Women, Violence and Work: Threat of Sexual Violence and Women's Decision to Work*

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Abstract

We investigate the extent to which the low workforce participation of women in India can be explained by growing instances of officially reported crimes against women. We employ a fixed-effects strategy using district-level panel data between 2004-2012. To address additional concerns of endogeneity, we exploit state-level regulations in alcohol sale and consumption and provide estimates from two different strategies - an instrumental variable approach and a border analysis. Our estimates suggest that for every additional sexual crime in a district, approximately 75 women are deterred from joining the workforce.

Keywords: Crime-against-women, Female Labor Supply, Instrumental Variable, Alcohol Regulation

JELcodes: E24, J08, J16, J18

Declarations of interest: none

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1 Introduction

India is an outlier when it comes to women's labor force participation. Over the past decades, the country experienced high growth rates, significant improvement in women's educational attainment, and a remarkable decline in fertility rate. Nevertheless, the female labor force participation rate (FLFPR) has remained relatively low compared to other emerging economies. The International Labor Organization (2019) places India at 179th among 185 countries for women's labor force participation.

Policymakers around the world have considered a broad range of policies to increase women's labor force participation rates. These include policies related to maternity benefits (Baker and Milligan, 2008), child care support (Cascio et al., 2015), tax incentives (Eissa and Liebman, 1996) and protection against discrimination at work (Neumark, 1993). While variants of most of these policies are followed globally, their relevance varies widely across countries. For instance, the need for greater child care support is likely to depend on the social context. Child care support might be a less responsive policy in societies where help from extended families is widely prevalent. On the other hand, there could be factors that are equally or more relevant to encourage women's workforce participation. In this paper, we investigate the role played by the threat of sexual violence on women's labor force participation, especially for work that involves traveling away from home. Based on our findings, we explore a new line of policy to improve female labor supply in countries with a high incidence of crime against women – reducing the implicit cost of traveling to work. While the significance of this line of policymaking may be particularly high in countries with a high incidence of crime against women and low female participation, the relevance of the question for all countries is undeniable.

Sexual violence against women is widely documented to be a significant deterrent to women's liberty to move freely, both in developed and developing nations. Past studies have provided survey-based evidence on how women modify their lifestyle choices to reduce the risk of violence. For example, Riger and Gordon (1981), in a study of a few cities in the US, find that women are much more likely to avoid going out at night than men. The gravity of sexual violence against women has been increasingly recognized at the international level, and United Nations now declares it as a major violation of women's rights. However, the incidence of such violence and the stigma borne by the victims of sexual violence vary widely. In India, several surveys report that women commonly experience sexual violence in public spaces. In a survey of adolescent girls in Delhi, 92% reported having experienced some form of sexual violence in public spaces in their lifetime (UN Women and ICRW, 2013). Another survey, conducted in relatively smaller cities, found that 95% of women feel unsafe using public transport, and a similarly high fraction of women reported feeling unsafe while waiting for public transport, in the marketplace, or on the roads (Kapoor, 2019). Other surveys report the perceived threat of sexual violence as one of the foremost reasons discouraging women from working. In their survey of non-working women in Delhi, Sudarshan and Bhattacharya (2009) find that safety concern is cited as the second most important reason for not working. The fear became particularly prominent after the Nirbhaya Delhi rape case of 2012, widely reported in domestic and international media. Nearly 82% of the 2,500 women surveyed in several Indian cities after the attack reported leaving the office earlier (Thoppil, 2013). These surveys suggest that the prevalence of sexual crimes may discourage women who are considering whether to work.

Extensive research exists on women's choice to participate in the labor force. However, very few have tried to link the threat of sexual violence to women's economic choices, particularly labor supply decisions. To our knowledge, Mukherjee et al. (2001), Chakraborty et al. (2018) and Siddique (2021) are the only papers to study the relationship between sexual violence and women's labor force participation.[1] However, both Mukherjee et al. (2001) and Chakraborty et al. (2018) only establish correlations. While the former finds a positive correlation in a Delhi-based survey, the latter uses cross-sectional data from the India Human Development survey to find a negative relationship. The discrepancy in findings could be driven by the non-causal approaches. Siddique (2021) is the closest to our work. She uses data from two rounds of the National Sample Survey between 2009 and 2012 and links it with political events data from the Global Database of Events, Language and Tone(GDELT) to study the effect of any physical or sexual violence against women on women's labor force participation in India. After eliminating district-specific factors and accounting for state-time effects, she finds a significant reduction in women's participation in areas with higher reported incidents of violence.

We analyze the impact of sexual crimes against women on women's labor force participation. We specifically focus on sexual violence since there is no apriori reason to believe that other forms of physical violence, like murder, would affect men's and women's choices differently. Our analysis rests on a fixed-effects model using district-level panel data from India stretching over almost ten years. We obtain employment information from four waves of the National Sample Survey conducted between 2004-05 and 2011-12. We combine this with official police records on district-level incidences of reported sexual crimes such as rape, molestation, and sexual harassment instead of media reports or self-reported perception measures. In comparison, the GDELT data used by Siddique (2021) aggregates information on violence related to political events from a few prominent English dailies. Given the vast linguistic diversity of India and the relatively limited reach of English print media across the wider population, police cases registered across India, which comprises both political and apolitical crimes, are more likely to be representative of crimes, and perceived threat, from all corners of India.[2]

However, as is true of all measures of reported crimes, print or perceived, registered crime data is also likely to suffer from measurement error problems due to large scale under-reporting (Iyer et al., 2012). Hence, we conduct additional analysis exploiting potential exogenous

[1] Borker (2017) studies how the threat of sexual violence affects the educational choices of women in Delhi. She finds that girls settle for lower-quality colleges in order to avoid sexual harassment while traveling to college.

[2] In one specification, Siddique (2021) controls for police reports of sexual crimes against women (CAW) corresponding to the two waves of NSS data in her analysis. However, she does not find any significant effect of reported crime on women's labor force participation. This could be because of the large under-reporting of sexual crimes biasing the estimates down. We address this issue in section 3.3.2.

variation in crimes against women coming from variation in alcohol regulation policies across India. First, we provide estimates from an instrumental variables approach that exploits state-level variation in the minimum legal alcohol drinking age. We argue that restriction on alcohol sale and consumption is unlikely to affect women's labor supply directly but closely relate to crimes against women (Luca et al., 2015). Second, we use a complete alcohol ban in the state of Gujarat to conduct a border analysis. This approach compares the interior districts of Gujarat with those sharing a common border with the neighboring states where there is no prohibition on alcohol sales.

We find a robust and statistically significant deterrent effect of sexual crimes on female workforce participation. An additional sexual crime reported per 1000 women in a district reduces the probability that a woman is employed outside her home by 1%. Roughly, these estimates imply that for every additional sexual crime in a district, approximately 75 women are deterred from joining the workforce.

Our paper contributes to the literature inspecting the declining trend in FLFPR in India. Past research has attributed the declining trend to various factors, both on the demand and supply side. Demand-side factors include household income effect (Himanshu, 2011; World Bank, 2010; Abraham, 2009) and rising demand for education from women (Goldin, 1994; Olsen and Mehta, 2006; Mammen and Paxson, 2008; Rangarajan et al., 2011; Klasen and Pieters, 2015). Lack of suitable employment opportunities for women has been cited as a supply constraint (Das and Desai, 2003). We add to this literature by estimating the extent to which the incidence of sexual violence against women explains women's low labor supply in India. Encouraging women's labor force participation by addressing longstanding social norms or ensuring an adequate job supply is challenging and requires more long-term policy interventions. Our findings raise the possibility of a more immediate policy intervention that could enable women to join the labor force. Further, policies directed at reducing crimes against women have first-order implications aside from improving women's labor force participation.

The rest of the paper is organized as follows: Section 2 describes the data sources and descriptive statistics, along with the spatial and chronological trends. Section 3 explains the estimation approach and summarizes the main findings. Section 4 concludes.

2 Data

2.1 Data Sources

We compile data from various sources for our analysis. First, we collect individual-level data on labor force participation and demographic particulars from four National Sample Surveys (NSS) on employment and unemployment conducted between 2004-2011: survey-years 2004 (round 61), 2007 (round 64), 2009 (round 66), and 2011 (round 68)[3]. Each round surveys more than 100,000 households across India and is representative at the national and state levels.

Next, we obtain data on reported rapes, molestation, and sexual harassment (Sections 376, 354, and 509 of the Indian penal code, respectively) from the 'Crimes in India' publications by the National Crime Record Bureau (NCRB). We match the NSS data with the previous year's reported sexual crimes aggregated at the district and state levels. We ignore the crimes registered with railway police and special crime branches because their jurisdictions span over multiple administrative districts. These divisions record less than 0.6% of the total sexual crimes in India. Between 2004-2011, several new administrative districts were created by splitting existing districts or combining fragments from two or more districts, so the district boundaries have changed over time. To maintain consistency in geographical regions over time, we club new districts with their old parent districts, thus obtaining 566 units after aggregation.[4]

In addition to the employment and crime records, we obtain district-level female population data from 2001 and 2011 decennial censuses to estimate district-level female population for survey years 2004 and 2007-2011, respectively. We use this data to calculate district-level female-per-capita sexual crimes, our primary regressor in the analysis. Finally, for our instrumental variable analysis, we collect state-specific alcohol regulations for 25 (out of 28) states and 6 (out of 7) union territories from the laws published by state excise departments (Table A2).

2.2 Estimation Sample and Summary Statistics

We focus on the NSS urban sample of women aged 21-64 years. Although the working-age population is defined as 15-64, we consider women above age 21 since they are likely to have completed college by then.[5],[6] Our outcome variable of interest is workforce participation, which we construct using individuals' self-reported principal activity statuses during the 365

[3]Survey years refer to the year in which the survey started. E.g., a survey conducted in 2004-05 is denoted by the year 2004.

[4]The Indian Penal Code (IPC) categorizes seven offenses as crimes against women: rape (Section 376 IPC), kidnapping and abduction (Section 363-373 IPC), dowry death (Section 302, 304B IPC), torture by husband and relatives (Section 498A IPC), molestation (Section 354 IPC), sexual harassment (Section 509 IPC), and importation of girls (Section 366-B IPC). We focus only on rapes, molestation, and sexual harassment because these crimes are frequently encountered at a workplace or during a commute. We exclude dowry death and torture by husband and relatives since they are domestic crimes and hence irrelevant to the analysis. In addition, we exclude kidnappings as they are not necessarily sexual crimes and importation of girls as they are largely unreported. However, we include kidnappings and importation of girls in a robustness analysis.

[5]OECD (2021), Working age population (indicator). doi: 10.1787/d339918b-en (Accessed on 25 March 2021)

[6]Since an overwhelming fraction of the workforce in rural regions is engaged in agriculture, working close to home, we focus on the urban sample in our primary analysis.

days preceding the survey date. Figure 1 summarizes the broad activity categories. The 'homemaker' category includes women who engage only in domestic duties and comprises about 70% of women across all survey years. The 'employed/ seeking work' category includes regular/casual wage employees working away from home and women who are not engaged in work but are available for work or making tangible efforts to seek work. This group comprises 12.0-15.9% of the sample. The 'self-employed' category includes women engaged as paid or non-paid workers in the household enterprises and comprises less than 10% of the sample in any given year. The 'others' category includes students, rentiers, pensioners, remittance recipients, physically disabled, etc., and comprises less than 6% of the sample. Our outcome variable takes value one for women who work as regular/casual wage employees away from home or are seeking (available for) work, and zero for homemakers. We exclude self-employed women since they work in household enterprises and are less likely to be exposed to crimes that occur while traveling to work or at the workplace. We also exclude the 'others' category from our analysis. The final sample includes 177,316 women from 140,048 unique households.

Our variable of primary interest is a woman's vulnerability to sexual crimes (i.e., reported rape, molestation, and sexual harassment), measured as the proportion of sexual crimes to the total population of women in the district.[7] While our primary focus is on urban women's labor force participation rates, we are restricted by the aggregated nature of the NCRB data to use the proportion of sexual crimes in the entire district. Although sexual crimes in the immediate neighborhood are likely to have a more direct influence on the perception of threat, sexual crimes in the entire district are also likely to affect the perception of threat in the urban regions, even if with reduced intensity.

