

Measuring Changes in Tobacco Product Sales and Availability following California's Statewide Flavored Tobacco Sales Restriction – A Synthetic Control Method using Retail Scanner Data

Tobacco Online Policy Seminar (TOPS)
Friday, June 6, 2025

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Funding, Disclosures, and Disclaimers

- This research was funded by the California Department of Public Health, California Tobacco Prevention Program (Contract # 20-10188)
- I have no conflicts of interest to disclose. The only tobacco-related funding that I have received is from federal and state governments over the past 10 years
- The findings and conclusions in this presentation are those of the authors and do not necessarily represent the views or opinions of the California Department of Public Health or the California Health and Human Services Agency
- Authors own analyses and calculations based in part on NielsenIQ [Retail Measurement Service] data for the tobacco category for the period 1/8/2021 – 12/30/2023, for 24 US states. The conclusions drawn from the NielsenIQ data are those of the authors and do not reflect the views of NielsenIQ. NielsenIQ is not responsible for, had no role in, and was not involved in analyzing and preparing the results reported herein or in developing, reviewing or confirming the research approaches used in connection with this report.

Introduction

- Marketing of flavored tobacco targets specific populations
- Most youth who use tobacco use flavored products
- Most Non-Hispanic Black adults who smoke cigarettes use menthol cigarettes (~80%) (compared to 43.4% overall)
- California's statewide law (Senate Bill (SB) 793) restricting most flavored tobacco product sales could reduce tobacco use among priority populations if flavored tobacco products are removed from the marketplace

Background

- On December 21, 2022, Senate Bill 793 (SB 793) went into effect
 - Prohibits sales of tobacco products with characterizing flavors, including menthol cigarettes
 - Exemptions: shisha (21+ stores), pipe tobacco, and premium cigars
- ~47% of CA's population was already covered by a local sales restriction on flavored tobacco

Setting

- Dec 2022 and Jan 2023, CDTFA and CDPH notified tobacco retailers, distributors and wholesalers about SB 793
 - Special online notice and mailed postcards and letters
- Monetary fine \$250 per violation (sellers) (*fine has since increased*)
- Rebuttable presumption
 - Products can be presumed flavored based on marketing, including but not limited to a product's name, packaging, and advertising
 - Flavor name might “implicitly communicate that the tobacco product has a characterizing flavor”
- Synthetic cooling agents introduced (e.g., “non-menthol cigarettes”)
- Subsequent laws implemented to strengthen SB 793 (e.g., Unflavored Tobacco List (UTL))

Research Questions

- From before to after SB 793:
 - To what extent did non-cigarette tobacco product availability, by flavor category, change in California compared to a Control Area?
 - To what extent did cigarette sales and availability, by flavor category, change in California compared to a Control Area?

Data

NielsenIQ state level retail scanner data

- Geography – State level data
 - 24 U.S. states, including California
- Study period
 - Pre-intervention (1/8/21 – 12/17/22) ~23 months
 - Post-intervention
 - Non-Cigarette Availability: (12/18/22-6/22/23) ~6 months
 - Cigarette Availability and Sales: (12/18/22-12/30/23) ~12 months

Data cont.

- Products
 - Cigarettes
 - Electronic nicotine delivery systems (ENDS)
 - Cigars (cigarillos and little filtered cigars) (*premium cigars exempted*)
 - Moist snuff, snus, chewing tobacco
 - Nicotine pouches
 - Roll-your-own (RYO) tobacco (*pipe tobacco exempted*)
- Store Types
 - Convenience, grocery, drug, mass merchandiser, warehouse/club, discount/dollar, military retailers
 - Excludes online sales and sales in tobacco specialty stores and smaller format stores

Data cont.

- Flavor category for non-cigarette tobacco products:
 - Explicit (e.g., menthol, mint, berry)
 - Concept (e.g., blue dream fusion, clear)
 - Unflavored (e.g., labeled as “tobacco” or no flavor value coded from external packaging).
- Flavor category for cigarettes:
 - Menthol
 - “Non-Menthol” Labeled (NML)
 - Tobacco/Unflavored

Outcomes

- Availability
 - Universal Product Codes (UPCs) [i.e., barcodes]
 - Uniquely identify products based on characteristics such as, brand, sub-brand, flavor, nicotine strength, and size
 - Operationalized availability as the number of UPCs with non-zero sales in each week
 - Informs variety of available products on the market and week to week changes
- Sales (only modeled for cigarettes) - standardized to a single pack of 20 sticks

Synthetic Control Method

SCM is a statistical technique to estimate the effect of an intervention

1) Create synthetic California for each outcome

- Model identifies the optimal combination of untreated states to produces a control group that matches the treatment group as closely as possible in the pre-intervention period
 - SCM algorithm is designed to minimize the root mean squared predicted error (RMSPE) when comparing the outcome in the pre-intervention period between the treatment group and the synthetic control group
- 19 states in donor pool (excluded border states and states with state flavor policies)
- Goal is pre-intervention comparability (e.g., matched comparison market)
- Used lagged values of the outcome in each model and also population in model of cigarette pack sales

