Does Alcohol Prohibition Improve Caloric and Macronutrient Intake from Healthy Food Sources? Evidence from Bihar, India

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ABSTRACT

We examine the impact of a recent state-led alcohol prohibition policy on caloric and macronutrient intake from healthy food sources in Bihar, India. We exploit an exogenous statewide ban on the production, sale, and consumption of alcohol implemented in 2016. Using data from two rounds of a nationally representative cross-sectional survey conducted before and after the ban and employing a propensity score matching difference-in-differences framework, we find that alcohol prohibition led to significant increases in caloric, protein, and fat intake from healthy food sources. The policy was also associated with a decline in fat intake from unhealthy food sources. These findings are robust across a range of specifications and estimation strategies. Heterogeneity analysis reveals stronger effects among urban households, wealthier cohorts, and marginalized castes. The observed changes are likely driven by healthy behavioral spillovers, reduced marital conflicts, higher household earnings, reduced alcohol-related expenditure, and increased household spending on healthy food items such as pulses, dairy products, and healthy oils.

Keywords: Alcohol prohibition; Caloric intake; Macronutrients; Healthy and unhealthy food sources; India

JEL codes: D12; I18; Q18

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1. Introduction

Food insecurity continues to pose a significant challenge in lower-middle-income countries (LMICs) such as India, where it is strongly associated with adverse nutritional outcomes and heightened risks of malnutrition across the life course (Dhamija et al., 2022; Moradi et al., 2018). Despite a decline in the prevalence of undernourishment from 21.4% in 2004–2006 to 13.7% in 2021–2023, India remains home to approximately 194.6 million undernourished individuals, representing 27% of the global burden in this period (FAO et al., 2024). According to the 2023 Global Hunger Index, India's score of 27.3 places it 105th out of 127 countries, corresponding to a 'serious' level of food insecurity (Welthungerhilfe et al., 2024). Furthermore, in 2022, 55.6% of the population was unable to afford a nutritionally adequate diet—substantially above the global average of 35.4% (FAO et al., 2024). India is also characterized by the dual burden of malnutrition, wherein persistent undernutrition coexists with a rising prevalence of overnutrition and diet-related non-communicable diseases, the latter driven in part by dietary transitions toward calorie-dense, nutrient-poor food items (Meenakshi, 2016).

This paper investigates the nutritional spillover effects of alcohol prohibition in a resource-constrained setting. Specifically, we assess whether the reallocation of household expenditures, induced by an exogenous shock to alcohol availability, translates into improved nutritional intake. Studies have shown that alcohol consumption would crowd out expenditure on essential goods, including food, by diverting a non-trivial share of household budgets (Gell & Meier, 2012; Jumrani et al., 2017). We hypothesize that the imposition of a prohibition regime reduces alcohol-related expenditure and potentially improves health behaviors, thereby inducing a shift in household consumption patterns toward more nutritious food sources. Using detailed household survey data, we empirically estimate the effects of prohibition on caloric and macronutrient (protein and fat) intake from healthy food sources.

This paper focuses on the *Bihar Prohibition and Excise Act (2016)*, which instituted a comprehensive ban on the consumption, sale, production, and transportation of alcohol in the Indian state of Bihar starting in April 2016. We exploit this policy shock to examine changes in caloric and macronutrient intake, comparing Bihar with neighboring states before and after the ban. Our identification strategy employs a difference-in-differences (DiD) framework combined with kernel-based propensity score matching to improve covariate balance across treatment and comparison groups. Using two rounds of nationally representative Consumer Expenditure Survey (CES) data collected pre- and post-intervention, we find that alcohol prohibition led to significant increases in caloric, protein, and fat intake from healthy food sources. The ban also corresponded with a reduction in fat intake from unhealthy food sources. Subgroup analysis indicates that the effects are more pronounced among urban households, wealthier cohorts, and marginalized caste groups. The findings are plausibly mediated by healthy behavioral spillover, reduced marital conflicts, improved earnings, and a reallocation of expenditure toward nutritious items such as pulses, dairy products, and healthy oils facilitated by reduced alcohol-related spending.

This study engages with and contributes to a growing body of empirical and policy-oriented literature on alcohol regulation and household welfare in resource-constrained settings. First, it adds to the limited empirical evidence on the effectiveness of restrictive alcohol policies in reducing the social costs of alcohol consumption in developing countries. While legal restrictions, taxation, and comprehensive bans have proven effective in high-income settings (Carpenter & Dobkin, 2015; Luukkonen, 2023; Hall, 2010), such interventions often face implementation challenges in lower-middle-income contexts due to weak institutional capacity and the absence of coherent national alcohol control policies (Gururaj et al., 2021). Additionally, the inelastic nature of alcohol demand, ranging from −0.14 to −0.46 for different types of alcohol, limits the efficacy of taxation-based strategies in

these settings (Kumar, 2017). Despite its contentious nature, total prohibition remains understudied as a policy instrument in developing countries, primarily due to concerns over enforceability and political feasibility. This gap is especially salient given that, unlike many high-income countries, alcohol consumption has been rising in lower-middle-income countries such as India alongside economic growth (WHO, 2018). Alcohol use is a major contributor to India's disease burden, responsible for over 22,000 deaths and 2.6 million disability-adjusted life years (DALYs) in 2019 (GBD 2016 Risk Factors Collaborators, 2017). Beyond direct health impacts, alcohol consumption is associated with elevated rates of violent crime, reduced labor productivity, and adverse child health outcomes, including malnutrition (Barron et al., 2024; Buvik et al., 2018; Bhandari et al., 2024).

Second, this study contributes to the limited body of evidence on the public health impacts of alcohol prohibition in resource-poor settings, specifically through the lens of nutritional outcomes such as caloric and macronutrient intake. While the *Bihar Prohibition and Excise Act (2016)* has been the focus of prior evaluations, existing studies primarily examine its effects on socio-economic and behavioral outcomes. For instance, the ban has been shown to reduce intimate partner violence and neighborhood-level violent crime (Dixit & Mukherjee, 2025; Chaudhuri et al., 2024). Other work finds positive spillovers on educational outcomes, including improvements in learning among school-going children (Dar et al., 2024), as well as reductions in the prevalence of overweight and obesity among adult males (Chakrabarti et al., 2024). This paper extends the literature by examining the nutritional spillover effects of prohibition, an outcome dimension that remains underexplored.

Finally, this paper contributes to three related strands of literature. First, it engages with the literature on the paradox of income growth not leading to sustained reductions in undernutrition (Deaton & Drèze, 2009), by offering new evidence on how reductions in non-food spending through prohibition can release household resources toward improved

nutrition. Second, it engages with the literature documenting the rise of overnutrition in India, where energy-dense, nutrient-poor diets contribute to a growing double burden of malnutrition (Nguyen et al., 2021; Meenakshi, 2016; Downs et al., 2015), by showing that prohibition simultaneously improves caloric adequacy and diet quality, thereby highlighting a policy pathway relevant to both undernutrition and overnutrition debates. Third, it contributes to the emerging body of work evaluating the welfare and health impacts of alcohol control policies, which has primarily focused on cardiovascular disease and biological risk factors, by introducing a novel angle that links prohibition to food security and nutritional well-being (Chaudhuri et al., 2024; Kumar, 2017). As illustrated in Figure 1, recent rounds of the Consumer Expenditure Survey (CES) reveal a decline in caloric intake from healthy food sources alongside a marked increase in the intake from unhealthy alternatives, particularly for protein and fat. These dietary transitions pose a growing public health challenge, given their established role as risk factors for non-communicable diseases (NCDs) (Chakravorty et al, 2019). In response, the World Health Organization underscores the importance of promoting healthy diets to combat all forms of malnutrition and mitigate the burden of NCDs (WHO, 2018).

[Figure 1 Here]

The remainder of the paper is structured as follows. Section 2 reviews the context of food security and alcohol prohibition in Bihar. Section 3 presents the conceptual framework. Section 4 details the data and empirical strategy. Section 5 reports the main results, and Section 6 explores the underlying mechanisms driving our results. Section 7 tests the parallel trends assumption and conducts robustness checks. Section 8 explores heterogeneity in treatment effects. Section 9 concludes with policy implications.

2. Background

2.1 Food Security in Bihar

Bihar, located in eastern India, remains one of the most socio-economically disadvantaged states in the country. With a population exceeding 130 million—approximately 1.5% of the global population—and a per capita income of INR 50,555 (approximately USD 593) in 2021-2022, it ranks among the poorest regions globally. Bihar consistently performs poorly on human development indicators and occupies the lowest tier among Indian states (Smits & Permanyer, 2019).

