

# The Effects of Tobacco Flavor Restrictions on Tobacco Retail Businesses

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## Executive Summary

The federal government, numerous states, and many localities have implemented policies restricting the sale of flavored tobacco products (FTPs). Opponents of FTP sales restrictions argue that these policies harm retailers who sell tobacco and vaping products. We use data on tobacco stores, convenience stores, and convenience stores with gas stations from the US Bureau of Labor Statistics Quarterly Census of Employment and Wages to examine the effects of FTP restrictions. Using a three-way fixed effects regression technique, we find no evidence that flavored e-cigarette or menthol cigarette sales restrictions have negative effects on tobacco stores, convenience stores, or convenience stores with gas stations. In general, the FTP sales restrictions had insignificant effects on the number of stores, the number of employees, and the real wages paid to the employees. The results of the analyses show that businesses that sell tobacco products successfully adapt to changes in market conditions, including the implementation of FTP sales restrictions on tobacco products.

## Introduction

The federal government, numerous states, and many localities have implemented policies restricting the sale of flavored tobacco products (FTPs). The most comprehensive policies restrict the sale of all FTPs without exemptions for certain flavors, products, or retailers (Donovan et al., 2021).

In 2009, the United States (US) Family Smoking Prevention and Tobacco Control Act (Tobacco Control Act) authorized the Food and Drug Administration (FDA) to regulate the manufacture, distribution, and marketing of tobacco products. As part of the Tobacco Control Act, Congress banned characterizing flavors in combustible cigarettes with the exception of menthol flavor. The FDA did not have authority to regulate e-cigarettes until 2016 when it issued a final rule deeming all products made or derived from tobacco intended for human consumption to be within its regulatory authority. In February 2020, FDA prioritized enforcement against flavored cartridge/pod-based e-cigarette products, except for menthol and tobacco flavors. The prioritized enforcement exempted flavored disposable e-cigarettes and e-liquid products (FDA, 2020).

Currently, seven states restrict the sale of flavored tobacco products. In 2019, Massachusetts became the first state in the US to restrict the sale of all flavored tobacco products - including menthol cigarettes and flavored e-cigarettes.<sup>1</sup> The only exception to the Massachusetts law is that FTPs can still be sold at licensed smoking bars where consumption must occur on-site. In 2020, New Jersey, New York, and Rhode Island enacted restrictions on the sale of flavored e-cigarettes. In December 2022, California restricted nearly all FTPs; the only exemptions from the policy are loose leaf tobacco, premium cigars, and hookah tobacco. Maryland and Utah restrict the sale of some flavored e-cigarettes. Specifically, Maryland restricts the sale of all flavored cartridge-based and disposable e-cigarettes except for menthol-flavored e-cigarettes, and Utah prohibits the sale of flavored e-cigarettes, except mint- and menthol-flavored e-cigarettes, in adult-only retail tobacco specialty businesses.

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<sup>1</sup> Massachusetts' flavor ban became effective 11/27/2019 for e-cigarettes and 06/01/2020 for all other products.

Numerous localities have restricted the sale of flavored tobacco products. According to Truth Initiative, as of March 31, 2023 fifteen states had at least one local level jurisdiction that had enacted a flavored tobacco sales restriction. As of March 31, 2023, 388 jurisdictions in the US had placed some type of restriction on the sale of flavored tobacco products, and of those, 121 had fully comprehensive policies that prohibit sales of all types of flavors across all products, including menthol/mint/wintergreen tobacco products, at all retailers. On March 31, 2023, 27.9% of the US population was covered by some type of flavored tobacco sales restriction and 2.9% of the US population was covered by a fully comprehensive flavored tobacco sales restriction where the sale of all tobacco products in a jurisdiction were restricted including all flavors, all products, and all retailers.

An argument against implementing FTP sales restrictions is that these policies harm retailers who sell tobacco and vaping products. Claims of adverse economic impacts to businesses have been made about a variety of measures that affect the demand for tobacco products. A review of the literature from methodologically sound studies contradicts this claim, concluding that measures that affect the demand for tobacco products have either no negative economic impact or, in many cases, have positive economic effects (NCI/WHO, 2016).

Despite claims that FTP sales restrictions cause companies to go out of business and employees to lose their jobs, there is very little scientific evidence on this topic. A report by Tauras and Chaloupka (2023) graphically examined trends in employment, wages, and number of establishments in Massachusetts and all neighboring states for the period 2018-2021. The report concluded that FTP sales restrictions do not adversely impact businesses that sell tobacco products. Results from graphical trend analyses suggested that these businesses successfully adapt to changes in market conditions, including the implementation of FTP sales restrictions.

This report provides the first evidence on the relationship between FTP sales restrictions and several measures of tobacco store, convenience store, and convenience store with gas station business in the United States using multivariate regression analyses. In particular, this report examines the effects of FTP sales restrictions on the number of

establishments, number of employees, and average wages paid to employees working in tobacco stores, convenience stores, and convenience stores with gas stations.

## Methods

State-level quarterly data on tobacco stores and convenience stores were extracted from the US Bureau of Labor Statistics (BLS) Quarterly Census of Employment and Wages (QCEW) for the first quarter 2017 through the fourth quarter 2021.<sup>2</sup> State-level quarterly data on convenience stores with gas stations were also extracted from the US BLS QCEW for the first quarter 2017 through the fourth quarter 2022.<sup>3</sup> Using the QCEW, we created nine dependent variables for each type of business. Three dependent variables included the number of establishments for each type of business: tobacco stores, convenience stores, and convenience stores with gas stations. The next three dependent variables included the number of employees working in each type of business: tobacco stores, convenience stores, and convenience stores with gas stations. The final three dependent variables included the average inflation adjusted wages employees earned (in 2022 Quarter 4 dollars) in each type of business: tobacco stores, convenience stores, and convenience stores with gas stations.