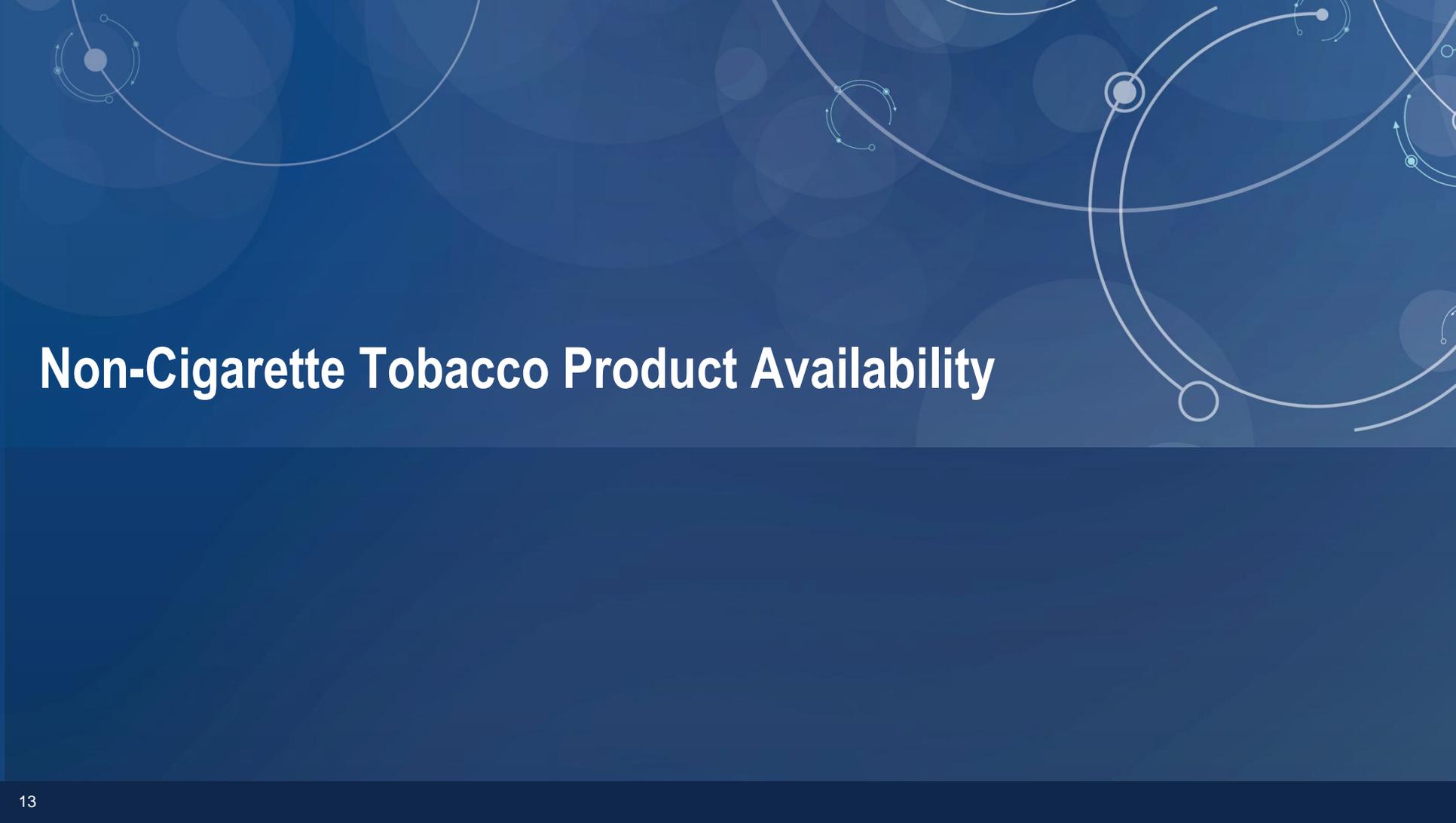
Synthetic Control Method (Cont.)

2) Compared actual California to synthetic California

- Synthetic control represents what CA's tobacco market would have experienced in the absence of SB 793

