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Health Shocks, Risk Aversion, and Consumption Choices: Evidence from Household Intoxicant Spending in India During COVID-19

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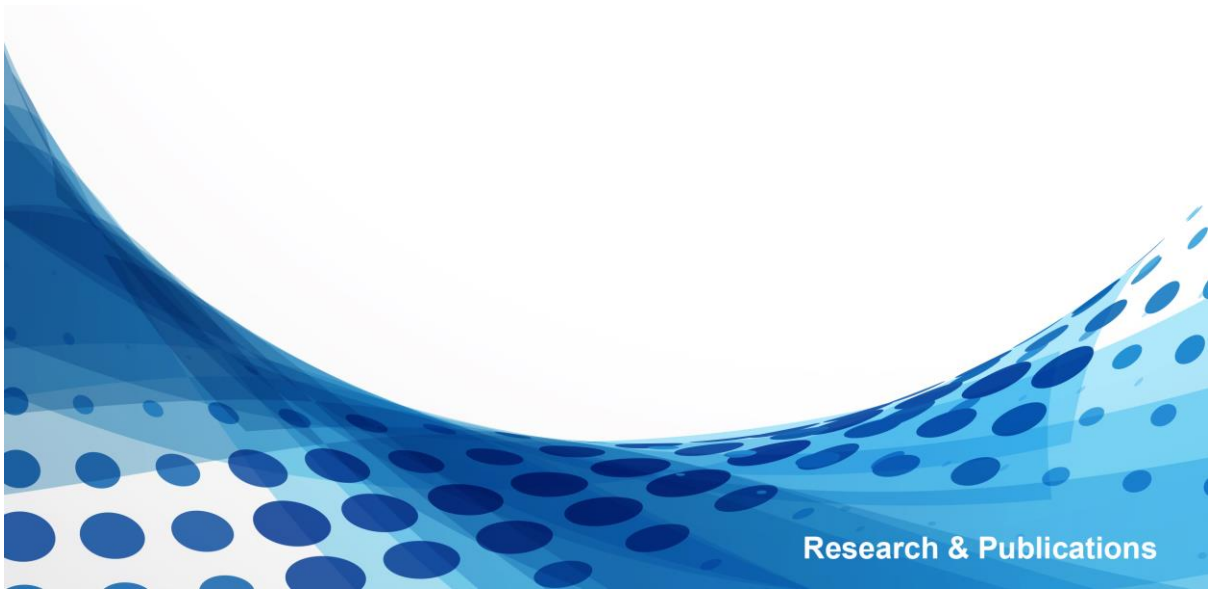

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Abstract

This study delves into the nuanced relationship between heightened health awareness amid the COVID-19 pandemic with household intoxicant consumption patterns in India. The central hypothesis posits the pandemic as a transformative shock, shaping both health awareness and intoxicant consumption, guided by risk aversion. Analysis using a difference-in-differences approach underscores a substantial reduction in intoxicant expenditures for households without health insurance compared to households with health insurance during the pandemic, with specific categories like cigarettes, tobacco and liquor expenditure experiencing a drop for uninsured households. In rural areas households lacking health insurance exhibit a notable reduction in intoxicant expenditures than the rural areas. This study contributes to the understanding of economic and behavioural responses to health crises, offering valuable insights into the complex interplay between risk perception, health awareness, and consumption choices in challenging times.

Keywords: COVID-19, health awareness, risk aversion, household intoxicant expenses, health insurance

JEL classification: I11; D14; R20; O12

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1 Introduction

The global crisis of the COVID-19 pandemic has had an unprecedented impact on public health, especially in middle- or low-income countries, prompting nations to implement extensive measures to control its spread. Governments worldwide have implemented extensive measures to curb the spread of the virus, but the impact has been profound, affecting individuals and societies on various fronts. The repercussions extend beyond the immediate health threats, encompassing fears of the unknown, concerns about illness, social isolation, mortality, and disruptions to physical and financial well-being (Yazdi et al., 2020; Dubey et al., 2020).

As societies grappled with unprecedented challenges, there emerged a heightened awareness of health-related issues. Individuals and households started to reconsider their health priorities, seeking ways to protect and improve their well-being. A consumer behaviour survey conducted by Aditya Birla Health Insurance indicates a rising awareness and inclination among individuals towards fitness, dietary choices, and health-related products and services. The study reveals an increasing connection between health and professional life, leading to a heightened consciousness among people to prefer employers offering insurance coverage for family medical costs. [1] The pandemic has prompted a re-evaluation of health-related behaviours, influencing individual and household decisions. Due to increasing awareness, the spending on intoxicants, including tobacco, cigarettes, and alcohol, should have gone done. But these substances, often regarded as coping mechanisms or sources of solace in times of stress, may witness shifts in consumption amid the uncertainties brought about by the crisis (Martínez-Cao et al., 2021). Understanding these dynamics is crucial for unravelling the intricate interplay between health awareness, risk perception, and consumption choices.

This paper delves into the complex relationship between the COVID-19 pandemic, health awareness, and household intoxicant consumption patterns, with a specific focus on the health insurance status of households. The overarching aim is to investigate how the

[1] https://business.outlookindia.com/news/84-people-say-health-awareness-has-increased-after-covid-19-pandemic-says-survey-news-278146

heightened awareness of health risks triggered by the pandemic has shaped expenditures on intoxicants within the Indian context. India, marked by one of the highest COVID-related death rates and stringent lockdown policies [2], offers a unique backdrop for examining the nuanced responses of households to health-related shocks. The central hypothesis driving this study posits that the COVID-19 pandemic serves as a shock that not only raises health awareness but also significantly influences household intoxicant consumption patterns. This impact, I contend, is likely to differ based on the risk aversion of households, as indicated by their health insurance status. High-risk aversion, reflected in households with health insurance, is expected to manifest in altered consumption patterns compared to less risk-averse households without health insurance. To empirically explore these dynamics, I employ a robust difference-in-differences estimation approach. This strategy allows me to systematically compare intoxicant expenditures by households without health insurance and those with health insurance before and during the COVID-19 pandemic. The methodology enables me to isolate the causal impact of the COVID pandemic on intoxicant spending, disentangling it from pre-existing trends.

Preliminary findings reveal a striking 40% reduction in the expenditure on intoxicants for households without health insurance during the pandemic, as opposed to their insured counterparts. This overarching trend holds true for specific categories, with spending on cigarettes and tobacco witnessing a 33% decrease and liquor expenditure experiencing a 21% decline for uninsured households compared to their insured counterparts. I also conduct an in-depth investigation into the differentiated impacts of the COVID-19 pandemic on household spending on intoxicants. This protective influence is more noticeable in rural regions, where households lacking health insurance exhibited a noteworthy decrease compared to urban areas. However, households with a majority of females and those with all members being literate did not have a considerable effect on intoxicant expenditures during the pandemic.