## Flavored Tobacco Policies Restrictions

We merged state quarterly cigarette and e-cigarette flavor restrictions with the QCEW data. We used the FTP sales restriction database, maintained by Truth Initiative, that tracks local and state FTP sales restrictions in the US (<https://truthinitiative.org/our-top-issues/flavored-tobacco>). FTP laws for this database are retrieved from news and

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<sup>2</sup> Data on convenience stores and tobacco stores for 2022 were not included in this study. Convenience stores went through an NAICS number change from 445120 to 445131 in 2022. Although the description of both NAICS numbers representing convenience stores is the same, the change in NAICS number represents a "DIRECT+ classification change" in 2022. This implies that all establishments in 2017 NAICS 445120 will transfer directly into 2022 NAICS 445131, but the 2022 NAICS 445131 adds additional establishments beyond the 2017 NAICS 445120. Likewise, tobacco stores went through an NAICS number change from 453991 to 459991 in 2022. This was also a "Direct+" change. Therefore the 2022 data for convenience stores and tobacco stores is not compatible with data prior to 2022 and thus the 2022 data on convenience stores and tobacco stores is not used in the analyses.

<sup>3</sup> Convenience stores with gas stations went through an NAICS number change from 447110 to 457110 in 2022. However, the change in NAICS number for convenience stores with gas stations represents a "DIRECT" change where the industry receives a new numeric code, but keeps the same exact definition. Therefore the 2022 data on convenience stores with gas stations is compatible with prior data and is included in the analyses.

media outlets, and text from online sources such as municipal codes and state statutes (Donovan, et al., 2021). For this study, we examined 474 laws implemented from January 2009 to December 2022 from the 50 US States and District of Columbia. US territories and Native American tribes were excluded from this study. We subset the data by laws that apply to menthol cigarettes and laws that apply to flavored e-cigarette products. Depending on how the laws are written, some laws may include other tobacco products.

### **Flavored Tobacco Policies Restrictions Comprehensive Classification Schema**

To properly capture nuance in sales restriction policies, we use the classification scheme developed by Donovan and colleagues (Donovan et al., 2021). This six-level classification scheme grades the comprehensiveness of all FTP restrictions passed at the local and state level, with level 1 being the least comprehensive and level 6 being the most comprehensive level. This system grades FTP restrictions based on three criteria: flavor restrictions, product restrictions, and retailer restrictions (see Figure 1 ). The classification schema was integrated as a variable in the FTP Restrictions Database and was presented as a numerical value (1-6) denoting the comprehensiveness of the policy. Localities with no policies were given a value of zero. Table 1 provides the percent of US Population Covered by FTP sales restrictions for any product by comprehensiveness level, as of March 31, 2023. As can be seen in Table 1, 27.9% of the US population was covered by an FTP sales restrictions. Specifically, 1.1%, 11.2%, 1.3%, 7.9%, 3.5%, and 2.9% of the US population was covered by comprehensiveness level 1, 2, 3, 4, 5, and 6, respectively.

**Figure 1**

**All FTP Sales Restrictions**

All flavors restricted / all products restricted, and endgame policies<sup>a</sup>

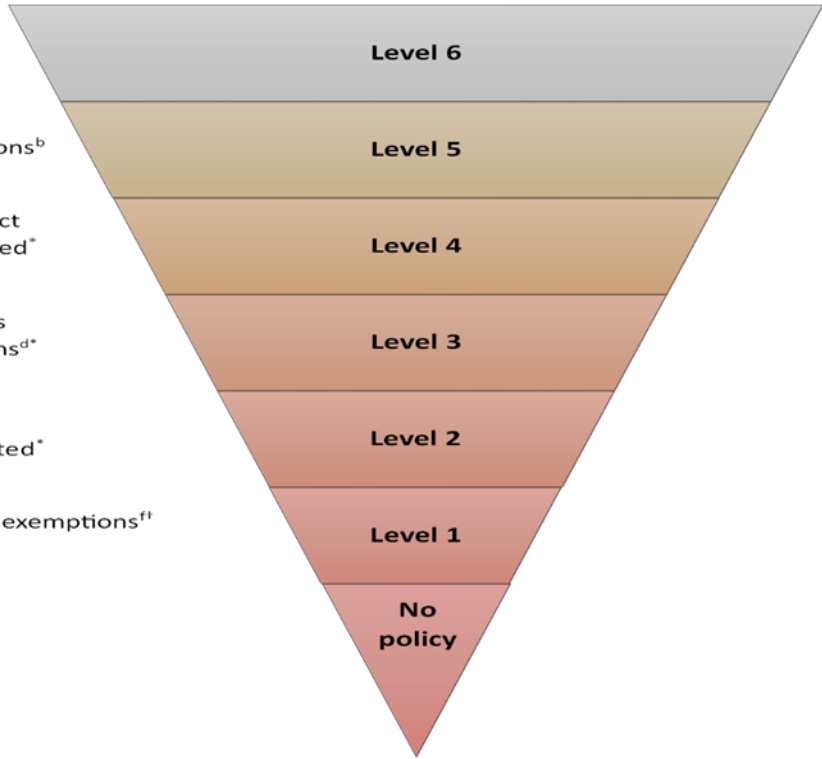
All flavors restricted / all products restricted / narrow retailer exemptions<sup>b</sup>

All flavors restricted / narrow product exemptions<sup>c</sup> / most retailers restricted<sup>d</sup>

All flavors restricted / most products restricted / major retailer exemptions<sup>d\*</sup>

Flavor exemptions<sup>e</sup> / major product exemptions<sup>f†</sup> / most retailers restricted<sup>d</sup>

Flavor exemptions<sup>e</sup> / major product exemptions<sup>f†</sup> AND major retailer exemptions<sup>d,g\*</sup>



