

Covid & Smoking: Evidence from India

Donald Kenkel, Alan Mathios, Revathy Suryanarayana, Hua Wang

Tobacco Online Policy Seminar (TOPS)

May 5, 2023

Disclaimer

Produced with the help of a grant to Cornell University from the Foundation for a Smoke-Free World, Inc. (FSFW), a U.S. nonprofit 501(c) (3) private foundation.

This study is, under the terms of the grant agreement with FSFW, editorially independent of FSFW. The contents, selection, and presentation of facts, as well as any opinions expressed herein are the sole responsibility of the authors and under no circumstances shall be regarded as reflecting the positions of FSFW. FSFW had no role in the planning or execution of this study, data analysis, or publication of results. FSFW accepts charitable gifts from PMI Global Services Inc. (PMI); under FSFW's Bylaws and Pledge Agreement with PMI, FSFW is independent from PMI and the tobacco industry.

Background: Smoking in India

- Around 267 million tobacco users in India – the second largest number of tobacco users in the world
- Half of them use cigarettes and bidis and about 75 percent of them use smokeless tobacco (chewing tobacco)
- Not surprisingly – tobacco consumption accounts for more than 1.2 million deaths
 - 350,000 deaths attributed to smokeless tobacco consumption alone
 - Responsible for 27% of all cancers in India in 2020
- Survey evidence suggests that around half of tobacco users in India would like to quit using tobacco products [GATSS 2016-17; Kar et al., 2020]

Tobacco regulation in India – efforts so far

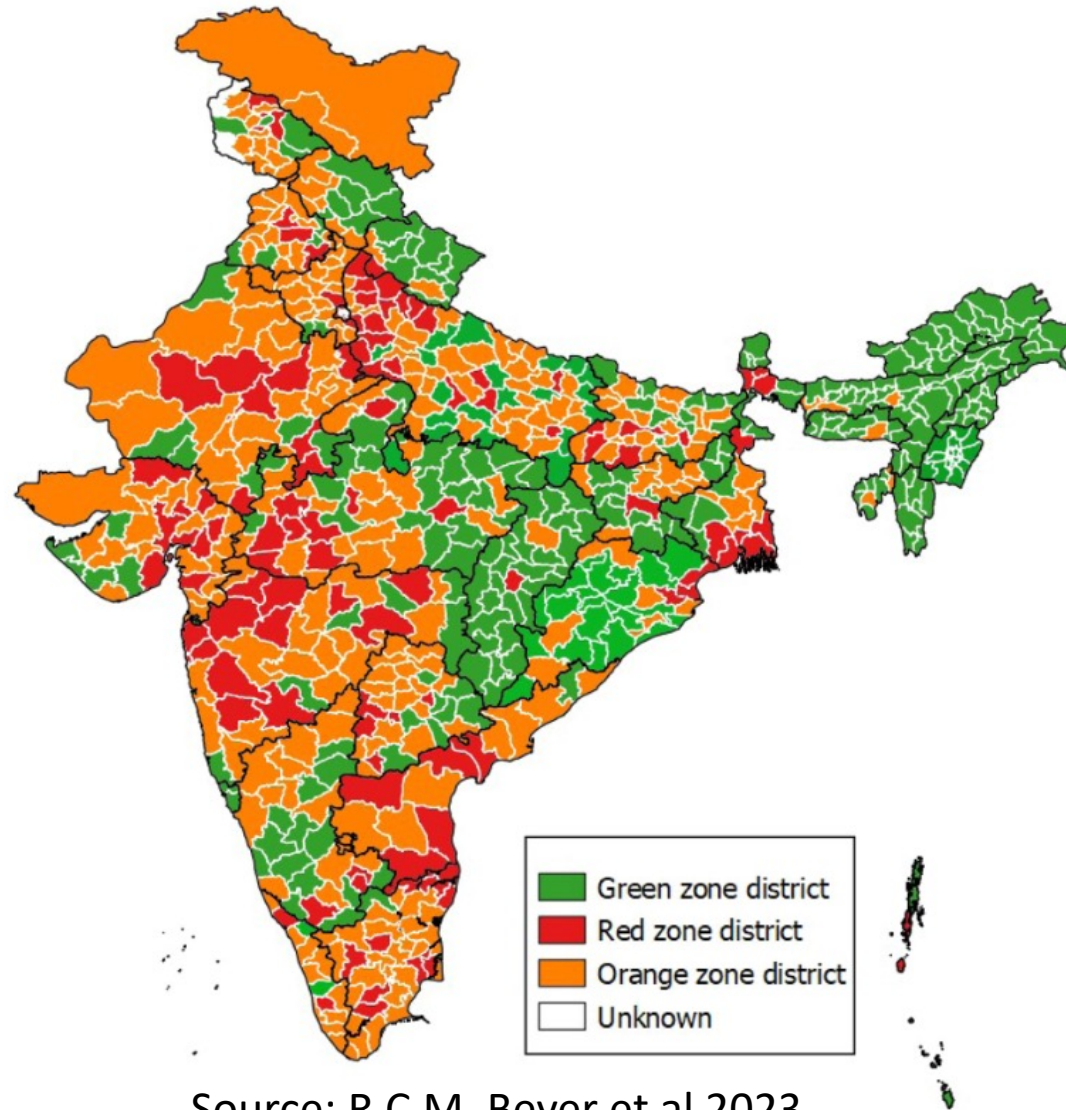
- Since 1975, India has been enacting various measures to regulate tobacco consumption
 - Prohibits advertisement
 - Graphic and textual warnings on packages
 - Warnings for smoking and tobacco products in movies and television programs
 - Many states ban the sale of single cigarettes and *gutka* and other forms of smokeless tobacco
 - Prohibits the manufacture, import/export, sale, and distribution of e-cigarettes
 - Sale of heated tobacco products (HTPs) is prohibited
- However, cigarette and bidi smoking, and the use of smokeless tobacco products remains high