Food insecurity remains acute. Bihar ranks second-worst nationally in progress toward Sustainable Development Goal 2: Zero Hunger (NITI Aayog, 2024). While cereals constitute the dietary staple for most households, consumption of macronutrient-dense non-staple food groups—such as pulses, dairy, leafy vegetables, eggs, fish, and meat—remains limited (Tata-Cornel Institute, 2022). Dietary patterns have also shifted unfavorably. As shown in Figure A.1, between 2004–2005 and 2011–2012, caloric intake from healthy food sources increased marginally by 2.16%, while intake from unhealthy sources rose by 51.86%. Similarly, protein intake from unhealthy sources grew by 124.06%, far outpacing the 4.84% increase from healthy sources. Fat intake from unhealthy foods increased by 115.40%, more than five times the growth from healthy sources (21.96%). These patterns underscore the dual burden of undernutrition and a growing reliance on energy-dense, nutrient-poor diets.

2.2 Alcohol Prohibition in Bihar

Alcohol consumption among men in Bihar is substantial, with more than 29% of males aged 15–54 reporting use. In 2016, the Bihar government enacted the Bihar Prohibition and Excise Act, imposing a comprehensive ban on the production, sale, transportation, and consumption of alcohol. The prohibition was politically motivated, following a campaign promise by the

incumbent chief minister in the 2015 state elections, particularly in response to rising demands from women voters concerned about domestic violence linked to alcohol use (Singh, 2015). The law contained some of the most stringent provisions among Indian prohibition policies, including the death penalty for those causing fatalities from illicit liquor, and prison terms of 5–10 years with fines up to INR 1 million (approximately USD 12,000) for public consumption. However, the government relaxed some of these strict provisions in July 2018 (Tewary, 2018).[1]

To curb alcohol production, the Bihar government stopped issuing and renewing licenses for liquor manufacturing units, leading to the closure of breweries across the state. Law enforcement agencies actively enforced the Act (Press Trust of India, 2017). By August 2024, more than 1.27 million individuals had been arrested for violations, and over 34.6 million litres of alcohol were seized (Press Trust of India, 2024).

Evidence indicates that the prohibition substantially reduced alcohol consumption in Bihar. The blanket ban is estimated to have prevented 2.4 million cases of frequent drinking (Chakrabarti et al., 2024). A government survey reported that over 95% of respondents quit alcohol after the ban (Rumi, 2023), and women reported significant declines in their husbands' drinking (Debnath et al., 2023). The reduction is also reflected in state excise revenues, which fell sharply to INR 30 crore (USD 3.5 million) in 2016–17, a decline of INR 3,112 crore from the previous year (Comptroller and Auditor General of India, 2018).

[1] Key amendments to the law included making the first offence of alcohol consumption bailable with a penalty of INR 50,000 (approximately USD 570) and reducing the penalty for non-payment to three months' imprisonment (from the earlier provision of a 10-year sentence). The amendment ended property seizure, community fines, and family-wide arrests for home consumption, while retaining strict penalties for stocking and repeat offences related to manufacture or sale.

3. Conceptual Framework

Drawing on theoretical insights and empirical evidence, we identify four potential channels through which alcohol prohibition may influence household-level caloric and macronutrient intake from healthy and unhealthy food sources. These mechanisms are depicted in Figure 2.

Income Effect and Resource Reallocation: Prior to prohibition, alcohol expenditure—including country liquor, beer, and foreign/refined spirits—accounted for 8.36% of total food spending for drinking households in Bihar. Existing literature highlights that alcohol spending often crowds out expenditures on food and other essentials (Gell & Meier, 2012; Jumrani et al., 2017). By constraining access to alcohol, prohibition generates an income effect: households effectively increase their real disposable income, as resources previously devoted to alcohol become available for other uses. These savings can be reallocated toward food—particularly healthier food groups—thereby improving dietary quality. Importantly, even though the share of alcohol-consuming households in the post-prohibition survey data is relatively modest, this strengthens rather than weakens the pathway, since the mechanism operates through increased capacity for reallocation among affected households while leaving non-drinking households unaffected. This income effect and reallocation channel is therefore a central mechanism examined in this study.

Gateway Behavior Hypothesis: Health-risk behaviors—such as alcohol use, smoking, poor diets, and physical inactivity—tend to cluster (Li et al., 2024). The gateway behavior hypothesis suggests that behavioral interventions targeting a single health domain can generate positive spillover effects on other health behaviors (Berg et al., 2012). Reduced alcohol consumption may act as a 'gateway behavior' for dietary improvements marked by greater intake from healthy sources and reduced reliance on unhealthy, energy-dense foods (Breslow et al., 2010; Kruger & Kruger, 2015)

Reduced marital conflicts: Family dynamics play a critical role in shaping household dietary patterns. Lower marital conflicts are associated with healthier eating behavior (Jaremka et al., 2016). Dixit and Mukherjee (2025) find that the prohibition in Bihar significantly reduced intimate partner violence. A decline in domestic conflict may foster more stable household environments conducive to improved nutritional outcomes.

Labor Market Participation: Alcohol misuse has been linked to diminished labor force participation and heightened risk of unemployment (Jørgensen et al., 2019). Prohibition may improve labor market engagement and productivity, potentially raising household income and enabling greater access to nutritious foods. Increased employment and income could, in turn, alleviate food insecurity.

[Figure 2 Here]

4. Data and Methods

4.1 Data

This study utilizes household-level data from the Consumer Expenditure Survey (CES) conducted by the National Sample Survey Office (NSSO), Government of India, for the years 2011–2012 and 2022–2023. The CES is a nationally representative, cross-sectional survey administered quinquennially (and annually with a smaller sample size) across all Indian states.[2] The data collected are primarily used to estimate the poverty line, compile Consumer Price Indices (CPIs) for rural and urban India, and generate key indicators of standard of living, social consumption, and economic inequality. The 2011–2012 and 2022–2023 rounds surveyed 101,651 and 261,746 households, respectively.

[2] Although the NSSO conducted a CES round in 2017–2018, the Government of India did not release the report due to administrative and technical reasons

We focus on households from Bihar (treatment group) and its neighboring states (control group)—Uttar Pradesh, Jharkhand, and West Bengal—as shown in Figure A.2. To improve comparability and mitigate potential biases, we restrict our sample to households in the lower four quintiles of monthly per capita household expenditure. We exclude the fifth quintile due to their distinct dietary behavior. For instance, the most affluent households spend a lower proportion of their income on food. Moreover, the rich rely less on cereals for their nutritional needs than others. Additionally, wealthier households spend a greater share of their food budgets on processed foods (IFPRI, 2024; Borkotoky & Unisa, 2018). As postulated by Engel's law, the income elasticity of food is lowest for the high-income group (Kumar et al., 2011).

Some anecdotal reports suggest limited bootlegging and inflated prices in parallel markets (Parth, 2020). Such avenues are more accessible to affluent households; this is another reason we exclude the top expenditure quintile from our sample. For the vast majority of households, however, prohibition effectively curtailed access to alcohol, ensuring that our estimates capture the population most affected by the policy. These exclusions therefore minimize bias arising from households whose alcohol consumption may be less affected by the ban. Our final analytical sample comprises 18,684 households in the treatment group (Bihar) and 56,970 households in the control group (neighboring states).

The CES collects information on the quantity of various food items consumed over reference periods of 7 or 30 days.[3] These quantities are converted into caloric, protein, and fat values using standard NSSO-provided nutritional conversion factors (NSSO, 2014). Following the dietary guidelines of the EAT-Lancet Commission, we categorize food items

[3] The reference period is the same across the survey rounds for all food items except dairy products and bread (bakery).

as either *healthy* or *unhealthy* (Willett et al., 2019; Sharma et al., 2020).[4] We compute daily per-consumer-unit[5] intake of calories, protein, and fat from healthy and unhealthy food sources, aggregated at the household-level. Additional socio-economic and demographic characteristics reported in the CES are used as control variables in the empirical analysis.

4.2. Identification Strategy

This study estimates the causal effect of alcohol prohibition in Bihar on household-level caloric and macronutrient intake from healthy and unhealthy food sources. A naive comparison of dietary outcomes before and after the policy may be confounded by contemporaneous policy changes or unobserved time-varying factors, such as cultural norms, that influence both alcohol consumption and dietary behavior. While a standard difference-in-differences (DiD) framework can mitigate such concerns, differences in observable characteristics across states may still bias the estimates (Table A.1).

To strengthen identification, we follow Blundell & Dias (2009) and implement a kernel-based propensity score matching difference-in-differences (PSM-DiD) strategy. It should be noted that our estimates are based on repeated cross-sections rather than panel data, so the same households cannot be followed over time. First, kernel propensity score matching is used to improve covariate balance between treatment (Bihar) and control (neighboring states) groups, with propensity scores estimated from a rich set of pre-treatment household-level covariates. The resulting weights are then applied as sampling weights in the DiD estimation, which yields the ATT (average treatment effect on the treated), adjusting for potential selection bias from observable heterogeneity. This ensures that for every treated

[4] Table A.20 classifies different food items as healthy and unhealthy food sources. Further, each food item is categorized into 20 food groups.