<sup>a</sup>Final classification scheme for all FTP sales restrictions (including e-cigarette-only restrictions) and e-cigarette-only sales restrictions. <sup>b</sup>Endgame policies refer to restrictions on the sale of all tobacco products. <sup>b</sup>Narrow retail exemptions allow for the sale of FTPs in on-site consumption tobacco or smoking bars (ie, retailers exclusively occupying an enclosed indoor space and are primarily selling tobacco products for consumption by customers on the premises). <sup>c</sup>Narrow product exemptions allow for the sale of flavoured: hookah, pipe, premium cigars, FDA premarket approval products, and/or FDA modified risk approval products. <sup>d</sup>Major retailer exemptions allow for the sale of FTPs in: adult-only retailers, liquor stores, vape shops, specialty stores (i.e., establishments in which the primary purpose is the sale of tobacco and tobacco-related products and/or a specified percentage of its revenues is derived from the sale of tobacco and tobacco-related products), and/or policies that apply only to buffer zones (i.e., policies that apply only to retailers within a certain distance of youth-oriented areas, such as schools, parks, playgrounds and libraries). <sup>e</sup>Flavour exemptions allow for the sale of FTPs with menthol flavour or characterising flavors. <sup>f</sup>Major product exemptions allow for the sale of flavoured: e-cigarettes, cigars, LCCs, SLT, and/or roll-your-own tobacco. <sup>g</sup>Includes FTP policies with missing data for any flavour, product, or retailer exemption and/or FTP policies that exempt existing retailers...<sup>\*</sup>Narrow retailer exemptions may also be present. <sup>†</sup>Narrow product exemptions may also be present... The diagram and footnotes are from Donovan and colleagues.<sup>1</sup>

**Table 1**

**Percent of US Population Covered by FTP sales restrictions for any product by comprehensiveness level, as of March 31, 2023.**

Name	No Policy (%)	Comprehensiveness Level (1-6) (%)						Any (1-6) (%)
		1	2	3	4	5	6	
United States	72.1%	1.1%	11.2%	1.3%	7.9%	3.5%	2.9%	27.9%

## Census Vintage 2020 Population Estimates for City and Town Population Totals: 2010-2020

We used Census Vintage 2020 Population Estimates for City and Town Population Totals: 2010-2020 data (Census, 2022). The dataset has 81,415 entries and provides population estimates for US states, counties, incorporated places (e.g., cities, boroughs, and villages), and minor civil divisions (e.g., towns and townships) from July 1, 2010 to July 1, 2020. To properly merge this data with the FTP sales restrictions database, we only included entries with a summary level of 40 (State), 50 (County), 61 (State-County-County Subdivision), and 157 (State-County-Place). A summary level is a stratified arrangement of geographic entities that allows for data analysis, sorting, and mapping by location (Missouri Census Data Center, 2023).

## Percentage of the Population Covered by a Flavored Tobacco Sales Restriction

The FTP sales restrictions and Census vintage populations data were merged by year, quarter, summary level, and by the corresponding federal information processing system (FIPS) code for the state, county, place, and county subdivision. We excluded FTP sales restrictions missing an effective date and FTP sales restrictions originating and pertaining to Native American tribes. Duplicate entries that fall under the same year-quarter period were accounted for in the analysis. In total, there were 384 localities (n = 384; including counties and states) out of 445 observations (n = 445).

In our analysis, we accounted for the number of days a law was in effect for any given year-quarter period (0-1). We multiplied this variable by the population estimate of each locality and comprehensiveness level by product. We considered certain law characteristics (e.g., effective date, expiration date, county jurisdiction) and calculated the population estimate covered by FTP sales restrictions at the local, county, and state level. Percentage of the population covered by an FTP sales restriction was calculated for each comprehensive level (0-6) by dividing the total number of people in the state covered by FTP sales restrictions by the total state population for that year (Equation 1). For more information on methodology please see forthcoming paper by Donovan et al., 2024.



$$\sum_{i=1}^6 \%Population\ Covered\ by\ FTP_{iSYQP} = \frac{(Total\ Population\ Covered\ by\ FTP\ restrictions_{iSYQP})}{(Total\ Population_{iSYQ})} \quad (1)^4$$

In our regression analyses, we used four different measures of FTP sales restrictions: percent of the population covered by any flavored e-cigarette restriction; percent of the population covered by any combustible menthol cigarette restriction; a flavored e-cigarette restriction index, and a menthol cigarette restriction index. The flavored e-cigarette and menthol cigarette restriction indices places more weight on the higher comprehensiveness levels of flavor restrictions. For example, a weight of 1 is applied to FTP comprehensiveness level 1, a weight of 2 is applied to FTP comprehensiveness level 2, a weight of 3 is applied to FTP comprehensiveness level 3, and so forth. Specifically, the e-cigarette flavor restriction index is defined as follows:

$$E\text{-cigarette flavor restriction index} = (1 * \text{Percent of population in e-cig FTP level 1} + 2 * \text{Percent of population in e-cig FTP level 2} + 3 * \text{Percent of population in e-cig FTP level 3} + 4 * \text{Percent of population in e-cig FTP level 4} + 5 * \text{Percent of population in e-cig FTP level 5} + 6 * \text{Percent of population in e-cig FTP level 6}) \quad (2)$$

The menthol cigarette restriction index is defined as follows:

$$Menthol\ cigarette\ flavor\ restriction\ index = (1 * \text{Percent of population in cig FTP level 1} + 2 * \text{Percent of population in cig FTP level 2} + 3 * \text{Percent of population in cig FTP level 3} + 4 * \text{Percent of population in cig FTP level 4} + 5 * \text{Percent of population in cig FTP level 5} + 6 * \text{Percent of population in cig FTP level 6}) \quad (3)$$

We also merged a measure of quarterly inflation-adjusted state per capita gross domestic product with the QCEW data to control for overall quarterly state-level economic conditions. Quarterly gross domestic product by state was acquired from the Bureau of Economic Analysis - US Department of Commerce and was adjusted for inflation using the consumer price index (in 2022 fourth quarter dollars). The real state gross domestic product was divided by the state population to derive a per-capita measure of real state gross domestic product.

