

CAsToR Pilot Project Program Lightning Talk

Cross State Border Nicotine Vaping Products Purchase –
Early Evidence from State Emergency Sales Restrictions in 2019

Kai-Wen Cheng

Acknowledgments

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Nicotine Vaping Products, Flavors and Flavored NVP Sale Restrictions

- Flavors in Nicotine Vaping Products (NVPs) have demonstrated powerful appeal to youth, young adults, and adults.
- Several states and local jurisdictions have implemented nontobacco flavor bans in NVPs.
 - Studies using sales data indicated that flavor ban decreases restricted flavored NVP sales, all NVP sales, and tobacco sales. (Gammon et al. (2021), Liber et al. (2021), Ali et al. (2022))
 - Studies using survey data indicated mixed findings with some indicated no change in flavored NVP consumption
 - Consumption among younger age groups is more sensitive than among older groups in response to flavor ban
 - Possibly purchase through other channels (online, social sources, neighboring jurisdictions) (Yang et al. 2020, Katchmar et al. 2021)

State Flavored NVP Sales Restrictions in 2019

- In August 2019, dozens of cases of lung injuries reported related to NVP use, a new syndrome coined “E-cigarette, or Vaping Product Use Associated Lung Injury (EVALI)” by CDC
- Several states issued emergency regulatory responses in attempt to control NVP market:
 - Policy in Massachusetts, Rhode Island, and Washington lasted 90 – 120 days in 2019
 - Policy in Michigan, Oregon, New York, New Jersey was blocked in 2019