Figure 2 plots the national trends in sexual crimes and women's LFP in our sample. Panel (a) shows that the rape cases reported in the country steadily increased by 48%, the molestation reports went up by 27%, and the overall complaints related to sexual offenses rose by 25%. Panel (b) shows that women's workforce participation declined over this period, from about 19% to 16% as reported in Table 1 Panel(b). The stagnancy in women's LFP is in sharp contrast to the steady improvement in educational attainment levels. The percentage of urban women with a graduate degree increased from 14% to 19%, and the percentage of illiterate women fell from 31% to 19%. One might argue that the reduction in workforce participation could merely be an artifact of the redirection of working-age women to higher education. Figure 3 shows that this was not the case, as women's LFP was stagnant across all age groups. If anything, the labor-force participation slightly increased in the education-seeking age group (20-30 years). Overall, these trends point towards worsening, or stagnating at best, sexual crimes and women's LFP between 2004-2011.

In Figure 4, we explore the cross-section variation in sexual crimes and women's LFP across the states of India. Panel (a) reports the state-wise incidence of sexual crimes during the calendar year 2010. Panel (b) reports the urban female workforce participation in NSS year 2011-12. A quick look reveals that states with high reported crimes against women (darker shades) tend to have low female workforce participation (lighter shades). Similarly, states

[7]We approximate the district-level population of women using census population estimates because NSS is not representative at the district level.

with low reported instances of crimes against women tend to have high female workforce participation. However, neither cross-sectional nor time-series correlations establish causality since there may be unobserved confounding differences across geographical regions and over time. In the empirical analysis, we, therefore, rely on fixed-effect models.

Table 1 reports the means (and standard deviations) of all the variables used in the analysis for our estimation sample.[8] We present the summary across all four sample years to examine the historical trends. Panel (a) shows that districts, on average, had around 14 sexual crimes, 42 thefts, and 7 murders per hundred thousand women. Note that while the total reports of sexual crimes increased considerably (Figure 2), the per-capita values are stable over the years since they account for the growth in the female population over this period. The district-level female-to-male child sex ratio in the 0–6 age group has improved over the years, and roughly 1% of girls got married before eighteen. Male unemployment rate and middle-school completion rate were, on average, 2% and 22% respectively. Panel (b) summarizes the personal and household characteristics from the NSS data. The average woman in our sample is 37 years of age, completed middle school, is 75% likely to be a Hindu, 45% likely to be from the general caste category, and belongs to a household with 5 members.

In the remainder of the paper, we empirically explore how much of the variation in female workforce participation can be attributed to sexual crimes.

3 Empirical Model and Results

In this section, we examine the association between the sexual-crime rate and female workforce participation. Under the cost-benefit framework of Chakraborty et al. (2018), a woman's participation can be seen as a rational choice wherein she works if the expected benefit from work exceeds the expected cost of work. Higher instances of crimes against women raise the likelihood of victimization and increase the psychological cost of work. Woman's labor force participation could also be an outcome of the household's decision-making. Hence in our empirical framework below, the extent of sexual violence could be thought of as shaping the perception of the entire household to which the woman belongs and the woman's labor supply as an outcome of household utility maximization.

3.1 Baseline Analysis

We begin by estimating the following baseline linear probability model incorporating lagged sexual-crime reports:

[8] See Table A3 for a summary of state-level characteristics.

$$W_{idt} = \beta_0 + C_{d,t-1}\beta_1 + \beta_2 X_{idt} + \delta_d + \delta_t + \delta_{dt} + \epsilon_{idt} \tag{1}$$

where W_{idt} is an indicator taking value one if individual i from district d participates in the workforce outside home as per survey-year t, and zero if she primarily engages in domestic duties. $C_{d,t-1}$ denotes the sexual-crime rate in district d in the calendar year $t-1$, which we calculate as the sum of reported rape ($R_{d,t-1}$), molestation ($M_{d,t-1}$), and sexual harassment ($H_{d,t-1}$) cases per thousand women in the district.

$$C_{d,t-1} = \frac{R_{d,t-1} + M_{d,t-1} + H_{d,t-1}}{F_{d,t-1}} \times 1000 \tag{2}$$

$F_{d,t-1}$ represents the district-level female population in the year $t-1$ as estimated from the closest decennial census data (census 2001 for survey-year 2004 and census 2011 for survey-years 2007-11). β_1 captures the effect of exposure to sexual crimes on the decision to participate in the workforce and is the parameter of interest. The lag in the sexual-crime rate allows us to address the potential reverse causality arising mechanically as workforce participation outside the home makes women vulnerable to crimes. X_{idt} represents individual-level characteristics (age and education status) and household-level characteristics (household size, and religious and caste affiliation) that affect an individual's employability or choice. We capture religion using an indicator that takes value one if the respondent follows Hinduism and zero for all other religious groups. Similarly, we record caste affiliation using indicators for socially disadvantaged SC, ST, and OBC groups that qualify for affirmative action schemes in India, treating General caste as the omitted category. δ_d represents district fixed effects that account for time-invariant unobserved differences across geographic regions that may be correlated with workforce participation as well as the incidence of crimes against women. Large districts with a high population, for instance, experience more incidents of sexual crimes as well as better employment opportunities for women. On the other hand, districts with conservative values may exhibit low female workforce participation and low reporting of sexual crimes. District fixed effects also help control for intrinsic differences in law enforcement across states. δ_t represents time fixed effects that allow for possible structural differences in the economy and the evolution of cultural values across time. For instance, reporting of crimes and women's workforce participation might have gone up over time across all states. Finally, δ_{dt} represents district-level linear time trends that control for unobserved district-level characteristics that vary linearly over time and are related to district-level trends in female workforce participation. For instance, India has experienced uneven growth in urbanization across regions, and a greater degree of urbanization is likely to increase women's workforce participation as well as crimes against women. δ_{dt} would capture the district-specific linear trends in urbanization.

We identify β_1 by exploiting the period-to-period variation in sexual crimes against women within a district, beyond the linear long-term district-level trend in crimes, and linking it to the variation in women's workforce participation rate within that district. Thus, β_1 is identified under the assumption that non-linear over-time changes in other district-level factors that affect women's workforce participation do not affect sexual crime rates. However, we cannot entirely rule out the possibility of such changes. The biggest concern is that of labor market changes. For instance, higher unemployment rates in the labor market in a certain period could drive up both female and male unemployment rates, and the latter could simultaneously raise sexual crimes against women. While lags in sexual crime reduce the possibility of simultaneous changes to some extent, we also explicitly control for male unemployment in our sensitivity analysis (see Section 3.3.1 for details).

Table 2 reports the estimates corresponding to equation 1 using our sample of urban women in the age group 21-64 years. Column (1) reports the unconditional bivariate relationship between crimes against women and women's decision to work. The positive relationship indicates that districts reporting high sexual crimes also have high rates of female workforce participation. In the absence of controls for unobserved differences between districts, it perhaps reflects higher reporting of crimes in districts with higher workforce participation of women.[9]

Column (2) includes district fixed effects, ensuring that comparisons identifying the effect of sexual crimes are only made within (and not across) districts. With the inclusion of district fixed effects, the estimate indicates that an additional sexual crime per thousand women in a district is associated with a 5.7 percentage point reduction in the probability of working away from home. The subsequent columns sequentially include additional controls. Column (3) adds year fixed effects, column (4) adds individual-specific controls (years of schooling and a quadratic in age), column (5) includes household-specific controls (religious and caste indicators), and column (6) accounts for district-level linear time trends. The coefficient for sexual crimes across columns (3)-(5) differs negligibly, suggesting that district fixed effects pick up most unobserved heterogeneity. The coefficients for other variables are also consistent with our expectations. For instance, the estimates for age indicate that work involvement increases with age at a decreasing rate. In addition, women belonging to the SC-ST groups are 11-14 percentage points more likely to be involved in the workforce than the general caste women. Besides, women's workforce participation is positively associated with the years of schooling and negatively associated with the household size in all the specifications.

The inclusion of linear district trends in column (6) strengthens the negative relationship between sexual crimes and workforce participation, implying that the linear trend captures time-varying district characteristics that increase both sexual crimes and women's workforce participation rates. The estimate in this full specification indicates that women are 15 percentage points less likely to work for one additional report of sexual crime per thousand women. Thus, at the mean crime rate ($\approx$0.13 crimes per thousand women) in the sample, a one percent increase in sexual crimes against women translates to a 0.14 percent drop in women's workforce participation rate in the 21-64 age group. To understand the practical implication of this estimate, we ran some back-of-the-envelope calculations. As per Census 2011, roughly 50 % of India's 586 million women belonged to this working-age category. This implies that for every additional crime in a district, roughly 75 women are deterred from

[9] We report standard errors clustered at the district-year level. Clustering standard errors at the district level provides similar results. Results available from authors upon request.

joining the workforce.[10]

3.2 Placebo Checks

While district fixed effects, linear time trends, and the individual and household level covariates reduce the possibility of correlated unobservables, we cannot rule out the possibility that non-linear time-varying district characteristics may drive the negative association between crime rate and women's employment. For instance, poor labor market conditions may push men and women out of the market as well as increase sexual crimes. In this section, we conduct placebo tests using men's employment and gender-neutral crimes to investigate this possibility. We report the results in Table 3.

As a first step, we estimate equation 1 using a gender-neutral crime instead of sexual crime. The rationale is that poor economic conditions influence all types of crimes (Cantor and Land, 1985) and also influence labor market conditions. Consequently, if the negative relationship in Table 2 is driven by poor labor market conditions, we should observe a similar pattern for gender-neutral crimes. Conversely, if the threat of sexual assault drives the pattern in women's labor force participation, we should not find a negative association between women's labor force participation and gender-neutral crimes. Note that our hypothesis that sexual crimes against women reduce women's workforce participation rests on the underlying notion that sexual crime increases the cost of traveling to work for women. However, gender-neutral crimes also increase the cost of traveling to work for both men and women. Even then, the cost of sexual crimes is likely to be much higher compared to that of gender-neutral crimes, especially in a society that attaches a high value to the chastity of women because sexual crimes have the additional component of *stigma cost* which gender-neutral crimes do not have (Chakraborty et al., 2018). Hence, we expect gender-neutral crimes to have a weaker (or no effect) on men's and women's workforce participation. Column (1) reports the results from regressing women's workforce participation on thefts. We choose theft because it does not have an associated stigma and hence qualifies as a gender-neutral crime.[11] The coefficient is close to zero implying negligible or no effect of gender-neutral crimes on women's employment.[12]

Second, we estimate equation 1 using sexual crimes in the future instead of the past. Since sexual crimes affect women's workforce participation in the future, we do not expect crime

[10] Note that one additional crime per thousand women implies a total of $\frac{x}{1000}$ crimes in the district, where x stands for the district level total female population. Our estimates indicate that this reduces the probability of working by 15 percentage points. This implies that a total of $(\frac{15 * x_{21-64}}{100})$ are deterred from joining the workforce, where x_{21-64} is the working-age population in the district. In other words, one additional crime deters $(\frac{15 * x_{21-64}}{100} * \frac{1000}{x}) = 150 * \frac{x_{21-64}}{x}$ women.

[11] The other possibility is to consider murder, which would normally qualify as a gender-neutral crime. However, a case of sexual assault that is followed by murder is recorded as murder under NCRB. Thus, the observed data on 'murder' is a combination of gender-neutral and sexual crimes.

[12] We find no effect of theft and murder on men's labor force participation rate either. For women, murder has a non-zero but insignificant coefficient.

rates to deter workforce participation in the past. On the other hand, the relationship may run in the opposite direction because higher participation of women in the workforce would increase crime in the future. Column (2) reports the results from regressing women's workforce participation on sexual crimes two years in the future. A positive significant coefficient on crime confirms our prior and implies that our baseline estimates are likely to be lower bounds of the actual effect of crime on women's decision to participate in the workforce.

Finally, we estimate equation 1 using the sample of urban men aged 20-64. The rationale is that an upturn or downturn in the labor market is likely to impact both men and women in their employment prospects. However, an increase in sexual crimes against women is unlikely to affect men's employment probability. Column (3) shows that, as expected, sexual crimes against women do not affect male labor force participation.

3.3 Robustness

The placebo results give us confidence in our baseline findings that higher sexual crimes deter women's participation in jobs away from home. In Tables 4 and 5, we conduct a series of further sensitivity checks to see if the results are robust to alternative empirical specifications, estimation sample, and variable definitions. Additionally, in Sections 3.3.2 and 3.3.3 we follow an Instrumental Variables approach and an analysis using bordering districts, respectively.

