The Impact of Stay-at-Home Orders on Binge Drinking Patterns in the US

Tiange Tang, MPH, Charles Stoecker, PhD
Department of health policy and management, School of Public Health and Tropical Medicine, Tulane University

Tulane
SCHOOL OF PUBLIC HEALTH
AND TROPICAL MEDICINE

INTRODUCTION

World Health Organization (WHO) declared the Corona Virus Disease 19 (Covid-19) as a global pandemic on March 11th.[1]
- Covid – 19 has significantly increased the rate of anxiety, depression, and stress among the general population.[2]

Most US states enforced stay-at-home orders to limit social contact and reduce transmission of COVID-19.
- Essential activities are allowed, but people are otherwise required to stay at home.
- The stay-at-home order primarily regulated the opening and closing of non-essential businesses, such as restaurants and bars.
- People exhibited healthier eating habits and more sedentary behaviors during the stay-at-home order.[3]
- Younger adults, including college students, experienced more anxiety and depression during the stay-at-home order.[4,5]

Drinking behaviors have also been studied under the implementation of the stay-at-home order
- To our knowledge, no previous research have studied the effect of the staggered adoption of the stay-at-home order on binge drinking.

AIM

This study aims to evaluate the impact of the stay-at-home orders, especially closing and reopening bars and other drinking establishments, on binge drinking patterns in US populations in Metropolitan Statistical Areas (MSAs).

METHOD
Assumptions

| Assumption 1 | The stay-at-home order was assumed to impact the entire state equally if no specification has been made. |

| Assumption 2 | The bars were assumed to reopen if the indoor service has been reactivated at any capacity. |

METHOD(Cont.)

| Data Source | Data for this study was extracted from Behavioral Risk Factor Surveillance System (BRFSS). |

| Study Period | The study period is from 2018 – 2021. Part of the data from the 2017 BRFSS dataset has been included as it contains interview records from early 2018. |

| Study Population | Since BFRSS is a phone-based survey and no other eligibility criteria have been specified, therefore, the study population is the general American population who completed the BFRSS interview during the study period. |

Study Outcomes
- The major outcome of this study is whether a person had binge drinking in the past 30 days. This study will explore the major outcome in two ways: whether the person ever had binge drinking in the past 30 days or whether the person ever had heavy binge drinking in the past 30 days. The outcome was measured by the numbers per 1000 people.

Statistical Analysis
- Proportions and standard deviation were reported for all the covariates.
- The staggered difference in difference analysis was conducted via the CSDID package and FECT package through Stata/SE 16.1 for Mac.

Coding Schemes

| Coding Scheme 1 | Treat the first-treated month as the non-treated month if the remaining time of the month is less than 10 percent |

| Coding Scheme 2 | Treat all the first-treated months as treated regardless of the remaining time. |

| Coding Scheme 3 | Treat all the first-treated months as non-treated regardless of the remaining time. For this coding scheme, the length of the treatment period needs to be at least two months. |

RESULTS

### Participants demographic and clinical characteristics
For binge drinkers:
- There were 247,301, 225,004, 221,131, and 238,619 participants in the years 2018, 2019, 2020, and 2021 respectively. For both the treatment and control groups each year, the female gender accounts for around 54% of the total population. Around 37% population in the control group and 33% population in the treatment group were aged 65 years or older each year.

For heavy binge drinkers:
- There were 267,835, 253,310, 259,337, and 266,467 participants in the years 2018, 2019, 2020, and 2021 respectively. For both the treatment and control groups each year, the female gender accounts for around 54% of the total population as well. Around 39% population in the control group and 32% population in the treatment group were aged 65 years or older each year.

Implementation of the stay-at-home order (Only coding scheme 1 is shown here)

