Alcohol Prohibition and Women's Autonomy: Evidence of Policy Spillovers

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Abstract

Public policies often have the potential to generate substantial welfare effects beyond their intended objectives. One such public policy intervention that warrants closer examination of its second-order effects is alcohol prohibition. In this paper, I contribute to the debate on welfare implications of alcohol regulation policy by studying the impact of an alcohol ban implemented in the Indian state of Bihar in 2016 on women's autonomy outcomes. Using data from the two latest rounds of the National Family Health Survey (NFHS), and employing a difference-in-differences model, I find that the policy substantially increased women's autonomy outcomes - including contraceptive use, participation in household decision-making, and attitudes towards spousal beating. Investigating potential mechanisms, I find that these improvements in women's autonomy are primarily driven by reduced alcohol consumption and decreased incidences of Intimate Partner Violence (IPV). These findings contribute to our understanding of how substance abuse regulations in developing economies can have substantial spillover effects on gender-related development outcomes. (JEL B55, I18, I38, J16)

Keywords: Alcohol Prohibition, Women's Autonomy, Contraception, Public Policy, Spillover Effects

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1 Introduction

Policymakers and governments devise public policies with the intent of addressing specific problems, promoting economic growth, or achieving particular societal objectives. These interventions may be motivated by a range of factors, from populist considerations to electoral strategy, as well as underlying economic motivations to improve overall welfare and maintain harmony within the social fabric. In evaluating the success of such policies, the focus is typically on measuring their direct impact on the targeted outcomes or population - that is, whether the policy was able to achieve its original goals.

However, public policies often have the potential to generate substantial welfare effects beyond their intended objectives and targeted populations. These second order-effects or spillover effects, operating through behavioral responses, equilibrium changes, shifts in power relations, or social transformations not explicitly considered in the policy design, can significantly alter the overall welfare implications. For policymakers in resource-constrained settings, understanding and measuring these indirect impacts is of paramount importance, as omitting them from cost-benefit analyses may lead to incorrect welfare calculations and inefficient allocation of limited public resources. This challenge is particularly acute in developing countries, where multiple policy objectives compete for scarce public funds, and where indirect effects might create unforeseen complementarities or trade-offs across development goals.

One such public policy intervention that warrants closer examination of its second-

order effects is alcohol prohibition. In 2016, 80 countries reported national alcohol policies, 8 had subnational policies, and 11 others imposed total bans (WHO, 2018). Implemented in various forms across both developed and developing countries, alcohol prohibition represents a significant policy lever with the potential to generate substantial spillover impacts on individual behavior, social dynamics, and broader economic welfare. In developed country contexts, previous studies have exploited variations in legal access to alcohol to analyze the effects on social costs, including mortality rates and health outcomes (Miron and Zwiebel, 1991; Miron 1999; Dills et al., 2005; Marcus and Siedler, 2015; Petrusevich, 2024). However, the evidence is scarce in the context of developing countries, where the alcohol prohibition literature has largely focused on crimes against women and domestic violence.

Existing studies in crime and domestic violence have provided valuable insights. Luca et al. (2015) examined the impact of prohibition on alcohol consumption and violence against women, concluding that state-level bans on commercial alcohol sales are associated with substantial reductions in male drinking as well as domestic violence. Roy (2020) investigated the effect of various alcohol bans on a range of violent and non-violent crimes and found significant reductions, especially in violent crimes. However, Dar and Sahay (2018) have shown that crime increased in Bihar after the ban. In contrast, Chaudhuri et al. (2023) concluded that alcohol bans led to declines in violent and non-violent crime in the same state. Additionally, Dixit and Mukherjee (2023) studied the impact of the alcohol ban policy in Bihar and found it led to a reduction in intimate partner violence (IPV).

Against this backdrop, this paper estimates the causal impact of alcohol prohibition policy on women's autonomy outcomes. Autonomy is defined as "the control women have over their own lives—the extent to which they have an equal voice with their husbands in matters affecting themselves and their families, control over material and other resources, access to knowledge and information, the authority to make independent decisions, freedom from constraints on physical mobility, and the ability to forge equitable power relationships within families" (Jejeebhoy and Sathar, 2001).

I study three key outcomes: use of contraception, participation in household decision-making, and attitudes towards spousal beating. Use of contraception is a crucial indicator of reproductive autonomy. Upadhyay et al. (2014) defined reproductive autonomy as "having the power to decide about and control matters associated with contraceptive use, pregnancy, and childbearing." Women's involvement in household decision-making and their beliefs about spousal beating are also important indicators of their overall autonomy and intra-household dynamics (Bloom et al., 2001; Gupta and Yesudin, 2006; Banerjee and Roy, 2015).

This study leverages the alcohol prohibition policy implemented by the Indian state of Bihar as its empirical setting. The policy was an electoral commitment fulfilled by Chief Minister Nitish Kumar and was enacted largely in response to demands from women voters who campaigned against alcohol-induced domestic violence and family welfare concerns. The government implemented the Bihar Prohibition and Excise Act in April 2016. The legislation comprehensively banned the production, storage, transportation, sale, and consumption of all alcoholic

beverages, including Indian-made foreign liquor (IMFL) and country liquor.

I utilize two rounds of the latest cross-sectional National Family Health Survey (NFHS) data on households, collected in 2015-16 and 2019-21. These rounds were conducted just before and after the enforcement of the ban in Bihar, making it suitable for the evaluation of the alcohol prohibition policy implemented between these two rounds. I employ a difference-in-differences (DID) design to identify the effect of prohibition on women's autonomy outcomes. I compare the outcomes in Bihar (the treatment state) with the outcomes in the neighboring state of Jharkhand (the control state).

The estimated DID coefficient would be unbiased only if the parallel trends assumption is valid, that is only if the trends in women's autonomy outcomes would be parallel in Bihar and Jharkhand. The parallel trends assumption underlying standard DID models cannot be definitively proven and establishing it may also be implausible if the pre-intervention covariates are unbalanced between the treatment and the control groups. To address such concerns, I also consider inverse probability weighted difference-in-differences (IPW-DID) where observations are reweighted based on observable baseline variables like – age, education, place of residence, caste and wealth index. I argue that treatment and control groups formed using IPW are more likely to fulfil the parallel trends assumption.

To strengthen the analysis, I also carry out a within-state comparison using different control groups. I compare the outcomes for women affected by the alcohol prohibition policy to two control groups - Muslim women and women who do not report experiencing intimate partner violence (IPV). Additionally, I compare border

districts of Bihar (which serve as the control group) with interior districts (the treatment group) to account for the potential ineffectiveness of prohibition in areas near state borders. Prohibition policies may be undermined by illegal cross-border alcohol transportation and purchases in regions close to state boundaries (Miron and Zwiebel, 1991; Eashwar et al., 2020). The border district comparison helps address this concern. All these tests point in the same direction as the effect in my main specification. In fact, the estimated effect sizes are very similar.