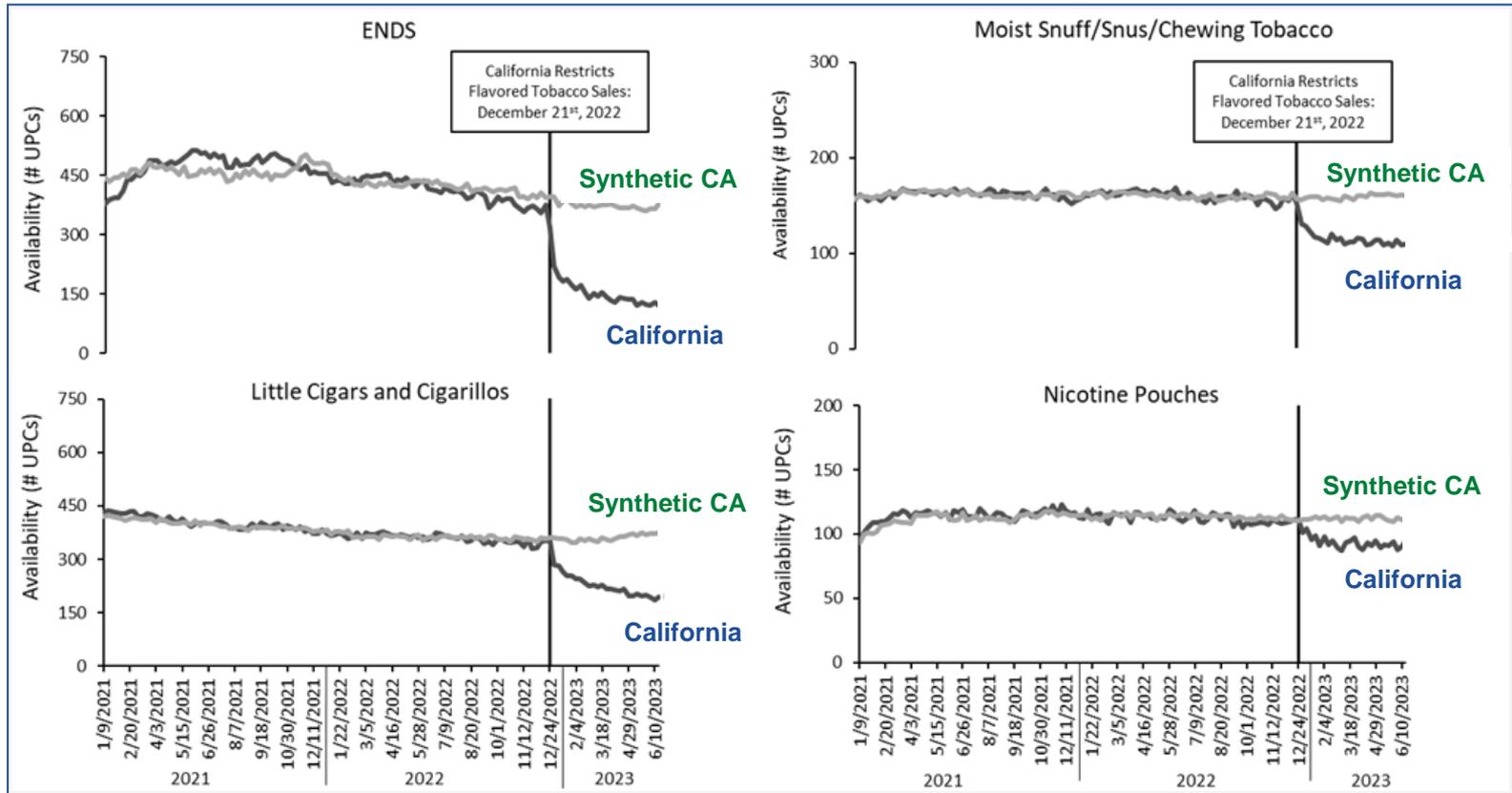
3) Placebo models

- Estimate models where we iteratively replace CA with each state from donor pool and re-estimate the effect (with CA in the donor pool)
- Compare the ratio of the RMSPE in the post and pre periods between the main model (CA as the treatment) and placebo models
 - *The larger the ratio is in CA model, the stronger the support of a treatment effect*

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Non-Cigarette Tobacco Product Availability