Even healthy individuals often value the financial protection provided by insurance against unforeseen medical expenses. Risk aversion incentivizes them to purchase insurance regard-

[2]https://www.thelancet.com/article/S0140-6736(21)02796-3/fulltext

less of their current health status (Arrow et al., 1974; Gollier, 2001). However, the landscape of health insurance in India has been characterized by low coverage and significant inequality. The skewed distribution of health insurance towards higher wealth quintiles and certain states is evident in the research by Yadav and Mohanty (2021). Health insurance adoption is associated with income, educational attainment, occupational status, health expenditure, and awareness, displaying substantial variation across states and communities. (Mohanty et al., 2023; Yellaiah and Ramakrishna, 2012). Existing research, such as that by Savitha and Banerjee (2021), underscores the influence of health status, expected healthcare expenditure, and past health experiences alongside socio-economic variables in determining the purchase of health insurance. Recognizing this, I employed matching techniques, where households are matched based on relevant characteristics, including household income and size. Additionally, fixed characteristics such as age group, occupation group, education group, gender group, and region (rural or urban) were considered in the matching process. Using the matched sample, I re-evaluated the difference-in-differences specification and observed an approximate 40% reduction in the expenditure on intoxicants for households without health insurance during the pandemic, in contrast to their insured counterparts.

This paper contributes to the ongoing discourse on the economic and behavioural implications of health-related shocks, using the COVID-19 pandemic as a lens to examine household intoxicant consumption. The detailed analysis sheds light on the differential responses of households based on their health insurance status, providing valuable insights into the intersections of health awareness, risk aversion, and consumption choices in times of crisis.

2 Literature Review

A substantial body of research has extensively examined the factors influencing households' expenditures on intoxicants during the COVID-19 period. The existing literature underscores the profound impact of the pandemic on various economic and health dimensions, with uncertainties surrounding its effects on health-related behaviours. French et al.

(2022) empirically demonstrate that individuals experienced deteriorating outcomes across these dimensions, with a particular emphasis on the exacerbation of issues related to alcohol consumption and sleep quality. Jacob et al. (2021) highlights a surge in alcohol consumption among UK adults during lockdown, particularly impacting mental health. Moreover, the psychoactive nature of alcohol heightens vulnerabilities amid the backdrop of social distancing Calina et al. (2021). The lockdown measures in India, including the acute unavailability of alcohol, have precipitated both biological and psycho-social consequences, ranging from fatal alcohol withdrawal conditions to an increased risk of relapse due to isolation, black marketing, and consumption of illicit products (Nadkarni et al.; 2020. Kaicker (2023) corroborates an increased alcohol consumption during the pandemic, defying supply restrictions imposed by states in India. In contrast, exploring alcohol consumption during the pandemic among primary health care (PHC) patients in Colombia and Mexico, Manthey et al. (2022) observes a decline in average consumption levels and a stable prevalence of heavy drinking patterns. The introduction of social distancing and isolation policies associated with COVID-19 in Adelaide, South Australia, correlates with a decrease in population-level weekend alcohol consumption Bade et al. (2021).

Again, Niedzwiedz et al. (2021) found that smoking declined, but adverse alcohol use increased. In the context of U.S. young and middle adults, Patrick et al. (2022) identifies deviations from historical trends, including decreases in alcohol use prevalence, increases in alcohol use frequency, and heightened use of alcohol for relaxation and boredom relief. These shifts are attributed, in part, to increased solitary drinking at home during the pandemic. The impact of the pandemic on high-risk health behaviours remains ambiguous, with a mixed picture emerging in terms of changes in consumption among current smokers and drinkers Reynolds et al. (2021).

There are various theories that are used to explain the increase or decrease in consumption of intoxicants during a crisis period like COVID-19. Khantzian (1997) posits that substances such as alcohol may alleviate psychological sufferings, a notion supported by the stress-response-dampening theory (Sher and Levenson, 1982), which underscores increased alcohol consumption during economic crises as a means to reduce anxiety and stress. The

economic strain induced by the pandemic is evident in the detrimental impact of alcohol consumption, with expenses on alcohol and tobacco diverting resources away from essential goods, a phenomenon known as "crowding out" (John, 2008; Haneef et al., 2022). Wu et al. (2021) present evidence across diverse countries, indicating that tobacco and alcohol use is associated with the crowding-out of health-related behaviours and crowding-in of harmful behaviours. On the other hand, economic theories, such as the income effect theory, find resonance in the observation by Ruhm and Black (2002) that heavy drinking declines during economic downturns. Supporting these hypotheses, there is evidence from this pandemic also that I have presented earlier.

García Arancibia (2014) proposed the influence of household socioeconomic and demographic characteristics on the budget share for alcoholic beverages. This has also held true during a pandemic. Investigating health behaviour changes among females residing in rural areas during the COVID-19 pandemic, Glenister et al. (2021) report net increases in the consumption of unhealthy food and alcohol. Females living with children exhibited significant associations with increased alcohol consumption and decreased visits to health professionals, painting a nuanced picture of the pandemic's impact. Guignard et al. (2021) highlight variations in tobacco and alcohol consumption during the French lockdown, influenced by socio-demographic factors and mental health. Koopmann et al. (2021) provides survey-based insights, reporting increased drinking and smoking during lockdown, associated with factors such as middle age, subjective stress, and pre-lockdown alcohol consumption. The heterogeneity in smoking and drinking changes during the pandemic is underscored by Lee et al. (2022), noting substantial disparities across individuals based on gender, residence, and smoking history.

However, all the above-mentioned studies ignored psychological factors that play a significant role in shaping individuals' behaviours, particularly concerning substance consumption. Dave and Saffer(2007) and Thrailkill et al. (2022) found that risk aversion exerts a substantial negative influence on the inclination towards intoxicant consumption. Smokers face elevated risks of severe illness, hospitalization, and death from COVID-19 compared to non-smokers (Neira et al., 2021; Patanavanich and Glantz, 2020). The pandemic serves

as a catalyst for smokers to quit, fueled by fear-evoking messages about increased COVID-19 severity for smokers Duong et al. (2021). Research interventions during the pandemic emphasize the effectiveness of communicating risks associated with smoking in motivating smokers to quit (Hoek et al., 2013; Moradi et al., 2007). Scholars contend that the adversity of the COVID-19 pandemic may incentivize smokers to quit, as evidenced by higher cessation rates and intentions to quit during this period (Hefler and Gartner, 2020; Popova, 2020). Emotional responses to potential severe COVID-19 complications emerge as a motivational force for smokers, fostering greater intentions to quit (Klemperer et al., 2020; Kayhan Tetik et al., 2021; Berlin et al., 2020).

Media, in general, helps in spreading health awareness to the masses [3]. As a significant societal influencer, it plays a pivotal role during the pandemic, arousing fear and anxiety through exposure to acute threats and evoking sadness through portrayals of suffering and death (Liu et al., 2022; Yang and Chu, 2018). Emotional language in news reporting and the portrayal of COVID-19 deaths amplify emotional responses, which is particularly relevant for smokers facing increased risk.[4] These messages gain traction, especially among smokers with higher levels of comparative optimism, contributing to intentions to quit and potentially serving as strategies to combat the tobacco epidemic. Analyzing changes post-nationwide outbreak reveals a significant reduction in the quantities of cigarettes consumed by smokers, pointing towards altered smoking behaviours Yang and Ma (2021).