I find that the alcohol prohibition policy increases the use of contraception among women in Bihar by a statistically significant 7 percentage points. Participation in household decision-making increases significantly by 11.7 percentage points, and women's attitudes towards spousal beating improve, as they justify it less by 9 percentage points. These results suggest that the alcohol prohibition policy had substantive positive impacts on women's autonomy and intra-household dynamics in the state.

I evaluate the potential pathways that could be driving the results. I hypothesize that lower alcohol consumption by husbands and a decline in incidences of intimate partner violence (IPV) are two key mechanisms leading to an increase in women's autonomy. First, I examine the impact of the policy on alcohol consumption by husbands, as reported by women in the sample. Second, I investigate the effect on the incidences of IPV. To test whether IPV and alcohol consumption channel the relationship between prohibition and women's autonomy, I augment the DID specification with these hypothesized mechanisms as controls. The results from this exercise are consistent with my hypotheses.

This paper contributes to three strands of literature. First, it contributes to the literature on alcohol prohibition policies and their welfare implications. Alcohol consumption generates significant negative externalities and social costs, exhibiting classic properties of a public bad. A substantial body of research has established robust theoretical and empirical links between alcohol consumption and various outcomes: crime (Carpenter and Dobkin, 2015; Lindo et al., 2018; Hansen and Waddell, 2018, Chaudhari et al., 2023), IPV (Card and Dahl, 2011; Luca et al., 2015, Dixit and Mukherjee, 2024), mortality rates (Carpenter and Dobkin, 2009; Carpenter et al., 2016; Yakovlev, 2018; Kueng and Yakovlev, 2021), traffic accidents (Jackson and Owens, 2011; Lindo et al., 2016; Sloan, 2020), and losses to the state exchequer (Rahman, 2004). While prohibition policies aim to curtail alcohol's societal costs, they often lead to unintended consequences such as the proliferation of black markets and production of potentially harmful illicit alcohol (Hall, 2010). This paper contributes to understanding the welfare implications of state-led alcohol prohibition by examining its effects on women's autonomy.

Second, this study advances the scant literature examining alcohol prohibition's effects on women's reproductive health and autonomy. Prior research has established strong associations between alcohol consumption and risky sexual behavior, particularly unprotected sexual activity (Scott-Sheldon et al., 2016; Rehm et al., 2012). This connection has been linked to increased risks of unintended pregnancies (Connery, Albright and Rodolico, 2014; Oulman et al., 2015; Lundsberg et al., 2018) and sexually transmitted infections (Rehm et al., 2012; Williams et al., 2016). Contraceptive use, a crucial indicator of women's reproductive autonomy and health outcomes, remains understudied in the context of prohibition policies. My study

specifically addresses this gap by investigating the causal relationship between state-implemented alcohol prohibition and women's contraceptive practices.

Third, this research contributes to the growing literature on policy-induced changes in intra-household dynamics and gender relations. Prior research has extensively documented the how various state interventions reshape household power dynamics, predominantly focusing on economic policy instruments such as conditional cash transfers, labor market interventions, quotas and property rights legislation (Duflo, 2012; Heath and Tan, 2019; Deininger et al., 2010; Banerjee and Sen, 2024; Millan et al., 2014). While these studies establish how resource redistribution affects bargaining power, my analysis of alcohol prohibition provides novel evidence on how behavioral regulations can fundamentally alter intra-household power dynamics. By investigating the causal relationship between alcohol prohibition and women's participation in decision- making and attitude towards spousal beating, a historically accepted norm, I demonstrate the capacity of non-economic policy instruments to generate significant shifts in household power relations and welfare outcomes.

The rest of the paper is organised as follows: Section 2 discusses the policy context, section 3 describes the data that is used in the analysis, section 4 presents the main empirical strategy, section 5 presents the main results, section 6 discusses the robustness of the results followed by heterogeneity analysis in section 7. Section 8 discusses the plausible mechanisms driving the results in this paper and section 8 concludes.

2 Policy Context and Background

Alcohol consumption represents a significant public health and economic burden globally. In 2019, alcohol-attributable mortality reached 2.6 million deaths, accounting for 4.7 % of global mortality. The externalities of alcohol consumption intersect with multiple development objectives, particularly those outlined in the Sustainable Development Goals (SDGs). These include reducing traffic mortality and various forms of violence (WHO Regional Office for Europe, 2020; Room et al., 2022). Historically, governments across the globe have implemented various regulatory interventions to address alcohol-related market failures and externalities. These policy instruments typically include -minimum legal drinking age requirements (MLDA), restrictions on retail availability through on-premise and off-premise regulations, limitations on public consumption, marketing constraints, price-based interventions, blood alcohol concentration (BAC) limits for vehicle operation, and complete prohibitions.

India's alcohol regulation has significant constitutional and historical underpinnings. The Constitution's Directive Principles of State Policy incorporate prohibition, reflecting Gandhian principles. Under the 7th Schedule, alcohol regulation is designated as a state subject, granting states autonomous authority over production, manufacture, possession, transport, purchase, and sale of intoxicating liquors. Thus, laws regarding alcohol differ from state to state, falling in the whole spectrum between prohibition and private sale. Currently, four states—Bihar, Gujarat, Mizoram, and Nagaland—maintain complete prohibition, though Gujarat introduced partial relaxations in 2023 to facilitate global business investments. Several

states, including Andhra Pradesh, Haryana, Kerala, Tamil Nadu, and Manipur, have experimented with prohibition and then repealed the regulation law. The fiscal implications of these policies are significant: state excise duties on alcohol, including Indian Made Foreign Liquor (IMFL), country liquor, and beer, constitute the third-largest source of states' own tax revenue (OTR).

Bihar, situated in eastern India, is one of the most economically challenged states in the country. With a population of approximately 130 million, it is characterized by high demographic pressure and significant development challenges. The state's per capita GDP stands at INR 66,828 at current prices (approximately $795 at current exchange rates, $2,463 in PPP terms), ranking among the lowest in India (Reserve Bank of India). According to NITI Aayog's Multidimensional Poverty Index (MPI), Bihar records the highest percentage of population living in poverty among all Indian states (33.76%). This developmental lag is further evidenced by its bottom ranking on NITI Aayog's SDG India Index, which measures progress on Sustainable Development Goals. Moreover, Bihar reports the lowest literacy rate in the country (Census 2011).