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<sup>4</sup> Percent population coverage by FTP is calculated for each comprehensiveness level (1-6; *i*), state (*S*), year (*Y*), quarter (*Q*), and product (cigarettes and e-cigarettes; *P*)

## Statistical Methods

We used ordinary least squares regressions to estimate all the equations. We employed a three-way fixed-effects regression technique that controls for year-specific, census division-specific,<sup>5</sup> and quarter-specific determinants of business activity. This type of fixed effects approach amounts to including a dichotomous indicator for census division (except the Pacific division which is omitted as the comparison division), each year (except 2017 which is omitted as the comparison year) and each quarter (except quarter 1 which is omitted as the comparison quarter) as explanatory variables in the models. The three-way fixed-effects regression technique controls for time-invariant unobserved Census division-level heterogeneity (through the division indicators), changes in the business activity over time (through the use of dichotomous year indicators), and seasonality (through the use of dichotomous quarterly indicators). Finally, we cluster corrected the standard errors at state level in all the equations.

Table 1 presents the regression equations where the dependent variables are the number of tobacco stores (Model 1), the number of convenience stores (Model 2), and the number of convenience stores with gas stations (Model 3). The independent variables in models 1-3 are the percent of the population covered by any flavored e-cigarette restriction, real state gross domestic product per-capita, Census division fixed effects, year fixed effects, and quarter fixed effects. Models 4 - 6 are identical to Models 1-3 except the percent of the population covered by any e-cigarette flavor restriction is replaced by the percent of the population covered by any menthol cigarette restriction.

Table 2 is identical to Table 1, except the flavor restrictions index for e-cigarettes replaces the percent of the population covered by any e-cigarette flavor restriction in Models 1-3 and the flavor restrictions index for menthol cigarettes replaces the percent of the population covered by any menthol cigarette restriction in Models 4-6.

Tables 3 and 4 are identical to Tables 1 and 2, except the dependent variables in Tables 3 and 4 are the number of employees working tobacco stores, convenience stores, and

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<sup>5</sup> We tried to estimate models using state fixed effects rather than Census division fixed effects. There was a high degree of collinearity between the FTP policy variables and the state fixed effects in the models.

convenience stores with gas stations. Finally, Tables 5 and 6 are identical to Tables 1 and 2, except the dependent variables in Tables 5 and 6 are the average real wages earned by employees working in tobacco stores, convenience stores, and convenience stores with gas stations.

## Results

Our analyses did not find any evidence that flavored e-cigarette or menthol cigarette sales restrictions harm businesses. In general, the FTP sales restrictions had insignificant effects on the number of stores, the number of employees, and the real wages paid to the employees. There are a few exceptions to this generalization. First, we found the percent of the population covered by both menthol cigarette and flavored e-cigarette restrictions and the flavored e-cigarette and flavored combustible cigarette restriction indices to have a positive and significant association with the number of convenience stores. We found the percent of the population covered by e-cigarette flavor restrictions and the flavored e-cigarette restriction index to have a positive and significant association with the number of convenience store employees. Finally, we found the percent of the population covered by flavored combustible cigarette restrictions and the flavored combustible cigarette restriction index to have a positive and significant association with wages earned by convenience store with gas station employees.

## Conclusion

An argument against implementing FTP sales restrictions is that these policies will harm businesses that sell tobacco and vaping products. In this report we examined the effects of flavored tobacco sales restrictions on the number of establishments, number of employees, and real average wages paid to employees working in tobacco stores, convenience stores, and convenience stores with gas stations. Using multivariate regression analyses, we find no evidence that flavored tobacco sales restrictions have a negative and significant impact on businesses that sell tobacco and vaping products. In fact, results of the analyses show that businesses that sell tobacco products successfully adapt to changes in market conditions, including the implementation of FTP sales

restrictions on tobacco products. This finding is consistent with the trend analyses conducted on Massachusetts and all surrounding states by Tauras and Chaloupka (2003).

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## About Tobacconomics

Tobacconomics is a collaboration of leading researchers who have been studying the economics of tobacco control policy for nearly 30 years. The team is dedicated to helping researchers, advocates and policymakers access the latest and best research about what’s working—or not working—to curb tobacco consumption and the impact it has on our economy. As a program of the University of Illinois at Chicago, Tobacconomics is not affiliated with any tobacco manufacturer. Visit [www.tobacconomics.org](http://www.tobacconomics.org) or follow us on Twitter <https://twitter.com/Tobacconomics>.