The global COVID-19 pandemic has triggered a notable shift in health consciousness among individuals. Čvirik et al. (2020) reports a substantial increase in health consciousness during the pandemic. Research by Saah et al. (2021) indicates improvements in health knowledge, access to health information, and a heightened understanding of health issues. A survey conducted by SUCCESS Insights India (2023) [5] , encompassing 6600 respondents in India, highlights an increased health consciousness and financial preparedness for health-

[3]The Role of the Media in Promoting and Reducing Tobacco Use https://cancercontrol.cancer.gov/brp/tcrb/monographs/monograph-19

[4]Newey S. Why have so many coronavirus patients died in Italy? https://www.telegraph.co.uk/globalhealth/science-and-disease/have-many-coronavirus-patients-died-italy/

[5]https://successinsightsindia.com/consumers-are-now-more-health-conscious-and-financially-prepared-however-need-to-be-more-consistent-in-following-a-healthy-lifestyle/

care among consumers. This growing awareness may have implications for the adoption of health insurance. The psychological factor of health consciousness significantly influences consumers' willingness to pay, as noted by Ali and Ali (2020). This insight elucidates why health-enhancing goods are viewed favourably while health-harming ones are avoided. Additionally, knowledge about health maintenance and production impacts consumer choices Hayakawa (2017). The pandemic prompted reductions in risky health-related behaviours, including alcohol intake, sharing personal items, and consuming junk foods. Conversely, positive changes were observed in healthy lifestyles, such as regular physical exercise and increased consumption of fruits and vegetables. The heightened health consciousness also led to improved health-seeking behaviour, with individuals opting for regular check-ups. Saah et al. (2021).

The extensive review of literature has shed light on the multifaceted dynamics influencing households' expenditures on intoxicants during the COVID-19 period. While existing research has diligently explored the economic and health dimensions of this phenomenon, there remains a critical gap in understanding the interplay between health shocks and intoxicant expenses, particularly within the context of heightened health awareness. The empirical evidence presented in various studies, spanning diverse geographical locations and demographic groups, provides valuable insights into the intricate relationship between the pandemic and substance consumption. These findings collectively lay the groundwork for the formulation of a comprehensive primary hypothesis that aims to unravel the intricate connections between health awareness, household responses to health shocks, and intoxicant consumption patterns amid the uncertainties posed by the COVID-19 pandemic in the Indian context.

3 Research Design and Methods

3.1 Data

The paper utilizes data from the Consumer Pyramids Household Surveys (CPHS) conducted by the Centre for Monitoring Indian Economy (CMIE), which collects data from

approximately 2 lakh households nationwide. Each household undergoes surveying in three waves annually since 2014: January to April (Wave-1), May to August (Wave-2), and September to December (Wave-3). The survey meticulously captures individual-level employment details quarterly for the designated set of households tracked over time. Conducted across all major Indian states, the survey encompasses comprehensive data on various aspects. This includes four-monthly observations on household demographics, member identities, education, health, financial inclusion, and employment status of individuals, including industry and occupation codes. Additionally, it covers information on household ownership of assets and amenities. Furthermore, monthly observations include details on household income and its composition, as well as household expenses and their composition.

For this study, I combine consumption data drawn from the consumption pyramid module of CPHS with income data drawn from the Income Pyramids module of CPHS. I use data spanning from January 2019 to December 2020 for all the estimations, except for placebo analysis, for which data from January 2017 to December 2018 for the same households is being utilized. The sample size saw a significant reduction during the lockdown months. Therefore, for this analysis, I narrowed down the sample to households with available data during the Covid period and preceding the Covid period. I retained only those households surveyed throughout the entire month, resulting in a sample size of 33,202 households.

Health insurance data is sourced from the People of India module of CPHS, specifically using wave 19 (January to April 2020) to determine whether household members possess health insurance. I then calculated the total number of members within a household with health insurance, defining a household as "No health insurance" if a household has a total of zero health insurance. I incorporated the consumer price index (CPI) as a representation of inflation in a state during a given month, drawn from the CMIE States of India database. The CMIE Consumer Pyramid reports classifying regions into two categories: gender into six categories and education into eleven categories. For clarity in understanding the heterogeneous impact, I created three sets of dummy variables: rural, female majority, and literate. [6]

[6]Refer to Table 1 for detailed information.

3.2 Summary statistics

Table 2 presents a comprehensive overview of key summary statistics for various variables, shedding light on the economic and demographic characteristics of the sample.[7] The average income of households in the main sample is approximately 21,832 Indian rupees, with a noteworthy minimum income of 0, indicating a significant impact on household income during the lockdown period. [8] The median household size is around six members. In terms of expenditures, households, on average, allocate 425 rupees to intoxicants. This includes an average of 278 rupees spent on cigarettes and tobacco and 144 rupees on liquor. The average household in the main sample spends approximately 12,824 Indian rupees on the consumption of goods and services. Notably, the proportion of household consumption expenditure allocated to intoxicants is, on average, 3.36 per cent. The binary variable "Covid" signifies the presence of the Covid-19 pandemic, exhibiting a balanced distribution across the 12 months pre-Covid (starting from January 2019 to December 2019) and the 12 months during Covid (starting from January 2020 to December 2020). The reason for taking January 2020 as the beginning of COVID-19 is the news and media in India started circulating content related to COVID-19, which might have generated awareness and health-risk-related fear. Within the main sample, 72% of households lack health insurance, implies that 28% of households have at least one member covered under health insurance or a health scheme, aligning closely with the NFHS-4 figure of 29% [9]. Additionally, the sample reveals that 28% of households reside in rural areas, 18% have a majority of females, and 33% consist of all literate members.

3.3 Empirical Strategy

This section outlines the empirical methodology that is utilised to examine the disparity in household expenditure on intoxicants between those with no health insurance and those with health insurance during the COVID-19 pandemic in comparison to the pre-COVID

[7]Total Income, Total Expenditure, Expense Intoxicants, Expense Cig-tabacco, Expense Liquor, Household Size are winsorized at 1% level.

[8]Since Total Income, Expense Intoxicants, Expense Cig-tobacco, Expense Liquor contains "0" values, I made log(variable + 1) transformation MaCurdy and Pencavel (1986).

[9]Health insurance coverage up in India but not robust yet, says NFHS https://www.business-standard.com/article/current-affairs/health-insurance-coverage-up-in-india-but-not-robust-yet-says-nfhs-122051301517_1.html

period. Through our estimations, I aim to uncover the impact of health awareness, particularly in terms of a health shock (COVID-19) and expenditure on intoxicants. Given that discussions related to COVID-19 commenced in January 2020, primarily in India, our analysis spans from January 2019 to December 2020 to comprehensively capture the impact on health behaviour. The primary analytical approach involves estimating a standard difference-in-differences specification for the results as proposed by Angrist and Pischke (2008), shown below:

$$\mathbf{Y}_{it} = \alpha + \beta_1 \textbf{No Health Insurance}_i + \beta_2 \textbf{Covid}_t + \beta_3 \textbf{No Health Insurance}_i \times \textbf{Covid}_t$$

$$+ \theta \mathbf{X}_{it} + \delta \mathbf{Z}_{st} + \textstyle\sum_k \phi_k \textbf{group}_{ik} + \mu_i + \tau_t + \epsilon_{it} \qquad (1)$$

Where Y_{it} refers to log expenses on intoxicants (for component-wise analysis, I use log expenses on cigarette and tobacco and log expenses on liquor) of the household i at month t. No Health Insurance$_i$ is 1 for households without any health insurance and 0 for households with at least one health insurance. Covid$_t$ is 1 for the Covid period (after January 2020 to December 2020), 0 otherwise. X_{it} is household-level controls that may change over time (log income of the households and household size). The variable Z_{st} denotes the state-specific variable, representing the monthly consumer price indices for the state s. The variable $\textbf{group}_{ik}$ represents a set of group indicators or dummy variables associated with different characteristics or categories of households like age group, occupation group, education group, gender group, and region. The subscript k would index the different categories within each group, and ϕ_k would be the corresponding coefficient for each category. Including these variables allows me to control for any systematic differences in intoxicant spending across different household demographics within the same time period.[10] Incorporating household fixed effects μ_i serves to manage unobservable, constant differences between households over time. Month-fixed effects τ_t address potential time-varying shared shocks and seasonal variations. ϵ_{it} is the error term, and standard errors are clus-

[10]For details, look two https://theeffectbook.net/ch-FixedEffects.html

tered at the household-month level. A noteworthy and statistically significant interaction coefficient β_3 would signify the degree of impact attributed to covid on the expenditure on intoxicants in households without health insurance compared to households with health insurance.