[5] Consumer unit of a person of a particular sex and age is an indicator of the energy requirement in terms of the standard applicable to an average male in the age group 20-39 doing sedentary work. The consumer units representing the energy requirement levels per diem of the different household members, irrespective of age and sex, are added together to derive the total number of consumer units in that household.

household, a counterfactual is identified in the control group within the common support region. Sufficient evidence suggests that the prohibition effectively reduced alcohol consumption; however, potential bootlegging makes full compliance challenging to enforce, Therefore, the estimates are best interpreted as an intent-to-treat effect (ITT). As shown in the covariate balance diagnostics (Table A.2), matching reduces the mean standardized bias to below 5% for all covariates. Moreover, post-matching t-tests indicate no statistically significant differences across most covariates (with the exception of land ownership in hectares), suggesting that the matching procedure achieves satisfactory balance (Rosenbaum & Rubin, 1983). The identification strategy exploits both temporal variation—before and after the implementation of the *Bihar Prohibition and Excise Act (2016)*—and regional variation—between Bihar and comparable neighboring states (Uttar Pradesh, Jharkhand, and West Bengal), to isolate the effect of the policy. The following specification is estimated:

$$Y_{idt} = \alpha Bihar_i + \beta(Bihar_i \times Post_t) + X_i + \lambda_d + Post_t + \epsilon_{idt}, \qquad (1)$$

where, Y_{idt} denotes the caloric and macronutrient intake in a household *i* from a district *d* in the year *t*. $Bihar_i$ is a binary indicator that denotes whether the household belongs to Bihar (treatment group). $Post_t$ is a time dummy equal to 1 for observations from 2022–2023 (post-prohibition) and 0 for 2011–2012 (pre-prohibition). β is the coefficient of interest and captures the average treatment effect of the prohibition on dietary outcomes. X_i is a vector of household-level covariates, including rural/urban location, religion, caste, education level of the most educated member, land ownership, LPG access, ration card ownership, and per capita expenditure quintile. λ_d denotes the district fixed effects. ϵ_{idt} is the error term. Standard errors are clustered at the district level to account for intra-district correlation in dietary outcomes. This empirical approach enhances internal validity by adjusting for observable covariate imbalance (via matching) and controlling for time-invariant

unobservables (via DiD), enabling a more credible identification of the prohibition's dietary impacts.

5. Results

5.1 Descriptive Results

Table 1 reports summary statistics of the study sample from the CES 2011–2012 (pre-prohibition) and CES 2022–2023 (post-prohibition) survey rounds. In Bihar (the treatment group), there was a marked increase in caloric and macronutrient intake from both healthy and unhealthy food sources over time. In contrast, the control states— Uttar Pradesh, Jharkhand, and West Bengal—exhibited a decline in caloric intake from healthy sources and an increase from unhealthy sources. Macronutrient intake from both categories rose modestly in the control states. Notably, in both survey rounds, average caloric and macronutrient intake from healthy food sources was higher in the treatment group compared to the control group.

[Table 1 Here]

Figure 3 shows the caloric and macronutrient intake from healthy and unhealthy food sources across the two survey rounds. The increase in caloric and macronutrient intake from healthy food sources over the two survey rounds is higher for the treatment than for the control group. There was no differential change in the caloric and protein intake from unhealthy food sources between the treatment and control groups. However, the increase in fat intake from unhealthy food sources was lower in the treatment group.

[Figure 3 Here]

Figure 4 shows post-prohibition trends in alcohol consumption in Bihar and neighboring states. In the treatment group, the consumption of country liquor, beer, and foreign/refined liquor or wine intake fell from 3.68 to 0.24 millilitres, while in the control group, it rose from 3.98 to 8.59 millilitres. According to WHO data, adult per capita alcohol

consumption in India rose sharply from 2.3 litres in 2000 to 5.5 litres in 2018, with further increases projected through 2025 (WHO, 2018; WHO, 2024). This overall upward trend has been linked to rising incomes, greater affordability and availability of alcohol through expanded retail networks, and evolving social attitudes—particularly among urban and younger populations—toward more permissive drinking norms (Gururaj et al., 2021). Within this broader national context, state-specific factors further explain the rise observed in our control states. For instance, alcohol manufacturing surged in Jharkhand after prohibition was imposed in Bihar, potentially increasing access (Dey, 2017). In West Bengal, changes in the pricing mechanism led to lower prices of beer and foreign liquor, encouraging higher consumption (Mukherjee, 2022). In Uttar Pradesh, growth in alcohol use has been attributed to increased manufacturing capacity and policies easing the 'ease of doing business' for the alcohol industry (Raghuvanshi, 2023).

[Figure 4 Here]

5.2 Main Results

Table 2 presents the estimated effects of the prohibition on household-level caloric and macronutrient intake, disaggregated by healthy and unhealthy food sources. The results show a statistically significant increase in intake from healthy sources across all outcomes. Specifically, caloric intake from healthy food increases by 172.04 kcal per-day-per-consumer unit, protein intake by 3.91 grams, and fat intake by 9.14 grams. The policy leads to a statistically significant reduction in fat intake from unhealthy sources by 1.73 grams, while changes in caloric and protein intake from these sources are small and statistically insignificant.

In relative terms, the largest effect is observed for fat intake from unhealthy food sources, which declines by 18.82% relative to the sample mean. Fat intake from healthy

sources increases by 18.02%. Caloric and protein intake from healthy sources rise by 7.11% and 5.48%, respectively. The coefficients for caloric and protein intake from unhealthy food sources are not statistically significant, suggesting that the policy's nutritional effects are primarily driven by changes in the composition of healthy food intake rather than overall reductions in unhealthy consumption.

[Table 2 Here]

The baseline consumption of alcohol in Bihar was substantial. In other words, a significant population in the state was dependent on alcohol for their daily caloric intake. Therefore, a prohibition policy may lead to a loss of calories from alcohol consumption itself. Table A.3 presents the effect of the policy on caloric and macronutrient intake from alcohol consumption. While the effect is negative and highly significant, comparing it with our main results shows that gain in food calories exceeds the lost alcohol calories post-prohibition.

6. Mechanisms

We explore several pathways that may underline the observed improvements in caloric and macronutrient intake from healthy food sources following the prohibition. Specifically, we assess whether these effects are driven by reductions in alcohol-related expenditure, increased household spending on nutritious food items such as pulses, dairy products, and healthy oils, improved healthy behaviors, gains in labor markets outcomes, and reduced marital conflicts.

We begin with the resource reallocation mechanism, hypothesizing that the observed dietary improvements stem primarily from households redirecting expenditures away from alcohol toward food consumption. A necessary condition for this channel is a decline in alcohol-related spending following the policy. To test this, we re-estimate Equation (1) with household alcohol expenditure as the dependent variable. Column (1) of Table 3 shows that the interaction term is negative and statistically significant, indicating a post-prohibition reduction in real alcohol spending (adjusted to the 2011–2012 Consumer Price Index).

Column (2) further reveals a statistically significant increase in real expenditure on healthy food sources. Taken together, these results offer direct evidence in support of the resource reallocation mechanism.

Beyond this direct economic mechanism, we examine potential spillover effects on health-related behaviors. Drawing on data from the Drinking Water, Sanitation, Hygiene, and Housing Condition Survey (NSSO 69th and 76th rounds), we find that the likelihood of household toilet access increased significantly post-prohibition (Column (4)), while the incidence of malaria declined (Column (5)). These findings are consistent with the gateway behavior hypothesis, suggesting that prohibition may have fostered broader health-promoting behaviors, which could, in turn, affect food consumption patterns.

We also examine the role of intra-household dynamics. Data from NFHS-4 (2015–16) and NFHS-5 (2019–21) indicate that prohibition was associated with reductions in reported sexual, emotional, and physical violence (Columns (6) – (8), Table 3), consistent with findings by Dixit and Mukherjee (2025). A decline in domestic violence may alleviate marital conflict, fostering a more stable household environment conducive to healthier consumption choices. To verify whether this channel is operational in our setting, we examine if districts experiencing larger reductions in domestic violence also observed greater dietary improvements. Using NFHS-4 (2015–2016) and NFHS-5 (2019–2021), we rank districts in Bihar by the percentage point decline in domestic violence between the two survey rounds. The treatment group is then split at the median into ‘high-intensity’ and ‘low-intensity’ districts and results are estimated separately for each in Table A.4. Results in Columns (1)–(2) show that dietary gains were concentrated in the high-intensity districts, whereas the effects were muted in the low-intensity districts. This evidence further supports reduced marital conflict as a potential mechanism linking prohibition to improved food security in Bihar.