**Table 1**

**Regression Results for Number of Stores**

	<b>Tobacco Stores</b>	<b>Convenience Stores</b>	<b>Convenience Stores with Gas</b>	<b>Tobacco Stores</b>	<b>Convenience Stores</b>	<b>Convenience Stores with Gas</b>
Population covered by any flavor restrictions for e-cigarettes	84.69 (1.09)	802.3** (2.28)	228.3 (0.55)			
Population covered by any flavor restrictions for cigarettes				492.6 (1.32)	1820.9*** (2.73)	2117.1* (1.73)
Real State GDP Per-Capita	-648.4 (-0.58)	-158.9 (-0.04)	-8643.5 (-1.10)	-781.2 (-0.74)	-320.2 (-0.07)	-9860.3 (-1.32)
East North Central	14.89 (0.08)	-71.66 (-0.17)	780.7 (0.96)	5.715 (0.03)	-77.05 (-0.18)	742.0 (0.95)
East South Central	-130.8 (-0.76)	-556.1 (-1.48)	530.9 (0.61)	-124.7 (-0.76)	-522.9 (-1.44)	555.3 (0.67)
Mid Atlantic	30.45 (0.15)	980.0* (1.75)	678.8 (0.60)	59.55 (0.32)	1197.5** (2.10)	808.3 (0.76)
Mountain	-250.3 (-1.47)	-683.2* (-1.82)	-1295.0 (-1.58)	-238.4 (-1.49)	-604.7* (-1.71)	-1243.9 (-1.64)
Northeast	-279.5 (-1.56)	-450.0 (-1.08)	-1360.2 (-1.59)	-280.2 (-1.65)	-348.8 (-0.85)	-1415.9* (-1.78)
South Atlantic	-57.80 (-0.33)	151.0 (0.35)	648.4 (0.71)	-44.24 (-0.27)	217.7 (0.51)	713.3 (0.83)
West North Central	-251.7 (-1.65)	-668.1* (-1.94)	-1023.4 (-1.37)	-249.3* (-1.71)	-619.8* (-1.78)	-1016.0 (-1.46)
West South Central	-23.36 (-0.12)	217.3 (0.29)	1702.7 (0.91)	-16.44 (-0.09)	251.5 (0.34)	1734.7 (0.93)

	<b>Tobacco Stores</b>	<b>Convenience Stores</b>	<b>Convenience Stores with Gas</b>	<b>Tobacco Stores</b>	<b>Convenience Stores</b>	<b>Convenience Stores with Gas</b>
Quarter 2	2.907* (1.92)	2.405 (0.36)	-3.566 (-0.41)	2.213* (1.70)	1.280 (0.23)	-7.249 (-0.87)
Quarter 3	8.164*** (4.17)	2.038 (0.31)	8.522* (1.99)	6.885*** (3.84)	2.114 (0.30)	2.041 (0.35)
Quarter 4	11.50*** (3.68)	-5.641 (-0.50)	23.07* (1.81)	11.43*** (4.02)	6.292 (0.71)	12.98 (1.33)
2018	8.118** (2.60)	9.910 (0.91)	33.24*** (3.07)	7.909** (2.56)	10.42 (0.99)	32.77*** (3.14)
2019	20.03*** (3.73)	9.782 (0.41)	41.31** (2.06)	20.51*** (3.64)	24.17 (1.11)	41.18** (2.16)
2020	24.40*** (3.07)	-29.08 (-0.80)	18.44 (0.49)	22.02*** (3.21)	9.303 (0.28)	-4.833 (-0.18)
2021	51.81*** (3.34)	-25.23 (-0.50)	74.16 (1.28)	47.58*** (3.36)	15.09 (0.30)	42.65 (0.85)
2022			102.7 (1.52)			58.25 (1.00)
Constant	367.0** (2.15)	785.5 (1.63)	2574.7** (2.68)	370.0** (2.25)	739.7 (1.54)	2639.8*** (2.87)

*t* statistics in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

**Table 2**

**Regression Results for Number of Stores**

	<b>Tobacco Stores</b>	<b>Convenience Stores</b>	<b>Convenience Stores with Gas</b>	<b>Tobacco Stores</b>	<b>Convenience Stores</b>	<b>Convenience Stores with Gas</b>
Index flavor restrictions for e-cigarettes	62.17 (1.32)	369.9*** (3.54)	226.3 (1.23)			
Index flavor restrictions for cigarettes				103.3 (1.15)	405.6** (2.35)	437.3 (1.55)
Real State GDP Per-Capita	-715.2 (-0.67)	-355.2 (-0.08)	-9204.3 (-1.21)	-771.8 (-0.73)	-327.0 (-0.07)	-9831.2 (-1.32)
East North Central	12.75 (0.07)	-66.98 (-0.16)	767.7 (0.96)	13.71 (0.08)	-48.93 (-0.12)	777.3 (1.01)
East South Central	-129.6 (-0.77)	-542.1 (-1.50)	529.7 (0.62)	-124.4 (-0.76)	-520.5 (-1.45)	556.8 (0.68)
Mid Atlantic	24.89 (0.12)	1014.0* (1.83)	628.1 (0.55)	59.61 (0.32)	1200.1** (2.11)	808.9 (0.76)
Mountain	-247.8 (-1.50)	-647.3* (-1.82)	-1292.7 (-1.63)	-238.2 (-1.50)	-602.4* (-1.72)	-1242.9 (-1.65)
Northeast	-291.4 (-1.60)	-457.5 (-1.09)	-1440.2 (-1.67)	-281.1 (-1.64)	-356.7 (-0.87)	-1420.3* (-1.78)
South Atlantic	-55.86 (-0.33)	172.6 (0.41)	650.5 (0.73)	-44.65 (-0.27)	218.6 (0.51)	711.3 (0.83)
West North Central	-253.9* (-1.69)	-656.9* (-1.97)	-1041.1 (-1.42)	-245.1* (-1.70)	-604.5* (-1.77)	-995.1 (-1.44)
West South Central	-21.68 (-0.11)	232.6 (0.31)	1705.0 (0.91)	-16.15 (-0.09)	253.9 (0.34)	1736.0 (0.93)
Quarter 2	2.333 (1.62)	-0.130 (-0.02)	-5.939 (-0.68)	2.198* (1.72)	1.002 (0.18)	-7.331 (-0.88)