COVID in India

- March 25, 2020 – nationwide lockdown in the country
 - Due to the increasing spread of global infection, India implemented a nationwide lockdown starting March 25
 - Uniform lockdown across the country, with one of the strictest enforcement globally
 - All establishments were shut down (except essential grocery services) and mobility was severely curtailed
- Starting May 4, 2020, districts were classified into 3 zones – green, orange, and red depending on the severity of COVID cases in these districts
- Red districts continued having complete lockdown restrictions while green and orange districts had relatively lax restrictions on mobility
- Studies show that districts with severe restrictions had on average 5.8-6.6% lower GDP than districts that opened up [Beyer et al., 2023]

District-wise Containment policy



Source: R.C.M. Beyer et al 2023

Ministry of Health & Family Welfare
Government of India

Spitting in public places is a public nuisance and spreads #COVID19 infection

It is the right time to quit chewing tobacco and pan masala for a safer and better health



To Quit Tobacco Call Tollfree National Tobacco Quit Line | 1800112356 or Give a Missed Call at 011-2290 1701 | #Coronavirus #NoTobacco


Government of India (COVID-19) help you

Boost your immunity, don't weaken it

Quit smoking

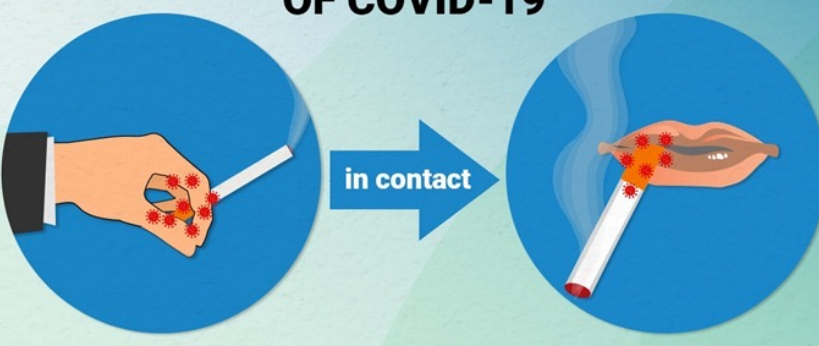
Smoking makes the lungs more vulnerable to infection and diseases

Together we will fight COVID-19



TO DEVELOP SYMPTOMS OF COVID-19

Fingers → in contact → Lips



COVID & Smoking in India

- Government issued notices across India warning individuals how smoking & COVID might interact
- The government also banned the sale of liquor, gutka, and tobacco in April 2020
- Coupled with the total lockdown and the ban, what this created is a situation of *forced reduction*, at least among some users of tobacco products

What we do:

- Research questions:
 - We explore how this temporary ban on tobacco affected tobacco spending in India
 - Use variation in district-wise containment policies between May and July 2020 to evaluate how tobacco purchases were associated with opening up after a relatively restrictive lockdown
 - Want to see if this temporary ban really affected tobacco purchases in the post ban period
- What we find:
 - We find that districts that opened up after May 2020 experienced an increase in cigarette purchases compared to those that remained closed
 - We also observe that there were no long-run decreases in cigarette purchases after a restrictive lockdown