SCM Results: Explicit-Named Tobacco Products, California

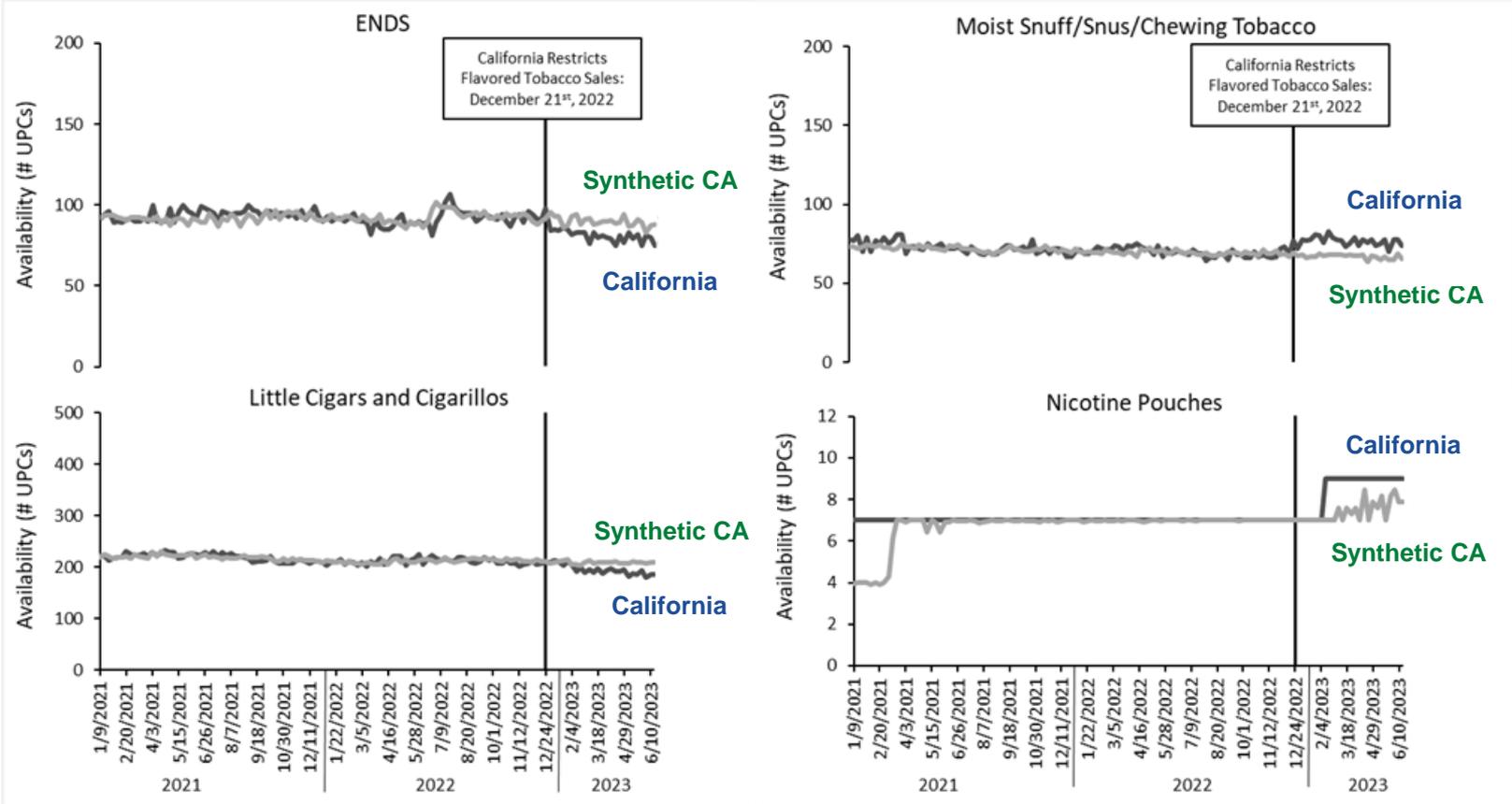


Placebo Results: Explicit-Named Tobacco Products, California

Ratio of Post-Intervention RMSPE to Pre-Intervention RMSPE	California	Placebo Range (n=19)
ENDS	<u>7.4</u>	0.7–6.3
Little Cigars/Cigarillos	<u>13.1</u>	0.7–8.8
Moist Snuff, Snus, Chew	<u>11.0</u>	0.7–4.6
Nicotine Pouches	<u>5.00</u>	0.5–2.4

RMSPE = root mean square predicted error. Underlined values indicate a larger ratio in the main model compared to placebo models. The larger the ratio in CA the stronger the support of a treatment effect.