	<b>Tobacco Stores</b>	<b>Convenience Stores</b>	<b>Convenience Stores with Gas</b>	<b>Tobacco Stores</b>	<b>Convenience Stores</b>	<b>Convenience Stores with Gas</b>
Quarter 3	7.003 <sup>***</sup> (3.51)	-1.942 (-0.24)	3.923 (0.58)	6.782 <sup>***</sup> (3.90)	1.223 (0.17)	1.679 (0.28)
Quarter 4	9.863 <sup>***</sup> (3.12)	-7.960 (-0.74)	13.08 (0.88)	11.34 <sup>***</sup> (4.08)	5.433 (0.61)	12.52 (1.20)
2018	8.060 <sup>**</sup> (2.63)	10.35 (0.99)	33.19 <sup>***</sup> (3.15)	8.086 <sup>**</sup> (2.61)	11.02 (1.05)	33.57 <sup>***</sup> (3.24)
2019	19.09 <sup>***</sup> (3.55)	11.88 (0.55)	36.45 <sup>*</sup> (1.88)	21.01 <sup>***</sup> (3.76)	25.75 (1.20)	43.48 <sup>**</sup> (2.37)
2020	17.79 <sup>*</sup> (1.86)	-39.64 (-1.17)	-13.30 (-0.31)	22.65 <sup>***</sup> (3.33)	9.334 (0.28)	-1.503 (-0.06)
2021	43.14 <sup>**</sup> (2.57)	-42.67 (-0.83)	34.52 (0.52)	47.73 <sup>***</sup> (3.37)	12.46 (0.25)	44.25 (0.88)
2022			56.47 (0.72)			58.68 (0.99)
Constant	373.5 <sup>**</sup> (2.20)	789.6 (1.67)	2631.7 <sup>***</sup> (2.75)	368.9 <sup>**</sup> (2.25)	738.3 (1.55)	2635.5 <sup>***</sup> (2.86)

*t* statistics in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Table 3

## Regression Results for Number of Employees

	Tobacco Store Employees	Convenience Store Employees	Convenience Store with Gas Employees	Tobacco Store Employees	Convenience Store Employees	Convenience Store with Gas Employees
Population covered by any flavor restrictions for e-cigarettes	8.063 (0.04)	3591.9** (2.45)	1254.7 (0.35)			
Population covered by any flavor restrictions for cigarettes				965.6 (1.18)	7809.9* (1.93)	20447.8 (1.51)
Real State GDP Per-Capita	-3107.6 (-0.86)	-3814.4 (-0.18)	-64294.4 (-1.05)	-3530.7 (-1.04)	-4404.3 (-0.21)	-75358.0 (-1.34)
East North Central	235.3 (0.52)	-712.2 (-0.29)	7566.8 (1.06)	207.8 (0.46)	-726.6 (-0.29)	7137.3 (1.05)
East South Central	-179.2 (-0.37)	-3667.8 (-1.65)	-2711.2 (-0.39)	-171.8 (-0.37)	-3521.8 (-1.61)	-2478.7 (-0.37)
Mid Atlantic	418.8 (0.65)	6051.3** (2.31)	7249.2 (0.76)	441.0 (0.72)	7018.4*** (2.76)	8193.4 (0.97)
Mountain	-686.1 (-1.55)	-3743.4 (-1.66)	-10487.7 (-1.49)	-674.4 (-1.61)	-3395.9 (-1.56)	-10067.8 (-1.55)
Northeast	-828.2* (-1.82)	-3080.0 (-1.27)	-13448.6* (-1.83)	-868.2* (-2.00)	-2613.8 (-1.10)	-14256.9** (-2.10)
South Atlantic	-79.60 (-0.17)	365.9 (0.14)	1663.9 (0.23)	-59.28 (-0.13)	656.9 (0.25)	2260.2 (0.33)
West North Central	-739.7* (-1.89)	-3355.8 (-1.50)	-6147.8 (-0.92)	-747.4* (-2.00)	-3136.7 (-1.35)	-6181.9 (-1.01)

	<b>Tobacco Store Employees</b>	<b>Convenience Store Employees</b>	<b>Convenience Store with Gas Employees</b>	<b>Tobacco Store Employees</b>	<b>Convenience Store Employees</b>	<b>Convenience Store with Gas Employees</b>
West South Central	575.1 (1.00)	-138.5 (-0.04)	11957.7 (0.76)	585.1 (1.04)	11.16 (0.00)	12259.6 (0.78)
Quarter 2	-2.631 (-0.45)	10.89 (0.33)	78.20 (0.99)	-5.026 (-0.84)	6.510 (0.25)	41.48 (0.54)
Quarter 3	40.63*** (5.30)	78.82** (2.21)	497.6*** (6.85)	36.09*** (4.77)	80.63** (2.36)	411.1*** (5.11)
Quarter 4	61.54*** (4.99)	1.296 (0.02)	407.7*** (4.02)	56.81*** (5.01)	56.25 (1.20)	332.7*** (3.91)
2018	51.95*** (3.56)	-103.2* (-1.95)	139.1 (1.54)	51.77*** (3.62)	-100.6* (-1.99)	130.2 (1.57)
2019	112.4*** (4.38)	-171.8 (-1.43)	386.8** (2.22)	108.8*** (4.37)	-106.1 (-1.05)	357.8** (2.27)
2020	55.21* (1.68)	-479.5** (-2.16)	-122.4 (-0.36)	36.79 (1.28)	-300.3* (-1.96)	-438.9 (-1.64)
2021	210.2*** (3.44)	-401.4 (-1.35)	466.1 (0.99)	185.6*** (3.31)	-211.2 (-0.89)	2.276 (0.01)
2022			1051.5* (1.97)			558.4 (1.17)
Constant	1252.2*** (2.76)	4736.8* (1.83)	22476.1*** (2.88)	1280.5*** (2.93)	4522.7* (1.74)	23127.9*** (3.14)