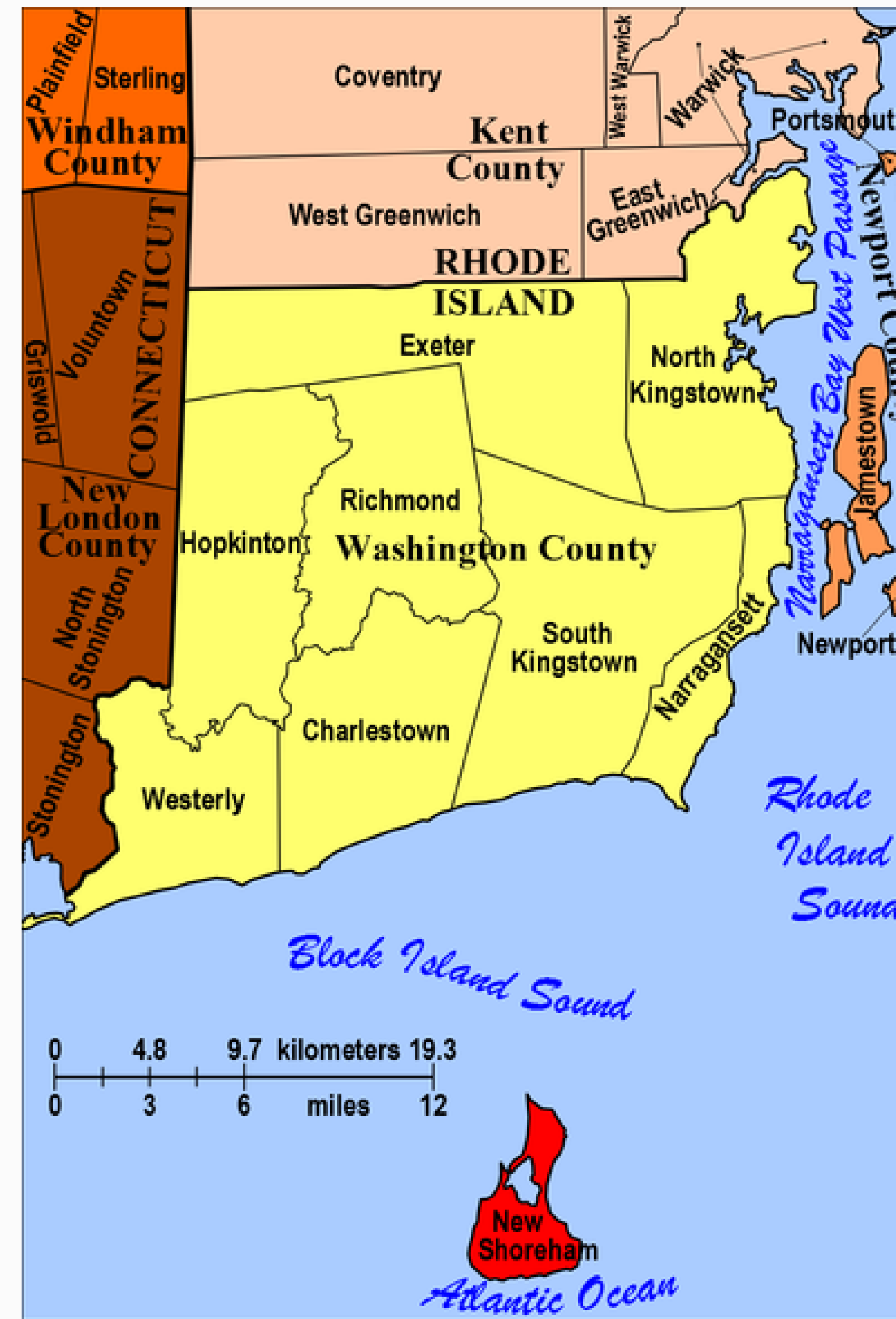
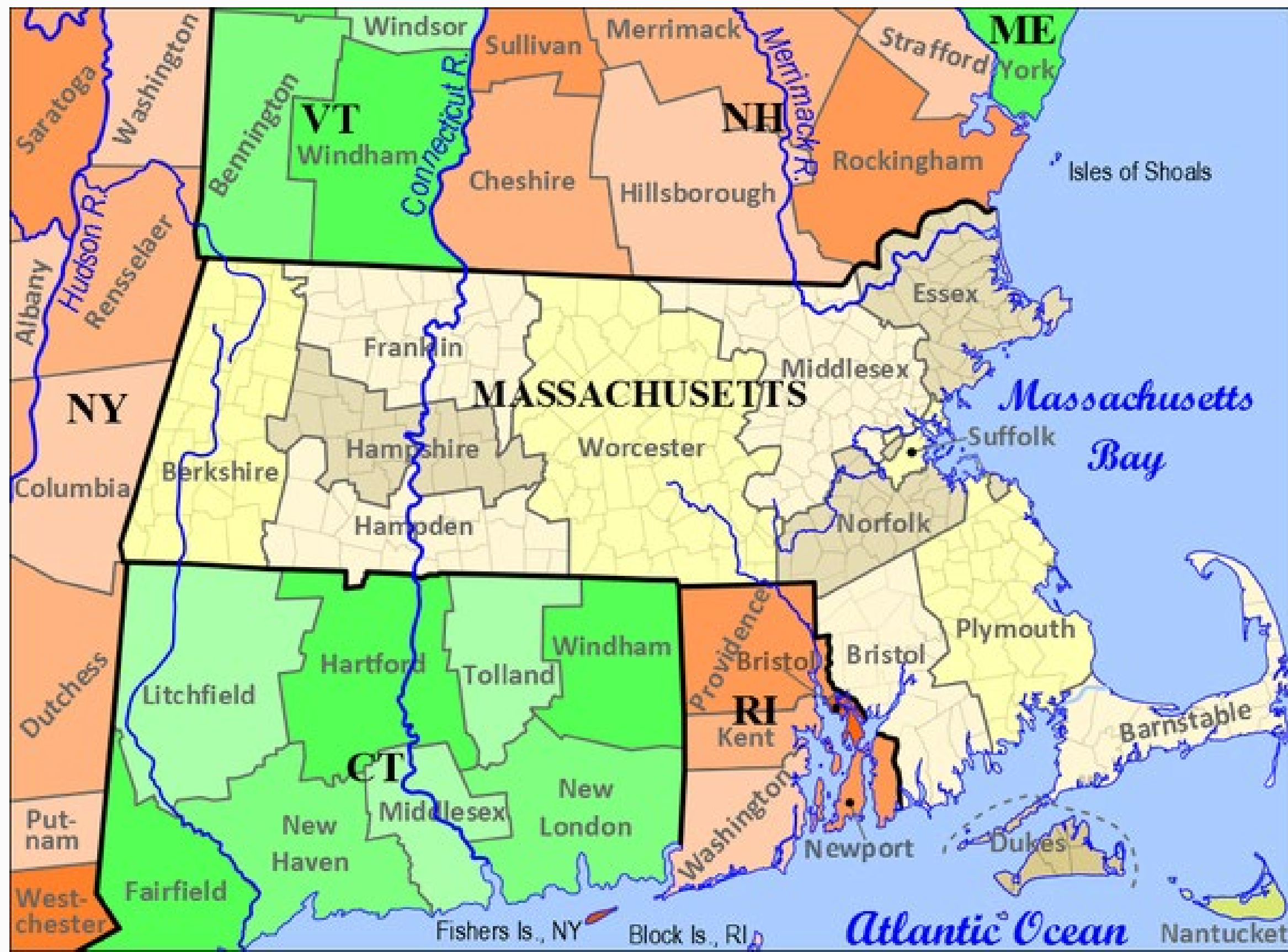
Investigating Cross-border Purchase

- We identified and quantified potential cross-border shopping activities that sought to circumvent state NVP sales restrictions by investigating NVP sales from the border counties surrounding the states of MA, RI, WA where NVP sales were prohibited in 2019.
- We hypothesized that border counties will experience an influx of cross-border purchases from neighboring states restricting NVP sales due to their geographic proximity.

Data

- Nielsen Scanner data from Kilts Marketing Data Center Archive of the Nielsen Company at the University of Chicago Booth School of Business
- Sales of NVPs from a constant panel of retailers, including weekly sales volume and product characteristics (e.g., product type, flavor, and number of items per package) for each unique product code (UPC) from the sample of retail outlets
- State/county geo-codes for retailers' location was provided

Neighboring States & Border Counties for MA, RI, WA



- MA neighboring states include New York (NY), Vermont (VT), New Hampshire (NH), Connecticut (CT), and Rhode Island (RI)
- MA-bordering counties: Bennington, and Windham (VT), Cheshire, Hillsborough, and Rockingham (NH), Rensselaer and Columbia (NY), Litchfield, Hartford, Tolland, and Windham (CT), and Providence Bristol and Newport (RI).

- RI neighboring states include Connecticut (CT) beyond Massachusetts (MA)
- CT border counties: New London and Windham.

- WA neighboring states include Oregon and Idaho
- OR-WA border counties: Clatsop, Columbia, Clackamas, Multnomah, Hood River, Wasco, Sherman, Gilliam, Morrow, Umatilla, and Wallowa Counties.