Contribution to Literature

- COVID & Smoking
 - A number of papers study the health impact of smoking on COVID transmission and severity
 - What is the impact of COVID lockdown policies on smoking? [Carreras et al 2022] – mixed results on smoking intensity among a sample of adults in Italy
 - In a systematic review, Almeda and Gomez-Gomez, 2022 observe the general decrease in smoking behaviors during COVID
- Effect of forced abstinence [Clarke et al., 2013; Tong et al., 2013]
 - Studies smoking in an environment that forces giving up cigarettes- e.g.: prisons
 - No significant impact on post-release smoking status among prisoners

Data

- We use data from the CMIE Consumer Pyramid database
- Tracks monthly consumption expenditure for a sample set of households across India for a wide variety of consumer goods and services
- Specifically for tobacco products we have information on:
 - Monthly cigarette expenditure
 - Monthly bidi expenditure (mini cigar)
 - Monthly expenditure on all tobacco products
- Sample characteristics
- Focus on hhs reporting positive tobacco purchases anytime during 2019-2020 – total (N=13364 hh)
- For our main analysis we focus on a narrow time period – 2020 March to 2020 July
- For our long-term analysis we look at the months of May – July 2017-2020

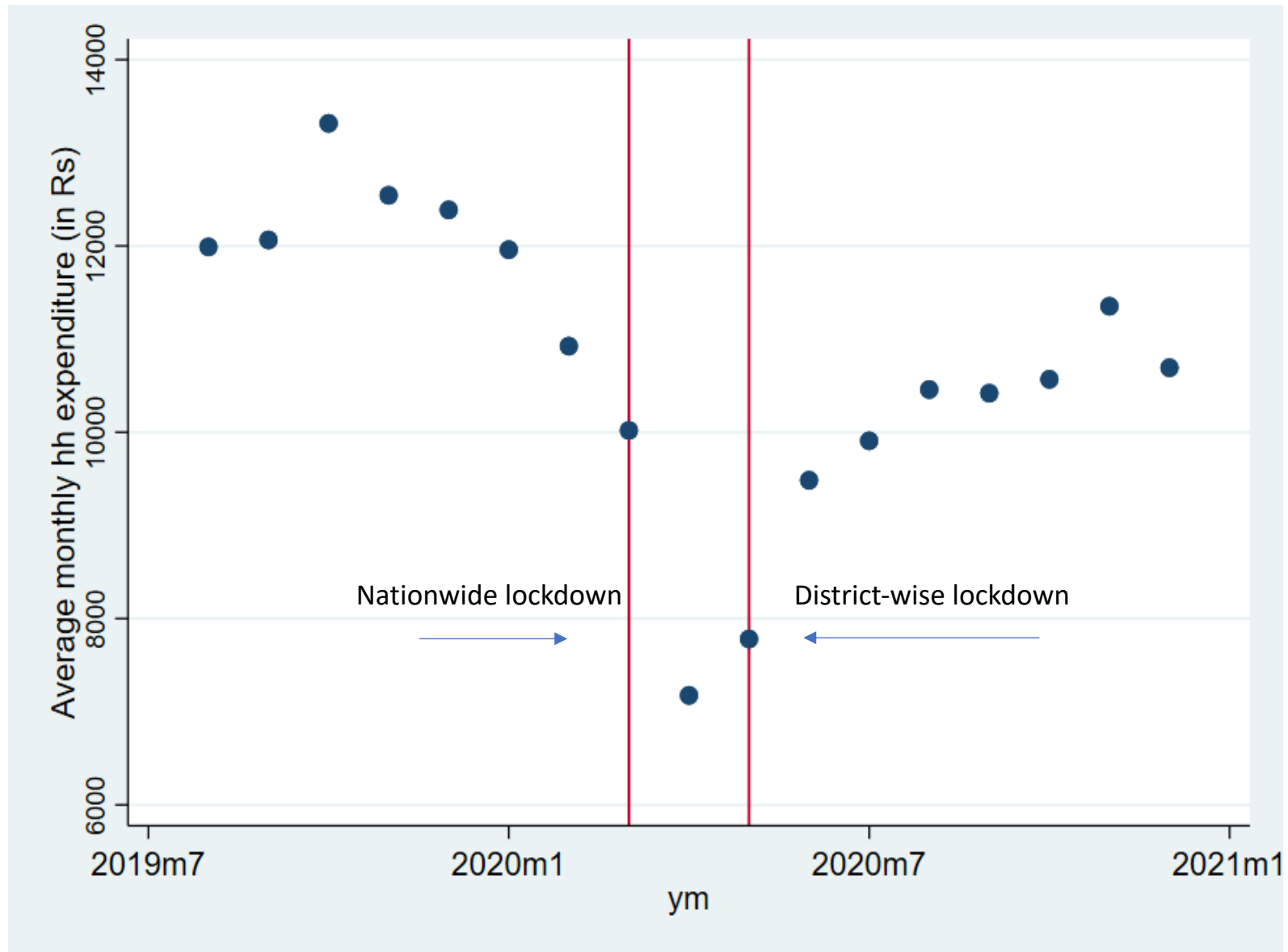