The estimation of causal relationships through the difference-in-differences design hinges on the assumption that, before the covid, the average values of the households without health insurance and households with health insurance followed parallel trends. In essence, in the absence of the COVID-19 pandemic, outcomes for these two groups should exhibit similar trajectories over time. To validate this assumption in the study, I assess pre-trends by plotting interaction coefficients using the event study design specification outlined below:

$$\begin{aligned}\mathbf{Y}_{it} = \alpha + \beta_1 \mathbf{No\ Health\ Insurance}_i + \beta_2 \mathbf{Month}_t \\ + \textstyle\sum_{t=Jan19}^{Dec20} \gamma_t (\mathbf{No\ Health\ Insurance}_i \times \mathbf{Month}_t) \\ + \theta \mathbf{X}_{it} + \delta \mathbf{Z}_{st} + \textstyle\sum_k \phi_k \mathbf{group}_{ik} + \mu_i + \tau_t + \epsilon_{it} \qquad (2)\end{aligned}$$

All the variables specified in equation 2 are similar to equation 1, the variable $Month_t$, which spans from February 2019 to December 2020, with January 2019 serving as the base month. To scrutinize the parallel trends assumption crucial for our difference-in-differences design, I plot monthly coefficients of the logarithm of expenditure on intoxicants. The focus is on the pre-covid period, extending until December 2019. In this initial phase, I expect the coefficients to be statistically insignificant, thereby establishing a foundation for assuming parallel trends between households without health insurance and those with health insurance. By closely examining the pre-shock period, particularly the months leading up to December 2019, I aim to validate the assumption that, in the absence of the COVID-19 pandemic, both groups exhibited comparable trends in their expenditures on intoxicants.

4 Results

4.1 Baseline Results

Table 3 reports the results for the main specification in equation 1 for all the households present in the sample. Column (1) shows the results for log expenditure on intoxicants, and columns (2) and (3) show it by component of intoxicants – log expenditure on cigarette and tobacco and log liquor, respectively. Column (1) reveals interesting differences in expenditure on intoxicants between households with and without health insurance during the COVID-19 pandemic than the pre-covid period. Households without insurance spent significantly less on intoxicants overall, roughly 40% less than those with insurance. This trend also holds true for specific categories, with cigarette and tobacco spending 33% lower and liquor spending 21% lower for the uninsured households compared to the insured households. These results imply a consistent and across-the-board reduction in the expenditure in different intoxicant categories among uninsured households during the pandemic.[11] Table A2 presents the baseline results without considering the Household groups. Similar to the results in Table 1, the negative coefficients in all three columns of Table A1 indicate a significant reduction in expenditures on intoxicants, cigarette and tobacco, and liquor for households without health insurance during the COVID-19 period.

The estimated coefficients of the control variables align with our expectations and demonstrate consistency across all dependent variables. Firstly, income plays a role, with higher household income generally linked to increased spending on intoxicants (Chaloupka et al.,1999; Azagba and Sharaf, 2011). This could be due to increased disposable income leading to greater indulgence, or perhaps higher-income individuals perceive a lower risk of adverse consequences from substance use. Secondly, household size might also factor in, with larger families potentially having larger budgets allocated to intoxicants.

I verified the parallel trend assumption in the sample to ensure that the average log expenses on intoxicants exhibited similar behaviour in both groups, i.e., households with and without

[11]The baseline results without fixed effects are presented in Table A1. The results remain significant and in the same direction.

health insurance. Figure 1 illustrates the parallel trends observed in both groups. It also gives a nuanced illustration that the gap between intoxicant expenses of households with and without health insurance is narrowing down during the COVID-19 period, compared to the pre-COVID period. This observation suggests a significant reduction in intoxicant expenses for households without health insurance in the COVID-19 period relative to households with health insurance. The trend lines of expenses on cigarettes and tobacco and on liquor are shown in Figure A1 and Figure A2, respectively, showing a drop in expenses for households without health insurance compared to the insured households.

To further assess the identification strategy, I depicted the estimated interaction coefficients using equation 2 in Figure 2, with the dependent variable being the log of expenses on intoxicants. The results indicate that the interaction coefficients during the pre-covid period are close to zero, and most of them are statistically insignificant. This suggests that in the absence of COVID-19, the disparity between households without health insurance and households with health insurance is minimal. The COVID period, marked by a vertical line starting from December 2019, reveals a sharp change in the coefficient estimates for expenditure on intoxicants. This notable shift aligns with the period when news and media reports in India on COVID-19 cases gained prominence. In the initial months, from January to March, a substantial decline in this expense is evident. [12] Even after partial unlocks, the observed effect persists throughout the remaining months of the COVID-19 period. The rapid response and sustained impact on intoxicant expenses suggest a significant influence of external factors, such as media coverage and public awareness, on household behaviour during this period.

4.2 Heterogeneity analysis

In this section, I delve into a detailed exploration of the differentiated effects of Covid-19 on households' expenditures on intoxicants. To capture the diverse characteristics of households, I leverage the predefined groups within the CPHS data set. To simplify the examination of heterogeneous impacts, I create three distinct variables: rural, female majority, and literate. By dissecting the impact along these dimensions, I aim to discern whether

[12]The data for the Consumer Price Index (CPI) is unavailable for April and May 2020.

certain household characteristics intensify or mitigate the observed changes in intoxicant expenditures during the COVID-19 period. I re-estimated Equation 1 by incorporating moderating variables. [13]

The re-estimation of equation 1 is presented in Table 4, where I explore the interaction between Covid-19 and specific household attributes. In column (1), I examine whether the influence of Covid-19 on intoxicant expenses is influenced by the household's location, distinguishing between rural and urban areas. Notably, households with no health insurance exhibited a substantial reduction of approximately 32.3% in expenditures on intoxicants compared to households with health insurance during the COVID-19 period. This protective effect was more pronounced in rural areas, where households without health insurance have shown a significant reduction of around 25.9%. The households without health insurance in rural areas are spending less on intoxicants compared to those which are in urban areas during the COVID period. Interestingly, the direct impact of the pandemic on intoxicant spending in rural regions is marginal (0.01) and insignificant, illustrating the interplay of health insurance status and rural residence in shaping household behaviours during the Covid period.

In column (2), the analysis delves into the gender composition of households. Households with a female majority are spending approximately 35.4% less on intoxicants compared to households without a female majority, indicating potential distinctions in spending behaviours. Conversely, the Covid-19 period itself led to a significant increase of around 12.4% in expenditures on intoxicants in households with a female majority. However, when considering the absence of health insurance in female-majority regions during the pandemic, the impact on intoxicant expenditures is not statistically significant. This implies that female-majority households without health insurance did not exert a substantial impact on expenditures on intoxicants during the pandemic.