In the world's largest democracy, politicians increasingly recognize the necessity of addressing women's concerns to secure electoral success. Bihar's prohibition policy exemplifies this dynamic, driven by political motives to attract women voters while also responding to legitimate social demands for an alcohol ban. Prior to the 2015 state election, Chief Minister Nitish Kumar pledged complete prohibition in response to demands from women voters who complained about domestic violence, crime, and household income diversion. The policy context

is particularly significant given Bihar's pre-prohibition consumption patterns: the state ranked sixth nationally in alcohol consumption with average yearly per capita consumption of 14.7 liters (NSS 2011-12). Survey data indicated that 29% of men aged 15 and above consumed alcohol, while one-third of married women reported regular alcohol consumption by their husbands (NFHS 2015-16).

Following electoral victory, the government implemented the Bihar Prohibition and Excise Act in April 2016, establishing one of India's most stringent prohibition regimes. The legislation comprehensively banned the production, storage, transportation, sale, and consumption of all alcoholic beverages, including Indian-made foreign liquor (IMFL) and country liquor. This policy decision, while addressing social concerns, faced criticism for potential revenue losses in a resource-constrained state and anticipated rise of black market and underground production activities.

Bihar is also a highly patriarchal state that fares poorly on women's empowerment indicators, reflected across demographic, economic, and social dimensions. The state's sex ratio stands at 920 (PLFS, 2020-21). Women's economic participation remains constrained, with female labor force participation (FLFPR) at merely 10.9% (PLFS, 2021). The human capital landscape shows substantial differentials, with female literacy at 65.5% compared to male literacy of 81.2% (PLFS, 2021). Bihar records the highest fertility rate of 3.0, with 31% of women reporting son preference (NFHS, 2019-21). The prevalence of early marriage remains a significant concern, with 40% of marriages occurring before the legal age of 18. This corresponds to adolescent fertility rates of 11%—significantly higher than the national average of 6.8% (NFHS, 2019-21). Economic opportunities show similar disparities, with

women holding only 214 per 1,000 managerial positions in the formal sector (Ministry of Corporate Affairs, 2018-19). Despite being the first state to implement 50% reservation for women in panchayats in 2006, it continues to show significant gaps in gender-related development indicators. Bihar, thus, provides an interesting setting to study the effect of alcohol prohibition on women's autonomy outcomes.

3 Data

I use the fourth and fifth rounds of India's National Family Health Survey[1] (NFHS), also known as the Demographic and Health Survey (DHS). The NFHS is a nationally representative household survey that provides comprehensive information on health and socio-demographic indicators, including fertility, family planning, maternal health, and domestic violence. My analysis spans NFHS-4 (2015-16) and NFHS-5 (2019-21). The timing of NFHS-4 data collection in Bihar (March-August 2015) precedes the announcement and implementation of the prohibition, ensuring clean pre-treatment measurements.

I use the neighboring state of Jharkhand as the control group in my empirical strategy. Jharkhand presents an appropriate control for several reasons. First, its validity as a control for Bihar is established in the economics literature, having been similarly employed in recent studies (Chaudhari et al., 2023; Muralidharan and Prakash, 2017). Second, the states share a common history—Jharkhand was part of Bihar until 2000, when the Bihar Reorganization Bill carved out 18 districts to establish the new state. Third, both states exhibit comparable development

[1] NFHS is a cross-sectional data

indicators and rank among India's poorest regions, with the lowest per capita GDP among all states. This is further evidenced by their performance in standardized development metrics: Jharkhand follows Bihar in the 2021 Multidimensional Poverty Index (MPI) rankings and places sixth-lowest in NITI Aayog's 2023-24 Sustainable Development Goal (SDG) India Index. Fourth, the states demonstrate similar patterns in gender-related development outcomes: Jharkhand reports 32% of women marrying before the legal age of 18 (NFHS, 2019-21), a substantial gender literacy gap (67.8% for females versus 81.9% for males; PLFS, 2020-21), and comparable alcohol consumption patterns among men (35%; NFHS, 2019-21). Fifth, both states operate similar women's empowerment initiatives. Bihar's State Livelihood Promotion Society (JEEViKA), a program facilitating rural women's empowerment through self-help groups (SHGs) began in 2006 with phased expansion, while Jharkhand operated a parallel program (Aajeevika) since 2011. Furthermore, when the ban was introduced in Bihar in April 2016, the ruling party in Jharkhand imposed no such ban.

I examine three indicators of women's autonomy: contraceptive use, attitudes toward spousal beating, and participation in household decision-making. Given India's cultural and institutional context, where marriage remains nearly universal and typically occurs early in women's lives, these autonomy measures are most relevant within marital relationships. The NFHS domestic violence module exclusively captures violence perpetrated by husbands, and contraceptive use is predominantly reported by married women due to social norms surrounding fertility in India. Accordingly, I restrict the sample to ever-married women aged 15-49[2] . From this

[2]While India's legal marriage age is 18 years, I include women aged 15-49 to capture all married women in the



Figure 1: Location of Bihar and Jharkhand in India

group, I further include only those women who completed the domestic violence module[3] and responded to questions about their husbands' alcohol consumption patterns. Using the household and eligible women's files, I construct a dataset focused on Bihar and Jharkhand. The final sample comprises 12,445 observations: 6,496 from NFHS-4 and 5,949 from NFHS-5.

sample. The upper bound of 49 years corresponds to the NFHS survey design for reproductive-age women.

[3]The NFHS categorizes intimate partner violence as: (i) severe physical violence (kicked, dragged, strangled, burnt, or threatened with weapons), (ii) sexual violence (forced sexual intercourse or acts), and (iii) emotional violence (humiliation, threats, or insults by husband).

From the final sample, I construct binary indicators for each of the three outcome variables. The contraceptive use indicator equals 1 if a respondent reports current use of any contraceptive method at the time of survey. The participation in decision-making indicator equals 1 if the respondent reports sole or joint participation in the three household decisions: 1)major family purchases, 2) visits to relatives or friends, and 3) healthcare utilization. Attitudes towards spousal beating indicator equals 1 if the respondent justifies husband's violence under any of the following five circumstances: 1) wife goes out without telling husband, 2) neglects children, 3) argues with husband, 4) refuses to have sex, or 5) burns food. The indicator equals 0 if violence is never justified under any circumstance.

I use three sets of control variables from the NFHS data. At the individual level, I include respondent's age (in years), education (years of schooling), age at marriage, an indicator for ownership of money, and sex of first child. At the household level, I incorporate a standardized wealth index, spouse's age and education, and household head characteristics. Additionally, I include demographic indicators for caste category, religious affiliation, and place of residence.

Table 1 reports means and standard deviations of outcome variables, separately for Bihar (treatment) and Jharkhand (control), before and after the prohibition. Table 2 presents the corresponding descriptive statistics for individual and household-level controls and socio-economic characteristics used in the empirical analysis.