CMIE data collection during COVID

- Major challenge – how reliable was the data during the initial wave of COVID?
- Survey institution (CMIE) reorganized their data collection process in to protect data quality during the lockdown months
- Standard operating procedure of face-to-face interviews were replaced by telephonic interview starting March 25
- However, even with procedural changes, field staff were unable to contact all sample households – the final response rate was only 1/3rd of the original sample
- Data checks by the survey agency indicate that the quality was quite high
- We include only those households that were only observable during all waves of the survey

Summary Statistics (N=13364 for Pre-covid time period)

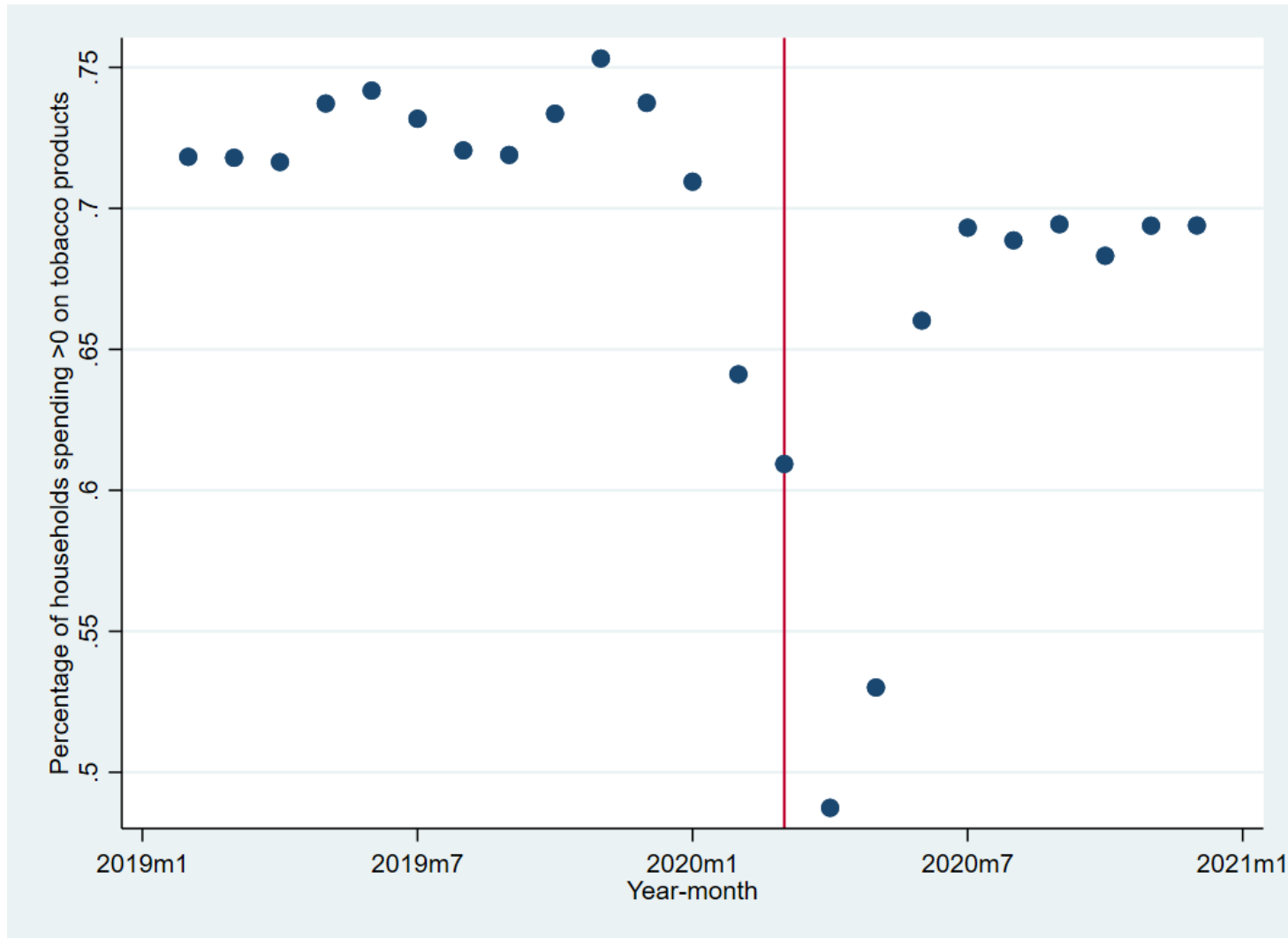
Variable name	Mean	SD
HH members not currently working	.0925	.2897
HH members are all illiterate	.024	.152
Household size	3.98	1.46
Gender Balanced Households	.336	.472
Total monthly expenditure (in Rs.)	11705.1	6873.726
Total monthly expenditure on food (in Rs.)	5032.536	1900.513
Total monthly expenditure on cigarettes (in Rs.) [A pack of cig cost anywhere between 120-340 rs]	27.9	103.10
Total monthly expenditure on bidis (in Rs.) [A pack of bidis costs anywhere between 5-25rs]	57.11	128.3
Total monthly expenditure on all tobacco products(in Rs.)	242.26	256.34