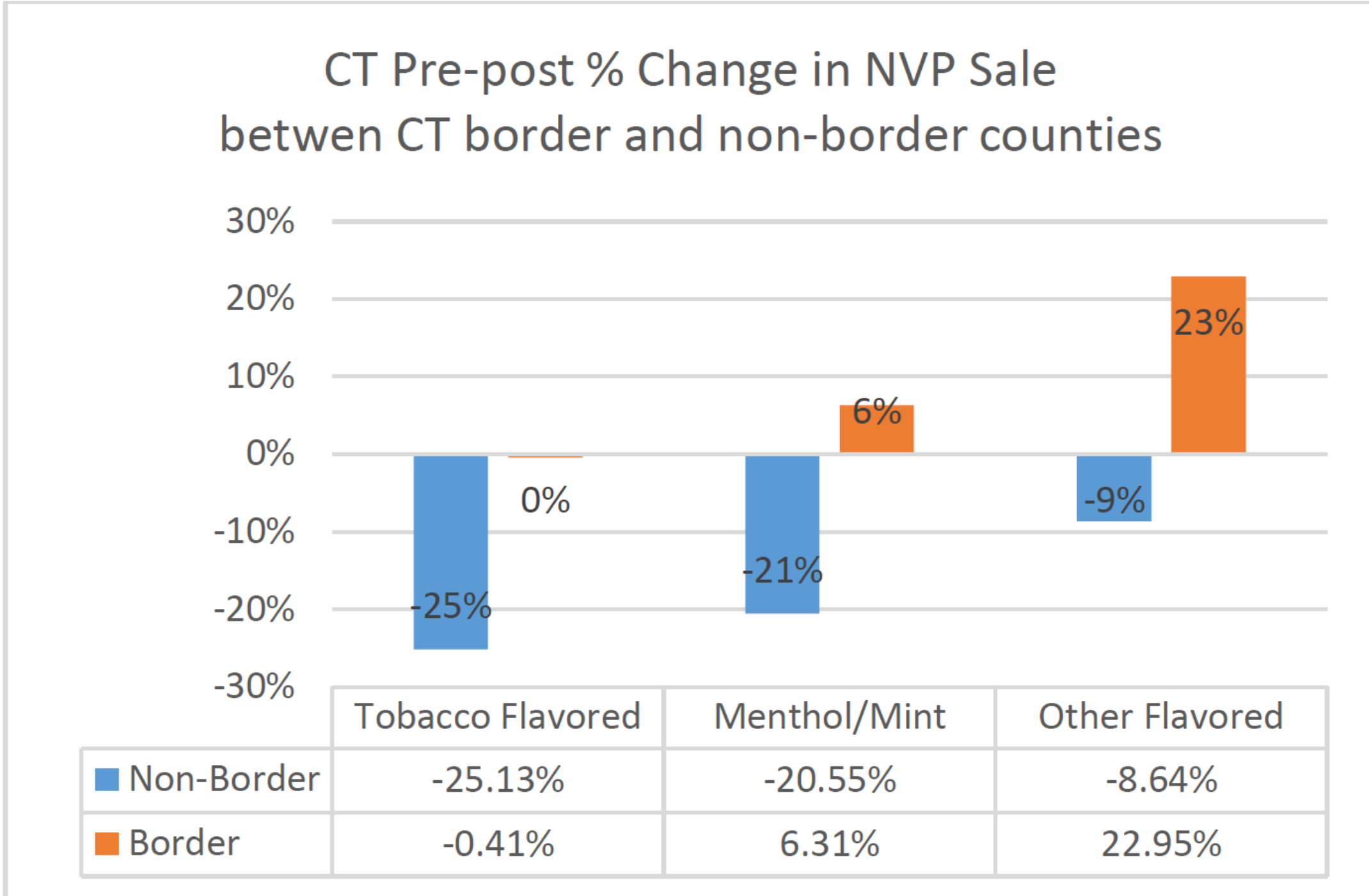
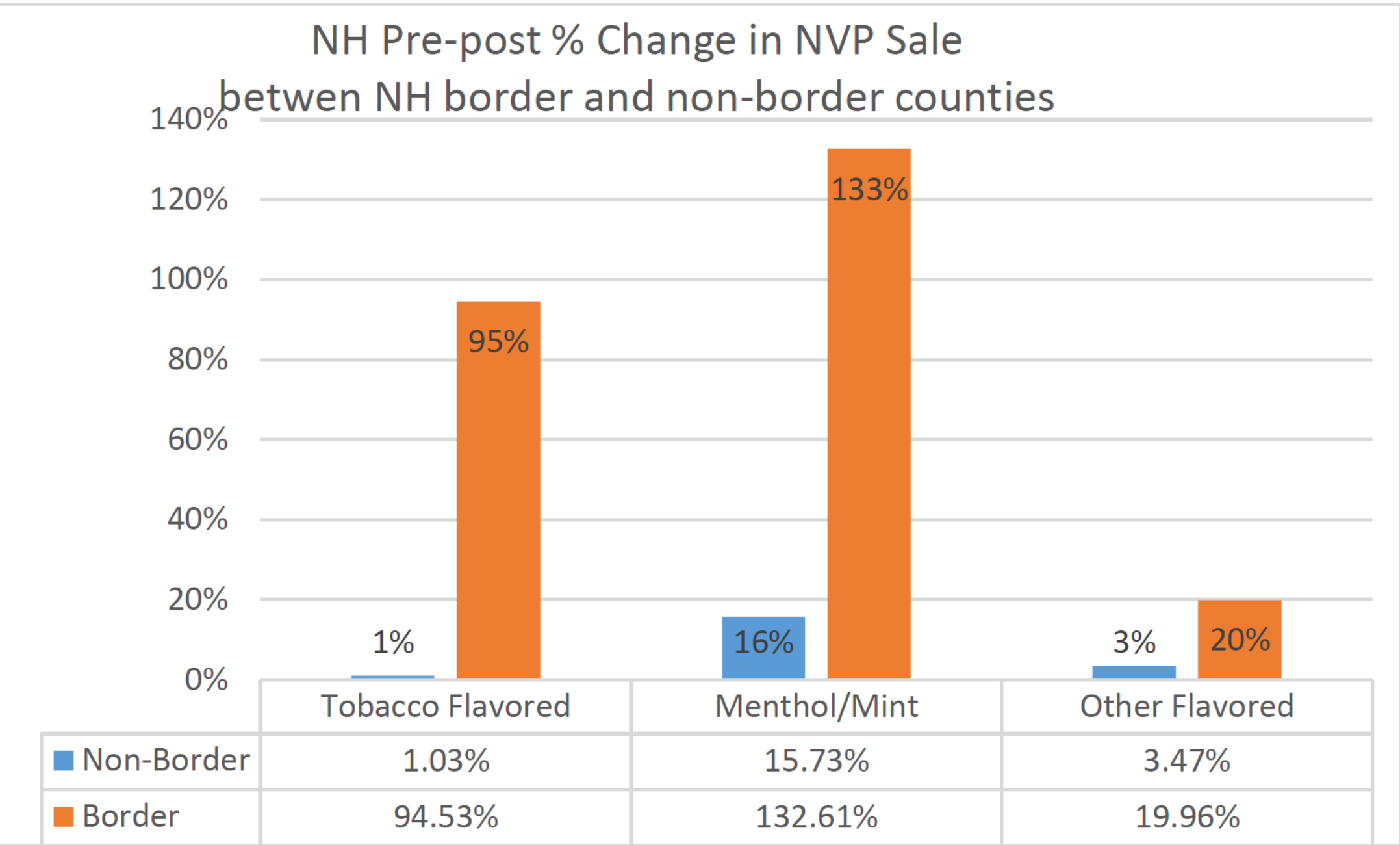