Table 1: Summary Statistics of Control Variables

	Pre-policy (2015-16)			Post-policy (2019-21)		
	Bihar	Jharkhand	Both States	Bihar	Jharkhand	Both States
Individual Characteristics						
Age of respondent	31.28	31.38	31.32	32.17	32.77	32.41
	(8.13)	(8.16)	(8.14)	(8.30)	(8.14)	(8.24)
Education of respondent	3.70	4.80	4.17	4.20	5.20	4.61
	(4.83)	(5.11)	(4.47)	(5.02)	(5.19)	(5.11)
Age at marriage	17.50	17.50	17.50	17.40	17.90	17.60
	(3.36)	(3.39)	(3.37)	(3.19)	(3.50)	(3.33)
Sex of first child (male)	0.49	0.50	0.49	0.47	0.49	0.48
	(0.50)	(0.50)	(0.50)	(0.49)	(0.50)	(0.49)
Respondent owns money	0.29	0.43	0.35	0.53	0.53	0.53
	(0.45)	(0.49)	(0.47)	(0.49)	(0.50)	(0.49)
Household Characteristics						
Age of husband	35.94	36.39	36.10	37.06	37.58	37.27
	(9.19)	(9.11)	(9.16)	(9.29)	(9.00)	(9.18)
Education of husband	6.33	7.10	6.60	7.29	7.42	7.34
	(6.35)	(8.26)	(7.17)	(10.60)	(8.26)	(9.75)
Household head's gender (female)	0.24	0.11	0.19	0.23	0.15	0.20
	(0.43)	(0.31)	(0.39)	(0.42)	(0.35)	(0.40)
Household head's age	44.16	43.98	44.36	44.50	44.04	44.30
	(14.24)	(13.59)	(13.90)	(13.90)	(13.07)	(13.56)
Poorest	0.49	0.48	0.49	0.44	0.50	0.46
	(0.50)	(0.49)	(0.49)	(0.49)	(0.50)	(0.49)
Poor	0.24	0.21	0.22	0.27	0.23	0.26
	(0.42)	(0.40)	(0.42)	(0.44)	(0.42)	(0.43)
Middle	0.14	0.13	0.13	0.15	0.12	0.14
	(0.35)	(0.33)	(0.34)	(0.35)	(0.33)	(0.35)
Demographic Characteristics						
Hindu	0.85	0.73	0.80	0.85	0.73	0.81
	(0.35)	(0.44)	(0.39)	(0.34)	(0.44)	(0.39)
Muslim	0.14	0.11	0.13	0.14	0.11	0.13
	(0.35)	(0.32)	(0.34)	(0.34)	(0.32)	(0.33)
SC	0.20	0.14	0.17	0.25	0.14	0.21
	(0.40)	(0.34)	(0.38)	(0.43)	(0.35)	(0.41)
ST	0.02	0.29	0.13	0.03	0.31	0.14
	(0.16)	(0.45)	(0.33)	(0.49)	(0.46)	(0.34)
OBC	0.60	0.46	0.54	0.55	0.42	0.50
	(0.49)	(0.49)	(0.49)	(0.49)	(0.49)	(0.50)
Rural	0.85	0.77	0.82	0.88	0.81	0.86
	(0.35)	(0.42)	(0.38)	(0.31)	(0.38)	(0.34)
N	3947	2549	6496	3609	2340	5949

Notes: Each cell shows the mean and standard deviation of the variables (in parentheses).

4 Empirical Strategy

I identify the causal effect of prohibition using a difference-in-differences (DID) framework, where I compare women's autonomy outcomes in Bihar, a treated state, relative to Jharkhand, a control state. The identification strategy leverages Bihar's implementation of prohibition while Jharkhand maintained status quo, comparing changes in women's autonomy outcomes between these states from pre-prohibition (2015-16) to post-prohibition (2019-21) period. This empirical strategy is particularly suitable given the state-wide implementation of prohibition and the availability of comparable pre and post-policy data from repeated cross-sections of the NFHS. The choice of Jharkhand as control is appropriate given its geographical proximity and socio-economic similarity to Bihar prior to the policy change. The key identifying assumption is that there were no other simultaneous policy changes in Bihar that could have impacted outcomes of interests[4] .

Thus, I estimate[5] the following equation:

$$Y_{ist} = \alpha + \beta_1 Post_t + \beta_2 (Bihar \times Post)_{st} + \beta_3 Bihar + X_{ist} + \mu_d + \varepsilon_{ist} \quad (1)$$

where Y_{ist} is the outcome variable for individual i in state s at time t, $Post_t$ is a dummy variable for the post-prohibition period, *Bihar* indicates treatment state, X_{ist} is a vector of control variables, μ_d represents district fixed effects, and ε_{ist} is

[4]The Bihar Women Empowerment Policy, approved by the government in 2015, aimed to address gender disparities and promote the empowerment of women in various spheres of life. However, despite the policy's approval, there appears to be a lack of available information regarding its progress and impact. Without concrete data or updates, it becomes challenging to gauge the extent to which the policy has been implemented and its effects on women's empowerment in Bihar.

[5]I employ a Linear Probability Model (LPM) for the main analysis. Results from alternative specifications using logit and probit models yield similar marginal effects, both in magnitude and statistical significance. Hence, I report only the LPM estimates.

the error term. The coefficient β_2 is the causal coefficient of interest.

Since the changes in the outcome variables may vary by individual, household characteristics and socio-economic factors, I estimate four specifications. The baseline specification includes only state and time fixed effects. The second specification adds individual-level characteristics, while the third incorporates household-level and demographic controls. In the fourth and most comprehensive specification, I include a vector $\mathbf{X}_{ist}$ of all individual and household-level controls, along with district fixed-effects (μ_d) to account for time-invariant factors such as district administration capacity, program implementation efficiency, and overall infrastructure.

5 Results

Table 2: Impact of the ban on Women's Autonomy outcomes

	(1) Contraceptive Use	(2) Participation in Decision Making	(3) Attitude towards beating
Post	0.204***	-0.0701***	0.0323***
	(0.0131)	(0.0120)	(0.0123)
Post × Bihar	0.0696***	0.1170***	-0.0900***
	(0.0165)	(0.0162)	(0.0165)
Constant	0.0331	0.634***	0.262***
	(0.0481)	(0.0486)	(0.0454)
Baseline mean	0.42	0.74	0.26
N	12401	12401	12401

Notes: Post is an indicator of post-ban period (NFHS-5). Bihar = 1 if the woman is from Bihar. All regressions include individual, household, demographic controls and district fixed effects. Robust standard errors are in parentheses. P-values are highlighted as: $p < 0.1^{*}$ $p < 0.05^{**}$ $p < 0.01^{***}$

Table 3 presents the estimated causal effects of alcohol prohibition on women's autonomy outcomes. I report estimates from the comprehensive specification which

includes district fixed effects and a set of individual, household, and demographic controls.