COVID timeline in India



- Nationwide lockdown in March 2020 – severely restricted mobility
- Beginning May 1st week restrictions were relaxed depending on COVID severity.

Did tobacco consumption fall between March-April 2020?



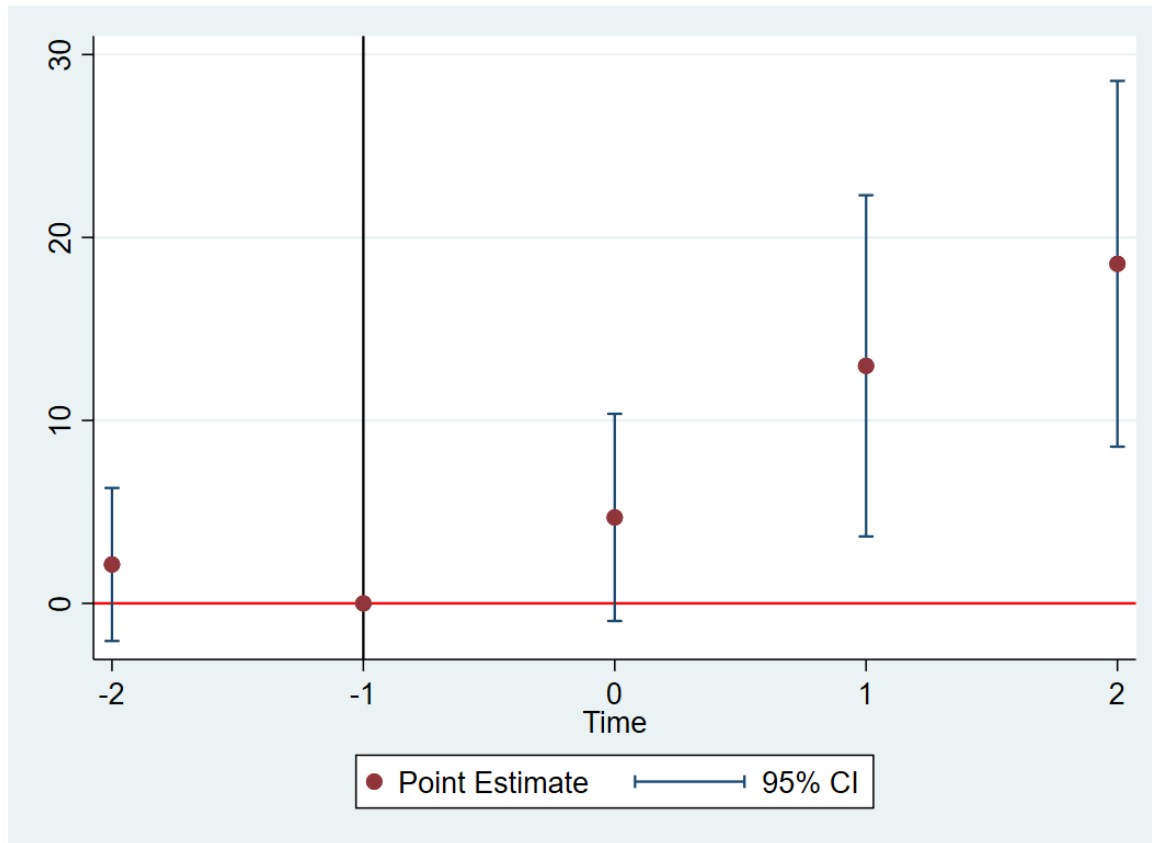
Event study [2020 March – 2020 July]