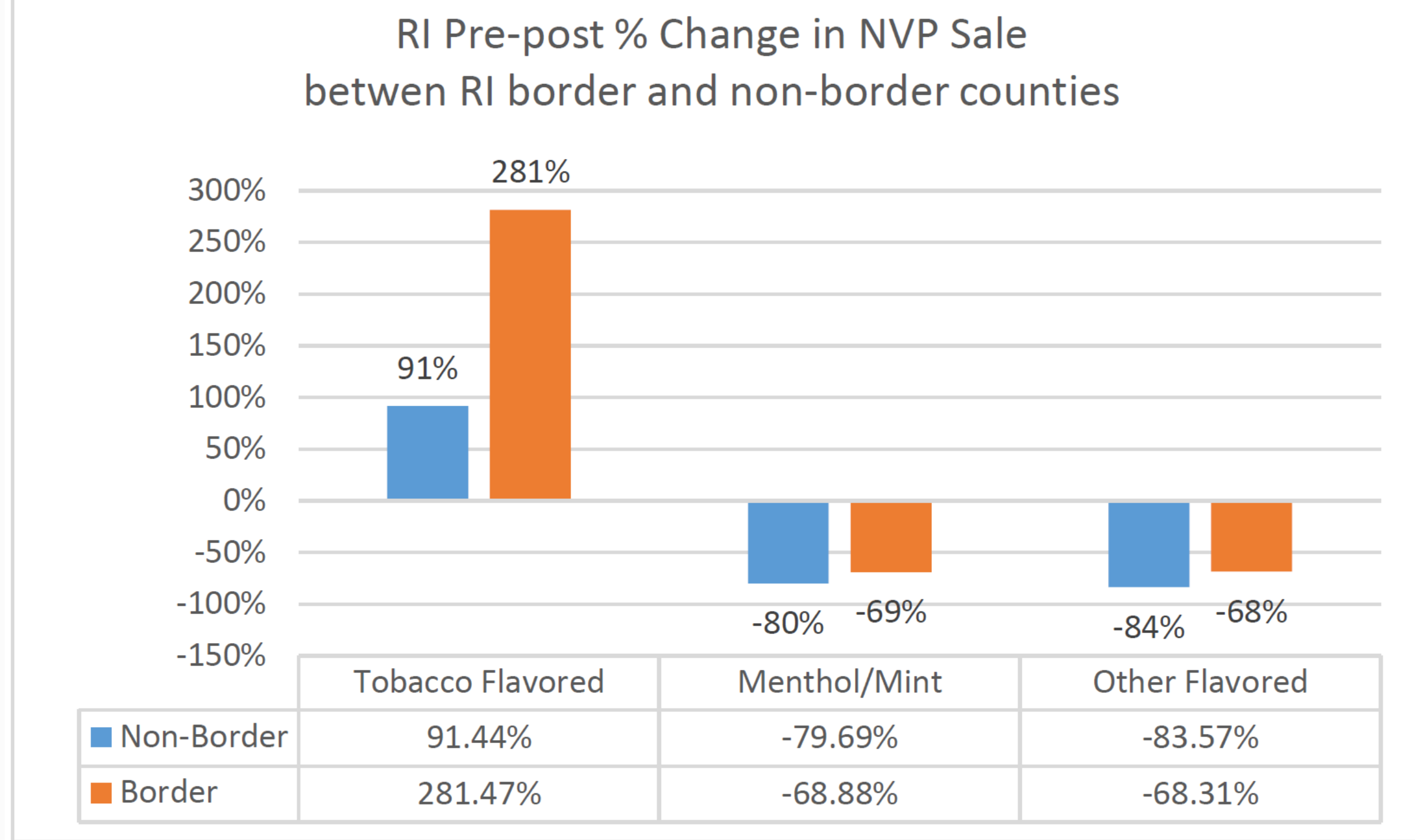
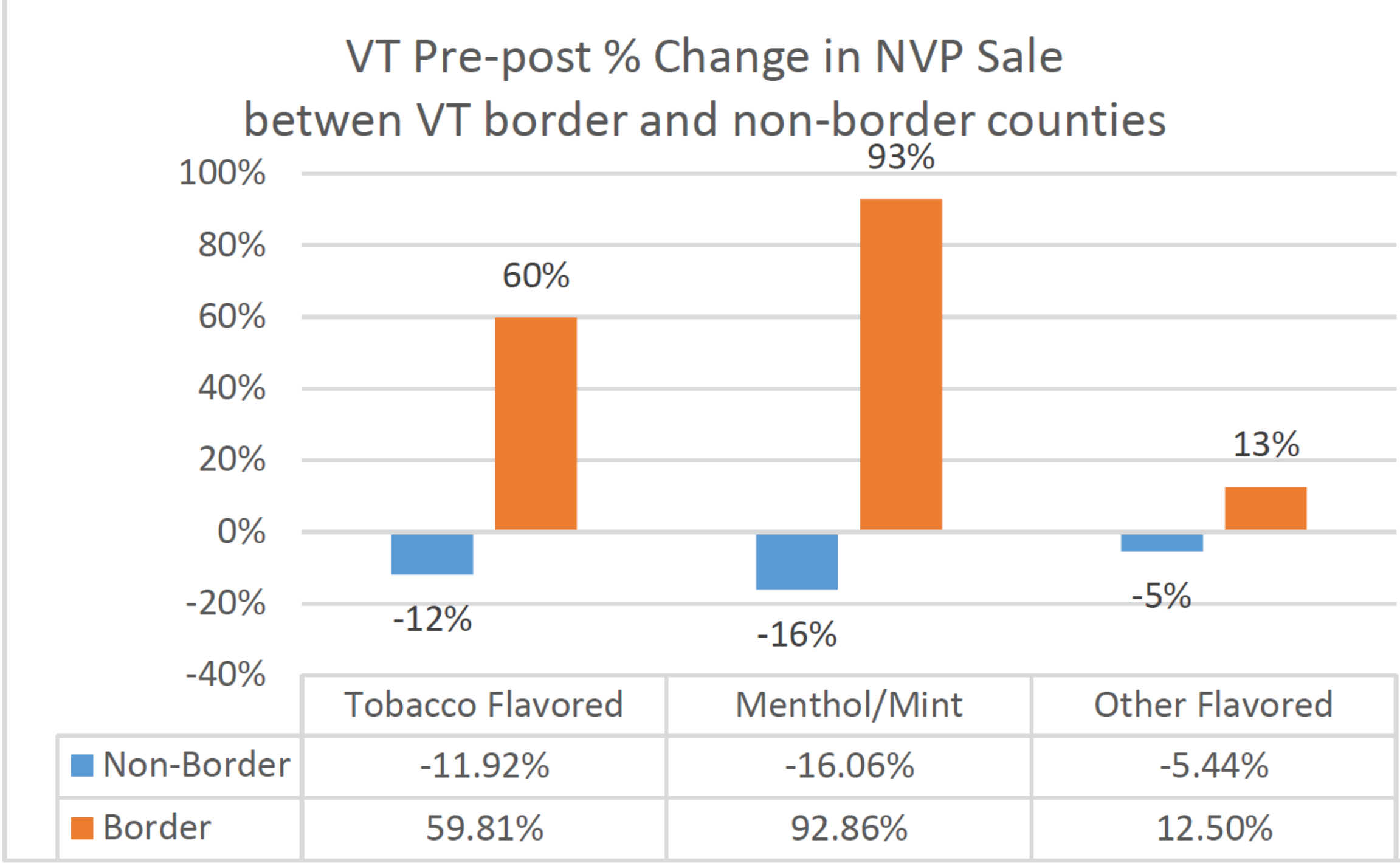