Next, we examine whether prohibition induced changes in the labor market that could, in turn, influence food security. To do so, we use data from two nationally representative NSSO surveys: the Employment and Unemployment Survey (2011–2012, pre-prohibition) and the Periodic Labour Force Survey (2018–2019, post-prohibition). Column (9) of Table 3 shows no statistically significant effect of prohibition on the employment status of adult males (ages 15–54). Similarly, Columns (10)–(12) indicate no changes in participation across different types of employment, suggesting no job switching. However, Column (13) reveals a rise in wages earned by casual laborers, pointing to higher labor productivity or reduced absenteeism post-prohibition. Increased earnings from higher wages may therefore represent one of the mechanisms through which prohibition contributed to improvements in dietary outcomes.

Figure A.3 further illustrates post-prohibition shifts in consumption patterns across food groups. We observe increased consumption of pulses, dairy products, and healthy oils—items that directly contribute to the observed rise in caloric and macronutrient intake from healthy sources. In particular, the increase in healthy oil consumption aligns with the large effect on fat intake from healthy food sources. Figure A.4 corroborates a decline in alcohol consumption across all beverage types—country liquor, beer, and foreign/refined liquor—underscoring the policy's effectiveness, in line with prior evidence (Dixit & Mukherjee, 2025; Chaudhuri et al., 2024).

Notably, these dietary improvements do not appear to be offset by increased consumption of unhealthy foods. As shown in Column (3) of Table 3 and in Figure A.3, we find no statistically significant increase in real expenditure on unhealthy food items or their consumption. This may reflect the combined influence of healthy behavioral spillovers, higher earnings, and reduced marital conflicts, which mitigates the risk of substitution toward unhealthy food sources.

[Table 3 Here]

7. Robustness Tests

7.1. Parallel Trends

The credibility of the difference-in-differences (DiD) estimates from Equation (1) depends on the parallel trends assumption: in the absence of the policy, outcomes would have followed similar trajectories in treatment and control groups. While this assumption is not directly testable, we assess its plausibility through a pre-trend (placebo) analysis.

Specifically, we re-estimate Equation (1) using data from two pre-policy periods: the 2004–2005 and 2011–2012 rounds of the Consumer Expenditure Survey (CES). During this time, alcohol prohibition had not been implemented in any of the four states in our sample, allowing us to simulate a placebo difference-in-differences analysis. We treat 2011–2012 as a placebo post-treatment period and test for differential pre-trends between Bihar (treatment) and its neighboring control states—Uttar Pradesh, Jharkhand, and West Bengal.

Under the parallel trends assumption, the interaction term coefficient, β, should be statistically insignificant, indicating no systematic differences in outcome trends prior to the policy. Table A.5 presents the results of this placebo analysis. Across all outcomes—caloric, protein and fat intake from both healthy and unhealthy food sources—the β estimates are statistically insignificant. These findings support the parallel trends assumption and strengthen the internal validity of our identification strategy.

7.2. Additional pre-treatment period

To further test the robustness of our identification strategy, we incorporate the 2004–2005 CES round as an additional pre-treatment period. We re-estimate Equation (1), redefining the post-treatment indicator to equal 1 for 2022–2023 and 0 for both 2004–2005 and 2011–2012. This expanded specification allows us to verify whether our main findings remain consistent

when leveraging a longer pre-policy window. As reported in Table A.6, the estimated treatment effects remain statistically significant and are comparable in magnitude and direction to those in Table 2. These results reinforce the stability of our estimates and suggest that they are not driven by the particular choice of pre-policy baseline.

7.3. Alternative specifications

Given the porous nature of state borders in India, enforcement of prohibition may be weaker in districts adjacent to neighboring states due to cross-border smuggling and illicit markets (Chaudhuri et al., 2024). To address this concern, we exclude all border districts and re-estimate Equation (1) using only interior districts. Figure A.5 shows the geographic distribution of border and interior districts. As reported in Table A.7, the estimated effects are larger for interior districts, consistent with stronger enforcement away from state borders.

We also examine the potential impact of sample selection arising from the exclusion of households in the top monthly per capita expenditure quintile. Re-estimating Equation (1) using the full, unrestricted sample yields estimates that are similar in sign, magnitude, and statistical significance to our main results (Table A.8). This suggests that our findings are robust to alternative sample construction choices.

7.4. Alternative classifications for food items

The health implications of certain food items, such as tea and coffee, have been debated in the literature (Ruxton et al., 2013; George et al., 2008). In our baseline classification, we exclude these items from both healthy and unhealthy food groups. To test the robustness of our results, we first classify tea and coffee as healthy food sources (Table A.9) and then as unhealthy food sources (Table A.10). In both cases, the results remain consistent with our main findings, suggesting that the inclusion of these items does not significantly affect our conclusions.

Similarly, we classify red meat (e.g., goat/mutton, beef/buffalo, pork) as an unhealthy food source, based on prevailing public health concerns. However, some studies suggest that red meat may offer nutritional benefits (McAfee et al., 2010). To assess the sensitivity of our results to this classification, we reclassify red meat as a healthy food source. The results, presented in Table A.11, show that the findings remain qualitatively similar and statistically robust, indicating that our conclusions are not driven by the classification of red meat.

Finally, we classify food sources by the degree of processing rather than by nutrient content, following the NOVA classification. While NOVA defines four categories, we use three—'unprocessed/minimally processed foods,' 'processed culinary ingredients,' and 'ultra-processed foods', to better reflect the Indian diet. Ultra-processed foods typically represent nutrient-poor sources. Results using this alternative classification are reported in Table A.12. We find that caloric and macronutrient intake from unprocessed/minimally processed foods and from processed culinary ingredients increased after prohibition (with the exception of protein from processed culinary ingredients), whereas intake from ultra-processed foods shows no significant change. These results align with our primary findings.

7.5. Difference-in-differences with Alternative Matching Techniques

To further assess the robustness of our matching strategy, we first estimate Equation (1) without matching, and the results, shown in Table A.1, are consistent with our main findings.

Next, we use Nearest Neighbor Matching (NMM) as an alternative matching technique. NMM matches each treated household with the closest five households in the control group. Matching is based on propensity scores. The estimates reported in Table A.13 are consistent with the main findings of the paper.

We also apply Coarsened Exact Matching (CEM) to evaluate the sensitivity of our results. CEM matches observations based on the coarsened joint distribution of covariates,

rather than using exact values (Iacus et al., 2012). We recognize the strengths of CEM, particularly in ensuring exact balance across coarsened strata. However, we do not use CEM for our main analysis for the following reasons. First, given our sample size, CEM drops a substantial share of observations outside the coarsened strata, reducing efficiency and precision. Second, CEM estimates can be sensitive to the choice of coarsening. By contrast, kernel-based PSM retains the full sample and flexibly reweighs control households, which makes it better suited to our dataset. Finally, our choice of kernel PSM follows Blundell & Dias (2009) and its recent application in similar empirical settings (Dixit & Mukherjee, 2025). For these reasons, we adopt kernel PSM as our primary matching strategy and use CEM as a robustness check to confirm the stability of our results. The estimates obtained for Equation (1) using CEM weights (Table A.14) align with the main results, providing further support for the robustness of our findings.

7.6. Exact Randomization Test

To further assess the robustness of our findings, we conduct an exact randomization test (Bharadwaj et al., 2014). In this procedure, we simulate 1,000 random assignments of treatment status across households in our final sample, preserving the original proportions of treated and control units. For each iteration, we estimate Equation (1) using the randomly assigned treatment indicator and record the resulting coefficient.

This procedure generates a distribution of placebo treatment effects under the null hypothesis of no true policy impact. We then compare this distribution to the actual treatment effect estimates for outcome variables that were statistically significant in Table 2. Figure A.6 presents the distribution of simulated coefficients for each outcome variable. In nearly all cases, the simulated coefficients are centered around zero and are substantially smaller in magnitude than the estimated effects in our main results, reinforcing the credibility of our findings.

7.7. Heterogeneous treatment effects

Słoczyński (2022) shows that the Ordinary Least Squares (OLS) estimates from Equation (1) (Table A.1) are a convex combination of average treatment effects on treated (ATT) and untreated (ATU). Under treatment heterogeneity, OLS estimates could be biased as weights placed by OLS are inversely proportional to the number of observations in each group. While our use of PSM mitigates concerns of selection bias, we further examine potential bias in our DiD estimates by implementing the decomposition method proposed by Słoczyński (2022).