CSDID: Scheme1 - Stay at Home Order Duration

FECT: Scheme1 - Stay at Home Order Duration
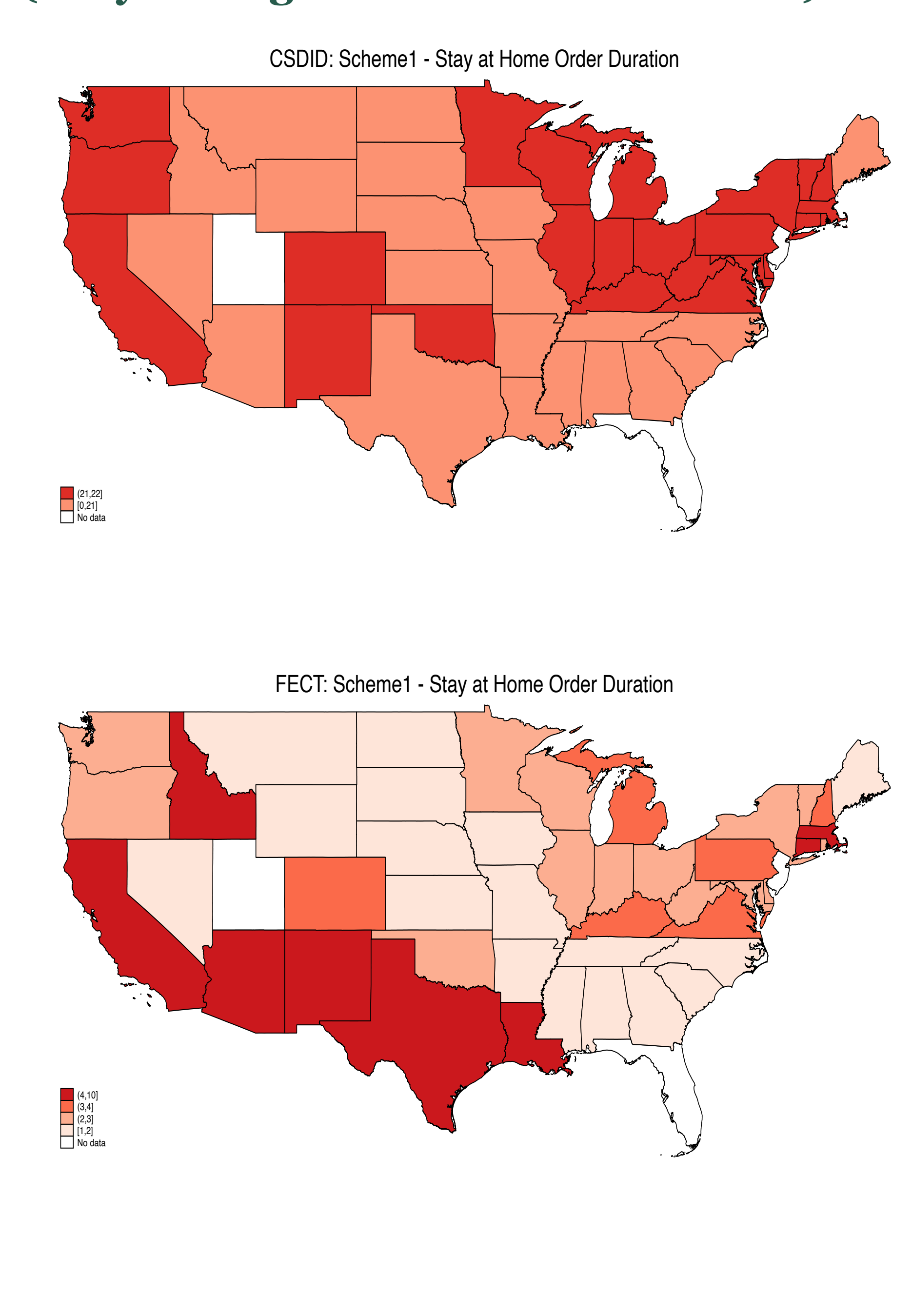
RESULTS (Cont.)
The Effect of Stay-at-Home Order

Table 10	Impact of Stay-at-Home order on Binge Drinking (FECT) for Heavy Binge Drinking					
Control Average	8.74 ± 10.80		8.71 ± 10.81		8.81 ± 10.80	
Controlling Factors	Raw (Two-way fixed Effects), Adjusted (Raw + Age + Income + Education + Race +Chronic Conditions)					
	Scheme 1		Scheme 2		Scheme 3	
	Raw	Adjusted	Raw	Adjusted	Raw	Adjusted
Stay-at-Home Order (people/1000)	1.42	0.94	0.80	0.85	4.43	4.86
Standard Error	1.89	2.13	1.81	1.77	1.78	2.20
P-value	0.44	0.66	0.66	0.63	0.013	0.027
#Observations	111	111	76	76	108	108
P-value of Robustness Check	0.67	0.59	0.17	0.15	0.32	0.23

Table 9	Impact of Stay-at-Home order on Binge Drinking (CSDID)					
Pre-Period Average	7.09 ± 10.57		7.07 ± 10.59		7.19 ± 10.73	
Controlling Factors	Raw (Two-way fixed Effects), Adjusted (Raw + Age + Income + Education + Race + Chronic Conditions)					
	Scheme 1		Scheme 2		Scheme 3	
	Raw	Adjusted	Raw	Adjusted	Raw	Adjusted
Stay-at-Home Order (people/1000)	0.42	3.51	1.95	NA	-4.48	6.74
Standard Error	2.75	1.91	2.67	NA	3.53	3.01
P-value	0.88	0.07	0.47	NA	0.20	0.025
#Observations	2,304	2,304	2,304	2,143	2,304	2,174

DISCUSSION&LIMITATIONS
- Due to the incompletion of the BRFSS interview, the data from Florida and New Jersey were excluded from this study which could bias the estimate as Florida is a valuable part of studying Covid-related topics.
- A finer time unit is needed to circumvent the compromising coding schemes such as treat the treated month as control if the remaining time of that month is less than 10 percent.
- The exogeneity assumption is not satisfied in this study, which is also a common problem for studies that use staggered difference in difference study design.
- The variation in some of the treated month using the FECT approach is not captured. The treatment effect is underestimated using the CSDID approach.

DISCUSSION&LIMITATIONS
- We provide suggestive evidence that stay-at-home orders may have increased heavy binge drinking in metropolitan areas. We estimated this led to a 55.16% (FECT) or 93.74% (CSDID) increase in heavy binge drinking during the pandemic. Future work will assess the characteristics of areas that saw the greatest increase in heavy binge drinking, and explore why heavy binge drinkers were more vulnerable than binge drinkers during the Covid.

REFERENCES
1. Organization WH. Archived: WHO Timeline - COVID-19. 2022.
2. Xiong J, Lipsitz O, Nasri F, Lui LM, Gill H, Phan L, et al. Impact of COVID-19 pandemic on mental health in the general population: A systematic review. Journal of affective disorders. 2020;277:55-64.
3. Flanagan EW, Beyl RA, Fearnbach SN, Altazan AD, Martin CK, Redman LM. The impact of COVID-19 stay-at-home orders on health behaviors in adults. Obesity. 2021;29(2):438-45.
4. Coughenour C, Gakh M, Pharr JR, Bungum T, Jalene S. Changes in depression and physical activity among college students on a diverse campus after a COVID-19 stay-at-home order. Journal of community health. 2021;46(4):758-66.
5. Benke C, Autenrieth LK, Asselmann E, Pané-Farré CA. Stay-at-home orders due to the COVID-19 pandemic are associated with elevated depression and anxiety in younger, but not older adults: results from a nationwide community sample of adults from Germany. Psychological Medicine. 2020:1-2.