3.3.1 Sensitivity Checks

Table 4 reports regression outcomes from several modifications of equation 1. Column (1) reproduces the outcome from Table 2 (column (4)) for reference. Column (2) adds various time-varying district-level controls to account for changing economic and social conditions. Specifically, we include the male unemployment rate, the child sex ratio, the fraction of men who completed middle school, and the fraction of girls getting married before the minimum legal marriageable age. These measures are obtained by aggregating the NSS data. Column (3) accounts for district-level linear time trends in addition to the time-varying district characteristics in column (2). We find that the estimates, after inclusion of district-level linear trends, are similar to our main findings in Table 2.

The analyses in columns (2) and (3) are based on district-level aggregates constructed from the NSS data. However, aggregation based on NSS rounds is representative only for states and NSS regions and not at the district level. Hence, we report analogous state-level regressions in columns (4)-(6). Here, we measure the sexual-crime rate using a state-level analog of equation 2. Using state-level aggregates also allows us to normalize the sexual crimes in each year by female populations in the respective survey year, as estimated from the NSS data.[13] column (4) reports the outcomes from estimating the base specification at the state level. The coefficient indicates that additional crime per thousand women is associated with a 33.5 percentage point reduction in the probability of a woman working outside the home. This effect is robust to the inclusion of time-varying state-level characteristics in column (5). As in district-level estimates, the coefficient size increases after accounting for state-level linear time trends. The state-level coefficients are similar in spirit to the district-level coefficients, although they are much larger in magnitude. However, state-level effects do not simply aggregate over district-level effects. Instead, state-level estimates are likely to be different from district-level estimates because of (a) externality effects across districts and (b) differences in population growth rates across districts with different initial levels of female labor supply. The former means that increases in crime in one district could also discourage female labor supply in other districts of the state. While state-level estimates include this externality effect, district-level estimates do not. We explain (b) by comparing state-level and district-level estimates using a numerical example in Appendix table A6.

Table 5 further checks the sensitivity of our baseline estimates by altering the estimation sample and variable definitions. First, in our baseline analysis, we define a woman's work status using her principal activity, as recorded in the NSS. However, a sub-sample of women in our data are engaged in subsidiary activities even when their primary activity involves household duties. Column (1) modifies the definition of workforce participation status by taking into account a woman's subsidiary activities in addition to her principal activity. Here, W_{idt} takes value one for women who engaged in work outside the home for a minimum of 30 days in the previous year and zero if they only engaged in domestic duties. This definition is in contrast to the baseline, where W_{idt} is one only for women who engaged in work outside the home for the major period during the previous year. Second, our main specification only considers crimes that are explicitly sexual in nature. However, at least a subset of all *kidnappings* could also involve sexual crimes. In column (2), we include kidnapping and importation of girls to define total crimes against women in a district. [14] Third, column (3) uses the sexual crime rate lagged by two years, instead of one year as in our baseline analysis, to allow for the possibility that the change in decision to join or exit the labor force might be slow. Fourth, our baseline specification uses data from four waves of NSS between 2004-2012. Even though the NSS survey conducted in 1999 has district identifiers, many larger districts were broken after 2000 to create smaller districts. As a result, including 1999 would constrain us to use aggregates over new districts with fewer cross-district variability in crime against women. Hence we do not include the 1999-2000 wave in our main analysis. In column (4), we report the results by including the survey round of 1999-2000 in our analysis. Fifth, in column (5), we include state-level time fixed effects to account for socioeconomic

[13] Census data provide us actual population figures, but it comes at the cost of lower variation as the census is only conducted once every ten years. With NSS data, we obtain more variation, but the population is only approximate. This data limitation presents a non-trivial trade-off. We prefer census data to estimate the female population for district-level regressions because NSS is not representative at the district level. NSS aggregation is the obvious better choice for the state-level regressions since the surveys are representative at the state level and allow us to normalize the crime rate using female population estimates for the same year.

[14] Although murders could also be included due to the same reason, we do not observe murders separately for women.

changes that varied over time and specific to each state that could affect both crimes against women and women's labor market outcomes. For instance, change in governance could affect crime rates and the economy of a state in general. Overall, the estimates remain close to the baseline estimates across all specifications.

3.3.2 Instrumental Variable

In addition to unobserved heterogeneity, ordinary least squares estimates may be biased due to measurement error in sexual crimes. Reporting errors may occur due to two reasons. First, NCRB's crime reporting procedure may result in under-reporting because sexual assaults that result in a victim's death are recorded only as murder (i.e., principal offense) to avoid double counting. Since murders are gender-neutral crimes and not recorded separately for women, the information about the accompanying sexual offenses is lost. This compilation procedure most likely affects the reporting of rapes since sexual harassment and molestation are usually non-fatal. If the resulting under-reporting is random across districts, it would bias our OLS estimates downwards. The second possibility is that of a systematic measurement error. Women from conservative societies are less empowered and are less likely to report sexual crimes for fear of stigma. Accordingly, regions where women are more empowered are likely to have a relatively higher reporting probability than regions where women are less empowered (Iyer et al., 2012). We would then expect a positive relationship between WLFP and reported sexual crime because women are more likely to participate in work in regions where they are more empowered. If so, the observed negative relationship is once again likely to be an under-estimate of the true relationship.[15]

We employ two approaches to address this concern. First, we use state-level policies governing alcohol accessibility to instrument for the instances of crimes against women. Second, we use the discontinuity in alcohol consumption policy at the Gujarat state border to proxy for the variation in sexual crimes in a contiguous-border analysis. Alcohol access policies are unlikely to affect the female labor force participation directly but may affect sexual violence (Finney (2004), Brecklin and Ullman (2001)) through multiple channels. Alcohol consumption heightens emotional responses and aggressive behavior, making men more likely to commit sexual offenses in an inebriated state. At the same time, alcohol consumption impairs cognitive function and decision making, rendering intoxicated women more vulnerable to crimes (Abbey et al., 2001).

India is one of the few countries where alcohol-related laws are enforced at the state level, allowing us to exploit quasi-experimental variation across states. Some states completely prohibit the sale and consumption of alcohol. For instance, during our sample period, Gujarat, Mizoram, Nagaland, and Lakshadweep exercised a complete ban.[16] Among the states

[15] As explained in Section 3.2, the reverse causality from the participation of women in the workforce to vulnerability to sexual crimes will also lead to an underestimation of the true effect of sexual crime on women's workforce participation.

[16] Lakshadweep permits consumption only on the island of Bangaram, which is an uninhabited island but

that permit alcohol consumption, the minimum legal drinking age (MLDA) for alcohol varies between 18-25 years. For all states in our sample, but Tamil Nadu, the MLDA policy has not changed over time. Tamil Nadu changed the MLDA from 18 years to 21 years in 2004. Despite the weak law enforcement and non-trivial evasion, policies limiting alcohol access have been shown to reduce the likelihood of consumption as well as instances of crimes against women in India(Luca et al., 2015, 2019). Drinking age laws have also been linked to sexual crimes in other countries(Cook and Moore, 1993). As such, we use the differences in the drinking age laws across states and time to induce an exogenous variation in sexual crimes.

MLDA policies induce selective prohibition on specific age groups and create a variation in the fraction of men who are legally qualified to drink across states and over time. We use this variation to construct the instrumental variable. In principle, our measure of the fraction of men legally eligible to drink could vary across districts. However, the non-representativeness of the NSS data at the district level means that we can only construct representative measures of male and female populations at the state level. As shown in Table 4, the baseline results from the district-level analysis continue to hold in essence when using a state-level variation. Hence, in what follows, the instrumental variable analysis that we conduct corresponds to columns (3)-(6) of Table 4.

The data for this analysis comes from all states and union territories except Jammu & Kashmir, Manipur, Karnataka, and Dadra & Nagar Haveli. We exclude Jammu & Kashmir as it was a Muslim majority state with the lowest alcohol consumption. We exclude Manipur because the alcohol consumption policy was not uniform within the state during the sample period. Manipur imposed a blanket prohibition before 2002 but lifted it in half of its districts through Manipur Liquor Prohibition (amendment) bill (2002). Since our population estimates are not representative at the district level, we cannot measure the fraction of drinking-age men in Manipur. We exclude Karnataka because of the lack of clarity within the excise department regarding the minimum drinking purchase age. The legal drinking age is 21 as per Karnataka Excise Department (1967) and 18 as per the Karnataka Excise Act (1965). In practice, some bars serve those above age 18 while others refuse service to anyone below 21 (Report, 2016; Yadav, 2016).[17] Lastly, we skip Dadra & Nagar Haveli as we were unable to document its legal drinking age during the sample period.

We estimate the following equations using two-stage least squares.

$$\begin{aligned} W_{ist} &= \alpha_0 + C_{s,t-1}\alpha_1 + X_{st}\alpha_2 + \delta_s + \delta_t + \delta_{st} + \varepsilon_{ist} \\ C_{s,t-1} &= \gamma_0 + \gamma_1 z_{s,t-1} + X_{st}\gamma_2 + \theta_s + \theta_t + \theta_{st} + \omega_{st} \end{aligned} \tag{3}$$

where W_{ist} is an indicator taking value one if individual i from state s participates in the workforce outside home in the survey-year t and zero otherwise. $C_{s,t-1}$ denotes the sexual crime rate in the state s in the calendar year $t-1$, calculated as the sum of reported rape

has a bar.

[17] Appendix table A4 provides the IV estimates including Karnataka in the sample, assuming MLDA to be 18 according to the available documentation in Karnataka Excise Act (1965).

($R_{s,t-1}$), molestation ($M_{s,t-1}$), and sexual harassment ($H_{s,t-1}$) normalized by the state-level female population ($F_{s,t}$) as follows:

$$C_{s,t-1} = \frac{R_{s,t-1} + M_{s,t-1} + H_{s,t-1}}{F_{s,t}} \times 1000$$

X_{st} represents time-varying state-level controls (male literacy, child sex-ratio, and fraction of girls getting married before the minimum legal marriageable-age), δ_s represents the state fixed effects, δ_t represents time fixed effects, and δ_{st} represents state-level linear time trends. $z_{s,t-1}$ denotes the excluded instrument, defined as the fraction of men within age-group 18-25 who are legally qualified to drink. Specifically, let M_{st} denote the total male population in the age group 18-25 and $MLDA_{st}$ denote the minimum legal drinking age in the state s during the survey-year t. Then,[18]

$$z_{s,t-1} = \frac{\sum_{i=1}^{M_{s,t-1}} \mathbf{I}(Age_i > MLDA_{s,t-1})}{M_{s,t-1}} \times 1000$$

The instrument $z_{s,t-1}$ varies at the state-time level in the sample because of three factors: (i) MLDA policies vary across states, (ii) demographic composition of the male population differs across states and time, and (iii) the state of Tamil Nadu changed its MLDA policy during the sample period adding a time-variation. In using $z_{s,t-1}$ to instrument for sexual crime rate $C_{s,t-1}$, we assume that state policies governing the minimum legal drinking age and/or the distribution of men in the age-group 18-25 in a state do not directly affect women's employment outcomes, after controlling for state and time fixed effects and state-specific linear time trends. We additionally account for time-varying socioeconomic factors at the state level in our estimation.

Figure 5 explores the cross-section variation in alcohol-access laws and the drinking-age male population across states in India. Panel (a) shows the state-wise minimum legal drinking age across states in the year 2011. Using the information on MLDA and age distribution of men, Panel (b) depicts the state-wise variation in our instrumental variable, the fraction of men above the legal drinking age in the 18-25 age group, in 2011. Comparison of Figure 4 Panel (a) and Figure 5 Panel (d) shows that the states with a higher male drinking age population also witness higher instances of sexual crimes on average.

Tables 6 and 7 report the IV estimates from equation 3 and the corresponding first-stage estimates, respectively. For comparison, we present the OLS and IV estimates of each specification.[19] Columns (1) and (2) control for state and year fixed effects. The F-statistic from the first stage corresponding to the specification in column (1) is 57.3, indicating that the

[18] We use total male population in the 18-25 age group in state s time t, M_{st}, estimated from the NSS survey year t, as a proxy for total male population in the 18-25 age group in state s time $t-1$, $M_{s,t-1}$.

[19] Since the first stage predicts crime at the state-time level based on variations in the instrument at the state-time level, we do not include the household and individual level characteristics from Table 2 in the IV estimation.

