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Compliance with a Sales Policy on Flavored Non-cigarette Tobacco Products

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Abstract

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Conflict of Interest Statement

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Objectives: We assessed the effect of the New York City (NYC) policy restricting sales of flavored non-cigarette tobacco products on retail sales using a quasi-experimental comparison design. We also studied possible cross-border purchasing and product substitution by consumers.

Methods: We compiled retail scanner data for January 2010–January 2014 for NYC, a proximal comparison area (PCA) surrounding NYC, and the US. We used regression models to assess trends in sales of flavored cigars, smokeless tobacco (SLT), loose tobacco (RYO), and total cigars in all areas.

Results: Sales of flavored cigars (–22.3%), SLT (–97.6%), and RYO (–42.5%) declined following policy implementation (all p s < .01). Flavored cigar sales declined nonsignificantly in the comparison areas. An average 7.4% reduction in total cigar sales was seen in NYC following the policy (p < .01), as cigar sales increased 12% nationally, suggesting that NYC consumers did not substitute flavored cigars with non-flavored varieties.

Conclusions: Implementation of the NYC policy was associated with significant reductions in sales of all restricted products, both absolutely and relative to comparison areas. Despite persistent sales of flavored cigars, overall cigar sales in NYC declined following the policy, although more intensive enforcement is needed to ensure greater policy compliance.

Keywords

flavored tobacco products; tobacco policy; cigars; public policy; compliance

Characterizing flavors, especially fruity/sweet flavors, are attractive to children and young adults,¹ preferences that are apparently well understood by tobacco companies.^{2–4} A large proportion of non-cigarette tobacco products marketed in the United States (US) are flavored.⁵ Flavored tobacco products are viewed favorably by users⁶ and are perceived by youth to be less harmful to health than non-flavored products.⁷ Furthermore, sales of these products appear to be driving the growth of non-cigarette tobacco use among youth, young adults and adults.^{8–15}

Because of the role flavors play in initiation of tobacco use, the 2009 Family Smoking Prevention and Tobacco Control Act (the TCA)¹⁶ banned flavored (except for menthol and tobacco-flavored) cigarettes nationally; however, the TCA authorizes the FDA to regulate flavors in other tobacco products, where there is currently no ban on flavored non-cigarette tobacco products. The TCA, as well as the final deeming regulations issued by the US Food and Drug Administration (FDA),¹⁷ do not preempt state and local governments from adopting policies that restrict the sale of flavored tobacco products. Thus, since 2009, several state and local jurisdictions – including the state of Maine, and the cities of Providence, Rhode Island; Chicago, Illinois; Minneapolis and St. Paul, Minnesota; Boston, Massachusetts; and New York City (NYC) – have implemented policies that restrict the sale of flavored non-cigarette tobacco products. As several other jurisdictions have passed or are considering flavored tobacco product sales restrictions, evaluation of the impact of these policies on retailer compliance and consumer purchasing behavior is informative. For example, whereas product substitution can occur when tax policy creates incentives for consumers to switch from higher priced to lower priced tobacco products,¹⁸ less is known

about consumer product substitution of non-flavored tobacco products when flavored tobacco product sales restrictions are implemented.

NYC was the first local jurisdiction to enact a policy restricting sales of flavored, non-cigarette tobacco products within its borders. The ordinance, passed in October 2009 and implemented after the July 28, 2010 publication of the final version of policy rules in the City Record (“Notice of Adoption”), prohibits selling or offering for sale flavored non-cigarette tobacco products anywhere within NYC, with a limited statutory exemption granted to 8 pre-existing tobacco bars. Tobacco products covered by the ordinance, “include, but are not limited to cigars, pipe tobacco, smokeless tobacco [SLT], dissolvable tobacco, snuff, shisha, blunts, and blunt wraps.” The ordinance does not restrict the sale of flavored e-cigarettes because e-cigarettes are not considered tobacco products under NYC law. The policy defines a flavored tobacco product as one that imparts a “characterizing flavor,” and excludes products with the taste or aroma of tobacco, menthol, mint, or wintergreen (NYC Admin Code § 17713 et seq.).