Lastly, in exploring the role of literacy in households, the findings reveal that literate house-

[13]For each moderating variable's impact estimation, I exclude its corresponding category from the group variable. For instance, when assessing the moderating impact of the female majority (dummy variable), I exclude the gender group (which has six categories) from the equation.

holds experienced a modest reduction of approximately 3.6% in expenditures on intoxicants compared to households where not all members are literate. However, the interactive effects of health insurance, the COVID-19 period, and the literacy status of households did not yield statistically significant impacts on intoxicant expenditures. These results may be because of the abstract way of coding this variable.

5 Robustness

To validate and reinforce the robustness of the primary result presented in column (1) of Table 3, I conduct a series of rigorous robustness checks for which results are shown in Table 5. The objective of these checks is to ensure that the observed differences remain unaffected and hold consistent for the outcome variable concerning non-insured households during the Covid-19 period.

5.1 Matching

5.1.1 Propensity Score Matching

Through Propensity Score Matching (PSM), households are matched based on pertinent characteristics such as household income and size, as well as other fixed characteristics like age group, occupation group, education group, gender group and region (rural or urban) of the households. With the matched sample, I re-estimated equation 1, and the result is presented in column (1) of Table 5.[14] Remarkably, within this meticulously matched sample, the regression coefficient retains its high statistical significance, indicating a substantial reduction of approximately 43% in expenditure on intoxicants for households without health insurance during the Covid-19 period in comparison to those with health insurance. Even after matching the sample, I found differences in income variables, so I tried various criteria in PSM to match households with and without health insurance. The results are presented in Table A3, with three different specifications for Propensity Score Matching. In column (2), the households without health insurance and households with health insurance are matched by the nearest neighbourhood (1) with no replacement and in column (3),

[14]The reported impact is estimated by matching the households without health insurance and the households with health insurance with the nearest neighbourhood (1) and with replacement.

the households are matched with the nearest neighbourhood (5) with replacement. These results underscore the robustness of the observed impact, consistently demonstrating a significant reduction in intoxicant expenditures for households without health insurance during the COVID-19 period across different matching specifications.

5.1.2 Coarsened Exact Matching

As household income is a major determinant of spending decisions, I employ an alternative approach to validate the robustness of my findings. I implement Coarsened Exact Matching (CEM), a technique where households are matched based on characteristics similar to those in PSM. The results derived from Coarsened Exact Matching shown in column (2) of Table 5 further validate the impact of Covid-19 on expenditure on intoxicants for households without health insurance, demonstrating a reduction of approximately 38% compared to households with health insurance. These consistent and robust findings underscore the reliability of our main results, reinforcing the notion that there is a significant drop in expense on intoxicants for households without health insurance during the pandemic. The findings in columns (2) and (3) of Table A4 suggest a uniform and widespread decrease in expenditures across various intoxicant categories among households without health insurance during the pandemic.

The first robustness check involves employing matching techniques, and the findings persist consistently across different methodologies.

5.2 State-month Trend

States often have different policies and regulations regarding the sale and consumption of intoxicants. Including state-month trends can help control the impact of state-level variations in policies, such as the opening or closing of liquor stores, changes in alcohol taxes, or other regulatory measures. It can also capture the socio-economic variations across state boundaries. One advantage of the inclusion of the state-month trend is to get rid of the CPI variable for which I do not have data for two months during the lockdown. The new estimation specification is as follows:

$$\mathbf{Y}_{ist} = \alpha + \beta_1 \mathbf{No\ Health\ Insurance}_i + \beta_2 \mathbf{Covid}_t + \beta_3 \mathbf{No\ Health\ Insurance}_i \times \mathbf{Covid}_t$$

$$+ \theta \mathbf{X}_{ist} + \textstyle\sum_k \phi_k \mathbf{group}_{ik} + \mu_i + \tau_t + \lambda_{st} + \epsilon_{ist} \qquad (3)$$

All the variables specified in equation 3 are similar to equation 1; the subscripts i denote to households, s denotes state and t denotes months. The only addition is the term λ_{st} capturing the state-month trend.[15] The result incorporating the State-month trend, presented in column (3) of Table 5, provides valuable insights into the temporal dynamics of household intoxicant expenditures during the Covid-19 period. This finding suggests that accounting for temporal variations across states and months, households without health insurance compared to households with health insurance experienced a significant decrease of approximately 11.7% in expenditures on intoxicants during the COVID-19 period. The outcomes reported in columns (2) and (3) of Table A5 suggest a reduction in spending across diverse types of intoxicants for households without health insurance during the pandemic. The consistency of this impact over time not only reinforces the reliability of the main results throughout the evolving phases of the pandemic.

5.3 Placebo

To assess the robustness of the finding, a placebo test is conducted by utilizing observations preceding the main sample period for this study, specifically from January 2017 to December 2018, extending exactly 24 months, similar to the main sample. In this placebo test, a simulated shock (Placebo) is introduced from January 2018 onwards. The pre-shock period spans from January 2017 to December 2017, and the post-shock period is from January 2018 to December 2018. Subsequently, I proceed to re-estimate Equation 1. The results of the placebo test are presented in column (4) of Table 5. The estimation for household expenditures on intoxicants includes all relevant controls and fixed effects, mimicking the setup in column (1) of Table 3. However, in this context, the coefficient for the interaction

[15]The standard errors are clustered at the household level instead of household month level following Abadie et al. (2023).

of "No health insurance and COVID" lacks statistical significance, affirming the absence of a significant impact during the placebo period. This result demonstrates that the main finding is not influenced by any other events occurring in the pre-shock period and is indeed linked to the unique circumstances of the COVID-19 pandemic.

The robustness checks, as depicted in Table 5, reinforce the main findings, establishing a solid foundation. The results consistently support the hypothesis that household expenditures on intoxicants experienced a significant decline for households without health insurance during the COVID-19 period compared to households with health insurance. This support is evident through various matching techniques and trend analyses, confirming the reliability and robustness of our conclusions.

6 Discussion

The central hypothesis posits that "Households without health insurance exhibit a more significant reduction in overall expenses on intoxicants during the COVID-19 pandemic compared to those with health insurance." The baseline results in Table 3 support this hypothesis, revealing a substantial 40% reduction in log expenditures on intoxicants for households without health insurance during the pandemic. The empirical findings presented in Table 6 illuminate the multifaceted dynamics of household behaviours during the COVID-19 pandemic, shedding light on potential mechanisms that go beyond the initial hypothesis. The negative coefficient of -0.068 in column (1) indicates a noteworthy reduction in income for households without health insurance during the pandemic compared to households with health insurance. This finding points to a vulnerability of uninsured households to COVID-19, which is very much an economic shock, suggesting that the pandemic has disproportionately affected their financial well-being. Contrary to the anticipated decline in expenditures, column (2) shows a seemingly paradoxical result revealing modest and insignificant reductions for households without health insurance during the pandemic. It hints that while overall spending did not witness a substantial fall, there might be a reorientation in spending patterns among the uninsured. Column (3) shows a 50% reduction in the share of household expenditures allocated to intoxicants for uninsured

households during the COVID-19 period relative to the insured households. This suggests a significant reevaluation of spending priorities among the uninsured, with a discernible shift away from non-essential and discretionary items, specifically intoxicants.

It suggests that the baseline results, indicating a reduction in overall intoxicant consumption among households without health insurance, may not be solely driven by rising awareness or risk aversion. Instead, the results point to the intricate relationship between economic vulnerability, income dynamics, and shifting spending priorities among uninsured households in response to the challenges posed by the pandemic.