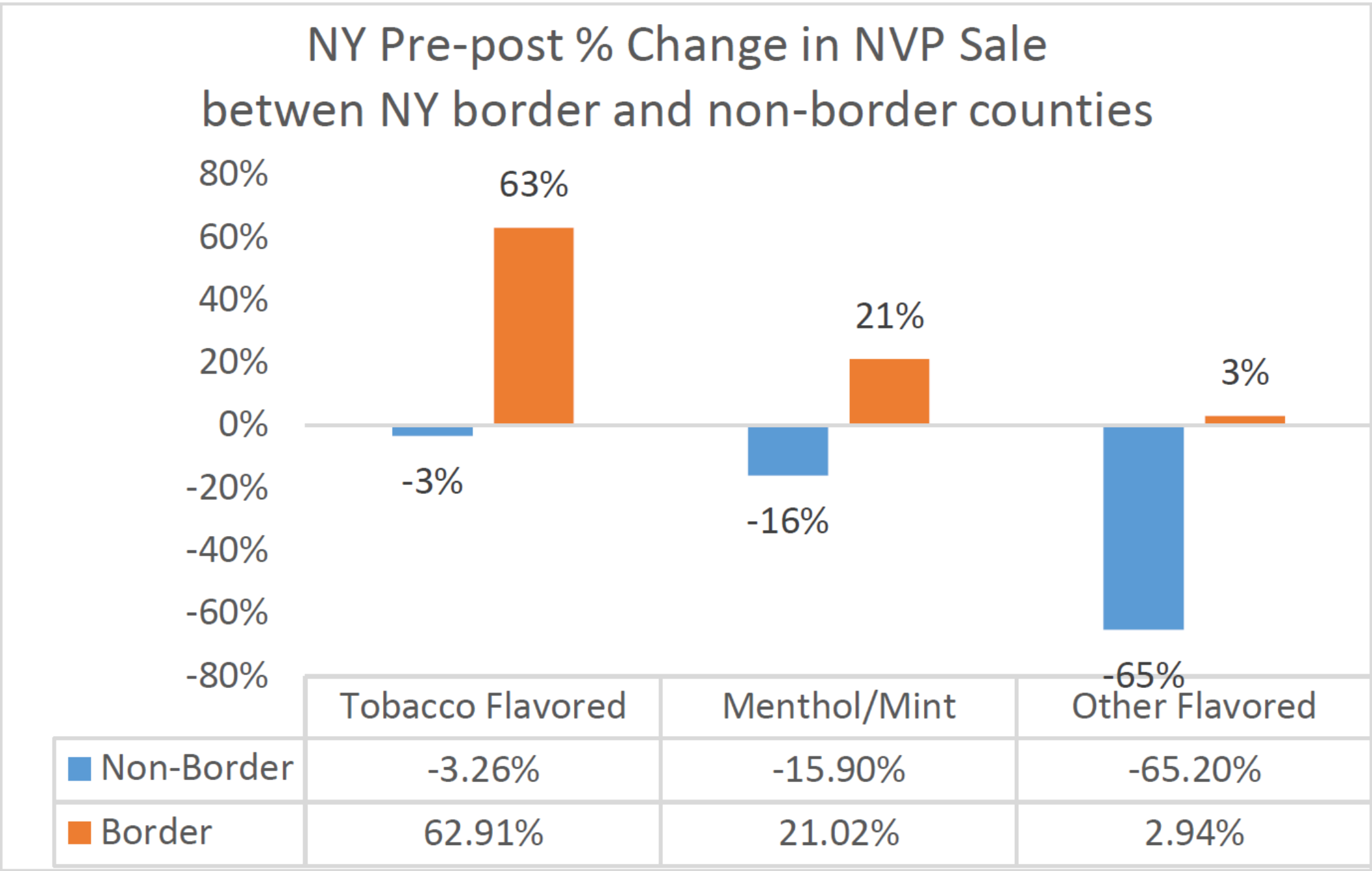
Approaches to Identify Cross-border Purchase