$$y_{ht} = \alpha + \sum_{j \in (-2,3)} \gamma_j D_{i,t-j} + \delta_h + \omega_t + \epsilon_{ht}$$

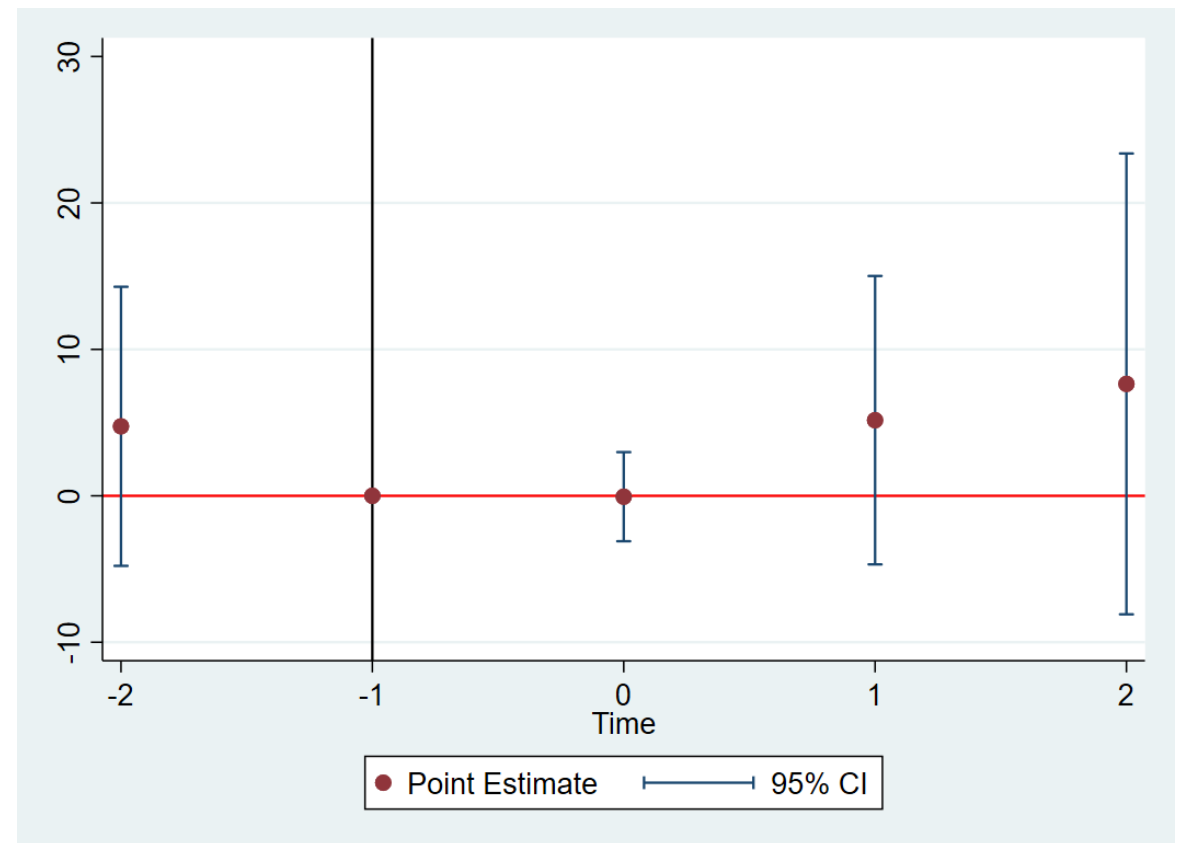
- y_{ht} - monthly household expenditure on cigarettes, bidis, and other tobacco products
- Includes household and year-month fixed effects
- Standard errors clustered at the state level
- Event corresponds to opening up of restrictions in May 2020
- Treated units are orange and green zone districts