The results indicate statistically significant improvements across multiple dimensions of women's autonomy in Bihar following the prohibition. The causal estimates in Column 1 show that contraceptive use increased by 7 percentage points in Bihar after the prohibition implementation which is about 16.6% on a baseline control mean of 42%. This represents a substantial increase in reproductive autonomy of women in Bihar. In Column 2, the results demonstrate an 11.7 percentage point increase in women's participation in household decision-making (15.8% on a baseline control mean of 74%). Column 3 reveals that women in Bihar were 9.0 percentage points less likely to justify beating post-prohibition (34.6% on a baseline control mean of 26%). The estimated coefficients are statistically significant at the 1% level.

6 Robustness

6.1 Parallel Trends

For the DID estimates to be unbiased, the parallel trends assumption which states that if no treatment had occurred, the difference between the treated group and the control group would have stayed the same in the post-treatment period as it was in the pre-treatment period, must hold. In other words, absent the alcohol ban policy, the outcome variables would have followed a similar trend in the treated and the control states.

I test for differences in outcomes between Bihar and Jharkhand before 2016, prior to the prohibition's implementation. The absence of differential trends during this period would suggest that post-2016 deviations in Bihar, relative to Jharkhand, can be attributed to the policy change. Using data from NFHS-3 (2005-06) and NFHS-4 (2015-16) survey rounds—both conducted before the prohibition—I estimate the regression specification shown in equation (1). In this specification, I introduce a fake treatment by considering 2015-16 as the post period. If the parallel trend assumption holds, then we should expect the value for the coefficient β_2 to be statistically indistinguishable from zero. Table 4 shows the results for this test, separately for each outcome variable. I am unable to establish parallel trends for the main autonomy outcomes.

Table 3: Parallel Trends

	(1) Contraceptive Use	(2) Participation in Decision Making	(3) Attitude towards beating
Post	-0.0104	-0.0855***	0.0480***
	(0.0152)	(0.0153)	(0.0154)
Post × Bihar	-0.105***	-0.127***	0.178***
	(0.02)	(0.02)	(0.02)
Constant	0.390***	0.475***	0.424***
	(0.0118)	(0.0119)	(0.0120)
N	10158	10159	10156

Notes: Post is an indicator of post-ban period (NFHS-5). Bihar = 1 if the woman is from Bihar. All regressions include individual, household, demographic controls and district fixed effects. Robust standard errors are in parentheses. P-values are highlighted as: $p < 0.1^{*}$ $p < 0.05^{**}$ $p < 0.01^{***}$

6.2 Difference-in-Differences with Propensity Score Weighting

Establishing parallel trends may also be implausible if the pre-intervention covariates are unbalanced between the treatment and the control groups (Abadie, 2005).

Given this violation of the parallel trends assumption, I employ inverse probability weighted difference-in-differences (IPW-DID) following Stuart et al. (2014) to obtain credible causal estimates. This approach reweights observations based on observable baseline characteristics to improve the comparability between treatment and control groups.

I estimate two IPW-DID specifications with different sets of baseline covariates. The first specification employs basic demographic and socio-economic characteristics to compute the weights: age and education, place of residence (rural/urban), caste and wealth index. The second specification adds baseline variables that the policy intended to affect: intimate partner violence exposure (physical violence, sexual violence and emotional violence) and husband's alcohol consumption.

Using these two sets of baseline covariates, I estimate multinomial probit models to obtain propensity scores for four groups: Bihar pre-prohibition, Bihar post-prohibition, Jharkhand pre-prohibition, and Jharkhand post-prohibition. I then construct weights as the ratio of the probability of being in the base group (Bihar pre-prohibition) to the probability of being in the group the observation is actually in. Finally, I estimate the difference-in-differences specification in Eq (1) using these probability weights to obtain the treatment effects.

Table 5 presents the IPW-DID estimates from the first specification. The results show that prohibition increased contraceptive use by 10.5 percentage points and household decision-making participation by 6.6 percentage points in Bihar. The probability of justifying spousal beating decreased by 9.9 percentage points. All coefficients are significant at the 1 percent level. The robustness of these estimates

to inverse probability weighting supports the causal interpretation of the main results.

Table 4: Impact of the ban on Women's Autonomy outcomes

	(1) Contraceptive Use	(2) Participation in Decision Making	(3) Attitude towards beating
Post	0.167***	0.02	-0.064***
	(0.0171)	(0.0115)	(0.0149)
Post × Bihar	0.105***	0.066***	–0.099***
	(0.02)	(0.0151)	(0.02)
Constant	-0.198***	0.694***	0.206***
	(0.054)	(0.0455)	(0.05)
Baseline mean	0.46	0.72	0.28
N	12401	12401	12401

Notes: Post is an indicator of post-ban period (NFHS-5). Bihar = 1 if the woman is from Bihar. All regressions include individual, household, demographic controls and district fixed effects. Robust standard errors are in parentheses. P-values are highlighted as: $p < 0.1^{*}$ $p < 0.05^{**}$ $p < 0.01^{***}$

Estimates from the second IPW-DID specification, which incorporates baseline IPV and alcohol consumption in the propensity score estimation, remain consistent with the first specification. The causal impacts in Bihar are: a 9.9 percentage point increase in contraceptive use, a 7.1 percentage point increase in household decision-making participation, and a 9.9 percentage point reduction in justification of spousal beating. All estimates are statistically significant at the 1 percent level. I report these results in Table 13.

6.3 Interior versus Border Districts of Bihar

To address potential concerns about policy enforcement and cross-border spillovers, I estimate an alternative specification using interior districts[6] of Bihar as the treatment group and border districts (those sharing boundaries with Jharkhand, West Bengal, Uttar Pradesh, and Nepal) as the control group. Given the relatively porous nature of state boundaries and free movement of people and goods, border districts might experience weaker policy implementation due to cross-border alcohol procurement. Based on this reasoning, I hypothesize that the ban's impact should be stronger in interior districts where enforcement is likely to be more effective.