Table A.15 presents the decomposition of the treatment effect. The estimates for the weight on the ATU ($\hat{\omega}_0$) suggest that the difference between the OLS estimate and $\widehat{\text{ATT}}$ is approximately 2% of the difference between the $\widehat{\text{ATU}}$ and $\widehat{\text{ATT}}$. This indicates that, even with treatment heterogeneity, the OLS estimates closely approximate the ATT, further confirming the reliability of our findings.

7.8. Contemporaneous Policy Changes and State-Time Trends

A potential threat to identification arises from contemporaneous policy changes in control states that could affect food security. For instance, West Bengal implemented Food Security Rules in 2016 (the same year as prohibition) to strengthen the National Food Security Act (NFSA) 2013 through improved enforcement and public grievance mechanisms. To ensure that the overlapping implementation of such policies does not bias our results, we re-estimate Equation (1) excluding households in West Bengal from the control group. The estimates, reported in Table A.16, are similar to the main findings.

State-specific policy trajectories or differential rollout intensity of the NFSA 2013 pose another challenge to estimating the true effect of alcohol prohibition. To address this, we include state-time trends in our specification. We incorporate an additional pre-treatment period from the 2004–2005 CES round to better capture state-level trends. The results,

presented in Table A.17, remain stable and robust to this specification. We do not include the 2004–2005 round in the main analysis due to concerns of recall period bias but use it here solely to estimate pre-trends.

7.9. Assumption of Exogenous Treatment

The implementation of the Bihar Prohibition and Excise Act was primarily motivated by widespread concern among female voters about alcohol-induced domestic violence. One might therefore question whether the policy was truly exogenous, as reductions in domestic violence could be correlated with unobserved factors that also affect dietary outcomes.

We address this concern in three ways. First, we use PSM to ensure balance in the observed characteristics of households in the treated and control states. Second, we include state-time trends in our specification; the estimates remain stable, suggesting that unobserved state-specific shocks are unlikely to bias the results. Third, we conduct a falsification test using data on domestic violence from NFHS-3 (2005–2006) and NFHS-4 (2015–2016), both conducted prior to the prohibition. We treat 2015–2016 as a "placebo" post-treatment period and estimate the impact of prohibition on the likelihood of emotional, physical, and sexual violence for married women aged 15–49. As shown in Table A.18, the estimates are insignificant across all measures, indicating that domestic violence followed parallel trends in treated and control states before the policy was enacted.

Taken together, these results support the assumption that the prohibition law was exogenous with respect to domestic violence trends. The significant post-prohibition reductions in violence reported in columns (6)–(8) of Table 3 therefore reflect the causal impact of prohibition, consistent with evidence from Dixit and Mukherjee (2025).

8. Sub-Sample Analysis

To explore heterogeneity in the policy's impact, we estimate Equation (1) across key socio-economic and demographic sub-groups. Prior research documents variations in alcohol consumption patterns across rural-urban settings, economic status, and caste groups in India (Kumar et al., 2018; Sood et al., 2019; Subramanian et al., 2005). We conduct three sub-sample analyses accordingly.

First, we estimate the effects separately for rural and urban households. As shown in Columns (1)–(2) of Table A.19, the impact of prohibition is larger for urban households. This difference likely reflects weaker enforcement in rural areas, where each police station covers more than twice the population of its urban counterpart (DoPO, 2023; Census, 2011). Moreover, anecdotal accounts suggest continued consumption of locally brewed spirits in rural Bihar post-prohibition (Zumbish, 2019).

Second, we compare impacts across the expenditure distribution by splitting the sample into “poor” and “rich” based on monthly per capita expenditure quintiles (Columns (3)–(4)). Consistent with prior evidence that wealthier households spent a larger share of their budget on alcohol pre-ban (Sood et al., 2019), we find stronger effects among richer households. This pattern is intuitive, that is, households with higher baseline alcohol expenditure had more scope for post-ban reallocation. In contrast, poorer households may continue to consume illicit or low-quality alcohol, attenuating policy effects at the lower end of the income distribution (Kumar & Prakash, 2016).

Third, we examine heterogeneity in the impact by caste. Patterns of alcohol consumption in India are deeply shaped by caste-based cultural norms. Historically, privileged-caste groups adhered to stricter abstinence due to the stigma attached to drinking, whereas disadvantaged castes faced fewer restrictions. Among marginalized communities,

alcohol use has also served as a coping mechanism for stigma and precarious livelihoods (Murthy, 2015). Moreover, caste-based biases in law enforcement have led to disproportionate policing of these groups (Singh, 2018), potentially heightening the perceived risk of punishment. Consistent with these contextual factors, our results show stronger effects of prohibition among Scheduled Castes (SC), Scheduled Tribes (ST), and Other Backward Classes (OBC), who exhibited higher baseline prevalence of alcohol use in Bihar (NFHS-4).

9. Conclusion

Our study presents an evaluation of unintended welfare gains from alcohol prohibition policy in a highly populous and socio-economically backward state in India. Using nationally representative data and a difference-in-differences framework, we find that Bihar's alcohol prohibition policy led to an increase in caloric and macronutrient intake from healthy food sources. Concurrently, fat intake from unhealthy food sources declined. These effects are robust across a range of alternative specifications and sensitivity checks. The classification of food sources based on their nutritional content aids in examining diet quality as a dimension of food security, which remains vastly understudied. The study offers an important implication for policymakers because of its direct relevance to population health and agricultural markets. By shifting household demand toward nutrient-rich foods, prohibition also has implications for agricultural production patterns, food supply chains, and market incentives for healthier crops.

Between 2011–2012 and 2022–2023, caloric intake from healthy food sources declined nationally, driven in part by rising food prices, growing non-food expenditures, and greater consumption of food prepared outside the household (Deaton & Drèze, 2009; Smith, 2015). Against this trend, our findings suggest that prohibition in Bihar contributed positively to household food security by enabling reallocation of resources toward more nutritious food.

Importantly, we find a significant increase in protein intake from healthy sources, particularly pulses and dairy. Given the central role of protein in combating child malnutrition (Esfarjani et al., 2013) and the challenge of improving protein intake in cereal-dominated Indian diets (Swaminathan et al., 2012), this is a policy-relevant outcome.

While fat consumption in India has risen due to greater availability of vegetable oils (Misra et al., 2011), this shift has often favored unhealthy fats due to affordability constraints (Downs et al., 2015). Our findings indicate that prohibition increased fat intake from healthy sources and reduced intake from unhealthy ones, suggesting an improvement in overall dietary quality, including a shift toward healthier oils.

The prohibition directly affects the consumption of alcohol, which is responsible for the heightened risk of death, disability, obesity and NCDs among the Indian population (WHO, 2018). Beyond the immediate health gains from reduced alcohol use, our estimates show that prohibition further enhances public health by increasing healthier food consumption while reducing intake of unhealthy foods. The study highlights the prohibition's dual role in preventing undernutrition and serving as a tool to address overnutrition. This result is crucial from the perspective of policymakers, given the rising trend in obesity and heightened risk of NCDs in India (Meenakshi, 2016).

Although prohibition could theoretically result in a shift toward unhealthy foods if freed-up resources are misallocated, we find no evidence of such adverse substitution. We believe prohibition-led gains in household well-being, such as health-behavior spillovers, enhanced intra-household bargaining due to reduced marital conflict, and a better standard of living from increased earnings, mitigated the tendency to prioritize spending on unhealthy foods. Nonetheless, the possibility of misallocation underscores the need for complementary public health campaigns that encourage healthier food choices alongside prohibition policies.

From a policy perspective, the external validity of our results is most relevant for Indian states and low- and middle-income country (LMIC) settings that share Bihar's socioeconomic profile and baseline alcohol consumption patterns. Bihar is characterized by low per-capita income, widespread poverty, and high alcohol use prior to prohibition, with alcohol expenditures constituting a substantial share of household budgets. Comparable conditions are observed in states such as Jharkhand, Chhattisgarh, Odisha, and parts of Northeast India, where high alcohol consumption coexists with severe food insecurity and poverty. Evidence from LMICs, particularly in South Asia and Sub-Saharan Africa, similarly shows that alcohol spending often crowds out essential expenditures on food and basic services. For instance, household-level data from rural Malawi indicate that alcohol expenditures significantly displace spending on food, durable goods, and health services among low-income families (Jolex & Kaluwa, 2022). These parallels suggest that the nutritional gains we document in Bihar—driven by a reallocation of resources from alcohol to healthier foods—are likely to be replicable in similar contexts. Policies in such settings therefore hold the potential to deliver dual benefits, improving both household nutrition and broader public health.