SCM Results: Unflavored Tobacco Products, California

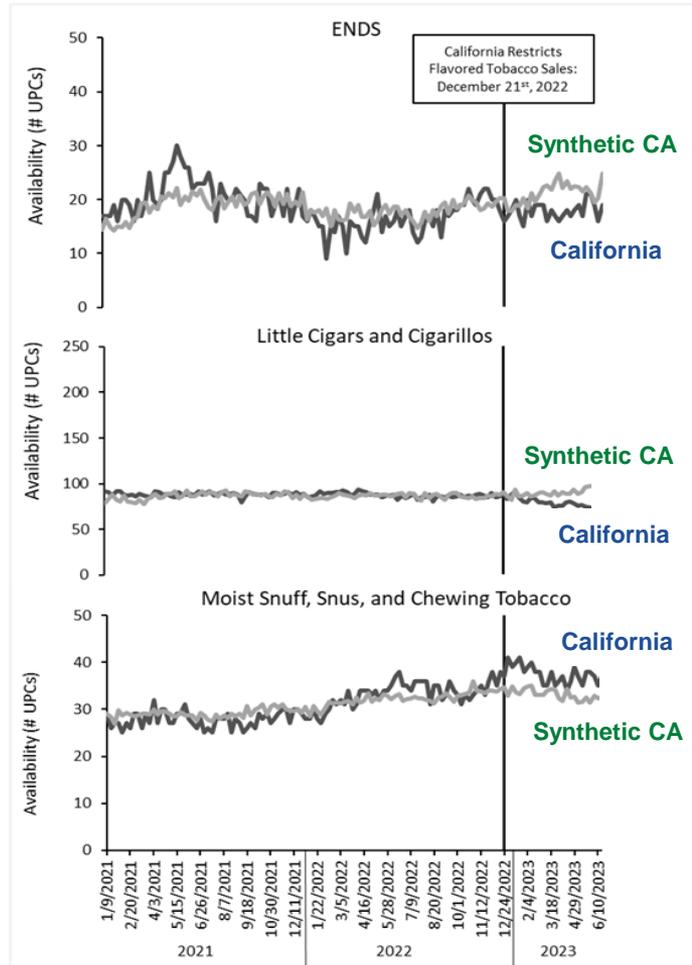


Placebo Results: Unflavored Tobacco Products, California

Ratio of Post-Intervention RMSPE to Pre-Intervention RMSPE	California	Placebo Range
ENDS	2.2	0.4-2.2
Little Cigars/Cigarillos	<u>2.8</u>	0.8-1.7
Smokeless Tobacco	<u>3.3</u>	0.7-1.8
Nicotine Pouches	1.5	0.5-2.4
Roll-Your-Own Tobacco	1.0	0.7-1.6

RMSPE = root mean square predicted error. Underlined values indicate a larger ratio in the main model compared to placebo models. The larger the ratio in CA the stronger the support of a treatment effect.

SCM Results: Concept Flavor- Named Tobacco Products, California



Placebo Results: Concept Flavor-Named Tobacco Products, CA

Ratio of Post-Intervention RMSPE to Pre-Intervention RMSPE	California	Placebo Range
ENDS	1.3	0.6-2.4
Little Cigars/Cigarillos	3.1	0.6-3.3
Smokeless Tobacco	2.1	0.8-2.2

RMSPE = root mean square predicted error. The ratio for California is within the range of ratios for the placebo models, suggesting no treatment effect.

Conclusions: Non-Cigarette Tobacco Product Availability

Explicit Flavor Names

- Policy associated with reduced availability in the first six-months following SB 793
- A lower but notable level of products remained available