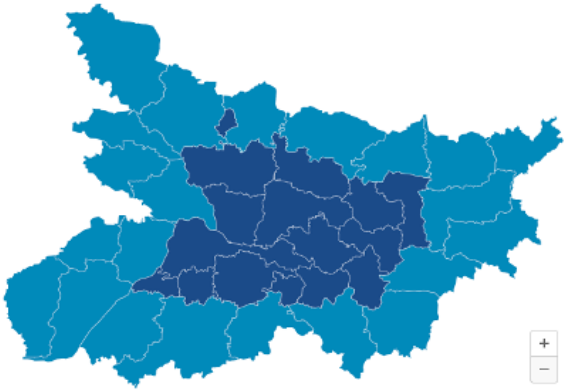


Figure 2: Interior and Border Districts of Bihar

Table 6 presents these estimates. The coefficients show that contraception use and household decision-making do not vary significantly between interior and border districts. However, I find that women in interior districts are 5 percentage points less likely to justify spousal beating than women in border districts after the prohibition. The absence of significant differences in contraception use and

[6]The border districts of Bihar include Kathihar, Bhagalpur, Banka, Rohtas, Aurangabad, Gaya, Nawada, Jamui, Kaimur, Buxar, Bhojpur, Saran, Gopalganj, Siwan, West Champaran, Kishanganj, Purnea, East Champaran, Sitamarshi, Madhubani, Supaul, Araria and Kishanganj

decision-making between interior and border districts provides additional support for the main results.

Table 5: Impact of the ban in the interior districts of Bihar

	(1) Contraceptive Use	(2) Participation in Decision Making	(3) Attitude towards beating
Post	0.268***	0.143***	-0.187***
	(0.0145)	(0.0147)	(0.0147)
Post × Interior_Bihar	0.017	-0.000279	-0.0509***
	(0.0206)	(0.022)	(0.0226)
Constant	-0.268***	0.431***	0.262***
	(0.0515)	(0.0587)	(0.0454)
N	7532	7532	7532

Notes: Post is an indicator of post-ban period (NFHS-5). Interior_Bihar = 1 if the woman is from interior districts of Bihar. All regressions include individual, household, demographic controls and district fixed effects. Robust standard errors are in parentheses. P-values are highlighted as: p < 0.1* p <0.05** p < 0.01***

6.4 Bihar-Jharkhand Border Analysis

While the previous specification compared interior and border districts within Bihar, I now restrict the analysis to districts along the Bihar-Jharkhand[7] border. This cross-border specification exploits geographic proximity to identify policy effects, comparing outcomes between Bihar's border districts and their adjacent counterparts in Jharkhand.

Table 7 presents these estimates. The results indicate that women in Bihar's districts bordering Jharkhand show a 14.3 percentage point increase in contraception use compared to women in Jharkhand's districts bordering Bihar after the prohibition. Similarly, women in Bihar's border districts are 6.9 percentage points less likely to

[7]The border districts of Jharkhand (with Bihar) include Garawah, Palamu, Chatra, Hazaribagh, Kodarma, Giridih, Deoghar, Godda, Sahibganj and Dumka.

justify spousal beating. However, I find no significant difference in participation in household decision-making. The persistence of significant effects in Bihar's border districts, even when compared to their immediate neighbors in Jharkhand, provides additional support for the policy's impact.

Table 6: Impact of the ban in the border districts of Bihar and Jharkhand

	(1) Contraceptive Use	(2) Participation in Decision Making	(3) Attitude towards beating
Post	0.159***	0.0704***	-0.187***
	(0.0205)	(0.0147)	(0.0147)
Post × Border_Bihar	0.143***	-0.0018	-0.0509***
	(0.0303)	(0.022)	(0.0226)
Constant	0.0695	0.718***	-0.0695***
	(0.0732)	(0.0751)	(0.0311)
N	3558	3588	3588

Notes: Post is an indicator of post-ban period (NFHS-5). Border_Bihar = 1 if the woman is from the districts of Bihar bordering with Jharkhand. All regressions include individual, household, demographic controls and district fixed effects. Robust standard errors are in parentheses. P-values are highlighted as: $p < 0.1^{*}$ $p < 0.05^{**}$ $p < 0.01^{***}$

6.5 Muslim Women as a control

To further validate the causal relationship between the alcohol ban and women's autonomy outcomes, I conduct a sub-sample analysis comparing Hindu and Muslim women. This comparison is informative given the pre-existing religious restrictions on alcohol consumption among Muslims. Despite religious prohibitions, 10% of Muslim women report spousal alcohol consumption (compared to 36% of Hindu women), suggesting they might also benefit from the state policy.

Table 8 presents these estimates. The lack of significant differences in contraception use and household decision-making between religious groups aligns with the

fact that Muslim households are not entirely unexposed to alcohol consumption. The results show decline in justification of spousal beating among Hindu women compared to Muslim women. The presence of alcohol consumption in Muslim households and subsequent similar policy effects provides additional validation for the main results.

Table 7: Impact of the ban on Hindu women

	(1) Contraceptive Use	(2) Participation in Decision Making	(3) Attitude towards beating
Post	0.240***	129***	-0.0828***
	(0.0264)	(0.0284)	(0.0306)
Post × Hindu	0.0416	0.0169	-0.0930***
	(0.0285)	(0.0306)	(0.0327)
Constant	-0.0542***	0.381***	0.453***
	(0.0465)	(0.0536)	(0.0557)
N	7524	7524	7524

Notes: Post is an indicator of post-ban period (NFHS-5). Hindu = 1 if the woman is a Hindu from Bihar. All regressions include individual, household, demographic controls and district fixed effects. Robust standard errors are in parentheses. P-values are highlighted as: $p < 0.1^{*}$ $p < 0.05^{**}$ $p < 0.01^{***}$

6.6 Baseline IPV Level

The final specification leverages variation in baseline IPV exposure within Bihar. Given that reducing domestic violence through decreased alcohol consumption was a key policy objective, I use women without reported IPV at baseline as a control group. This within-state comparison provides an additional test of the prohibition's causal impact, particularly on a vulnerable subgroup that the policy intended to benefit[8].

[8]Most crimes in India are under-reported (Dreze and Khera, 2000)

Table 9 presents estimates comparing women in Bihar who reported experiencing IPV at baseline to those who did not. The results indicate that women with baseline IPV exposure show larger improvements across outcomes following the prohibition. These women demonstrate a 5.74 percentage point increase in contraception use and a 6.22 percentage point decline in justifying of spousal beating, both significant at the 5 percent level. The increase in household decision-making participation (5.5 percentage points) is significant at the 10 percent level. The improvements in all the outcome variables among women with baseline IPV exposure provide additional validation for the policy's impact.

Table 8: Impact of the ban on by baselin IPV exposure

	(1) Contraceptive Use	(2) Participation in Decision Making	(3) Attitude towards beating
Post	0.261***	137***	-0.146***
	(0.0151)	(0.0164)	(0.0167)
Post × IPV	0.0574**	0.0555*	-0.0622**
	(0.0274)	(0.0306)	(0.0314)
Constant	-0.395***	0.416***	0.429***
	(0.0585)	(0.0634)	(0.0609)
N	7532	7532	7532

Notes: Post is an indicator of post-ban period (NFHS-5). IPV = 1 if the woman from Bihar reported incidence of IPV. All regressions include individual, household, demographic controls and district fixed effects. Robust standard errors are in parentheses. P-values are highlighted as: $p < 0.1^{*}$ $p < 0.05^{**}$ $p < 0.01^{***}$

7 Heterogeneity Analysis

I examine heterogeneous impacts of the prohibition across two dimensions. First, I analyze variation by age at marriage. The causal estimates reported in Table 10 indicate that for women married before 18, justification of spousal beating

decreases by 3.87 percentage points (significant at 10 percent) and household decision-making participation increases by 4.67 percentage points (significant at 5 percent) compared to those married at 18 or above.