Our study has certain limitations that should be acknowledged. First, the analysis relies on imputed caloric and macronutrient intake based on reported food consumption, which may involve measurement error. However, such errors are likely time-invariant and non-differential across treatment and control groups and are thus mitigated by the difference-in-differences design (Deaton & Drèze, 2009). Second, we do not comment on the overall welfare effect of prohibition. The policy entails fiscal trade-offs, including a sharp fall in state revenues and increased enforcement costs, which could offset nutritional gains (NITI Aayog, 2021). A blanket ban may therefore be less feasible in states or LMICs with weaker governance capacity, lower baseline alcohol consumption, or higher dependence on excise

revenues. In such contexts, selective restrictions aligned with the WHO-recommended SAFER technical package—which emphasizes regulating retail sales, enforcing minimum drinking age, restricting alcohol availability, and implementing taxation—may be more sustainable (WHO, 2019). Nevertheless, our results highlight that in settings with high social and nutritional costs of alcohol, prohibition-led improvements in food security and nutrition represent an important pathway that warrants consideration in the broader alcohol-control policy debate.

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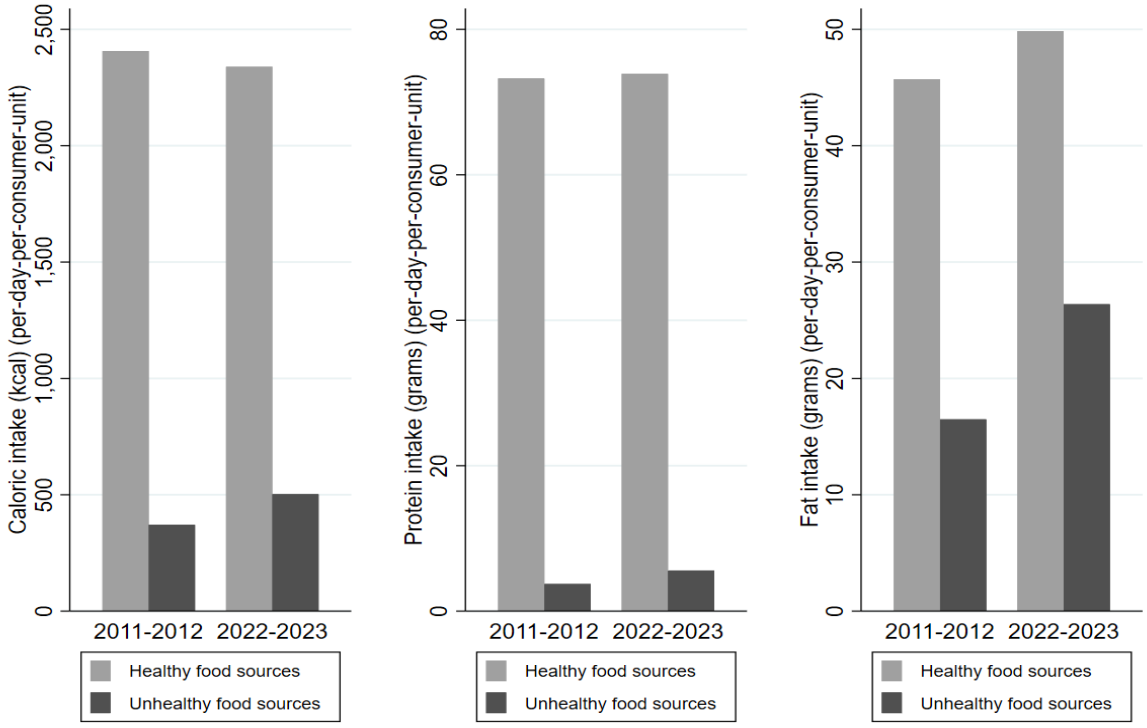
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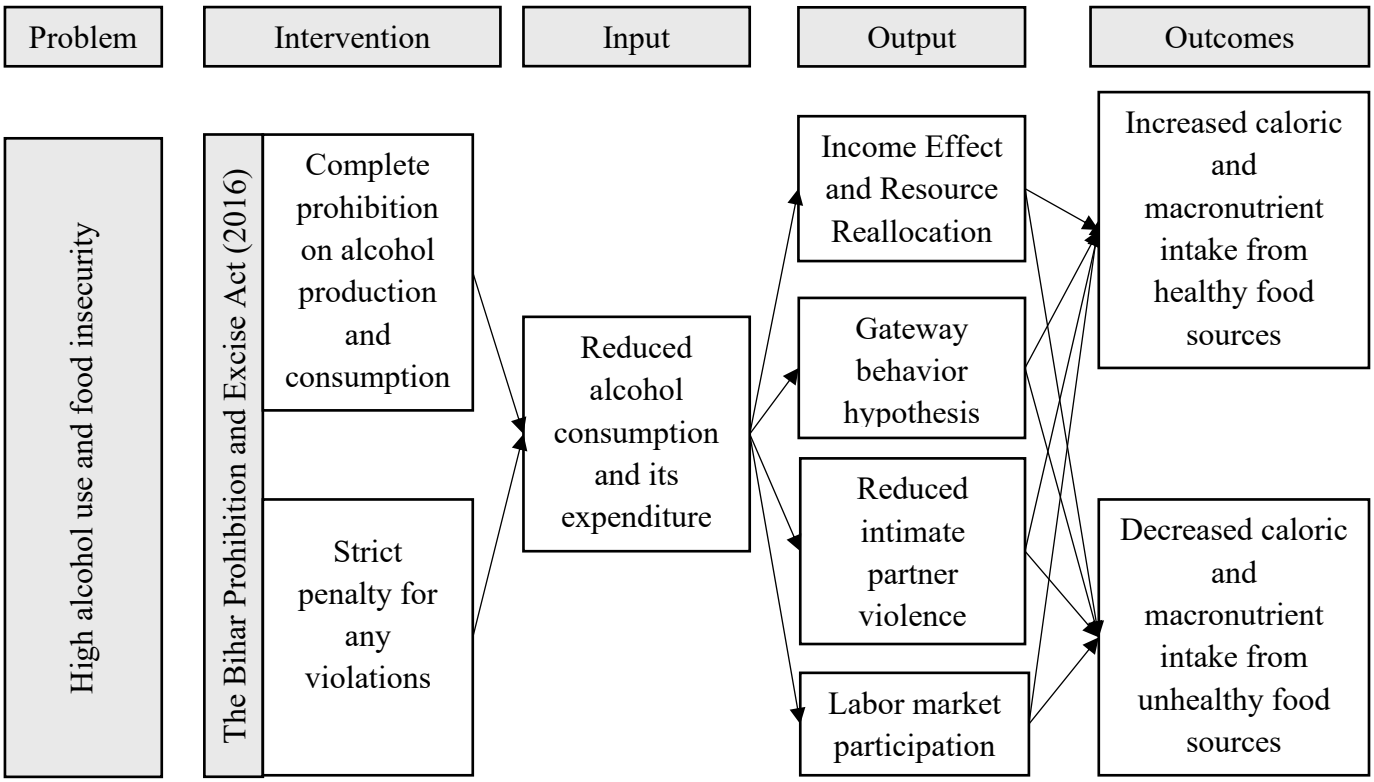
Figures and Tables

Figure 1. Trends in Caloric, Protein, and Fat Intake from Healthy and Unhealthy Food Sources



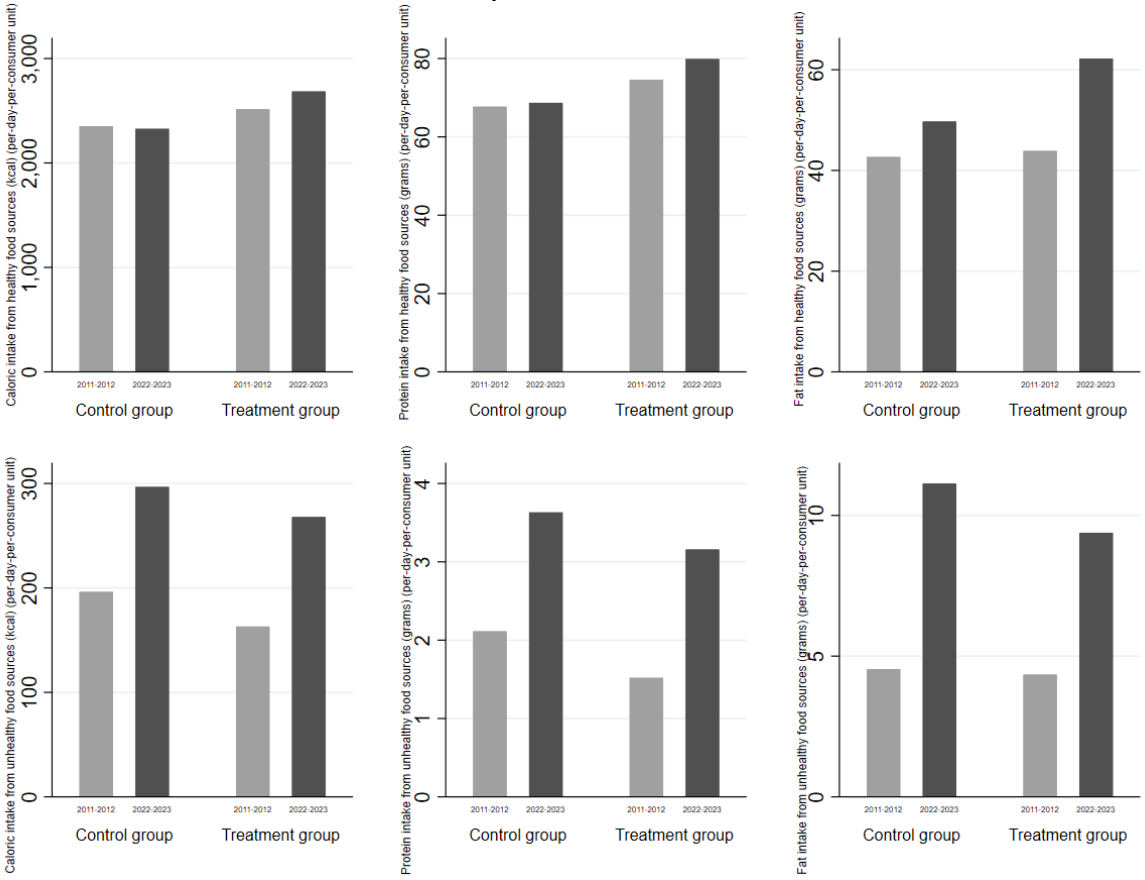
Notes: This figure presents household-level daily caloric and macronutrient intake per-consumer unit in India.
Data Source: Consumer Expenditure Survey (CES), 2011–2012 and 2022–2023.