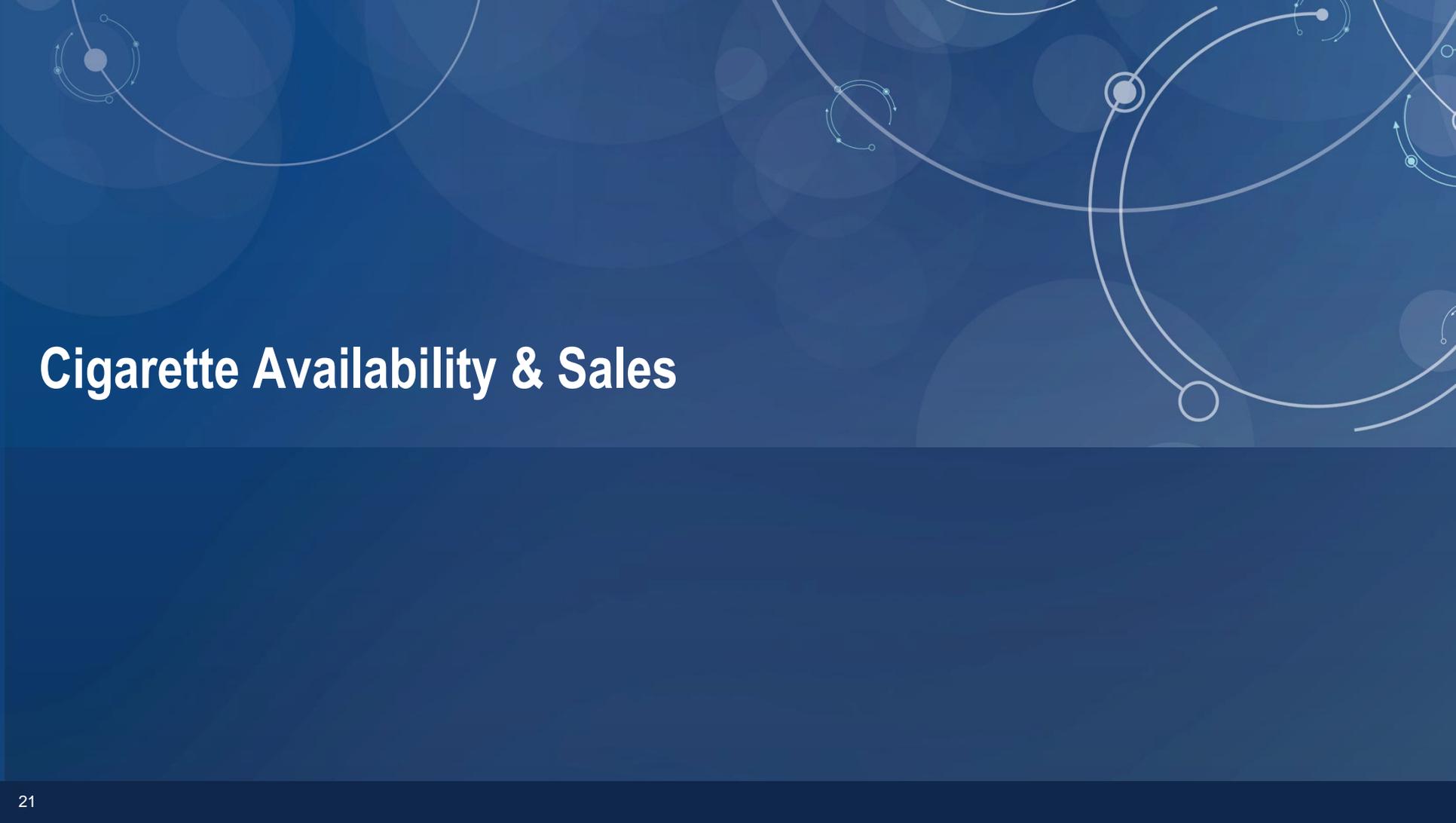
Tobacco/Unflavored

- No or weak evidence of a policy effect on availability

Concept Flavor Names

- No evidence of a policy effect on availability

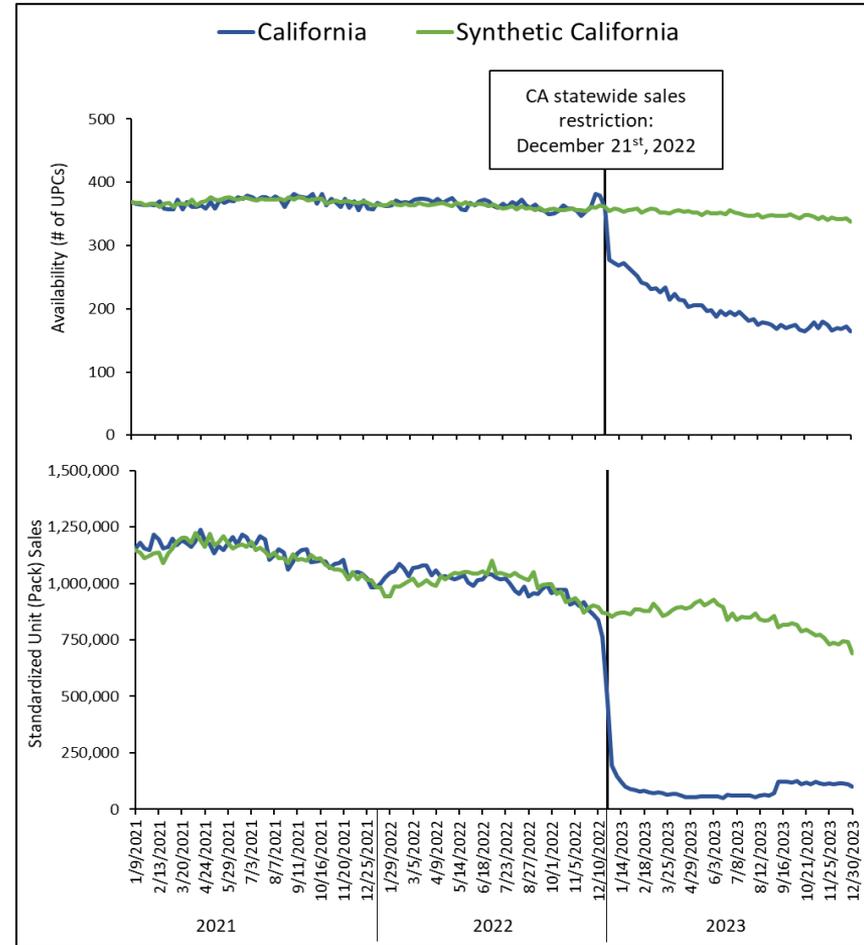
Average weekly availability of explicit named ENDS in CA decreased by 65% (443 to 156 UPCs) from pre- to post-SB 793

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Cigarette Availability & Sales