IV is strongly correlated with the crimes against women. Columns (3) and (4) additionally control for state-level socio-cultural factors – sex ratio in the 0-5 age group and the fraction of girls married before the legal marriageable age. One concern with using men eligible for alcohol consumption as an instrumental variable for sexual crimes is that it could be correlated with the male unemployment rate, which affects female employment rates. Therefore, we also control for the male unemployment rate in columns (3) and (4).[20] Columns (5) and (6) additionally control for domestic crime against women. These columns address the concern that greater access to alcohol among men might affect female employment decisions not only through sexual crimes away from home but also through domestic crimes against women. Finally, columns (7) and (8) additionally include state-level linear time trends. In each case, the IV estimates are not very different from the corresponding OLS estimates. Moreover, the first-stage estimates indicate that the IV is strongly correlated with crimes against women. The IV estimate in column (8) implies a 4.2 percent fall in the probability of women working away from home for an additional sexual crime per thousand women in a state. Overall, the results uphold our baseline findings that crimes against women act as a significant deterrent for women's workforce participation.

3.3.3 Contiguous Border Analysis

The instrumental variable estimates lend further support to our baseline findings. However, the data limitations restrict us to estimates based on state-level variations. Hence, in an alternative approach, we use alcohol policy discontinuity at the Gujarat border to proxy for district-level variation in sexual crimes.

Our estimation approach relies on the variation in potential ease of obtaining alcohol within Gujarat. Although Gujarat has prohibited the manufacture, storage, sale, and consumption of alcohol in the entire state since the 1960s, the intensity of the ban is likely to vary within the state due to the cross-state differences in alcohol laws at the porous Gujarat border. Since people residing in proximity to the non-ban states can easily buy alcohol outside of Gujarat, they are more likely to consume alcohol than people in districts located further away in Gujarat's interior. We use this variation in the potential ease of obtaining alcohol within Gujarat to conduct a contiguous-border analysis and compare the female labor-force participation between districts of Gujarat that share a border among themselves but differ in alcohol accessibility.

We begin by matching neighboring districts in the exterior and interior of Gujarat to form contiguous-border district pairs. Figure 6 presents the district map of Gujarat (as in the year 2000) to illustrate this process. The term 'exterior districts' describes the districts of Gujarat that share a border with a neighboring state where alcohol sales and consumption are legal. All remaining districts count as 'interior districts.' A contiguous-border district pair is a combination of an exterior and an interior district that share a common border. Note that an exterior (interior) district that shares a border with p distinct interior (exterior)

[20] We get similar results when we control for working-age men instead of male unemployment.

districts appears in p contiguous-border district pairs. The district Bharuch, for instance, appears in three pairs: (1) Bharuch-Vadodara, (2) Bharuch-Narmada, and (3) Bharuch-Surat. Moreover, exterior (interior) districts that do not share a border with any interior (exterior) districts do not appear in any pair. Overall, we use data from thirteen districts that form twelve contiguous-border pairs.

In the estimation, we take a reduced-form approach and compare the female labor force participation in the exterior and the interior districts within contiguous-border pairs[21]. Comparing adjacent districts within Gujarat allows us to eliminate the time-invariant as well as time-varying state-level confounders that potentially affect both sexual crimes and women's workforce participation. Our implicit first stage is that the districts of Gujarat close to neighboring states would be more susceptible to sexual crimes when compared to districts in the interior of Gujarat due to variation in access to alcohol.

Our estimation equation is:

$$W_{idpt} = \lambda_0 + E_{dp}\lambda_1 + X_{idt}\lambda_2 + \eta_t + \eta_p + \nu_{idpt} \tag{4}$$

where p indexes adjacent district pairs and W_{idpt} is an indicator for workforce participation. E_{dp} is an indicator taking value one if district d from contiguous pair p is an exterior district and zero otherwise. X_{idt} represents the individual, household and district-level controls, η_t denotes year fixed effects, and η_p denotes contiguous district-pair fixed effects. The inclusion of η_p ensures that the comparisons are made within local economic areas that are adjacent and hence similar, except for the difference in potential alcohol accessibility. The identifying assumption is that the location of a district, interior or exterior, is uncorrelated with the other residual factors affecting workforce participation. Since alcohol-induced crimes are likely to be higher in Gujarat's exterior districts, we expect these districts to have lower workforce participation than the interior districts.

Table 8 presents results from the reduced form contiguous pair analysis. Column (1) compares the female workforce participation in the contiguous border districts without any controls. The results align with our expectations, and we observe a lower workforce participation rate in the exterior districts. In particular, column (1) indicates that women in the exterior districts are 4.1 percent point (or 29.4%) less likely to work outside homes than those in the interior districts. The estimates are similar when we sequentially include individual/household controls and district-level controls in columns (2) and (3).

[21]The variation in access to alcohol comes from very few districts, making it difficult to conduct an instrumental variation estimation.

3.4 Heterogeneity Analysis

We find that most of the district-level estimates in our sensitivity analyses are close to the full specification (Column 6 of Table 2) in the baseline model. Hence, we choose it as our preferred average estimate of the effect of sexual crimes on women's workforce participation rate. At the same time, the marginal effect of sexual crimes may vary systematically with various characteristics. Women from conservative societies, for instance, may require a more considerable reduction in sexual crimes to join the workforce, everything else remaining the same. We investigate such heterogeneity by estimating the following equation:

$$W_{idt} = \phi_0 + \phi_1 G_{idt} \times C_{d,t-1} + \phi_2 G_{idt} + \phi_3 C_{d,t-1} + \phi_4 X_{idt} + \delta_d + \delta_t + \delta_{dt} + \epsilon_{idt}, \tag{5}$$

where G_{idt} is an indicator taking value one for individuals belonging to group G and zero otherwise. A positive and statistically significant coefficient on G indicates that in the absence of sexual crimes, women from group G are more likely to work outside homes than women in the base category. Moreover, a negative (positive) and significant coefficient on the interaction term indicates that the relationship between violence and workforce participation is stronger (weaker) for women from the group G as compared to others.

Figure 7 plots the predicted probability of workforce participation obtained from estimating equation 5 for different sections of women at various levels of the sexual-crime rate. The slope of the predicted-probability curve gives the marginal effect of the sexual crimes. Appendix Table A5 reports the detailed regression outcomes.

Panel (a) examines whether urban and rural women respond to sexual crimes differently. Figure 7 shows that in contrast to urban women, rural women are more likely to participate in the workforce at all values of the district level sexual crime rate. Additionally, in contrast to the large negative effect on urban women, we obtain a trivial and statistically insignificant effect of sexual crimes on rural women. Several factors can explain this. Rural women are more likely to be driven into the workforce by necessity than opportunity and may be compelled to overcome their fear of crimes. Moreover, 75% of the rural women in the NSS sample are employed in the primary sector (mostly agricultural) jobs, as opposed to 15% urban women. Agricultural jobs require women to work near their homes, so the probability of victimization while commuting is low.

Panel (b) shows the responsiveness of women to sexual crimes based on their educational attainment. Apriori, the effect is ambiguous. On the one hand, a higher education level indicates a higher opportunity cost of not working if returns to education are positive. On the other hand, high educational attainment reflects high socioeconomic status and low marginal benefit of employment. Figure 7 shows that at each level of crime rate, women with more than ten years of schooling are significantly more likely to be engaged in the labor force. However, the marginal effect of sexual crimes between these groups is statistically indistinguishable, as indicated by the slopes of the two lines.

Panel (c) examines heterogeneity in response to sexual crimes by religion. The inhibitory effect of sexual crimes may vary for women with different cultural backgrounds depending on the value that their community places on chastity. Since religion forms an important part of cultural identity, we explore the differential effect of sexual crimes by religion. Figure 7 indicates that at lower levels of crime, both sections of women are equally likely to participate in the workforce. However, the deterrence effect of higher crimes is much higher for Muslims compared to Hindus.

Panel (d) examines whether women of different age groups respond differently to the incidence of sexual crimes. The relative vulnerability to sexual crimes is likely to be higher for younger women. Historically, around 40% of rape victims in India are in the age group 18-30 while less than 15% have been older than 30 years. We examine this possibility by dividing our sample into two age groups: 21-30 and 30 above. Figure 7 shows that both sections of women respond negatively to higher crime rates. The interaction term reported in Table A5 is negative but statistically insignificant, indicating no significant difference in the deterring effect among the two age groups.

Overall, we do not find evidence for any notable heterogeneity in women's response to sexual crimes, barring religious differences. Women across regions, age groups, and education levels are likely to be significantly deterred from joining the labor force when the sexual crimes against women go up.

4 Conclusion

This paper is motivated by two alarming trends concerning women's vulnerability and (lack of) empowerment in India – a widespread and increasing trend in sexual crimes against women and a low and decreasing rate of women's workforce participation. We estimate the extent to which low labor force participation of women in India can be explained by high rates of sexual crimes against women. We find a robust negative and significant relationship between crimes against women and their participation in jobs away from home. Our preferred specification shows that a one percent increase in crime against women in a district reduces the expected probability of working by 0.14 percentage on average, which translates into a withdrawal of roughly 75 women from the workforce for every additional sexual crime committed in a district.

The inhibitory effect is more substantial for women in urban and Muslim households. To the extent that the reporting of crimes suffers from measurement error, we expect this estimate to be a lower bound of the absolute effect of crimes on female workforce participation. Our results hold up to a series of falsification exercises, sensitivity checks, and instrumental variable analysis that uses variations in alcohol purchase policies. Overall, our results are consistent with the hypothesis that the fear of sexual crimes compels women to quit the workforce.

Our evidence underlines the importance of accounting for the high crimes against women while designing policies to increase women's labor force participation. One way to understand the importance of addressing crimes against women to increase women's labor force participation is to compare it with other well-established causes of women's withdrawal from the labor force and policies adopted to prevent such instances. The existing literature underscores childbearing as the most important factor preventing women from participating in the labor force. In line with this understanding, an overwhelming thrust in policies geared towards encouraging female labor force participation has been on introducing and enforcing maternity and childcare benefits across the world. While paid parental leaves and facilitating childcare are likely to reduce the cost of working and encourage women to join the labor force in many countries, it is unlikely to be a one-size-fits-all policy. In India and other countries with higher crimes against women, reducing the cost of working also involves safer travel to work. To understand the relative importance of crimes against women vis-a-vis childbearing as potential causes preventing women from joining the labor force, we consider the estimates in Bloom et al. (2009). To our knowledge, Bloom et al. (2009) is the only study that provides a linear estimate of the effect of an additional child on female labor supply across 97 countries, including India. In the absence of any study providing estimates on motherhood penalty specific to India, Bloom et al. (2009) is the closest comparison to our study. They identify the effect of fertility on female labor force participation using variation in abortion legislation across these countries as an instrument for fertility. Their estimates imply a reduction in labor supply of 13.4% (or 7.5 percentage points) for each additional child born.[22] Our estimates in this paper indicate a comparable decline in women's labor supply, of about 9.3%, for each additional crime per ten thousand women, which is roughly the average rate of crime against women in our sample.

To sum up, the penalty of an additional crime per thousand women is close to the motherhood penalty in terms of labor loss, which is quite remarkable when considering that addressing crime against women is an important policy intervention in its own right. The economic benefits in terms of potential increases in women's labor supply, which we estimate in this paper, are over and above the ethical and social imperatives that primarily drive policies to reduce crimes against women.

[22] These estimates are obtained using the numbers from Table 8 of Bloom et al. (2009).

References

Abbey, A., Zawacki, T., Buck, P. O., Clinton, A. M., and McAuslan, P. (2001). Alcohol and sexual assault. *Alcohol Research & Health*, 25(1):43–51.

Abraham, V. (2009). Employment growth in rural India: Distress driven? *Economic and Political Weekly*, 44(16):97–104.

Baker, M. and Milligan, K. (2008). How does job-protected maternity leave affect mothers' employment? *Journal of Labor Economics*, 26(4):655–691.

Bloom, D. E., Canning, D., Fink, G., and Finlay, J. E. (2009). Fertility, female labor force participation, and the demographic dividend. *Journal of Economic growth*, 14(2):79–101.

Borker, G. (2017). Safety first: Perceived risk of street harassment and educational choices of women. *Job Market Paper, Department of Economics, Brown University*, pages 12–45.