Figure 2. Conceptual Framework



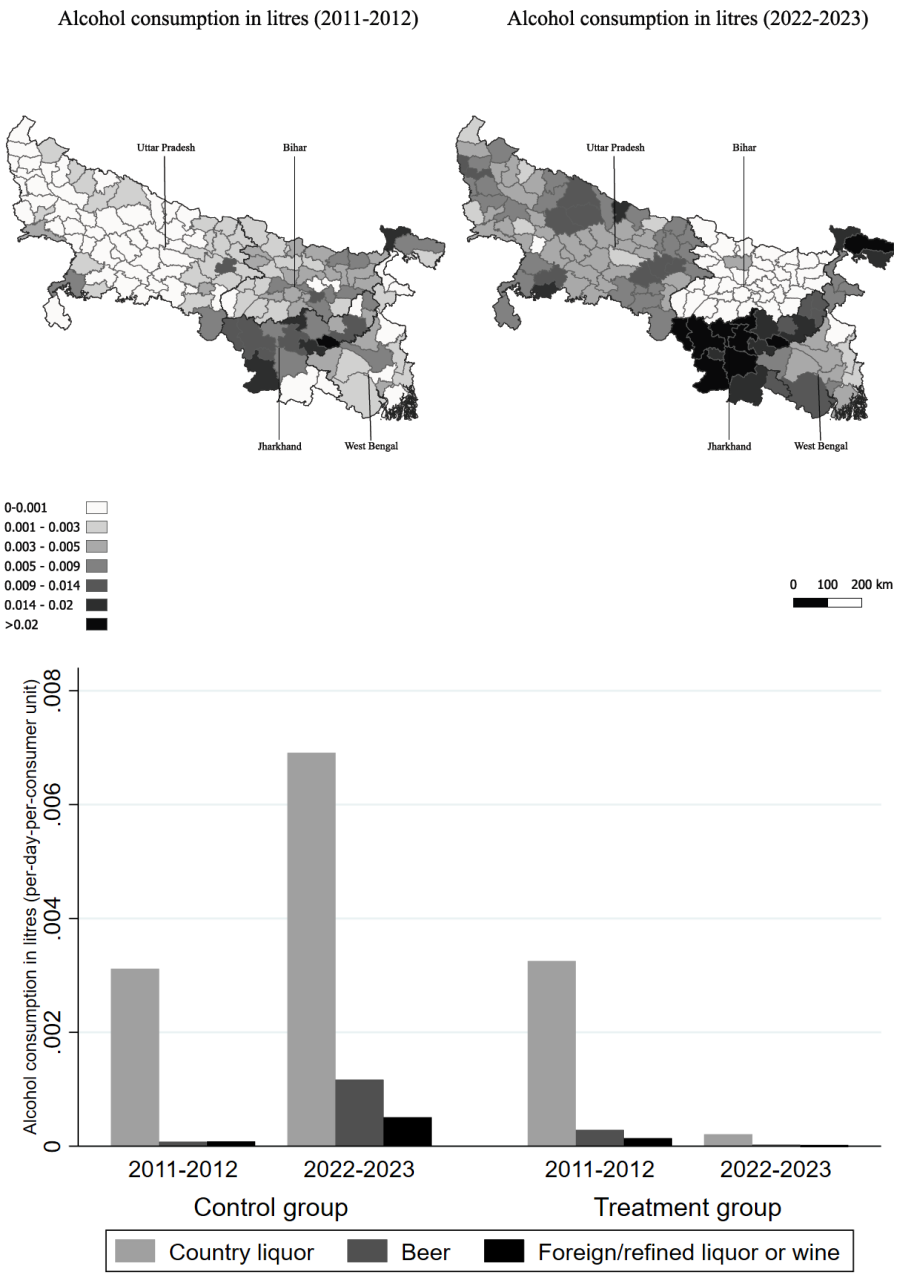
Notes: The figure illustrates potential pathways through which the *Bihar Prohibition and Excise Act (2016)* may influence household caloric and macronutrient intake from healthy and unhealthy food sources. **Source:** Gell & Meier (2012); Jumrani et al. (2017); Berg et al. (2012); Breslow et al., (2010); Kruger & Kruger, (2015): Jaremka et al. (2018); Dixit & Mukherjee (2025); Li et al. (2024); Jørgensen et al. (2019) and authors' conceptualization.

Figure 3. Caloric, Protein, and Fat Intake from Healthy and Unhealthy Food Sources in Treatment and Control Groups: 2011–2012 vs. 2022–2023



Notes: The figure presents the average daily household-level caloric and macronutrient intake per-consumer unit from healthy and unhealthy food sources in the treatment group (Bihar) and control group (Uttar Pradesh, Jharkhand, and West Bengal) for the years 2011–2012 and 2022–2023. **Data Source:** Consumer Expenditure Survey (CES), 2011–2012 and 2022–2023.

Figure 4. Trends in Alcohol Consumption in Treatment and Control Groups Before and After the *2016 Bihar Prohibition and Excise Act*



Notes: The figure depicts household-level alcohol consumption (measured as per-day per-consumer unit), comprising country liquor, beer, and foreign/refined liquor or wine, in the treatment group (Bihar) and control group (Uttar Pradesh, Jharkhand, and West Bengal) before and after the implementation of the *Bihar Prohibition and Excise Act (2016)*. The figure in the upper panel shows the average consumption levels for every district in Bihar and its neighboring states. Darker regions correspond to higher consumption levels. The district and state borders are defined as per the 2001 census of India. The figure in the lower panel shows the average consumption of different types of alcohol in the treatment and the control group. **Data Source:** Consumer Expenditure Survey (CES), 2011–2012 and 2022–2023.