- Pre-post difference in NVP sales volume between border and non-border counties within the neighboring states for tobacco, menthol/mint, and other flavored NVPs.
- A difference-in-differences approach is applied, time frame of the 10 weeks pre- and post-flavor sales restrictions by state (MA, RI, and WA) and flavor type (tobacco, menthol/mint, and other flavors).

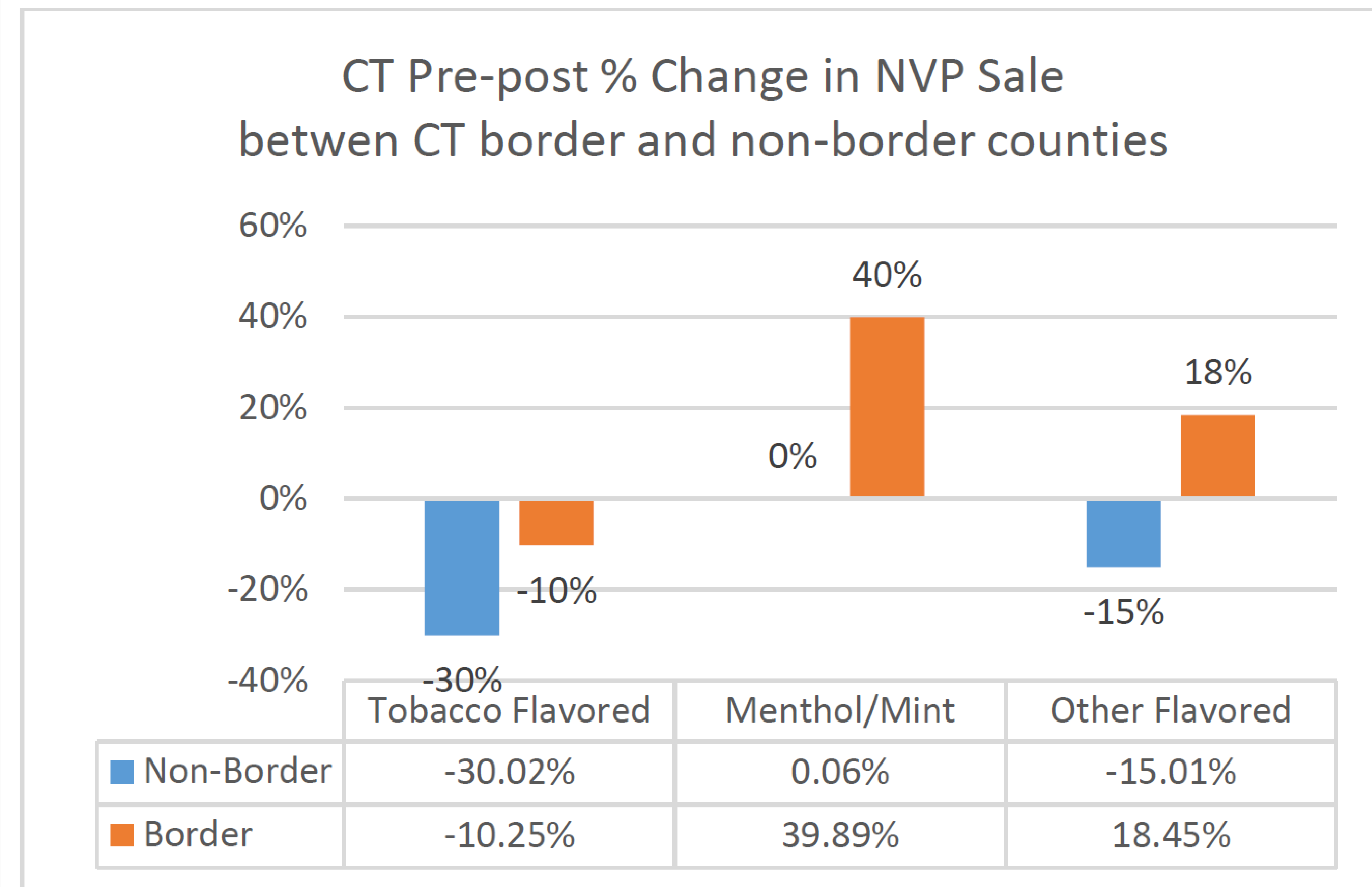
$$S_{rt} = \beta_0 + \beta_1 * Ban_t + \beta_2 * Border_r + \beta_3 * Ban_t * Border_r + \beta_4 * Week_t + u_{rt}$$