Brecklin, L. R. and Ullman, S. E. (2001). The role of offender alcohol use in rape attacks: An analysis of National Crime Victimization Survey data. *Journal of Interpersonal Violence*, 16(1):3–21.

Cantor, D. and Land, K. C. (1985). Unemployment and crime rates in the post-world war ii United States: A theoretical and empirical analysis. *American Sociological Review*, pages 317–332.

Cascio, E. U., Haider, S. J., and Nielsen, H. S. (2015). The effectiveness of policies that promote labor force participation of women with children: A collection of national studies. *Labour Economics*, pages 64–71.

Chakraborty, T., Mukherjee, A., Rachapalli, S. R., and Saha, S. (2018). Stigma of sexual violence and women's decision to work. *World Development*, 103:226–238.

Cook, P. J. and Moore, M. J. (1993). Violence reduction through restrictions on alcohol availability. *Alcohol Research*, 17(2):151.

Das, M. B. and Desai, S. (2003). Why are educated women less likely to be lmployed in India? Testing competing hypotheses. *Social Protection Discussion Paper Series, No. 313. Washington, D.C.: World Bank.*, 46(32).

Eissa, N. and Liebman, J. B. (1996). Labor supply response to the earned income tax credit. *The Quarterly Journal of Economics*, 111(2):605–637.

Finney, A. (2004). *Alcohol and sexual violence: Key findings from the research.* Home Office London.

Goldin, C. (1994). The U-shaped female labor force function in economic development and economic history. *NBER Working Paper Series, No. 4707.*

Himanshu (2011). Employment trends in India: A re-examination. *Economic and Political Weekly*, 46(37):43–59.

Iyer, L., Mani, A., Mishra, P., , and Topalova, P. (2012). The power of political voice: Women's political representation and crime in India. *Applied Economics*, 4(4):165–93.

Kapoor, A. (2019). Women and mobility: A case study of Bhopal, Gwalior and Jodhpur.

Klasen, S. and Pieters, J. (2015). What explains the stagnation of female labor force participation in urban india? *The World Bank Economic Review*, 29(3):449–478.

Luca, D. L., Owens, E., and Sharma, G. (2015). Can alcohol prohibition reduce violence against women? *American Economic Review*, 105(5):625–629.

Luca, D. L., Owens, E., and Sharma, G. (2019). The effectiveness and effects of alcohol regulation: Evidence from India. *IZA Journal of Development and Migration*, 9(1):1–26.

Mammen, K. and Paxson, C. (2008). Women's work and economic development. *The Journal of Economic Perspectives*, 14(4):141–164.

Mukherjee, C., Rustagi, P., and Krishnaji, N. (2001). Crimes against women in India: Analysis of official statistics. *Economic and Political Weekly*, pages 4070–4080.

Neumark, D. (1993). Sex discrimination and women's labor market interruptions. *National Bureau of Economic Research*.

Olsen, W. and Mehta, S. (2006). Female labour participation in rural and urban India: Does housewives' work count? *Radical Statistics*, 93:57.

Rangarajan, C., Iyer, P., and Kaul, S. (2011). Where is the missing labor force. *Economic and Political Weekly*, 46(39):68–72.

Report (2016). Is legal age to drink in Karnataka 18 or 21? *The Hindu*.

Riger, S. and Gordon, M. T. (1981). The fear of rape: A study in social control. *Journal of Social Issues*, 37(4):71–92.

Siddique, Z. (2021). Media reported violence and female labor supply. *Economic Development and Cultural Change*.

Sudarshan, R. M. and Bhattacharya, S. (2009). Through the magnifying glass: Women's work and labour force participation in urban Delhi. *Economic and Political Weekly*, 44(48):59–66.

Thoppil, D. A. (2013). After rape, women employees scared to work late. *India Real Time - Wall Street Journal*.

UN Women and ICRW (2013). Unsafe: An epidemic of sexual violence in Delhi's public spaces: Baseline findings from the Safe Cities Delhi Programme. *UN Women*.

World Bank (2010). *India's employment challenge: Creating jobs, helping workers*. Oxford University Press.

Yadav, U. (2016). No drinking age bar at Bengaluru pubs! *The Economic Times*.

Table 1: Summary statistics across different time periods

District Characteristics	2003	2006	2008	2010	Total
Sexual Crimes (per 1000 women)	0.14	0.12	0.14	0.14	0.13
	(0.12)	(0.10)	(0.11)	(0.12)	(0.11)
Thefts (per 1000 women)	0.42	0.40	0.46	0.46	0.43
	(0.55)	(0.49)	(0.57)	(0.60)	(0.56)
Murders (per 1000 women)	0.07	0.06	0.06	0.06	0.06
	(0.05)	(0.04)	(0.04)	(0.04)	(0.04)
Child Sex Ratio (F/M)	0.98	0.95	1.00	1.08	1.00
	(0.38)	(0.32)	(0.54)	(1.63)	(0.83)
Girl-Child Marriage Ratio	0.01	0.01	0.00	0.00	0.01
	(0.02)	(0.02)	(0.02)	(0.01)	(0.02)
Male Unemployment Rate	0.02	0.02	0.02	0.02	0.02
	(0.02)	(0.03)	(0.03)	(0.03)	(0.03)
Male Middle-school Completion Rate	0.18	0.20	0.24	0.26	0.21
	(0.08)	(0.09)	(0.10)	(0.10)	(0.10)
Observations	561	563	563	566	2731
Individual/ HH Characteristics	2004-05	2007-08	2009-10	2011-12	Total
Workforce participation	0.19	0.15	0.16	0.16	0.16
	(0.39)	(0.36)	(0.36)	(0.37)	(0.37)
Age	37.19	38.26	37.86	38.11	37.64
	(11.01)	(11.47)	(10.97)	(11.06)	(11.08)
Schooling	6.26	7.07	7.27	7.58	6.87
	(5.70)	(5.79)	(5.79)	(5.83)	(5.76)
Household size	5.55	5.26	5.22	5.13	5.37
	(2.76)	(2.67)	(2.61)	(2.52)	(2.70)
muslim	0.15	0.15	0.16	0.16	0.15
	(0.36)	(0.36)	(0.36)	(0.37)	(0.36)
Scheduled tribe	0.07	0.08	0.07	0.08	0.07
	(0.25)	(0.26)	(0.25)	(0.26)	(0.25)
Scheduled caste	0.14	0.12	0.13	0.13	0.13
	(0.35)	(0.33)	(0.34)	(0.34)	(0.34)
OBC	0.35	0.33	0.36	0.38	0.34
	(0.48)	(0.47)	(0.48)	(0.49)	(0.47)
Observations	45207	47719	42030	42360	225571

Source: NCRB(Panel 1) and NSS(Panel 2) multiple rounds, Own calculations
Notes: Upper panel reports the mean and standard deviation (in parenthesis) for different crimes in aggregated districts. Lower panel reports mean and standard deviation (in parenthesis) of individual and household characteristics of urban women in age-group 21-64. For a survey round beginning in year t, the table summarizes the crimes in calendar year $t-1$ (see table A1 for details).

Table 2: Crime against women and female workforce participation: Baseline

VARIABLES	(1) None	(2) + District FE	(3) + Time FE	(4) + Individual	(5) + Household	(6) + Dist Trend
Crimes	0.093***	-0.057**	-0.063**	-0.060**	-0.064**	-0.148***
	(0.030)	(0.023)	(0.027)	(0.026)	(0.026)	(0.039)
Age				0.005***	0.004***	0.004***
				(0.001)	(0.001)	(0.001)
Age Squared				-0.000***	-0.000***	-0.000***
				(0.000)	(0.000)	(0.000)
Schooling				0.005***	0.006***	0.006***
				(0.000)	(0.000)	(0.000)
Muslim = 1					-0.043***	-0.044***
					(0.005)	(0.005)
Scheduled Tribe = 1					0.141***	0.141***
					(0.012)	(0.012)
Scheduled Caste = 1					0.103***	0.104***
					(0.006)	(0.006)
OBC = 1					0.013***	0.012***
					(0.004)	(0.004)
HH Size					-0.012***	-0.012***
					(0.001)	(0.001)
HH Monthly Exp					-0.000	-0.000
					(0.000)	(0.000)
Constant	0.145***	0.167***	0.168***	0.070***	0.124***	0.136***
	(0.005)	(0.004)	(0.004)	(0.022)	(0.023)	(0.023)
Observations	177,316	177,316	177,316	177,316	177,316	177,316
R-squared	0.001	0.045	0.046	0.057	0.078	0.085
District FE	No	Yes	Yes	Yes	Yes	Yes
Time FE	No	No	Yes	Yes	Yes	Yes
District Linear Trend	No	No	No	No	No	Yes

Source: NSS and NCRB multiple rounds, own calculations
Notes: Linear probability models. The sample consists of urban women in the age group 21-64. All regressions include NSS survey weights. Robust standard errors presented in parentheses are clustered by district and year. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 3: Crime against women and female workforce participation: Placebo

VARIABLES	(1) Theft	(2) 2-yr lead	(3) Males
Crimes	-0.003	0.179**	-0.002
	(0.012)	(0.085)	(0.010)
Age	0.004***	0.004***	0.004***
	(0.001)	(0.001)	(0.000)
Age Squared	-0.000***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)
Schooling	0.006***	0.006***	0.001***
	(0.000)	(0.001)	(0.000)
Muslim = 1	-0.044***	-0.043***	0.000
	(0.005)	(0.006)	(0.002)
Scheduled Tribe = 1	0.141***	0.157***	0.003
	(0.012)	(0.016)	(0.003)
Scheduled Caste = 1	0.103***	0.110***	0.004***
	(0.006)	(0.007)	(0.001)
OBC = 1	0.012***	0.017***	0.003***
	(0.004)	(0.005)	(0.001)
HH Size	-0.012***	-0.013***	-0.001***
	(0.001)	(0.001)	(0.000)
HH Monthly Exp	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)
Constant	0.118***	0.081***	0.920***
	(0.027)	(0.027)	(0.008)
Observations	177,316	134,956	108,664
R-squared	0.085	0.093	0.029
Time FE	Yes	Yes	Yes
District FE	Yes	Yes	Yes
District Linear Trend	Yes	Yes	Yes

Source: NSS and NCRB multiple rounds, own calculations
Notes: Linear probability models. The sample consists of urban women in the age group 21-64. All regressions include NSS survey weights. Robust standard errors presented in parentheses are clustered by district and year. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 4: Crime against women and female workforce participation: Robustness I

VARIABLES	(1) Baseline (Col 5)	(2) + Dist Controls	(3) + District Trend	(4) Baseline (Col 5)	(5) + State Controls	(6) + State Trend
Crimes	-0.064**	-0.066**	-0.148***	-0.331***	-0.243**	-0.503***
	(0.026)	(0.026)	(0.039)	(0.111)	(0.102)	(0.107)
Age	0.004***	0.004***	0.004***	0.004***	0.004***	0.004***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Age Squared	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Schooling	0.006***	0.006***	0.006***	0.006***	0.006***	0.006***
	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)
Muslim = 1	-0.043***	-0.043***	-0.044***	-0.044***	-0.044***	-0.044***
	(0.005)	(0.005)	(0.005)	(0.008)	(0.008)	(0.008)
Scheduled Tribe = 1	0.141***	0.141***	0.141***	0.133***	0.133***	0.133***
	(0.012)	(0.012)	(0.012)	(0.013)	(0.013)	(0.013)
Scheduled Caste = 1	0.103***	0.103***	0.104***	0.100***	0.100***	0.100***
	(0.006)	(0.006)	(0.006)	(0.009)	(0.009)	(0.009)
OBC = 1	0.013***	0.013***	0.012***	0.011**	0.011**	0.011**
	(0.004)	(0.004)	(0.004)	(0.005)	(0.005)	(0.005)
HH Size	-0.012***	-0.012***	-0.012***	-0.012***	-0.012***	-0.013***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
HH Monthly Exp	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Constant	0.124***	0.117***	0.136***	0.167***	0.217***	0.241***
	(0.023)	(0.023)	(0.023)	(0.028)	(0.038)	(0.035)
Observations	177,316	177,316	177,316	177,316	177,316	177,316
R-squared	0.078	0.078	0.085	0.064	0.064	0.065
State/District FE	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
State/District Controls	No	Yes	Yes	No	Yes	Yes
State/District Linear Trend	No	No	Yes	No	No	Yes