Table 1. Descriptive Statistics

Variables	2011-2012 (Pre-period)			2022-2023 (Post-period)		
	Treatment	Control	Difference	Treatment	Control	Difference
	Mean (S.D)	Mean (S.D)		Mean (S.D)	Mean (S.D)	
	(1)	(2)	(3)	(4)	(5)	(6)
Healthy food sources						
Caloric intake	2514.35	2352.78	161.57***	2684.68	2326.77	357.91***
	(632.78)	(634.14)	(11.36)	(801.89)	(722.94)	(7.11)
Protein intake	74.60	67.70	6.90***	79.86	68.68	11.18***
	(19.55)	(19.85)	(0.35)	(24.10)	(21.03)	(0.21)
Fat intake	43.47	42.66	1.20**	62.22	49.71	12.51***
	(18.33)	(20.57)	(0.36)	(25.03)	(23.01)	(0.23)
Unhealthy food sources						
Caloric intake	163.07	196.19	-33.11***	267.92	296.71	-28.79***
	(114.30)	(123.77)	(2.18)	(159.25)	(171.33)	(1.61)
Protein intake	1.51	2.11	-0.60***	3.16	3.63	-0.47***
	(2.56)	(3.29)	(0.06)	(3.12)	(3.85)	(0.04)
Fat intake	4.34	4.54	-0.19	9.38	11.13	-1.75***
	(7.96)	(7.35)	(0.13)	(10.70)	(12.36)	(0.11)
Controls						
Rural	0.76	0.71	0.04***	0.85	0.74	0.11***
	(0.43)	(0.45)	(0.01)	(0.36)	(0.44)	(0.00)
Highest level of education	7.64	7.43	0.20***	6.16	6.62	-0.46***
	(3.11)	(2.98)	(0.05)	(3.27)	(3.24)	(0.03)
Hectares of land owned	0.47	0.40	0.07***	0.16	0.24	-0.08***
	(1.11)	(0.97)	(0.02)	(0.34)	(0.48)	(0.00)
Ration Card	0.83	0.81	0.02**	0.76	0.87	-0.10**
	(0.38)	(0.39)	(0.01)	(0.42)	(0.34)	(0.00)
Liquid Petroleum Gas	0.19	0.17	0.02***	0.35	0.39	-0.04***
	(0.39)	(0.37)	(0.01)	(0.48)	(0.49)	(0.00)
Monthly per-capita expenditure quintile						
Poorest	0.23	0.26	-0.03***	0.21	0.26	-0.06***
	(0.42)	(0.44)	(0.01)	(0.41)	(0.44)	(0.00)
Poor	0.26	0.25	0.00	0.25	0.25	0.00
	(0.44)	(0.43)	(0.01)	(0.43)	(0.43)	(0.00)
Middle	0.27	0.24	0.03***	0.28	0.24	0.04***
	(0.44)	(0.43)	(0.01)	(0.45)	(0.43)	(0.00)
Rich	0.25	0.25	-0.01	0.26	0.25	0.01***
	(0.43)	(0.43)	(0.01)	(0.44)	(0.43)	(0.00)
Religion						
Hindu	0.85	0.77	0.08***	0.86	0.77	0.08***
	(0.36)	(0.42)	(0.01)	(0.35)	(0.42)	(0.00)
Muslim	0.15	0.21	-0.06***	0.14	0.21	-0.07
	(0.36)	(0.40)	(0.01)	(0.35)	(0.41)	(0.00)
Christian	0.00	0.01	-0.01***	0.00	0.01	-0.01***
	(0.04)	(0.10)	(0.00)	(0.03)	(0.10)	(0.00)
Sikh	0.00	0.00	0.00	0.00	0.00	-0.00***
	(0.02)	(0.02)	(0.00)	(0.01)	(0.04)	(0.00)
Others	0.00	0.01	-0.01***	0.00	0.00	-0.00***
	(0.02)	(0.09)	(0.00)	(0.04)	(0.07)	(0.00)
Social group						
Scheduled Tribes	0.01	0.06	-0.05***	0.03	0.07	-0.03***
	(0.11)	(0.24)	(0.00)	(0.19)	(0.25)	(0.00)
Scheduled Castes	0.17	0.24	-0.08***	0.26	0.24	0.01***
	(0.37)	(0.43)	(0.01)	(0.44)	(0.43)	(0.00)
Other Backward Classes	0.61	0.39	0.22***	0.56	0.43	0.13***
	(0.49)	(0.49)	(0.01)	(0.50)	(0.50)	(0.00)
Others	0.21	0.31	-0.10***	0.14	0.26	-0.12***
	(0.41)	(0.46)	(0.01)	(0.35)	(0.44)	(0.00)

Notes: The table reports the mean values of key variables from the Consumer Expenditure Survey (CES) for 2011–2012 and 2022–2023. Columns (1) and (4) present descriptive statistics for the treatment group (Bihar), while Columns (2) and (5) report corresponding statistics for the control group (Uttar Pradesh, Jharkhand, and West Bengal). Standard deviations are shown in parentheses. Columns (3) and (6) display differences in means between the treatment and control groups for each survey round, based on two-sample *t*-tests, and corresponding *p*-values are reported in parentheses. All outcome variables represent per-day caloric, protein, and fat intake per consumer unit at the household level. **Data Source:** Consumer Expenditure Survey (CES), 2011–2012 and 2022–2023.

Table 2. Effects of Alcohol Prohibition on Caloric, Protein, and Fat Intake from Healthy and Unhealthy Food Sources

	Healthy food sources			**Unhealthy food sources**		
	Caloric intake (kcal)	Protein intake (grams)	Fat intake (grams)	Caloric intake (kcal)	Protein intake (grams)	Fat intake (grams)
	(1)	(2)	(3)	(4)	(5)	(6)
Bihar*Post	172.04***	3.91**	9.14***	-6.91	-0.08	-1.73**
	(56.01)	(1.66)	(1.10)	(9.63)	(0.13)	(0.77)
Post	-63.72**	-0.20	-7.44***	106.56***	1.64***	6.80***
	(26.31)	(0.91)	(0.66)	(6.66)	(0.08)	(0.55)
District-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
Observations	72791	72791	72791	72813	72813	72813
Mean of dependent variable	2418.74	71.24	50.71	265.64	3.14	9.19

Notes: This table reports the estimated impact of alcohol prohibition following the implementation of the *Bihar Prohibition and Excise Act (2016)* on per-day, per-consumer unit caloric and macronutrient intake from healthy and unhealthy food sources. The analysis employs a difference-in-differences framework combined with kernel propensity score matching to address observable selection bias. The treatment group comprises households from Bihar, while the control group includes households from Uttar Pradesh, Jharkhand, and West Bengal. The sample is restricted to households in the top four quintiles of monthly per-capita expenditure to minimize bias from extreme consumption patterns. Columns (1)–(3) present estimates for intake from healthy food sources; Columns (4)–(6) present estimates for unhealthy sources. Propensity scores are estimated using a probit model, and matching is implemented using an Epanechnikov kernel with a bandwidth of 0.06. All regressions control for household-level covariates, including area of residence (rural/urban), religion and caste, highest education level in the household, land ownership (hectares), access to LPG for cooking, possession of a ration card, and expenditure quintile. District and year-fixed effects are included. The data are drawn from the Consumer Expenditure Surveys conducted in 2011–2012 and 2022–2023. Robust standard errors, clustered at the district level, are reported in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table 3. Potential Mechanisms Linking Alcohol Prohibition to Caloric, Protein, and Fat Intake from Healthy and Unhealthy Food Sources

	Income effect and resource reallocation			**Gateway behavior hypothesis**		**Reduced marital conflicts**			**Labor market outcomes**				
	Alcohol (expenditure)	Healthy food sources (Expenditure)	Unhealthy food sources (Expenditure)	In-home toilets	Malaria	Sexual violence	Emotional violence	Physical violence	Currently employed	Employed in family business	Employed as regular wage/salaried employee	Employed as casual wage labor	Wages earned
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Bihar*Post	-0.95***	2.46***	-0.37	0.10***	-0.04**	-0.06***	-0.06***	-0.03**	-0.01	-0.02	0.01	0.00	384.04***
	(0.07)	(0.44)	(0.31)	(0.03)	(0.02)	(0.02)	(0.01)	(0.01)	(0.01)	(0.02)	(0.01)	(0.02)	(49.52)
Post	0.74***	4.56***	4.40***	0.27***	0.07***	-0.00	0.03***	-0.00	-0.05***	-0.00	0.02***	-0.06***	109.11***
	(0.06)	(0.25)	(0.17)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(29.92)
District-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	72816	72791	72813	32716	32704	23223	23223	23223	67001	67001	67001	67001	11075
Mean of dependent variable	0.63	28.07	8.42	0.45	0.09	0.09	0.16	0.11	0.74	0.41	0.15	0.18	999.02

Notes: This table reports the impact of alcohol prohibition under the *Bihar Prohibition and Excise Act (2016)* on potential mechanisms influencing caloric and macronutrient intake, using a difference-in-differences model with kernel propensity score matching (Epanechnikov kernel, bandwidth = 0.06; probit scores). Columns (1)–(3) show effects on real daily per-consumer unit expenditure (adjusted to 2011-2012 CPI) on alcohol, healthy, and unhealthy food. Data Source: Consumer Expenditure Surveys 2011–12 and 2022–23. Columns (4)–(5) show effects on in-home toilet access and recent malaria incidence using NSSO Rounds 69 (2012) and 76 (2018). Columns (6)–(8) report effects on sexual, emotional, and physical violence (married women, 15–49) using NFHS-4 (2015–16) and NFHS-5 (2019–21); sample restricted to pre-COVID (before March 2020). Columns (9)–(13) present the effects on labor market outcomes (currently employed, employed in family business, employed as regular wage/salaried employee, employed as casual wage labor, wages earned) for adult males (15-59) using the Employment and Unemployment Survey (2011–2012) and the Periodic Labour Force Survey (2018–2019). Bihar is the treatment group; Uttar Pradesh, Jharkhand, and West Bengal form the control. All models control for household/individual demographics, district and year-fixed effects. Standard errors clustered at the district level. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.