Impact of relaxing COVID restrictions on smoking outcomes – Expenses on cigarettes and bidis

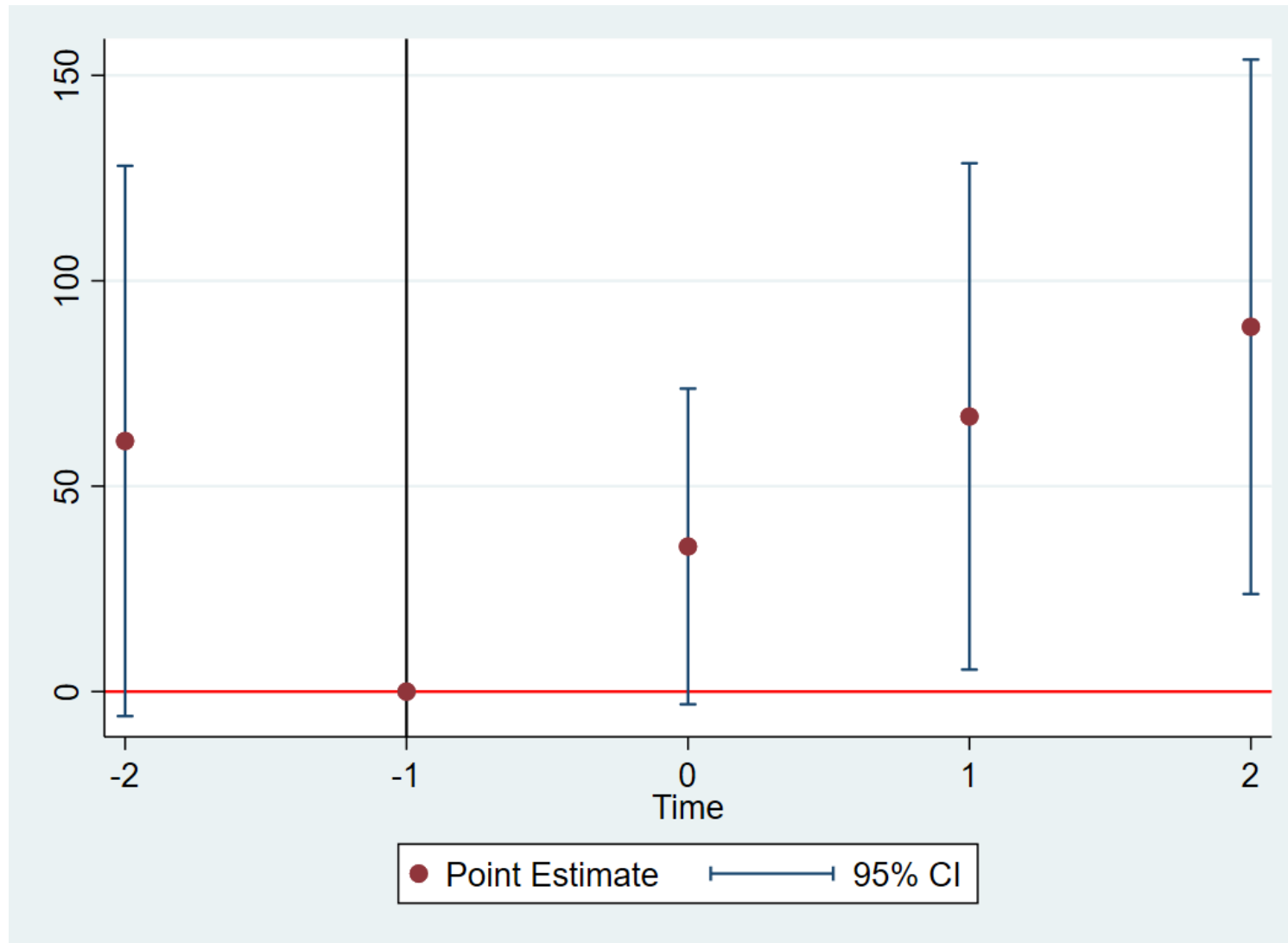
Cigarettes



Bidis



Impact of relaxing COVID restrictions on smoking outcomes – All tobacco purchases



DiD estimating equation

$$y_{ht} = \alpha + \beta_1 post * orangezone_d + \beta_2 post * greenzone_d + \delta_h + \omega_t + \epsilon_{ht}$$

