------------|---------------------------|------------------------|----------------------|---------------------|
|                | Marital duration $\leq 5$                     | Marital duration $> 5$ | Husband disapproves of FP | Husband approves of FP | Husband migrant      | Husband not migrant |
|                | (1)   | (2)                    | (3)                       | (4)                    | (5)                  | (6)                 |
| Lives with MIL | -0.187**<br>[0.084]                           | -0.108*<br>[0.059]     | -0.202<br>[0.171]         | -0.131***<br>[0.048]   | -0.221***<br>[0.066] | -0.082<br>[0.064]   |
| N              | 240   | 431                    | 70                        | 601                    | 341                  | 329                 |
| Control Mean   | 0.195   | 0.297                  | 0.257                     | 0.261                  | 0.238                | 0.286               |

NOTES: This table reports coefficients from specification (1). Each column is a separate regression. The outcome variable is the number of close peers a woman has in her village outside the household. Columns (1) and (2) split the sample by the woman's marital duration. Columns (3) and (4) compare women whose husbands approve or disapprove of family planning. Columns (5) and (6) compare women whose husbands have been away for more than a month in the last year. In all cases, we control for the DIL's age, years of schooling, Hindu dummy, amount of land owned by the household, and fixed effects for her caste category (SC-ST, OBC, or Other caste) and village. Control mean refers to the dependent variable mean for women who do not live with their MIL. Robust standard errors are in brackets. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

**Table A.2: Robustness checks**

|                        | Outcome: Visited FP clinic     |                      |                      |                      |
|------------------------|--------------------------------|----------------------|----------------------|----------------------|
|                        | (1)                            | (2)                  | (3)                  | (4)                  |
| <b>A. First stage</b>  | Outcome: # close outside peers |                      |                      |                      |
| $Prop_{cv} * MIL_i$    | -0.201***<br>[0.063]           | -0.214<br>[0.068]*** | -0.232<br>[0.066]*** | -0.228***<br>[0.072] |
| <b>B. Second stage</b> |                                |                      |                      |                      |
| # close outside peers  | 1.120***<br>[0.423]            | 0.652*<br>[0.372]    | 0.665*<br>[0.343]    | 0.659**<br>[0.331]   |
| <b>C. Reduced form</b> |                                |                      |                      |                      |
| $Prop_{cv} * MIL_i$    | -0.225*<br>[0.112]             | -0.140*<br>[0.082]   | -0.154*<br>[0.085]   | -0.150*<br>[0.084]   |
| N                      | 451                            | 671                  | 671                  | 627                  |
|                        | Outcome: Mobility score        |                      |                      |                      |
|                        | (1)                            | (2)                  | (3)                  | (4)                  |
| <b>A. First stage</b>  | Outcome: # close outside peers |                      |                      |                      |
| $Prop_{cv} * MIL_i$    | -0.256***<br>[0.080]           | -0.214***<br>[0.068] | -0.232***<br>[0.066] | -0.228***<br>[0.072] |
| <b>B. Second stage</b> |                                |                      |                      |                      |
| # close outside peers  | 2.562***<br>[0.858]            | 3.171***<br>[1.053]  | 2.595***<br>[0.944]  | 2.874***<br>[1.078]  |
| <b>C. Reduced form</b> |                                |                      |                      |                      |
| $Prop_{cv} * MIL_i$    | -0.657***<br>[0.120]           | -0.679***<br>[0.114] | -0.602***<br>[0.150] | -0.655***<br>[0.149] |
| N                      | 555                            | 671                  | 671                  | 627                  |

NOTES: This table reports coefficients from specifications (2) and (3) in Panels A and B, and the reduced form estimates for our IV estimation in Panel C. Each coefficient is from a separate regression. The outcome variable is an indicator for the woman having visited a health facility for reproductive health, fertility, or family planning services in Panel A. In Panel B, the outcome variable is the sum of the dummy outcome variables in columns (1)-(6) in Table 10, i.e., it is a categorical value that takes values 0 to 6. Standard errors in brackets are clustered at the village level. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .





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A photograph of a busy outdoor market in a developing country. People are walking through the market, some carrying baskets of goods. There are stalls with various items, including fresh produce like tomatoes and lemons. The scene is vibrant and captures the essence of daily life in a developing economy.

## HUMAN CAPITAL INITIATIVE

*The Human Capital Initiative (HCI) is a research initiative at Boston University's Global Development Policy Center. The GDP Center is a University wide center in partnership with the Frederick S. Pardee School for Global Studies. The Center's mission is to advance policy-oriented research for financial stability, human wellbeing, and environmental sustainability.*

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