Second, I investigate heterogeneity by household wealth using quintile indicators from the wealth index. The causal estimates reveal larger impacts among women from the poorest quintile. for these women, justification of spousal beating decreases by 5.28 percentage points and household decision-making participation increases by 5 percentage point, both significant at the 5 percent level. The magnitude of these estimates suggests that the prohibition had particularly pronounced impacts on women who got married at a young age and women from economically disadvantaged households.

Table 9: Heterogeneity Analysis

	(1) Contraceptive Use	(2) Participation in Decision Making	(3) Attitute towards Beating
Panel A: Respondent's Age at Marriage			
Less than 18	0.0028	0.0467**	-0.0387*
	(0.0204)	(0.0217)	(0.0222)
18-21	-0.0211	0.0277	0.0214
	(0.0209)	(0.0225)	(0.0230)
Above 21	0.0438	-0.0597	0.0491
	(0.0334)	(0.0368)	(0.0358)
Panel B: Wealth Index			
Poorest	-0.0324	0.0502**	-0.0528**
	(0.0205)	(0.0217)	(0.0224)
Poor	0.0310	-0.0207	0.0269
	(0.0233)	(0.0249)	(0.0256)

8 Potential Mechanisms

I investigate two key channels through which prohibition affects women's autonomy outcomes. The focus on these mechanisms is motivated by the policy's implementation context, as prohibition was enacted in response to rising alcohol consumption and IPV in Bihar. I hypothesize that prohibition improves women's autonomy through reduced alcohol consumption and decreased intimate partner violence.

To test these channels empirically, I first estimate the impact of prohibition on wives' reports of their husbands' alcohol consumption using the difference-in-differences specification used in Eq (1) with alcohol consumption as the outcome variable. Table 11 presents these estimates. The results indicate that prohibition caused a 6-percentage point decline in wives' reports of alcohol consumption by husband, significant at the 1 percent level.

Table 10: Impact of the ban on Alcohol Consumption and IPV

	(1) Alcohol Consumption	(2) Physical Violence	(3) Sexual Violence	(4) Emotional Violence
Post	-.0457***	0.008	-0.0176**	0.0165
	(0.013)	(0.008)	(0.008)	(0.01)
Post × Bihar	-0.059***	-0.042***	-0.037**	-0.048***
	(0.0168)	(0.0121)	(0.0121)	(0.0154)
Constant	0.711	0.101***	0.161***	0.107***
	(0.047)	(0.03)	(0.037)	(0.04)
Baseline mean	0.44	0.08	0.078	0.094
N	12401	12401	12401	12401

Notes: Post is an indicator of post-ban period (NFHS-5). Bihar = 1 if the woman is from Bihar. All regressions include individual, household, demographic controls and district fixed effects. Robust standard errors are in parentheses. P-values are highlighted as: $p < 0.1^{*}$ $p < 0.05^{**}$ $p < 0.01^{***}$

Next, I investigate the policy's impact on three measures of intimate partner violence using the same empirical specification. Table 11 shows that prohibition led to significant reductions in physical, sexual, and emotional violence. These findings align with prior evidence documenting the causal relationship between prohibition and reduced intimate partner violence in this context (Dixit and Mukherjee, 2024). Studies by Khurana and Mahajan (2022) and Luca et al. (2015) identified restricted alcohol access as one mechanism associated with lower rates of sexual assault and gender-based violence.

To test whether intimate partner violence and alcohol consumption affect the relationship between prohibition and women's autonomy, I augment the DID specification[9] with these hypothesized mechanisms as controls. Table 12 presents these estimates. The heterogeneous pattern in coefficients suggests varying channels of impact across outcomes. The prohibition's effect on contraceptive use increases marginally from 7.0 to 7.1 percentage points after controlling for the mechanisms. However, the coefficient for household decision-making declines from 11.7 to 7.9 percentage points, and justification for spousal beating decreases from 9.0 to 8.5 percentage points. This attenuation in coefficients for decision-making and attitudes, and almost no change in coefficient for contraceptive use suggests that reduced alcohol consumption and IPV are important mechanisms for these outcomes, while contraceptive use might operate through broader channels.

Research has consistently demonstrated strong links between IPV, reproductive health outcomes, and women's decision-making autonomy. Studies establish both

[9]Estimates from IPW-DID specification including IPV and alcohol consumption controls yield similar results: 8.0 percentage point increase in contraception use, 7.7 percentage point increase in decision-making participation, and 8.4 percentage point decline in justification of spousal beating, all significant at conventional levels.

the direct impact of alcohol on violence - with Fals-Stewart (2003) finding that the odds of severe male-to-female physical and sexual aggression were more than 11 times higher on days of men's drinking - and broader associations with reproductive health. Evidence from multiple contexts reinforces these relationships: in Ghana, P. Crissman et al. (2012) found that family planning decision-making autonomy was negatively associated with IPV, while in Nigeria, Solanke et al. (2022) showed that women who experienced IPV were more likely to face pregnancy complications, including miscarriages, induced abortions, stillbirths, and infant mortality, as well as higher fertility rates. Regional studies in West and Central Africa by Olorunsaiye et al. (2017) further revealed that high prevalence of domestic violence approval undermines women's reproductive health programs, particularly contraceptive use. This finding aligns with research from rural India by Stephenson et al. (2008), which demonstrated that women experiencing physical violence were significantly less likely to adopt contraception and more likely to experience unwanted pregnancies. Similar patterns were observed in Nigeria, where Bishwajit and Yaya (2018) found strong associations between contraceptive use and domestic violence. The impact extends beyond reproductive health to broader decision-making power, as evidenced by Kabir et al.'s (2019) research in Myanmar, which revealed that women experiencing violence face increased vulnerability and reduced decision-making roles.