- y_{ht} - monthly expenditure on cigarettes/bidis/all tobacco products
- β_1 and β_2 measure the association between opening up in orange and green districts and cigarette purchases after May 2020 compared to the red districts where restrictions were not lifted
- Includes household and time fixed effects
- Standard errors clustered at the state level

Impact of relaxing COVID restrictions on tobacco purchases

	Cigarettes	Bidis	Cigarettes and other tobacco products
Orange zone * post 2020 june	11.47** (5.237)	4.192 (5.741)	54.27*** (17.52)
Green zone * * post 2020 june	14.00* (8.094)	12.75*** (3.668)	60.33*** (17.10)
<i>N</i>	66820	66820	66820
<i>R</i> ²	0.6598	0.7727	0.7662
Mean y.	22.38	56.50	198.5

What about compliers?

- Concern that not all households may have complied with the restrictions or the ban on tobacco products
- We focus on a group of households that did drop consumption to Rs.0 during the initial lockdown months of March and April

What about compliers?

	Cigarettes	Bidis	Cigarettes and other tobacco products
Orange zone * post 2020 June	17.44** (6.529)	4.269 (6.495)	66.20*** (18.73)
Green zone * * post 2020 June	22.32** (10.39)	11.68*** (4.015)	68.36*** (15.64)
N	57960	57960	57960
R ²	0.4270	0.7757	0.7723
Y mean.	9.904	61.14	186.7

Regression by Novosad & Kalra (2022)

policy dataset

- We use an alternate policy dataset collected by Novosad & Kalra (2022) which collects data on non-pharmaceutical interventions in 5 Indian states
- The authors collected information on the creation and removal of NPI's using media reports
- This includes information on whether districts in these states had any of the following policies in each month in 2020 – border restrictions, curfews, industry closures, general lockdowns, **retail closures, school closures, temple closures**, and transportation restrictions
- The paper finds that opening up of districts (removal of NPIs) was associated with higher growth rates of COVID mortality

Hypothesis

- Our hypothesis: Tobacco purchases should be more pronounced in districts that had retail closures
- As placebo we check for the impact on other types of closures that should not have impacted tobacco purchases (school and temple closures)
- We explore the impact of retail closures, school closures, and temple closures on household tobacco expenditure
- Use TWFE differences-in-difference model as before on a sample of districts that had either a retail closure or a combination of school/temple closure

$$y_{ht} = \alpha + \beta_1 post * orangezone_d + \beta_2 post * greenzone_d + \delta_h + \omega_t + \epsilon_{ht}$$

Impact of retail closures on tobacco expenditures

	Cigarettes	Bidis	Cigarettes and other tobacco products
Districts with high retail closure*post 2020 June	-1.640 (21.17)	-13.55** (4.728)	-31.60 (32.35)
N	14750	14750	14750
R ²	0.1597	0.0518	0.1206
Mean y.	39.18	9.124	161.7

Impact of closures of religious/educational institutions on tobacco expenditures

	Cigarettes	Bidis	Cigarettes and other tobacco products
Districts with high religious closures*post 2020 June	-26.85 (19.45)	9.529 (9.963)	19.50 (44.57)
N	14750	14750	14750
R ²	0.1649	0.0513	0.1201
Mean y.	39.18	9.124	161.7

Did these temporary restrictions really affect cigarette purchases?

- So far, we find that opening up increases the purchase of cigarettes and other tobacco products compared to a pre-period that was restrictive
- Compared to pre-periods before COVID, is this an increase or a decrease? Or was there no change in cigarette purchases?
- We check this by running the DiD specification earlier with pre-periods defined as 2017-2019 May, June, and July

Did these temporary restrictions really affect cigarette purchases?

	Cigarettes	Bidis	Cigarettes and other tobacco products
Orange zone * post 2020 June	6.614 (6.714)	9.289 (6.956)	32.46** (13.85)
Green zone * post 2020 June	7.788 (7.576)	-3.468 (8.217)	-9.229 (26.44)
<i>N</i>	120276	120276	120276
<i>R</i> ²	0.4112	0.5727	0.5485
Y Mean.	26.08	56.35	236.2

Summary & Discussion

- We find that opening up after a restrictive lockdown had a positive impact on cigarette and tobacco purchases
- Cigarette purchases bounce back to pre-COVID levels after restrictive policies were lifted
- Caveats:
 - Unable to distinguish the effect of COVID and ban
 - Not able to generalize these findings
 - Unable to simulate the environment of a complete ban – as the data shows there may still be illegal purchases or ban may not have been completely enforced