7 Conclusion

This study has delved into the intricate relationship between the COVID-19 pandemic, heightened health awareness, and household intoxicant consumption patterns, with a specific focus on the health insurance status of households in the Indian context. The unprecedented global crisis led to profound impacts on public health, societal well-being, and individual behaviours. The findings of this research highlight a significant shift in health-related behaviours, with households re-evaluating their priorities in the wake of the pandemic. The heightened awareness of health risks triggered by the crisis has not only influenced health-conscious activities but has also had a notable impact on spending patterns related to intoxicants. The study supports the central hypothesis that the COVID-19 pandemic serves as a transformative shock, influencing both health awareness and household intoxicant consumption patterns.

The analysis underscores the role of risk aversion in shaping consumption choices during the pandemic. Households with health insurance, representing high-risk averse, demonstrated altered patterns in intoxicant expenditures compared to less risk-averse households without health insurance. The significant reduction of approximately 40% in the expenditure on intoxicants for uninsured households during the pandemic, as opposed to their insured counterparts, highlights the impact of health awareness raised by COVID-19 on consumption choices. The differentiated effects observed in rural areas, where households

lacking health insurance exhibited a substantial reduction in intoxicant expenditures compared to urban areas, emphasize the varying responses to health-related shocks across different geographic locations. This protective influence, however, is not as pronounced in female-majority households or those with all literate members.

The utilization of matching techniques enhanced the robustness of the study, ensuring that households were appropriately matched based on relevant characteristics. The re-estimated difference-in-differences specification consistently demonstrated the substantial reduction in intoxicant expenditures for households without health insurance, reaffirming the causal impact of the COVID-19 pandemic on consumption choices. Even after accounting for the state-month trend, the results continued to support the primary hypothesis, further solidifying the study's findings.

The study's implications extend beyond the immediate context, offering valuable insights for policymakers, public health professionals, and researchers. Recognizing the role of awareness and risk aversion in shaping household intoxicant consumption patterns during health crises can inform the design and implementation of tailored interventions. Moreover, the study contributes to the growing body of literature exploring the multifaceted consequences of the COVID-19 pandemic, emphasizing the interconnectedness of health awareness and lifestyle choices. As the world grapples with ongoing and future health challenges, understanding these dynamics becomes paramount for fostering resilience and designing effective strategies that promote both individual well-being and societal health.

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Figure 1: Descriptive Plot (Parallel Trend): displays the monthly patterns of log expenditures on intoxicants for households without health insurance and households with health insurance. The vertical line marks the commencement of the COVID-19 period.

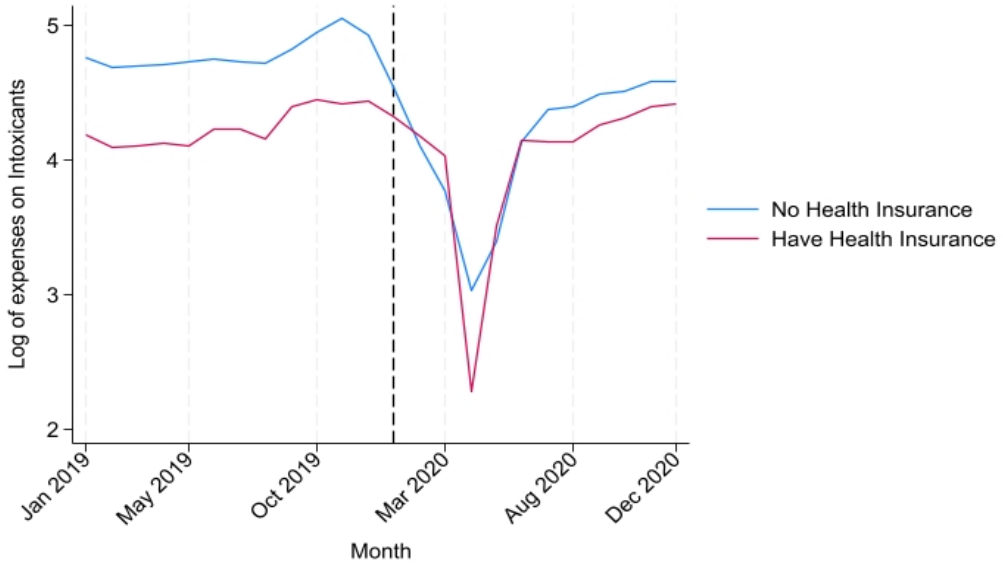

Figure 2: Coefficient Plot: displays the coefficient plot for expenditures on intoxicants, presenting the difference-in-differences coefficients by comparing the households without health insurance and households with health insurance for each month. The vertical line marks the commencement of the COVID-19 period.

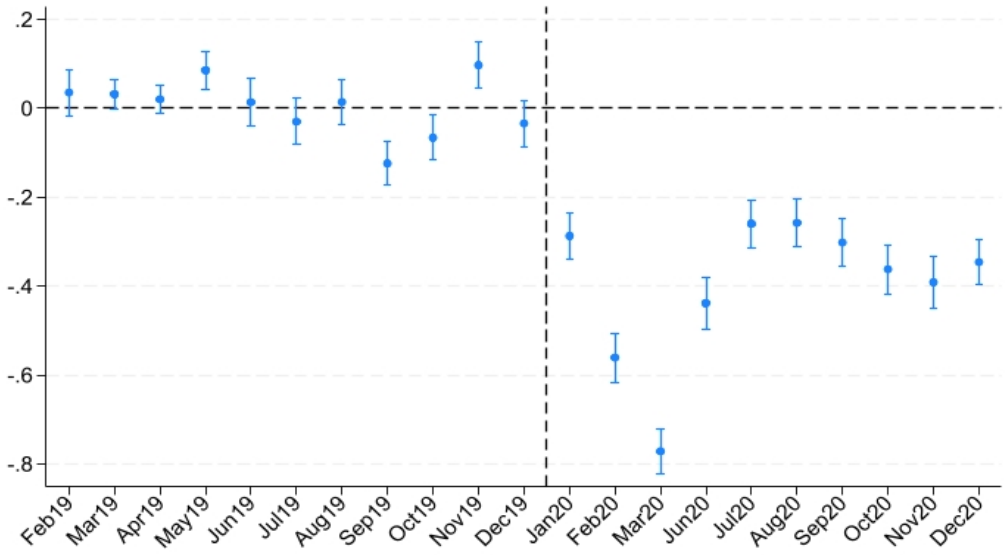

Table 1: Variable Description

Variables	Definitions and Measurements	Sources
Log Income	Log of total income of a household during a month	CMIE Income Pyramids
Log Intoxicants	Log of sum of adjusted monthly expenditure by a household on intoxicants during a month	CMIE Consumption Pyramids
Log Cig-tabacco	Log of sum of adjusted monthly expenditure by a household on cigarette and tobacco during a month	CMIE Consumption Pyramids
Log Liquor	Log of sum of adjusted monthly expenditure by a household on Liquor during a month	CMIE Consumption Pyramids
Log Expenditure	Log of total expenditure of a household on all consumption during a month	CMIE Consumption Pyramids
Household Size	Number of individuals in the household	CMIE Consumption Pyramids
CPI	Consumer Price Index representing Inflation of a state during a month	CMIE States of India
Total Health Insurance	Total number of members have Health Insurance in the household	CMIE People of India
No Health Insurance	Coded as 0 if a household has atleast one health insurance, 1 otherwise	Author's Creation
Covid	Coded as 1 if month is Jan 2020 onwards, 0 otherwise	Author's Creation
Rural	Coded as 0 if a household is in rural area and, 1 if in Urban area	Author's Creation
Female Majority	Coded as 1 if a household has majority female members and, 0 otherwise	Author's Creation
Literate	Coded as 1 if a household has all literate members and, 0 otherwise	Author's Creation
Intoxicant Share	Percentage share of intoxicant consumption in total consumption expenditure during a month	Author's Creation