- S_{rt} is the weekly sales volume for each flavor group separately for border r and week t .
- Separate regression by state (MA, RI and WA) and flavor (tobacco, menthol/mint, and other flavors)

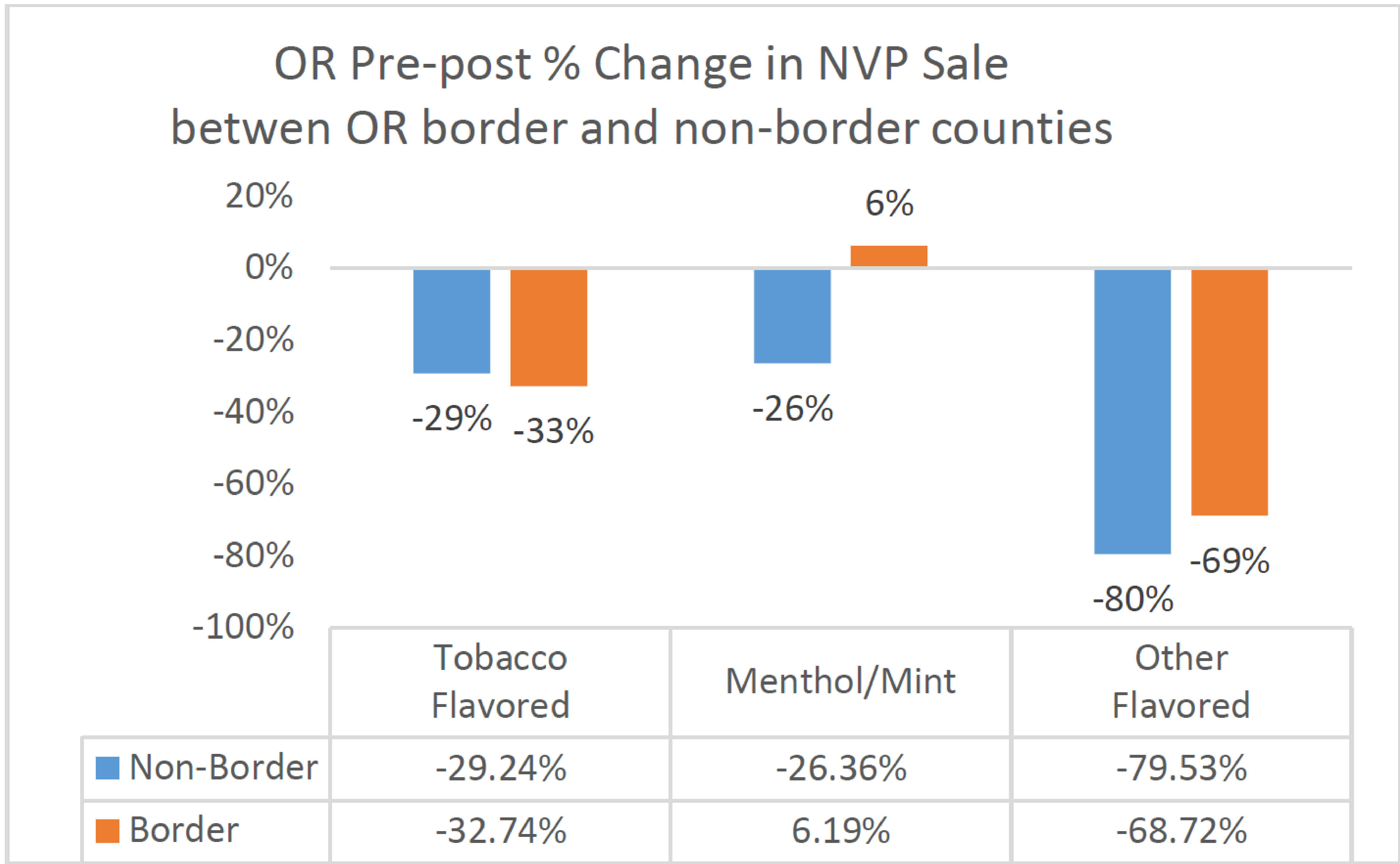
MA all NVP ban – pre-post sales difference between border and non-border counties