Source: NSS and NCRB multiple rounds, own calculations
Notes: Linear probability models. The sample consists of urban women in the age group 21-64. All regressions include NSS survey weights. District/State level control variables include male unemployment rate, child sex-ratio, fraction of men who completed middle-school, and the fraction of girls married before the minimum legal marriageable-age. Robust standard errors presented in parentheses are clustered by district and year in Columns (1)-(3), and by by state and year in Columns (4)-(6). *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 5: Crime against women and female workforce participation: Robustness II

VARIABLES	(1) Alternative WLFP	(2) All Crimes	(3) Crimes(t-2)	(4) 1999-2012	(5) State-Year FE
Crimes	-0.136***	-0.115***	-0.157***	-0.121***	-0.094**
	(0.044)	(0.037)	(0.040)	(0.036)	(0.041)
Age	0.005***	0.004***	0.004***	0.012***	0.004***
	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)
Age Squared	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Schooling	0.005***	0.006***	0.006***	0.007***	0.006***
	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)
Muslim = 1	-0.045***	-0.044***	-0.044***	-0.037***	-0.044***
	(0.005)	(0.005)	(0.005)	(0.008)	(0.005)
Scheduled Tribe = 1	0.144***	0.141***	0.140***	0.162***	0.141***
	(0.012)	(0.012)	(0.012)	(0.019)	(0.012)
Scheduled Caste = 1	0.109***	0.104***	0.103***	0.124***	0.103***
	(0.006)	(0.006)	(0.006)	(0.012)	(0.006)
OBC = 1	0.013***	0.012***	0.012***	0.035***	0.012***
	(0.004)	(0.004)	(0.004)	(0.008)	(0.004)
HH Size	-0.013***	-0.012***	-0.012***	-0.013***	-0.012***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
HH Monthly Exp	-0.000	-0.000	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Constant	0.137***	0.136***	0.137***	-0.051	0.129***
	(0.024)	(0.024)	(0.024)	(0.031)	(0.023)
Observations	177,316	177,316	177,316	225,571	177,316
R-squared	0.083	0.085	0.085	0.088	0.086
Time FE	Yes	Yes	Yes	Yes	Yes
District FE	Yes	Yes	Yes	Yes	Yes
District Linear Trend	Yes	Yes	Yes	Yes	Yes
State-Year FE	No	No	No	No	Yes
No. of Districts	557	557	557	478	557

Source: NSS and NCRB multiple rounds, own calculations

Notes: Linear probability models. The sample consists of urban women in the age group 21-64. All regressions include NSS survey weights. Column (1) modifies the dependent variable to account for women's subsidiary activities. Column (2) modifies sexual-crime variable to include kidnappings and importation of girls. Column (3) uses the sexual crime rate lagged by two years. Column (4) modifies the sample to include the NSS 1999-2000. Column (5) includes state level time fixed effects. Robust standard errors presented in parentheses are clustered by district and year. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 6: Crime against women and female workforce participation: Instrumental Variable

VARIABLES	(1) OLS	(2) IV	(3) OLS	(4) IV	(5) OLS	(6) IV	(7) OLS	(8) IV
Crimes	-0.322**	-0.305*	-0.211*	-0.237*	-0.362***	-0.349**	-0.464***	-0.654***
	(0.124)	(0.180)	(0.110)	(0.125)	(0.109)	(0.147)	(0.152)	(0.211)
Child sex ratio			-0.114***	-0.113***	-0.099***	-0.100***	-0.088***	-0.073**
			(0.034)	(0.033)	(0.036)	(0.034)	(0.029)	(0.033)
Male unemployment			0.963***	0.937***	0.839***	0.851***	1.102***	0.947***
			(0.281)	(0.296)	(0.266)	(0.305)	(0.264)	(0.304)
Girl-child marriage ratio			0.276	0.274	0.611	0.603	-1.318*	-1.227
			(0.361)	(0.362)	(0.386)	(0.397)	(0.792)	(0.776)
Domestic Crimes					0.126**	0.123*	-0.015	0.047
					(0.060)	(0.068)	(0.101)	(0.136)
Constant	0.200***	0.381***	0.267***	0.437***	0.253***	0.440***	0.287***	0.662***
	(0.018)	(0.071)	(0.030)	(0.068)	(0.034)	(0.075)	(0.033)	(0.067)
Observations	158,468	158,468	158,468	158,468	158,468	158,468	158,468	158,468
R-squared	0.032	0.032	0.033	0.033	0.033	0.033	0.033	0.033
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State Linear Trend	No	No	No	No	No	No	Yes	Yes

Source: NSS and NCRB multiple rounds, own calculations
Notes: Linear probability models. The sample consists of urban women in the age group 21-64 in all the states and UTs excluding Jammu & Kashmir, Manipur, Karnataka, and Dadra & Nagar Haveli. All regressions include NSS survey weights. Columns (1)-(2) control for state and year fixed effects. Columns (3)-(4) additionally control for state-level socio-economic factors. Columns (5)-(6) additionally control for state-level domestic crimes. Columns (7)-(8) additionally control for state-level linear time trends. Robust standard errors presented in parentheses are clustered by state and year. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 7: Crime against women and female workforce participation: First Stage

VARIABLES	(1) IV	(2) IV	(3) IV	(4) IV
Drinking-age men	0.130***	0.128***	0.102***	0.081***
	(0.017)	(0.017)	(0.017)	(0.015)
Child sex ratio		0.050	0.065**	0.079***
		(0.034)	(0.029)	(0.017)
Male unemployment		-0.666*	-0.687**	-0.581***
		(0.366)	(0.321)	(0.179)
Girl-child marriage ratio		0.635	1.110*	0.468
		(0.677)	(0.599)	(0.656)
Domestic Crimes			0.226***	0.281***
			(0.032)	(0.076)
Constant	0.071***	0.037	-0.005	-0.016
	(0.010)	(0.037)	(0.033)	(0.021)
Observations	158,468	158,468	158,468	158,468
R-squared	0.956	0.960	0.971	0.991
State FE	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes
State Linear Trend	No	No	No	Yes
F-Stat	57.30	27.01	42.11	57.99
Prob > F	0	0	0	0

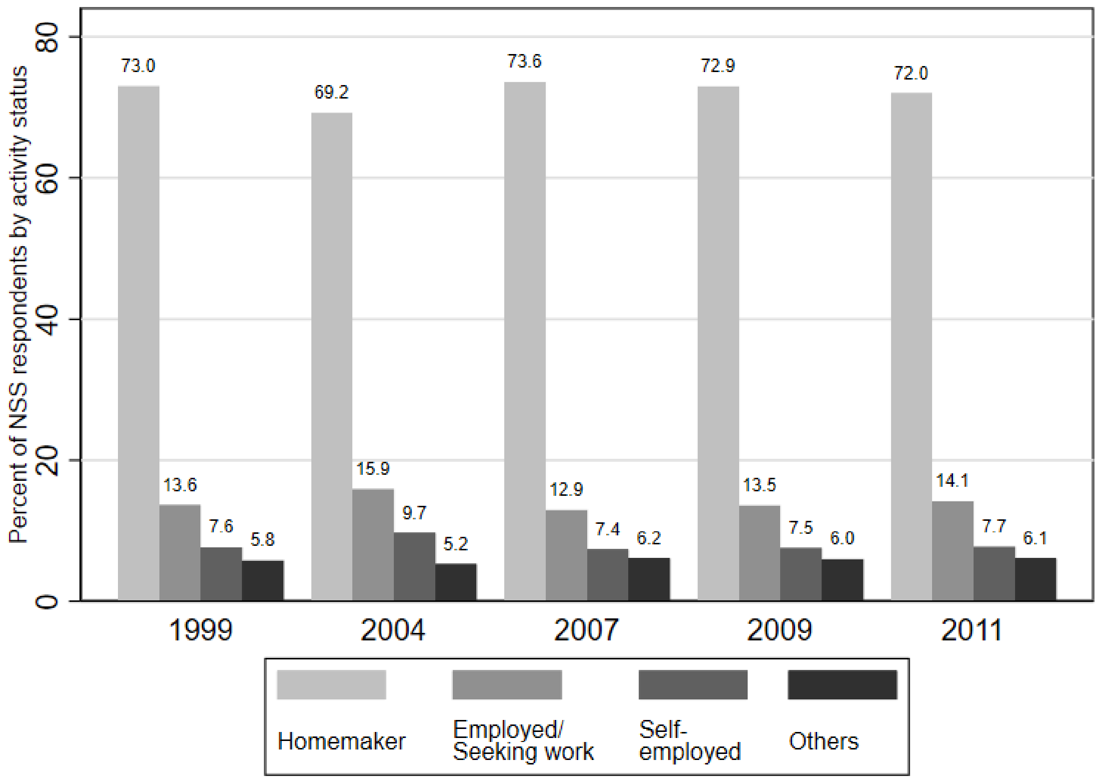
Source: NSS and NCRB multiple rounds, own calculations
Notes: This table shows the the first Stage estimates corresponding to columns (2), (4), (6), and (8) of Table 6. The sample consists of urban women in the age group 21-64 in all states and UTs excluding Jammu & Kashmir, Manipur, and Dadra & Nagar Haveli. All regressions include NSS survey weights. Robust standard errors presented in parentheses are clustered by state and year. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 8: Contiguous-pair analysis in Gujarat

VARIABLES	(1) Reduced form	(2) + Indi/ HH Controls	(3) + Dist Controls
Exterior-district	-0.041**	-0.051***	-0.050***
	(0.019)	(0.019)	(0.019)
Constant	0.162***	0.064	0.054
	(0.025)	(0.117)	(0.141)
Observations	5,746	5,746	5,746
R-squared	0.024	0.087	0.088
Contiguous Pair FE	Yes	Yes	Yes
Time FE	Yes	Yes	Yes
Individual Controls	No	Yes	Yes
HH Controls	No	Yes	Yes
District Controls	No	No	Yes

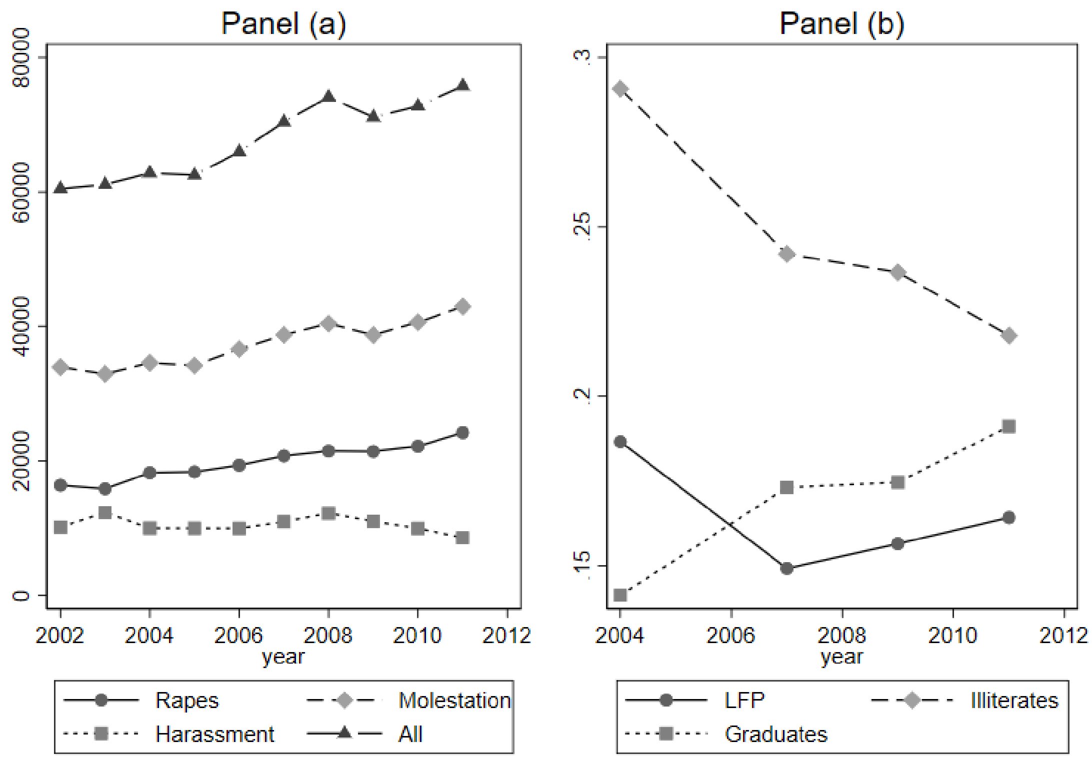
Source: NSS and NCRB multiple rounds, own calculations
Notes: Linear probability models. The sample consists of urban women in the age group 21-64. All regressions include NSS survey weights. Exterior districts are the districts of Gujarat that share a border with a neighboring state where alcohol sale and consumption are legal. Standard errors are computed using wild bootstrap. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Figure 1: National trends in women's principal activity status



