Flavorants and Addiction

An Empirical Analysis of Tobacco Product Bans and Taxation

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Introduction

Goal: Determine impact of menthol ban.

- Cigarette smoking related to about **one of every five deaths**.
  - 480,000 lives lost each year.
- Black Americans **overwhelmingly prefer** menthol products.
  - Impact of historical racial marketing practices.
- **FDA proposed ban** on Menthol Cigarettes.
  - Menthol makes up about one-third of all sales.
  - Advance health equity among the Black American community.
- FDA considering additional flavor bans on tobacco products.

Research Questions

- How does banning menthol cigarettes impact smoking rates?
  - What about in marginalized communities?
  - Do consumers switch to alternative products?
- Can taxation be as effective?
  - What tax rate results in the same reduction?
  - How does consumer surplus compare to the ban?
- What if the FDA expands the ban to E-cigarette flavorants?
  - E-cigarettes still available in both menthol and flavored varieties.

Approach

Main Idea: Design a model of **consumer demand** and **firm supply**.

- **RCNL** model using Nielsen data from 2015 through July 2019.
  - Incorporate **Retail and Household data** (Grieco et al., 2021).
  - Addiction via **dynamic state dependency** (Tuchman, 2019).
  - Within **category substitution** via nested logit.
  - **Demographic interactions** with **demand** parameters.
- **Supply side model** incorporates dynamic state dependency.
- **Counterfactual simulation** on impact of bans and taxation.
  - Consider merged producers of cigarettes and e-cigarettes.

Policy 1:
Menthol Cigarette Ban

Menthol Cigarette Ban

Table: Average Weekly Percent Change in Product Usage

		Independent	Merged
		% Change	% Change
Cigarettes	Black	-35.10%	-35.11%
	Non-Black	-9.28%	-9.30%
	High Income	-11.35%	-11.36%
	Low Income	-15.16%	-15.19%
	Average	**-12.57%**	**-12.59%**

- **Additional Findings:**
  - 68% of all menthol smokers switch to regular tobacco cigarettes.
    - About 53% of Black menthol smokers switch.
  - Average CS falls by 16%.
    - Black CS falls by about 43%.
  - Patterns similar to Levy et al. (2021) and Issabakhsh et al. (2022).

Menthol Cigarette Ban

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	Low Income	-15.16%	-15.19%
	Average	**-12.57%**	**-12.59%**
E-Cigarettes	Black	+12.27%	+23.09%
	Non-Black	+4.40%	+10.08%
	High Income	+3.78%	+8.94%
	Low Income	+7.48%	+15.45%
	Average	**+4.93%**	**+10.94%**

- **Additional Findings:**
  - Less than 2% of cigarette quitters substitute to e-cigarettes.
  - Patterns similar to Chaiton et al. (2020).

Menthol Cigarette Ban

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	High Income	-11.35%	-11.36%
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	Non-Black	+4.40%	+10.08%
	High Income	+3.78%	+8.94%
	Low Income	+7.48%	+15.45%
	Average	**+4.91%**	**+10.94%**
	Cessation	+1.74%	+1.74%

Policy 2:
Cigarette Sales Tax

Cigarette Sales Tax

- **$1.02 sales tax** $\rightarrow$ equivalent reduction in average smoking rates.
- Average CS falls by about 14%.
  - Black CS falls by about 13%.
  - Non-Black households **prefer ban** and Black households **prefer tax**.
- Expected tax revenue of **$114.6 million a week**.
  - $24.4 billion generated from April 2015 through April 2019.
- Smaller increase in e-cigarette usage compared to Menthol Ban.
- Little impact on cessation product usage.

Policy 3:
Total Flavorant Ban

Total Flavorant Ban

- Reduction in cigarette consumption **near identical** to menthol ban.
- **Average reduction** in e-cigarette usage of 46%.
- **Impact varies** by flavorant popularity (time).
  - Pre-2018 average reduction is about 40%.
  - Post-2018 average reduction is about 51%.
- Little impact on cessation product usage.

Thank you!

References I

Chaiton, Michael, Ismina Papadhima, Robert Schwartz, Joanna E Cohen, Eric K Soule, Bo Zhang, and Thomas Eissenberg. 2020. "Product substitution after a real-world menthol ban: a cohort study." *Tobacco regulatory science* 6 (3): 205.

Grieco, Paul LE, Charles Murry, Joris Pinkse, and Stephan Sagl. 2021. "Efficient estimation of random coefficients demand models using product and consumer datasets."Technical report, Working Paper.

Issabakhsh, Mona, Rafael Meza, Yameng Li, Zhe Yuan, Luz Maria Sanchez-Romero, and David T Levy. 2022. "Public health impact of a US menthol cigarette ban on the non-Hispanic black population: a simulation study." *Tobacco Control*.

Levy, David T et al. 2021. "Public health impact of a US ban on menthol in cigarettes and cigars: a simulation study." *Tobacco Control*.

References II

Tuchman, Anna E. 2019. "Advertising and Demand for Addictive Goods: The Effects of E-Cigarette Advertising." *Marketing Science* 38 (6): 994–1022.