RI flavored NVP ban – pre-post sales difference between border and non-border counties



WA flavored NVP ban – pre-post sales difference between border and non-border counties



Impact of MA all NVP ban on cross-border purchase

Impact of MA flavor ban on cross border purchase			
	Tobacco Flavored	Menthol/Mint Flavored	Other Flavored
	NVPs	NVPs	NVPs
Week	-16.68 [-629.12,595.75]	25.24 [-1850.97,1901.45]	-6.30 [-50.27,37.67]
Ban	163.29 [-5961.09,6287.68]	-2026.84 [-20788,16735]	-201.85 [-641.59,237.89]
Border	-1659.68 [-1659.68,-1659.68]	-5537.4 [-5537.4,-5537.4]	-376.62 [-376.62,-376.62]
Ban*Border	1637.16 [1637.16,1637.16]	5196.78 [5196.78,5196.78]	276.74 [276.74,276.74]
OBS	200	200	200
Avg. Weekly Sale	2898	10120	349
R- squared	0.43	0.57	0.45

Standard errors are clustered by border; Regressions for MA ban controls for state fixed effects.

Impact of RI flavored NVP ban on cross-border purchase

	Tobacco Flavored	Menthol/Mint Flavored	Other Flavored
	NVPs	NVPs	NVPs
Week	-23.70 [-318.99,271.58]	-178.30 [-2190.39,1833.78]	-0.35 [-15.87,15.17]
Ban	-604.24 [-3557.12,2348.62]	2142.02 [-17978.88,22262.92]	-17.96 [-173.21, 137.28]
Border	-1942.75 [-1942.75,-1942.75]	-7290 [-7290,-7290]	-346.68 [-346.68,-346.68]
Ban*Border	843.5 [843.5,843.5]	1191.75 [1191.75,1191.75]	61.31 [61.31,61.31]
Avg. Weekly Sale	1789.7	7201.5	330.6
OBS	60	60	60
R squared	0.87	0.87	0.74

Standard errors are clustered by border

Impact of WA flavored NVP ban on cross-border purchase

Impact of WA flavor ban on cross border purchase			
	Tobacco Flavored	Menthol/Mint Flavored	Other Flavored
	NVPs	NVPs	NVPs
Week	-62.53 [-209.34,84.26]	69.62 [-212.30,351.55]	-4.29 [-7.90,-0.67]
Ban	203.39 [-1264.68, 1671.46]	-1715.25 [-4534.55,1104.03]	-93.59 [-129.76,-57.41]
Border	-367.8 [-367.8,-367.8]	-1424.5 [-1424.5, -1424.5]	23.9 [23.9, 23.9]
Ban*Border	69.4 [69.4, 69.4]	1169.7 [1169.7, 1169.7]	2.4 [2.4, 2.4]
OBS	40	40	40
Avg. Weekly Sale	1065	2937	116
R squared	0.85	0.42	0.72

Standard errors are clustered by border

Conclusion and Policy Implications

- A consistently significant increase in NVP sales in border areas of neighboring states and the cross-border influx of sales varied by flavor types and states
 - Cross-border purchases seem most substantial (~50%) in response to the MA total NVP ban and least substantial (~2%) to the WA flavored NVP ban
 - Greatest increase found in Menthol/Mint flavored (WA), other flavored (MA), and about the same (RI)
- Around 10% NVP sales on average, varied by flavor type and state, shifted from states with sales restrictions to states without sales restrictions
- Policymakers should take appropriate caution to factor in these effects when evaluating any future potential NVP sales restrictions.

Future Studies and Plans

- Extend the study by adding more states that restrict flavored NVP or mentholated cigarette sales and year 2020 data
 - Several states implemented a permanent ban on flavored NVP sales in 2020
 - New York [5/18/2020-present], New Jersey [4/20/2020-present], Massachusetts [nontobacco flavor ban: 12/24/19—present]
 - FDA proposed products standards to prohibit menthol in cigarettes and all flavors in cigars
 - Massachusetts, California, San Francisco imposed a ban on all flavored tobacco products, including menthol cigarettes, although California's flavor ban faces some legal challenges.