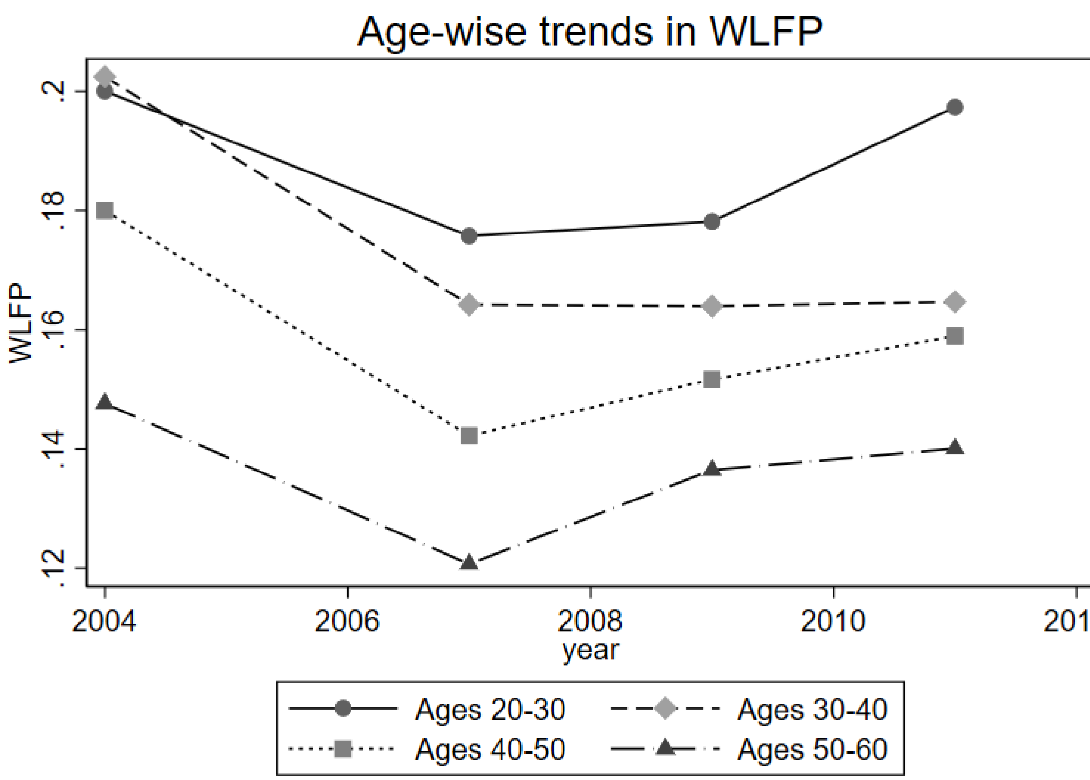
Source: NSS data multiple rounds, own calculations
Notes: The figure shows the distribution of urban women in the age group 21-64 across different principal activities.

Figure 2: National trends in sexual crimes, women's education and LFP



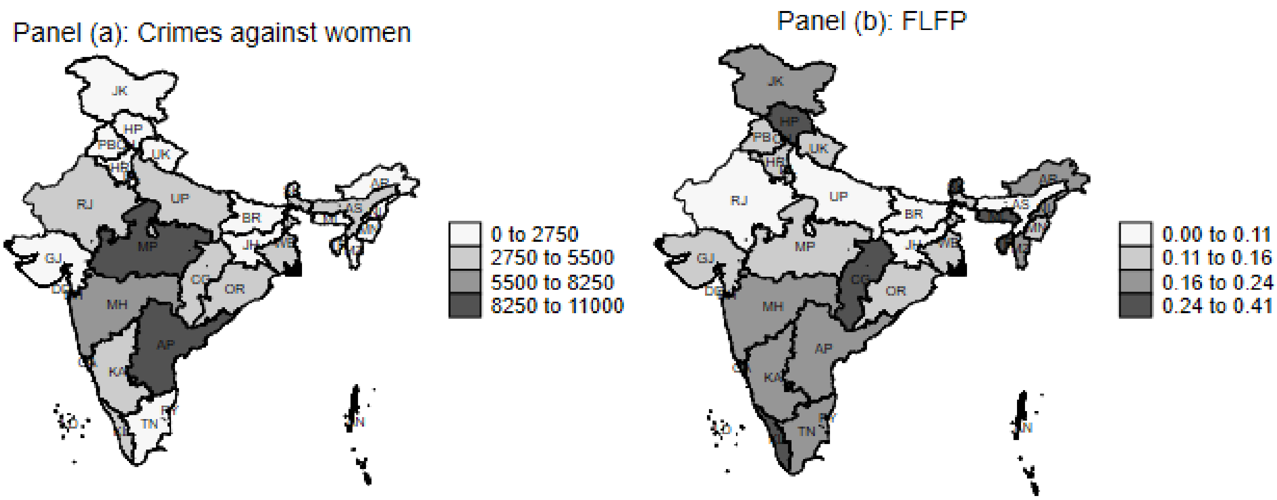
Source: NSS and NCRB data multiple rounds, own calculations
Notes: Panel (a) describes the trends in total registered cases of rapes, molestation and sexual harassment in the country during 2002-2011. Panel (b) shows the trend in percent of urban women (age group 21-64) employed in workforce, percent of illiterate women, and percent of women with at least graduate level education between NSS survey years 2004 and 2011.

Figure 3: National trends in women's workforce participation for different age groups



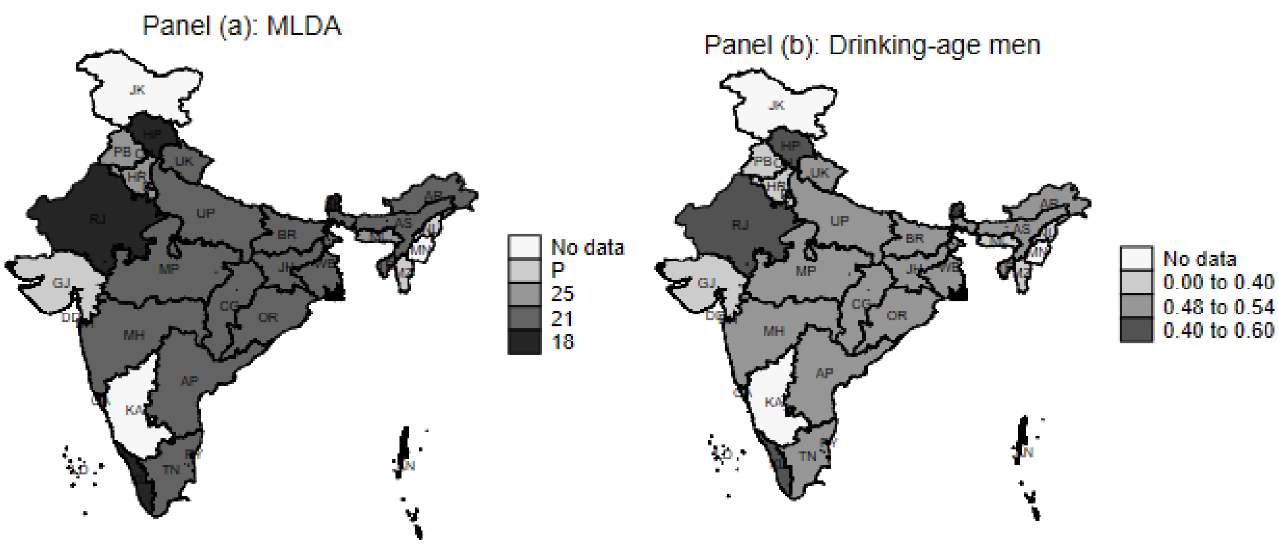
Source: NSS data multiple rounds, own calculations
Notes: The figure shows the age-wise trend in percent of urban women employed in workforce between survey years 2004 and 2011. Workforce participation has stagnated across all age-groups during the sample period.

Figure 4: State-wise sexual crimes and women's workforce participation



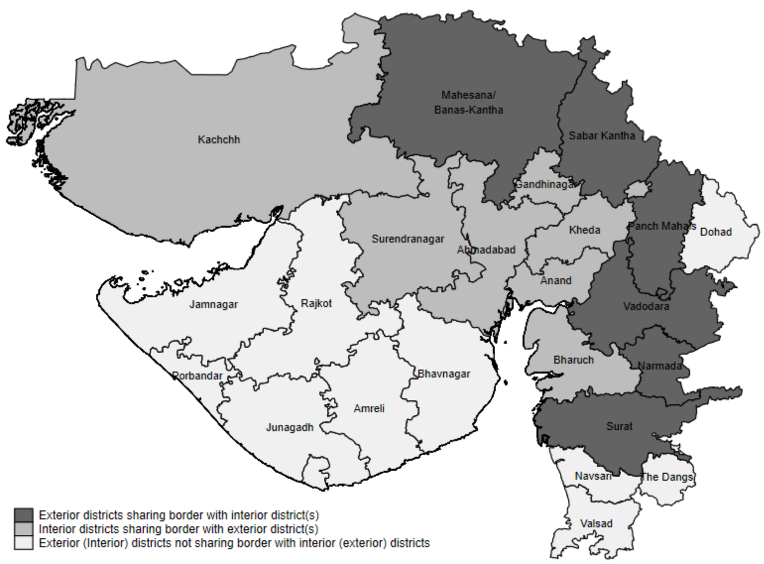
Source: NSS and NCRB data multiple rounds, own calculations
Notes: Panel (a) shows the state-wise reported sexual crimes (rapes, molestation, sexual harassment). Panel (b) reports the percent of urban women (age group 21-64) employed in the workforce in the survey year 2011. Darker shades indicate higher values.

Figure 5: State-wise MLDA and fraction of drinking-age men



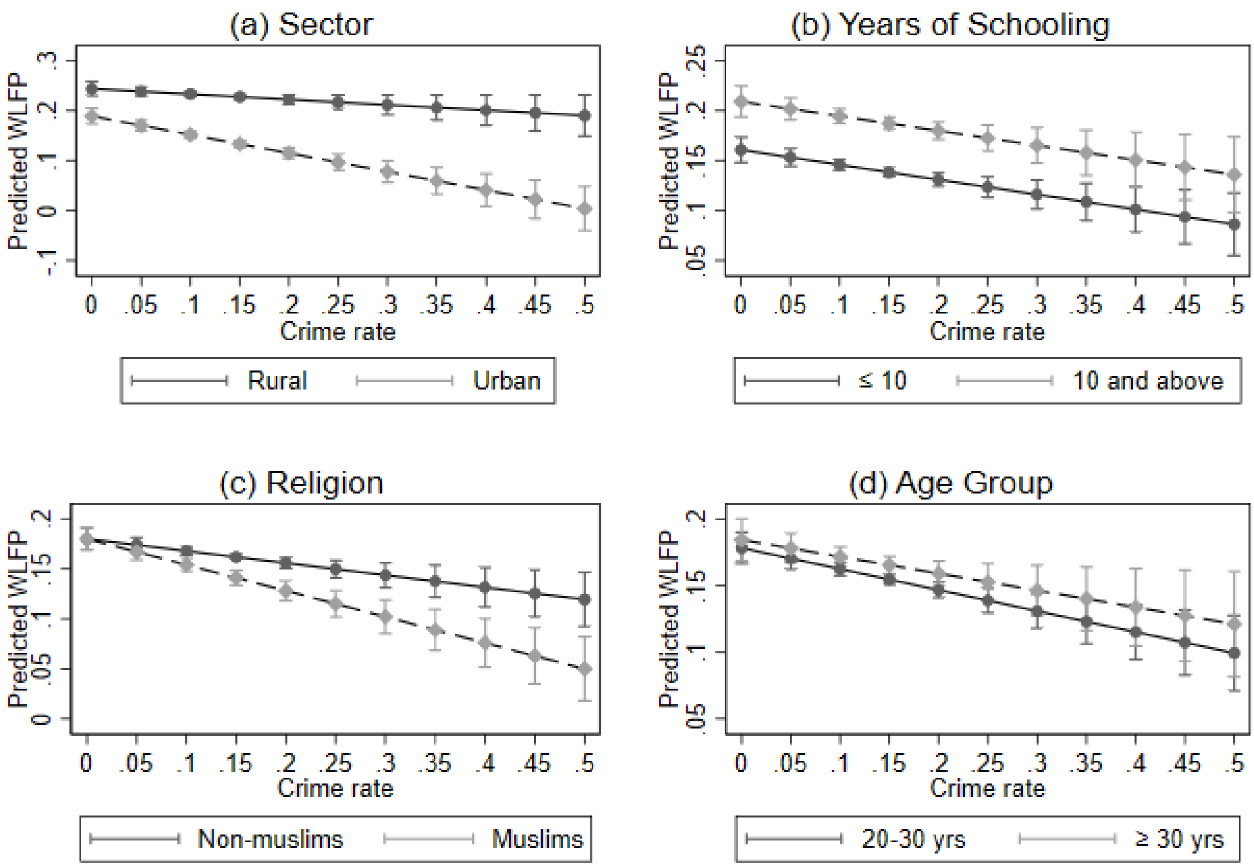
Source: NSS and NCRB data multiple rounds, own calculations
Notes: Panel (a) reports state-wise minimum legal alcohol drinking age in the year 2011. Panel (b) reports state-wise fraction of men between 18-25 that are legally eligible to drink in 2011. Darker shades indicate higher values.