Table 2: Summary Statistics

Variables	(1) Observations	(2) Mean	(3) SD	(4) Min	(5) p10	(6) p50	(7) p90	(8) Max
Total Income	796848	21832.29	18225.17	0	5600	16300	45120	100870
CPI	718558	147.78	7.05	134.2	138.5	147.4	157.4	175.8
Household Size	796848	5.88	1.5	1	4	6	8	10
Expense Intoxicants	796848	425.39	459.85	0	0	300	1061	2190
Expense Cig-tabacco	796848	277.69	298.81	0	0	225	642	1408
Expense Liquor	796848	143.93	329.66	0	0	0	600	1700
Total Health Insurance	796848	0.94	1.68	0	0	0	4	11
No Health Insurance	796848	0.72	0.45	0	0	1	1	1
Covid	796848	0.50	0.50	0	0	0.5	1	1
Rural	796848	0.28	0.45	0	0	0	1	1
Female Majority	796848	0.18	0.39	0	0	0	1	1
Literate	796244	0.33	0.47	0	0	0	1	1
Total Expenditure	796848	12824.53	6138.25	3664	6518	11536	20615	37043
Log Income	796848	9.50	1.56	0	8.63	9.70	10.72	11.52
Log Intoxicants	796848	4.38	2.84	0	0	5.71	6.97	7.69
Log Cig-tabacco	796848	3.93	2.78	0	0	5.42	6.47	7.25
Log Liquor	796848	1.34	2.61	0	0	0	6.40	7.44
Log Expenditure	796848	9.36	0.45	8.21	8.78	9.35	9.93	10.52
Intoxicant Share	796823	3.36	3.34	0	0	2.63	8.09	14.53

Notes: p refers to percentile.

Table 3: Expenditure on Intoxicants and components during Covid

Dependent Variables	(1) Log Intoxicants	(2) Log Cig-tobacco	(3) Log Liquor
No Health Insurance × Covid	-0.402***	-0.337***	-0.213***
	[0.055]	[0.064]	[0.050]
Log Income	0.066***	0.061***	0.028***
	[0.010]	[0.010]	[0.005]
CPI	0.062***	0.033**	0.056***
	[0.014]	[0.013]	[0.008]
Household Size	0.162***	0.139***	0.090***
	[0.017]	[0.016]	[0.011]
Constant	-6.025**	-2.055	-7.593***
	[2.172]	[2.016]	[1.294]
Household group	Yes	Yes	Yes
Household Fixed Effects	Yes	Yes	Yes
Month Fixed Effects	Yes	Yes	Yes
Observations	718002	718002	718002
Adjusted R-squared	0.442	0.513	0.523

Clustered standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 4: Heteregenous Impacts: Expenditure on Intoxicants during Covid

	(1) **Region**	(2) **Gender**	(3) **Literacy**
Dependent variable	Log Intoxicants	Log Intoxicants	Log Intoxicants
No Health Insurance × Covid	-0.323***	-0.392***	-0.431***
	[0.052]	[0.055]	[0.062]
Covid × Rural	0.01		
	[0.068]		
No Health Insurance × Covid× Rural	-0.259***		
	[0.079]		
Female Majority		-0.354***	
		[0.079]	
No Health Insurance × Female Majority		0.117	
		[0.094]	
Covid× Female Majority		0.124**	
		[0.059]	
No Health Insurance × Covid× Female Majority		-0.046	
		[0.078]	
Literate			-0.036
			[0.063]
No Health Insurance × Literate			0.032
			[0.076]
Covid× Literate			0.04
			[0.076]
No Health Insurance × Covid× Literate			0.082
			[0.091]
Controls	Yes	Yes	Yes
Household group	Yes	Yes	Yes
Household Fixed Effects	Yes	Yes	Yes
Month Fixed Effects	Yes	Yes	Yes
Observations	718002	718002	718002
Adjusted R-squared	0.442	0.441	0.441

Clustered standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 5: Robustness Checks: Expenditure on Intoxicants during Covid

	(1) **PSM**	(2) **CEM**	(3) **State-month trend**	(4) **Placebo (2018)**
Dependent Variable	Log Intoxicants	Log Intoxicants	Log Intoxicants	Log Intoxicants
No Health Insurance × Covid	-0.436***	-0.378***	-0.117***	0.099
	[0.062]	[0.047]	[0.033]	[0.059]
Log Income	0.058***	0.102***	0.062***	0.106***
	[0.011]	[0.014]	[0.003]	[0.012]
CPI	0.043***	0.027*		-0.002
	[0.014]	[0.014]		[0.010]
Household Size	0.168***	0.218***	0.136***	0.031**
	[0.021]	[0.027]	[0.011]	[0.011]
Constant	-3.174	-1.667	3.040***	3.678***
	[2.189]	[1.994]	[0.071]	[1.278]
Household group	Yes	Yes	Yes	Yes
Household Fixed Effects	Yes	Yes	Yes	Yes
Month Fixed Effects	Yes	Yes	No	Yes
State-month Fixed Effects	No	No	Yes	No
Observations	654479	316624	796244	692603
Adjusted R-squared	0.461	0.481	0.466	0.447

Clustered standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 6: Alternative explanation

Dependent Variables	(1) Log Income	(2) Log Expenditure	(3) Intoxicant Share
No Health Insurance× Covid	-0.068**	-0.014	-0.500***
	[0.028]	[0.009]	[0.075]
CPI	0	0.007***	0.063***
	[0.003]	[0.002]	[0.015]
Household Size	0.107***	0.063***	0.096***
	[0.005]	[0.003]	[0.017]
Log Income		0.045***	-0.004
		[0.002]	[0.007]
Constant	9.081***	7.601***	-6.162**
	[0.486]	[0.278]	[2.233]
Household group	Yes	Yes	Yes
Household Fixed Effects	Yes	Yes	Yes
Month Fixed Effects	Yes	Yes	Yes
Obervations	718002	718002	717978
Adjusted R-squared	0.379	0.648	0.456

Clustered standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Appendix

Figure A1: displays the monthly patterns of log expenditures on cigarette and tobacco for households without health insurance and households with health insurance. The vertical line marks the commencement of the COVID-19 period.