*t* statistics in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

**Table 4**

**Regression Results for Number of Employees**

	<b>Tobacco Store Employees</b>	<b>Convenience Store Employees</b>	<b>Convenience Store with Gas Employees</b>	<b>Tobacco Store Employees</b>	<b>Convenience Store Employees</b>	<b>Convenience Store with Gas Employees</b>
Index flavor restrictions for e-cigarettes	77.87 (0.70)	1638.6** (2.66)	1804.6 (1.08)			
Index flavor restrictions for e-cigarettes				212.6 (1.06)	1731.9* (1.71)	4120.7 (1.36)
Real State GDP Per-Capita	-3285.9 (-0.95)	-4658.4 (-0.23)	-69075.4 (-1.19)	-3529.2 (-1.04)	-4420.3 (-0.21)	-74600.2 (-1.32)
East North Central	226.8 (0.50)	-689.3 (-0.28)	7424.8 (1.06)	222.9 (0.50)	-605.5 (-0.25)	7484.0 (1.11)
East South Central	-180.3 (-0.38)	-3604.6 (-1.67)	-2737.3 (-0.40)	-170.7 (-0.37)	-3512.0 (-1.62)	-2465.5 (-0.37)
Mid Atlantic	390.1 (0.60)	6210.6** (2.42)	6669.1 (0.71)	442.1 (0.73)	7028.6*** (2.79)	8183.3 (0.97)
Mountain	-690.2 (-1.59)	-3581.6 (-1.64)	-10520.8 (-1.54)	-673.3 (-1.62)	-3386.6 (-1.57)	-10063.5 (-1.55)
Northeast	-864.4* (-1.86)	-3105.0 (-1.27)	-14206.3* (-1.92)	-872.6* (-2.00)	-2646.2 (-1.11)	-14272.4** (-2.09)
South Atlantic	-80.87 (-0.18)	463.0 (0.18)	1654.1 (0.23)	-59.07 (-0.13)	659.9 (0.25)	2230.2 (0.33)
West North Central	-750.1* (-1.94)	-3303.2 (-1.50)	-6349.3 (-0.97)	-739.2* (-2.01)	-3070.7 (-1.35)	-5981.5 (-0.98)
West South Central	575.1 (1.01)	-70.07 (-0.02)	11961.6 (0.76)	586.2 (1.04)	21.05 (0.01)	12268.1 (0.79)

	<b>Tobacco Store Employees</b>	<b>Convenience Store Employees</b>	<b>Convenience Store with Gas Employees</b>	<b>Tobacco Store Employees</b>	<b>Convenience Store Employees</b>	<b>Convenience Store with Gas Employees</b>
Quarter 2	-3.816 (-0.64)	-0.225 (-0.01)	57.85 (0.72)	-5.165 (-0.86)	5.387 (0.21)	41.86 (0.54)
Quarter 3	38.03*** (4.76)	61.57 (1.55)	457.0*** (5.45)	35.62*** (4.69)	76.97** (2.26)	409.9*** (5.09)
Quarter 4	57.27*** (4.64)	-8.029 (-0.14)	340.0*** (3.03)	56.34*** (4.99)	52.73 (1.12)	332.7*** (3.86)
2018	51.99*** (3.59)	-101.2* (-1.98)	137.1 (1.59)	52.21*** (3.63)	-98.07* (-1.95)	137.8 (1.66)
2019	109.0*** (4.34)	-161.5 (-1.45)	333.2** (2.02)	109.7*** (4.41)	-99.27 (-0.99)	380.5** (2.53)
2020	38.00 (1.06)	-522.6** (-2.31)	-430.2 (-1.09)	37.22 (1.29)	-299.5* (-1.91)	-396.9 (-1.62)
2021	188.8*** (3.04)	-474.3 (-1.52)	87.69 (0.16)	184.7*** (3.30)	-221.4 (-0.91)	31.15 (0.08)
2022			631.4 (1.01)			581.2 (1.22)
Constant	1273.6*** (2.82)	4750.3* (1.85)	22994.2*** (2.97)	1279.4*** (2.93)	4515.8* (1.75)	23052.0*** (3.13)

*t* statistics in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Table 5

Regression Results for Real Average Wages of Employees

	Real Wage Tobacco Store	Real Wage Convenience Store	Real Wage Convenience Store with Gas	Real Wage Tobacco Store	Real Wage Convenience Store	Real Wage Convenience Store with Gas
Population covered by any flavor restrictions for e-cigarettes	-33.89 (-0.96)	62.35** (2.11)	53.44* (1.69)			
Population covered by any flavor restrictions for cigarettes				-25.95 (-0.47)	69.28 (0.78)	61.68** (2.04)
Real State GDP Per-Capita	1288.5*** (6.57)	1458.2*** (6.56)	1618.3*** (6.40)	1272.1*** (6.29)	1473.5*** (6.04)	1639.6*** (6.01)
East North Central	-32.75 (-1.29)	-32.00 (-0.92)	-81.76*** (-3.04)	-34.01 (-1.38)	-30.35 (-0.88)	-79.50*** (-2.90)
East South Central	-61.30** (-2.56)	-45.69* (-1.83)	-80.05*** (-2.92)	-62.34** (-2.62)	-43.73* (-1.69)	-77.34*** (-2.76)
Mid Atlantic	64.12*** (2.72)	-25.13 (-1.14)	-98.66*** (-3.69)	56.00** (2.40)	-9.693 (-0.39)	-80.71*** (-2.95)
Mountain	36.64 (1.38)	-44.89 (-1.32)	-19.90 (-0.70)	33.85 (1.30)	-39.66 (-1.17)	-13.83 (-0.48)
Northeast	70.62 (1.39)	-22.22 (-0.81)	-22.96 (-0.79)	64.65 (1.32)	-11.62 (-0.38)	-13.78 (-0.42)
South Atlantic	9.149 (0.37)	-20.19 (-0.77)	-49.40* (-1.88)	7.404 (0.30)	-16.58 (-0.58)	-44.85 (-1.58)
West North Central	-53.74* (-1.91)	-35.65 (-0.85)	-48.67 (-1.47)	-56.23** (-2.05)	-31.26 (-0.72)	-43.56 (-1.25)
West South Central	14.13 (0.33)	-62.96*** (-2.69)	-55.91* (-1.78)	13.19 (0.31)	-61.10** (-2.52)	-53.34 (-1.67)