Table 11: Impact of the ban on Women's Autonomy outcomes

	(1) Contraceptive Use	(2) Participation in Decision Making	(3) Attitude towards beating
Post	0.205***	0.004	-0.069***
	(0.013)	(0.008)	(0.0122)
Post × Bihar	0.071***	0.079***	-0.085***
	(0.0165)	(0.0128)	(0.0165)
Constant	0.0143	0.707***	0.23***
	(0.0485)	(0.0409)	(0.0463)
Baseline mean	0.42	0.74	0.26
N	12401	12401	12401

Notes: Post is an indicator of post-ban period (NFHS-5). Bihar = 1 if the woman is from Bihar. All regressions include individual, household, demographic controls and district fixed effects. Additionally, regressions include alcohol consumption and IPV as controls. Robust standard errors are in parentheses. P-values are highlighted as: $p < 0.1^{*}$ $p < 0.05^{**}$ $p < 0.01^{***}$

9 Conclusion

In this paper, I demonstrate that state-led alcohol prohibition policy has significant spillover effects on women's autonomy. While the policy originated as an electoral response to women voter's complaints about spousal alcohol consumption and domestic violence, its impact extended beyond its primary objectives. Using a large representative household-level survey data, I provide evidence that prohibition significantly enhanced three key dimensions of women's autonomy: contraceptive use, household decision-making power, and attitudes toward spousal violence. These findings contribute to our understanding of how regulatory policies can generate broader social transformation, particularly in contexts where gender norms and household dynamics are deeply intertwined with substance use. The results also suggest that policies aimed at regulating male behavior can have substantial indirect benefits for women's autonomy.

I also identify two key mechanisms through which prohibition affects women's autonomy. First, the policy leads to a substantial decline in household alcohol consumption. Second, prohibition reduces the incidences of IPV. These mechanisms align with the theoretical framework linking substance abuse, domestic violence, and women's bargaining power within households, providing empirical evidence for the causal chain from prohibition to enhanced women's autonomy.

Critics of blanket alcohol prohibition policy in Bihar emphasize two main concerns: first, the policy's limited effectiveness in reducing alcohol availability due to illegal cross-border flows and persistent local production; second, significant revenue losses to the state exchequer, particularly salient given Bihar's low per capita GDP. However, my empirical findings reveal that despite these leakages, the policy generates significant positive effects on women's autonomy, complementing previous evidence of reduced crime and IPV. These results highlight the importance of moving beyond gender-neutral policy evaluation frameworks. While traditional policy assessments often prioritize macroeconomic indicators and growth metrics, this research demonstrates that the welfare analysis frameworks must incorporate both economic efficiency parameters and social equity measures, particularly gender-specific outcomes, to fully capture policy impacts.

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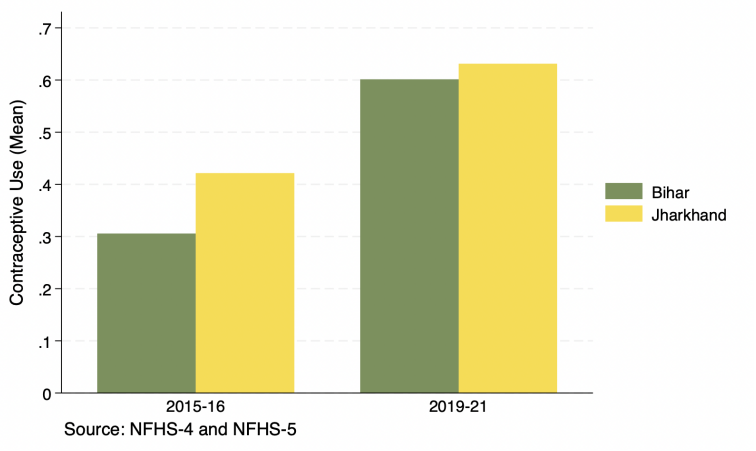
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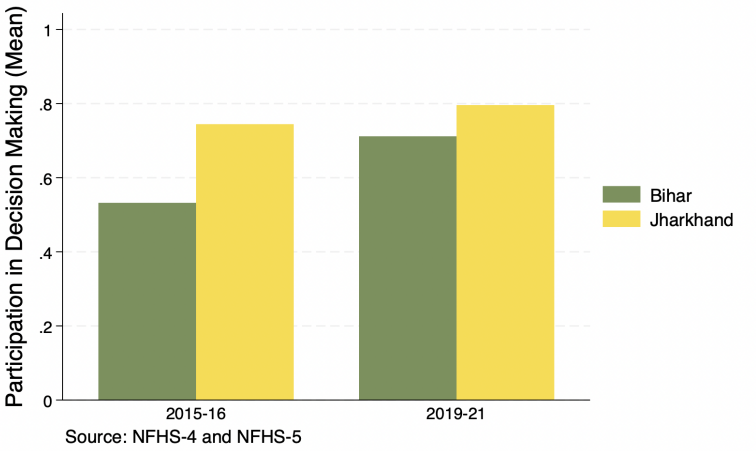
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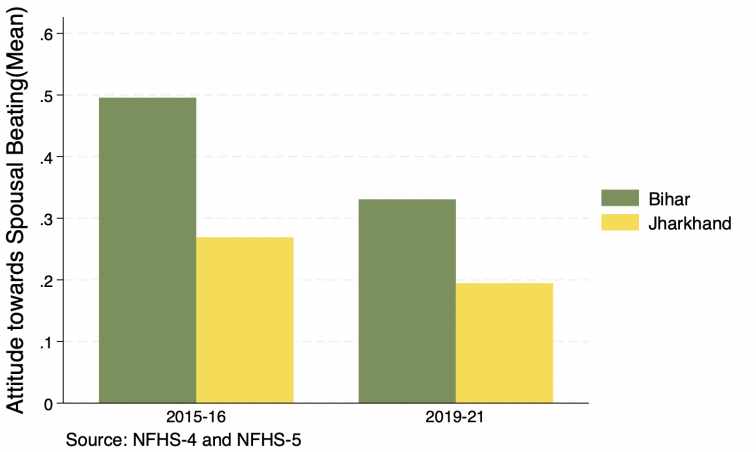
10 Additional Tables and Figures



(a) Contraceptive Use



(b) Decision Making



(c) Attitudes towards Spousal Beating

Figure 3: Bar Charts of Outcome Variables

Table 12: Impact of the ban on Women's Autonomy outcomes

	(1) Contraceptive Use	(2) Participation in Decision Making	(3) Attitude towards beating
Post	0.175***	0.01	-0.053***
	(0.018)	(0.0114)	(0.0185)
Post × Bihar	0.99***	0.071***	–0.099***
	(0.0212)	(0.0179)	(0.0218)
Constant	-0.202***	0.744***	0.219***
	(0.0553)	(0.0462)	(0.0519)
Baseline mean	0.55	0.73	0.26
N	12401	12401	12401

Notes: Post is an indicator of post-ban period (NFHS-5). Bihar = 1 if the woman is from Bihar. All regressions include individual, household, demographic controls and district fixed effects. Robust standard errors are in parentheses. P-values are highlighted as: $p < 0.1^{*}$ $p < 0.05^{**}$ $p < 0.01^{***}$