Figure 6: Districts of Gujarat as in 2000



Notes: The figure shows the districts of Gujarat as in the year 2000. Parts of districts Mahesana and Banas Kantha were split to form a new district named Patan in the early 2000s. The analysis combines these districts to maintain geographical consistency across years. The analysis excludes districts Dahod, Navsari, Dangs, and Valsad as they do not share a border with any interior districts.

Figure 7: Heterogenous treatment effects



Notes: The figure plots predicted probability of workforce participation at each level of sexual-crime rate for women of different sectors (Panel (a)), years of schooling (Panel (b)), religion (Panel (c)), age-group (Panel (d)), household income (Panel (e)). Predicted probabilities are constructed by estimating specification 5.

Appendix

Table A1: NCRB and NSS Data

NSS		NCRB	
ROUND	SURVEY YEAR *(t)*	CRIMES YEAR *(t-1)*	CRIMES YEAR *(t-2)*
61	2004-2005	2003	2002
64	2007-2008	2006	2005
66	2009-2010	2008	2007
68	2011-2012	2010	2009

Table A2: Minimum legal drinking age across states in India

S.No.	STATE	2003	2006	2008	2010
1	A&N ISLANDS	18	18	18	18
2	ANDHRA PRADESH	21	21	21	21
3	ARUNACHAL PRADESH	21	21	21	21
4	ASSAM	21	21	21	21
5	BIHAR	21	21	21	21
6	CHANDIGARH	25	25	25	25
7	CHHATTISGARH	21	21	21	21
8	DAMAN & DIU	21	21	21	21
9	DELHI	25	25	25	25
10	GOA	21	21	21	21
11	GUJARAT	P	P	P	P
12	HARYANA	25	25	25	25
13	HIMACHAL PRADESH	18	18	18	18
14	JHARKHAND	21	21	21	21
15	KERALA	18	18	18	18
16	LAKSHADWEEP	P	P	P	P
17	MADHYA PRADESH	21	21	21	21
18	MAHARASHTRA	21	21	21	21
19	MEGHALAYA	25	25	25	25
20	MIZORAM	P	P	P	P
21	NAGALAND	P	P	P	P
22	ORISSA	21	21	21	21
23	PUDUCHERRY	18	18	18	18
24	PUNJAB	25	25	25	25
25	RAJASTHAN	18	18	18	18
26	SIKKIM	18	18	18	18
27	TAMIL NADU	18	21	21	21
28	TRIPURA	21	21	21	21
29	UTTAR PRADESH	21	21	21	21
30	UTTARAKHAND	21	21	21	21
31	WEST BENGAL	21	21	21	21

Source: State Excise Departments
Notes: Table highlights the minimum legal drinking age in selected states of India.
'P' refers to a blanket prohibition.

Table A3: Summary statistics across different time periods

State Characteristics	2003	2006	2008	2010	Total
Sexual Crimes (per 1000 women)	0.14	0.15	0.17	0.16	0.16
	(0.10)	(0.09)	(0.10)	(0.11)	(0.10)
Child Sex Ratio (F/M)	0.93	0.95	0.92	0.92	0.93
	(0.18)	(0.12)	(0.19)	(0.13)	(0.15)
Girl-Child Marriage Ratio	0.01	0.00	0.00	0.00	0.01
	(0.01)	(0.01)	(0.00)	(0.00)	(0.01)
Male Unemployment Rate	0.03	0.03	0.03	0.03	0.03
	(0.03)	(0.02)	(0.02)	(0.04)	(0.03)
Male Middle-school Completion Rate	0.22	0.25	0.29	0.30	0.25
	(0.09)	(0.09)	(0.10)	(0.09)	(0.10)
Observations	35	35	35	35	175

Source: NSS and NCRB multiple rounds, Own calculations
Notes: The table reports the mean and standard deviation (in parenthesis) for state-level characteristics. For a survey round beginning in year t, the table summarizes the crimes in calendar year $t-1$ (see table A1 for details).

Table A4: Crime against women and female workforce participation: Instrumental Variable with Karnataka

VARIABLES	(1) OLS	(2) IV	(3) OLS	(4) IV	(5) OLS	(6) IV	(7) OLS	(8) IV
Crimes	-0.312***	-0.270	-0.201*	-0.204	-0.333***	-0.292*	-0.457***	-0.611***
	(0.119)	(0.184)	(0.104)	(0.127)	(0.107)	(0.151)	(0.145)	(0.210)
Child sex ratio			-0.111***	-0.111***	-0.096**	-0.098***	-0.086***	-0.074**
			(0.035)	(0.034)	(0.037)	(0.035)	(0.030)	(0.033)
Male unemployment			1.027***	1.024***	0.937***	0.970***	1.165***	1.040***
			(0.280)	(0.305)	(0.275)	(0.318)	(0.268)	(0.312)
Girl-child marriage ratio			0.094	0.094	0.394	0.370	-1.947**	-1.864**
			(0.405)	(0.402)	(0.433)	(0.438)	(0.933)	(0.929)
Domestic Crimes					0.114*	0.104	-0.008	0.045
					(0.058)	(0.065)	(0.093)	(0.131)
Constant	0.202***	0.373***	0.267***	0.421***	0.251***	0.421***	0.289***	0.644***
	(0.017)	(0.070)	(0.032)	(0.070)	(0.036)	(0.075)	(0.034)	(0.070)
Observations	167,159	167,159	167,159	167,159	167,159	167,159	167,159	167,159
R-squared	0.031	0.031	0.031	0.031	0.031	0.031	0.032	0.032
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State Linear Trend	No	No	No	No	No	No	Yes	Yes

Source: NSS and NCRB multiple rounds, own calculations
Notes: Linear probability models. The sample consists of urban women in the age group 21-64 in all states and UTs excluding Jammu & Kashmir, Manipur, and Dadra & Nagar Haveli. All regressions include NSS survey weights. Robust standard errors presented in parentheses are clustered by state and year. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table A5: Crimes against women and female workforce participation: Heterogeneity Analyses

VARIABLES	(1) Sector	(2) Schooling	(3) Religion	(4) Age
1.group#c.victim_prob_census_t1	-0.263***	0.002	-0.139***	0.031
	(0.054)	(0.056)	(0.029)	(0.051)
Crimes	-0.107*	-0.149***	-0.121***	-0.158***
	(0.056)	(0.044)	(0.038)	(0.040)
Age	0.017***	0.004***	0.004***	
	(0.001)	(0.001)	(0.001)	
Age Squared	-0.000***	-0.000***	-0.000***	
	(0.000)	(0.000)	(0.000)	
Schooling	0.001***		0.006***	0.007***
	(0.000)		(0.000)	(0.000)
Muslim = 1	-0.045***	-0.052***		-0.040***
	(0.004)	(0.005)		(0.005)
Scheduled Tribe = 1	0.167***	0.131***	0.140***	0.145***
	(0.008)	(0.012)	(0.012)	(0.012)
Scheduled Caste = 1	0.124***	0.091***	0.103***	0.109***
	(0.005)	(0.006)	(0.006)	(0.006)
OBC = 1	0.030***	0.004	0.011***	0.016***
	(0.003)	(0.004)	(0.004)	(0.004)
HH Size	-0.014***	-0.013***	-0.012***	-0.012***
	(0.000)	(0.001)	(0.001)	(0.001)
HH Monthly Exp	-0.000	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Constant	-0.036**	0.181***	0.124***	0.175***
	(0.017)	(0.024)	(0.023)	(0.008)
Observations	435,546	177,316	177,316	177,316
R-squared	0.201	0.082	0.085	0.082
Time FE	Yes	Yes	Yes	Yes
District FE	Yes	Yes	Yes	Yes
District Linear Trend	Yes	Yes	Yes	Yes

Source: NSS and NCRB multiple rounds, own calculations
Notes: Linear probability models. Sample in Column (1) consists of all women (rural and urban) between age group 21 to 64. Sample in Columns (2)-(5) consists of urban women between age group 21 to 64. Age group 31-64 forms the reference category in column 4. All regressions include NSS survey weights. Robust standard errors presented in parentheses are clustered by district and year. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table A6: Numerical Example Comparing District and State-level Estimates

	$t=1$, crime rate= 0					$t=2$, crime rate = 0.1		
District	F_1	W_1	$FLFP_1$	g	$\Delta FLFP$	$FLFP_2$	F_2	W_2
Case (i): Population grows by a factor of 2 in both districts.								
A	40	3	7.5	2	-1.5	6.0	80	4.8
B	40	8	20.0	2	-1.5	18.5	80	14.8
Total	80	11	13.8	2	**-1.5**	12.3	160	19.6
Case (ii): Population growth is higher in district A.								
A	40	3	7.5	2	-1.5	6.0	80	4.8
B	40	8	20.0	1.6	-1.5	18.5	64	11.8
Total	80	11	13.8	1.8	**-2.2**	11.6	144	16.6
Case (iii): Higher dispersion in $FLFP_1$ across districts.								
A	40	3	7.5	2	-1.5	6.0	80	4.8
B	40	15	37.5	1.6	-1.5	36.0	64	23.0
Total	80	18	22.5	1.8	**-3.2**	19.3	144	27.8

Notes: Consider a two-period set-up with two districts, A and B. For each district d during period t, let F_t^d and denote the total women and W_t^d denote the total women in workforce. The district-level female labor force participation rate, in any period t, is $FLFP_t^d = W_t^d / F_t^d$. Correspondingly, the state-level female labor force participation rate can be obtained by aggregating over the district-level rates ($FLFP_t^S = W_t^A + W_t^B)/(F_t^A + F_t^B) * 100$). In the first period ($t = 1$), each district d comprises 40 women ($F_1^d = 40$) and records no sexual crimes (crime rate = 0). However, district B differs from A in that B has a higher number of working women ($W_1^B > W_2^A$) and hence a higher level of female labor force participation rate ($FLFP_1^B > FLFP_1^A$). In period 2, the population in each district rises by a factor of g^d, and the sexual crime rate rises by 10 percentage points. Based on the estimates from our baseline framework ($\Delta FLFP^d = 1.5$), the workforce participation of women falls by 1.5 percent points in both districts. Using these estimates, in turn, we obtain the state level change in female labor force participation rate ($\Delta FLFP^S$) for a 10 percentage points increase in crime against women across the state. The extent to which the magnitude of the state-level effect differs from that of the district-level estimates depends on the variances in initial female labor supply and the population growth rate across districts. We explain this using three different possibilities which can lead to higher state-level estimates compared to district-level estimates. (i) The population grows at the same rate in both districts ($g^A = g^B$). In this situation, the district-level and state-level estimates coincide. (ii) The population grows at a slower rate when relatively more women participate in the labor force ($g^A > g^B$). In this situation, the state-level estimate of $\Delta FLFP$ is higher. (iii) The population growth rate varies as in (ii) but there is a larger gap in the initial female labor supply across the districts ($FLFP_1^B >> FLFP_1^A$). In this situation, the state-level estimates are even higher.