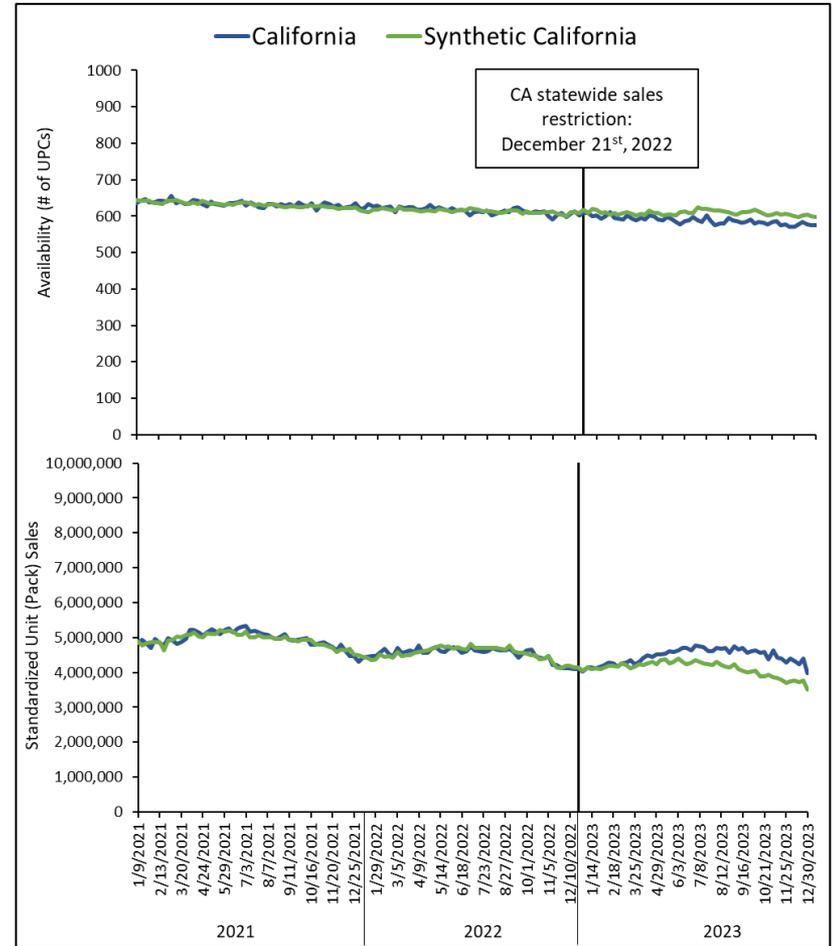
SCM Results: Menthol Cigarettes

- Pre-intervention, average weekly availability was **367 UPCs**
 - Within one week following the law going into effect, availability of menthol cigarettes in CA **decreased by 100 UPCs**
 - **44% decline** in average weekly availability pre- to post-intervention in CA
 - Compared to synthetic CA where estimated availability remained stable post-intervention
- Pre-intervention, average weekly pack sales of menthol cigarettes was **over 1,000,000 packs**
 - Within one week following the law going into effect, pack sales in CA dropped to under **100,000 packs**
 - **90% decline** in average weekly pack sales pre- to post-intervention
 - Compared to synthetic CA where estimated pack sales continued to decline at the pre-intervention rate



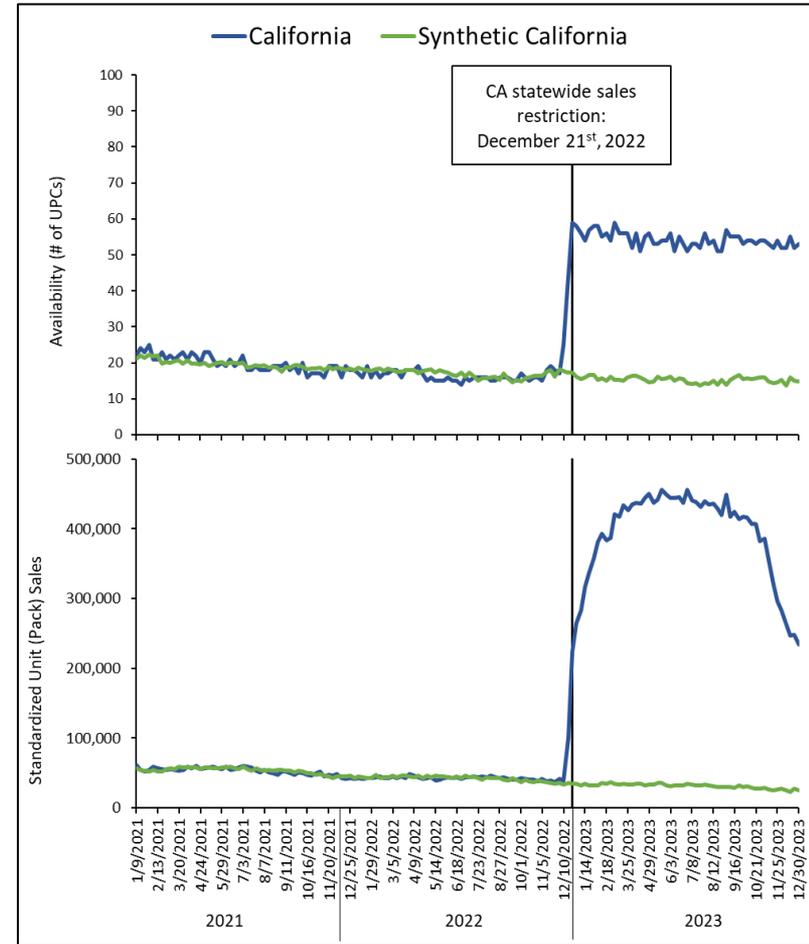
SCM Results: Tobacco/Unflavored Cigarettes

- Pre-intervention, average weekly availability of tobacco/unflavored cigarettes was **625 UPCs**
 - Post-intervention, availability in CA decreased slightly to **588 UPCs**
 - 5.8% decline in CA compared to 2.2% decline in synthetic CA
- Pre-intervention, average weekly pack sales were **over 4.7 million packs**
 - Post-intervention, weekly pack sales in CA decreased less than in synthetic CA
 - Estimated pack sales for synthetic CA decreased by 12.7%, while actual pack sales in CA decreased 6.3%