	Real Wage Tobacco Store	Real Wage Convenience Store	Real Wage Convenience Store with Gas	Real Wage Tobacco Store	Real Wage Convenience Store	Real Wage Convenience Store with Gas
Quarter 2	12.08*** (2.78)	9.460*** (3.99)	18.55*** (8.35)	12.04*** (2.77)	9.511*** (3.97)	18.60*** (8.14)
Quarter 3	12.44*** (3.31)	19.09*** (7.97)	23.83*** (8.94)	12.22*** (3.22)	19.41*** (8.28)	23.92*** (9.03)
Quarter 4	65.93*** (5.82)	30.74*** (9.81)	44.77*** (13.87)	65.29*** (5.89)	31.99*** (11.13)	45.52*** (13.66)
2018	-4.423 (-0.63)	10.20** (2.89)	5.664** (2.50)	-4.441 (-0.63)	10.31*** (2.96)	5.738** (2.53)
2019	2.202 (0.27)	17.19*** (3.23)	8.699* (1.71)	1.528 (0.19)	18.56*** (3.71)	9.842* (1.75)
2020	46.86*** (3.98)	53.49*** (3.81)	47.96*** (8.31)	44.18*** (3.93)	58.02*** (4.46)	51.79*** (7.66)
2021	47.88*** (4.28)	39.32*** (3.31)	34.06*** (5.33)	44.78*** (4.17)	44.49*** (4.15)	38.03*** (5.32)
2022			52.35*** (6.28)			56.80*** (5.64)
Constant	405.9*** (14.65)	343.9*** (12.49)	414.4*** (12.99)	409.4*** (14.98)	338.4*** (11.74)	408.0*** (12.33)

*t* statistics in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Table 6

Regression Results for Real Average Wages of Employees

	Real Wage Tobacco Store	Real Wage Convenience Store	Real Wage Convenience Store with Gas	Real Wage Tobacco Store	Real Wage Convenience Store	Real Wage Convenience Store with Gas
Index flavor restrictions for e-cigarettes	-12.55 (-1.09)	21.45 (1.68)	20.75** (2.28)			
Index flavor restrictions for cigarettes				-6.400 (-0.62)	11.65 (0.78)	14.25** (2.49)
Real State GDP Per-Capita	1290.3*** (6.51)	1457.5*** (6.40)	1606.3*** (6.48)	1273.4*** (6.29)	1479.9*** (5.97)	1636.8*** (6.05)
East North Central	-33.30 (-1.32)	-30.81 (-0.89)	-80.60*** (-3.02)	-34.37 (-1.39)	-29.06 (-0.80)	-78.53*** (-2.87)
East South Central	-61.93** (-2.59)	-44.53* (-1.77)	-78.77*** (-2.89)	-62.40** (-2.62)	-43.81* (-1.69)	-77.22*** (-2.76)
Mid Atlantic	61.47*** (2.72)	-19.59 (-0.88)	-93.47*** (-3.59)	55.90** (2.40)	-9.966 (-0.40)	-80.50*** (-2.95)
Mountain	34.91 (1.33)	-41.69 (-1.24)	-16.51 (-0.59)	33.79 (1.29)	-39.80 (-1.17)	-13.69 (-0.48)
Northeast	69.64 (1.37)	-19.29 (-0.67)	-22.55 (-0.77)	64.91 (1.32)	-11.21 (-0.37)	-14.32 (-0.44)
South Atlantic	8.194 (0.33)	-18.40 (-0.69)	-47.35* (-1.78)	7.333 (0.30)	-16.92 (-0.59)	-44.72 (-1.58)
West North Central	-54.66* (-1.96)	-33.73 (-0.80)	-46.89 (-1.41)	-56.44** (-2.05)	-30.66 (-0.71)	-42.94 (-1.24)
West South Central	13.49 (0.32)	-61.80** (-2.63)	-54.56* (-1.74)	13.13 (0.31)	-61.21** (-2.53)	-53.19 (-1.67)
Quarter 2	12.17*** (2.79)	9.360*** (3.95)	18.44*** (8.23)	12.05*** (2.77)	9.536*** (3.99)	18.58*** (8.14)



	Real Wage Tobacco Store	Real Wage Convenience Store	Real Wage Convenience Store with Gas	Real Wage Tobacco Store	Real Wage Convenience Store	Real Wage Convenience Store with Gas
Quarter 3	12.52*** (3.31)	19.02*** (8.02)	23.64*** (8.85)	12.24*** (3.23)	19.46*** (8.32)	23.88*** (9.05)
Quarter 4	65.88*** (5.81)	31.00*** (10.32)	44.76*** (13.83)	65.32*** (5.89)	32.04*** (11.22)	45.48*** (13.69)
2018	-4.452 (-0.63)	10.27*** (2.95)	5.720** (2.52)	-4.454 (-0.63)	10.34*** (2.96)	5.759** (2.55)
2019	1.999 (0.25)	17.72*** (3.52)	9.050* (1.71)	1.513 (0.19)	18.66*** (3.72)	9.894* (1.76)
2020	46.56*** (4.05)	54.41*** (4.01)	48.18*** (8.14)	44.23*** (3.94)	58.39*** (4.53)	51.75*** (7.68)
2021	47.70*** (4.31)	40.12*** (3.59)	33.93*** (5.27)	44.89*** (4.16)	44.90*** (4.26)	37.87*** (5.28)
2022			52.18*** (6.02)			56.60*** (5.61)
Constant	406.5*** (14.76)	342.3*** (12.36)	413.8*** (13.20)	409.3*** (14.98)	338.0*** (11.67)	408.1*** (12.39)

*t* statistics in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$