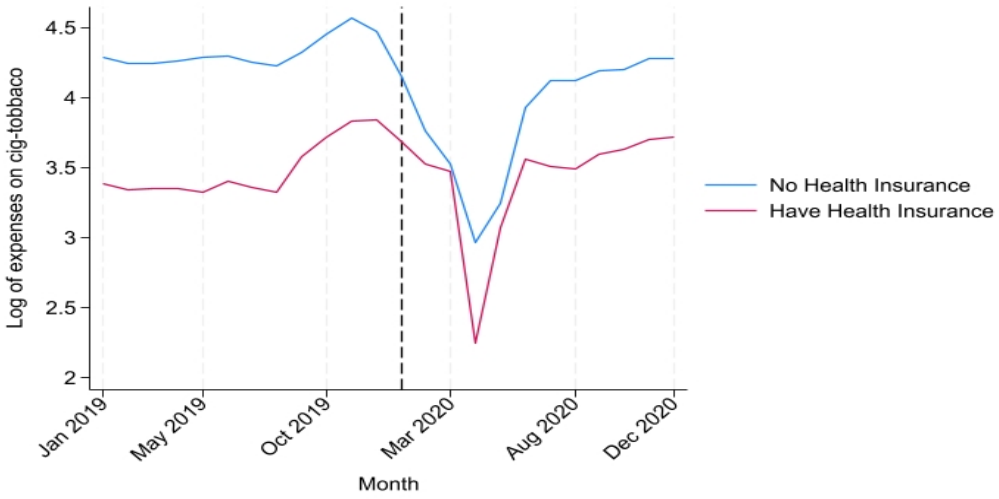

Figure A2: displays the monthly patterns of log expenditures on liqour for households without health insurance and households with health insurance. The vertical line marks the commencement of the COVID-19 period.

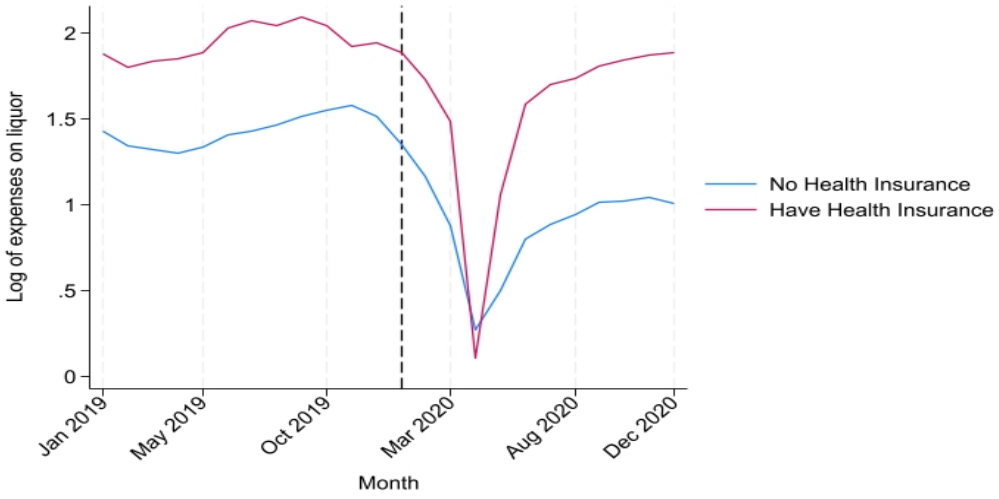

Table A1: Baseline results (without fixed effects)

Dependent Variables	(1) Log Intoxicants	(2) Log Cig-tobacco	(3) Log Liquor
No Health Insurance	0.276***	-0.484***	0.514***
	[0.033]	[0.045]	[0.033]
Covid	0.003	0.084	-0.006
	[0.107]	[0.109]	[0.100]
No Health Insurance × Covid	-0.370***	-0.234***	-0.297***
	[0.060]	[0.053]	[0.069]
Log Income	0.098***	0.090***	0.052***
	[0.017]	[0.010]	[0.018]
CPI	-0.006	-0.029***	0.005
	[0.008]	[0.009]	[0.006]
Household Size	0.176***	-0.068***	0.240***
	[0.013]	[0.011]	[0.011]
Constant	3.342**	5.575***	1.182
	[1.192]	[1.219]	[0.856]
Household group	Yes	Yes	Yes
Household Fixed Effects	No	No	No
Month Fixed Effects	No	No	No
Observations	718002	718002	718002
Adjusted R-squared	0.098	0.046	0.11

Clustered standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table A2: Baseline results (without Household group)

Dependent Variables	(1) Log Intoxicants	(2) Log Cig-tobacco	(3) Log Liquor
No Health Insurance × Covid	-0.404***	-0.345***	-0.207***
	[0.057]	[0.065]	[0.049]
Log Income	0.060***	0.055***	0.030***
	[0.009]	[0.010]	[0.018]
CPI	0.062***	0.033**	0.057***
	[0.014]	[0.013]	[0.009]
Household Size	0.211***	0.177***	0.110***
	[0.018]	[0.016]	[0.012]
Constant	-6.303**	-2.299***	-7.830***
	[2,186]	[2.040]	[1.313]
Household group	No	No	No
Household Fixed Effects	Yes	Yes	Yes
Month Fixed Effects	Yes	Yes	Yes
Observations	718558	718558	718558
Adjusted R-squared	0.436	0.508	0.521

Clustered standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table A3: Propensity Score Matching

	(1) **psm n(1)**	(2) **psm n(1) no-replacement**	(3) **psm n(5)**
Dependent variable	Log Intoxicants	Log Intoxicants	Log Intoxicants
No Health Insurance × Covid	-0.436***	-0.418***	-0.440***
	[0.062]	[0.048]	[0.064]
Log Income	0.058***	0.088***	0.060***
	[0.011]	[0.013]	[0.010]
CPI	0.043***	0.037**	0.039***
	[0.014]	[0.015]	[0.013]
Household Size	0.168***	0.206***	0.166***
	[0.021]	[0.025]	[0.019]
Constant	-3.174	-3.095	-2.626
	[2.189]	[2.196]	[1.972]
Household group	Yes	Yes	Yes
Household Fixed Effects	Yes	Yes	Yes
Month Fixed Effects	Yes	Yes	Yes
Observations	654479	402746	715053
Adjusted R-squared	0.461	0.48	0.462

Clustered standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table A4: CEM: Intoxicants and components

Dependent Variables	(1) Log Intoxicants	(2) Log Cig-tobacco	(3) Log Liquor
No Health Insurance × Covid	-0.378***	-0.322***	-0.248***
	[0.047]	[0.048]	[0.058]
Log Income	0.102***	0.090***	0.069***
	[0.014]	[0.013]	[0.013]
CPI	0.027*	-0.001	0.058***
	[0.014]	[0.011]	[0.007]
Household Size	0.218***	0.172***	0.150***
	[0.027]	[0.026]	[0.019]
Constant	-1.667	2.276	-8.394***
	[1.994]	[1.627]	[1.103]
Household group	Yes	Yes	Yes
Household Fixed Effects	Yes	Yes	Yes
Month Fixed Effects	Yes	Yes	Yes
Observations	316624	316624	316624
Adjusted R-squared	0.481	0.549	0.571

Clustered standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table A5: State Month Trend: Intoxicants and components

	(1)	(2)	(3)
Dependent Variables	Log Intoxicants	Log Cig-tobacco	Log Liquor
No Health Insurance × Covid	-0.117***	-0.095***	-0.053**
	[0.033]	[0.031]	[0.026]
Log Income	0.062***	0.053***	0.033***
	[0.003]	[0.003]	[0.002]
Household Size	0.136***	0.114***	0.077***
	[0.011]	[0.011]	[0.008]
Constant	3.040**	2.793***	0.589***
	[0.071]	[0.067]	[0.053]
Household group	Yes	Yes	Yes
Household Fixed Effects	Yes	Yes	Yes
State-Month Fixed Effects	Yes	Yes	Yes
Observations	796244	796244	796244
Adjusted R-squared	0.466	0.523	0.527

Clustered standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1