SCM Results: “Non-Menthol” Labeled Cigarettes

- Pre-intervention average weekly availability was **18 UPCs**
 - Post-intervention, availability in CA increased to **54 UPCs**, a **194% increase**
 - Synthetic CA maintained estimated availability of 15 UPCs post-intervention
- Pre-intervention, average weekly pack sales of “non-menthol” labeled cigarettes was **under 50,000 packs**
 - Post-intervention, weekly pack sales in CA increased over **708%** to a peak of **450,000 weekly pack sales** in July 2023
 - Late 2023, pack sales in CA declined rapidly, driven by a decrease in Camel Crush “Non-Menthol Oasis” sales during litigations regarding CA OAG determination that these products were presumptively flavored
 - Synthetic CA maintained ~40,000 average weekly pack sales post-intervention



Placebo Results: Cigarette Availability and Pack Sales

Ratio of Post-Intervention RMSPE to Pre-Intervention RMSPE	California	Placebo Range
<i>Menthol</i>		
Availability	<u>22.4</u>	0.9 - 5.0
Pack Sales	<u>17.2</u>	0.6 - 4.9
<i>Tobacco/Unflavored</i>		
Availability	<u>3.1</u>	0.9 - 2.2
Pack Sales	4.2	0.7 - 5.8
<i>"Non-Menthol" Labeled</i>		
Availability	<u>13.6</u>	0.8 - 7.8
Pack Sales	<u>52.4</u>	0.5 - 27.0

RMSPE = root mean square predicted error. Underlined values indicate a larger ratio in the main model compared to placebo models. The larger the ratio in CA the stronger the support of a treatment effect.

Conclusions: Cigarette Availability and Pack Sales

Menthol

- Policy associated with reduced availability and pack sales in the first year following SB 793
- A lower but notable level of menthol cigarette availability and sales remained

Tobacco/Unflavored

- Weak evidence the policy reduced availability and no change in pack sales
- Insufficient evidence of substitution

"Non-Menthol" Labeled

- Policy associated with increased availability and pack sales in the first year following SB 793 (suggests substitution)
- Decrease in sales in late 2023 related to litigation around presumptive flavors

Average weekly total cigarette sales in CA decreased by over 900,000 packs in the year following SB 793



Limitations, Implications, Progress, and Takeaway

Limitations

- Excludes availability and sales in tobacco specialty stores and online
- Availability in military commissaries and exchanges can't be parsed out
 - Military retailers not required to comply with state law
 - Compliance could be higher than estimated if remaining availability is in military retailers
- Measure of availability defined as any sales of a product over a specified period
 - Unknown if continued availability is from a single store or multiple stores
 - But, with 100% compliance, availability would be zero in state stores

Implications

Statewide flavored tobacco sales restrictions can be effective policies for substantially reducing the availability and sales of flavored tobacco products; however, enforcement and compliance agencies should be prepared to address avoidance tactics (e.g., synthetic coolants)

Continued availability and sales of restricted tobacco products limit the intended public health benefits of California's flavor law and suggests an opportunity for increased retailer education and enhanced enforcement



Progress – Assembly Bill 935

- AB 935 (effective 1/1/24) (i.e., STAKE Act amendment)
 - Permits local regulation and restrictions
 - Expands definition of local retailer to include mobile units, such as vending machines and booths
 - Tiered penalty scheme for violations (increases with each violation)
 - Clarified roles of California Dept of Public Health and California Dept of Tax and Fee Administration in advancing and strengthening the state flavor law

Progress – Assembly Bill 3218 and Senate Bill 1230

- AB 3218 and SB 1230 (effective 1/1/25)
 - Creates an Unflavored Tobacco List defining products allowed to be sold – to be administered by State Attorney General (on or before Dec 31, 2025)
 - Expands/clarifies restrictions on delivery and online sales
 - Updates definition of characterizing flavor to include additives that create a cooling sensation
 - On 12/24, RJ Reynolds dropped suit against AG for NODs deeming their non-menthol labeled cigarettes flavored
 - Updates nicotine definition to include synthetic nicotine and nicotine analogs
 - Expands and increases fines and penalties; Expands enforcement authority

Takeaway

- California's law prohibiting sales of flavored tobacco products successfully reduced the availability and sales of flavored products
 - Remaining flavored product availability and sales in the first 6 months to 1-year post-policy demonstrate an opportunity for further compliance
- California is addressing enhanced compliance with the passage of subsequent laws that strengthen the policy through increased fines, expanded location coverage, broader flavor and nicotine definitions, and the explicit empowerment of multiple agencies (state and local) to support enforcement
- Next step - Study changes in non-cigarette tobacco product sales; assess the impact of the subsequent laws and consider their applicability to current or future laws elsewhere



Thank you

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