A study by the New York City Department of Health and Mental Hygiene (NYC DOHMH) demonstrated significantly reduced sales of all types of flavored non-cigarette tobacco products in the city, which was attributed to the NYC policy.¹⁹ Although informative, this study had 3 limitations. First, the NYC DOHMH study employed sales data from a non-random sample of high-volume retailers having annual sales of at least \$2 million. This resulted in a limited sample of gas/convenience stores (4%) and grocery stores (12%), the store types where the majority of consumers purchase tobacco products.²⁰ Second, by using sales data only from selected NYC retailers without having similar data from retailers in a non-NYC comparison area, where the policy was not implemented, the NYC DOHMH study could not account for trends in sales of flavored tobacco products that may have been happening irrespective of the NYC policy. Third, by setting the policy implementation point as date of first enforcement (November 22, 2010) rather than at the Notice of Adoption date (July 28, 2010), the NYC DOHMH analytic model may have missed assessment of compliance actions by NYC tobacco retailers that occurred immediately following policy implementation.

The purpose of this study was to assess the effect of policy implementation on sales of flavored tobacco products in NYC. Using sales data from a variety of tobacco retailers, including convenience stores, in NYC and a proximal comparison area surrounding NYC, we considered the question of cross-border sales. We also assessed trends in total cigar sales (flavored and non-flavored) in NYC and comparison areas to determine possible consumer substitution of flavored cigars with non-flavored cigars in response to the NYC policy. Thus, our study addresses limitations in the previously published evaluation of the NYC policy outlined above, and provides complementary evidence to the possible impact of the policy on sale of non-cigarette tobacco products.

METHODS

Data Source

A database of retail scanner data obtained from The Nielsen Company (Nielsen) was used to analyze unit sales of all sizes of cigars and cigarillos, smokeless tobacco (SLT), including spit/chewing and dissolvable tobacco, and loose, roll-your-own and pipe tobacco (hereafter, RYO). Scanner data are collected at store checkout registers when an item's Universal Product Code (UPC) is scanned upon purchase from a participating retailer. Information on the product description, contents, and price is transmitted to Nielsen, which applies proprietary weighting methods to the sales data collected from their sample of retailers to create sales estimates projected to specific areas.

Sample

Data for this analysis reflect tobacco product sales measured in 2 retail channels in the study areas: convenience stores (selling at least \$1 million annually), and the combination of food (selling at least \$2 million annually), drug (selling at least \$1 million annually), and mass merchandisers (FDMs) (selling any amount annually). The data are reported in 13 4-week aggregates per year for the period January 2010 through January 2014. Reflecting the distribution of licensed tobacco retailer (LTR) types in NYC, the store samples drawn by Nielsen for projecting NYC tobacco sales consisted of approximately 60% convenience stores and 40% FDMs. Sales data are not available from small groceries, corner stores, and bodegas (about 57% of NYC LTRs), and independent liquor stores and tobacco shops, because these retailers generally do not use barcode scanners. Data from Internet sales and from military commissaries and Walmart and club stores (eg, Sam's Club), which had no presence in NYC during the study period, also were excluded.

Retail scanner data are reported for designated market areas (DMAs), which are centered on large metropolitan areas that include multiple municipalities and counties, sometimes spanning contiguous states. For this study, Nielsen provided a customized dataset that contained projected sales data for convenience stores and FDMs in 2 sub-areas within the New York DMA: NYC, and a Proximal Comparison Area (PCA). NYC includes the 5 city boroughs in which LTRs are subject to city policies. The PCA includes 10 non-NYC counties in the NY DMA, where retailers are not subject to NYC policies: Nassau, Rockland, Suffolk, and Westchester in New York State; Bergen, Essex, Hudson, Middlesex, Monmouth, and Union in New Jersey. Scanner data also were analyzed for the total US market (including the NY DMA), which offers information on trends in tobacco product sales; any changes observed in the US trends likely would be the result of factors outside of the influence of the NYC flavored sales restriction.

Measures

Dollar sales, unit sales, and characteristics of tobacco products are reported at the item level, where the UPC defines the brand name, product type, and characteristics (eg, flavor) of each item. Consistent with the NYC policy, each item in the scanner dataset was coded as flavored if UPC descriptors referred to a characteristic of fruit, chocolate, alcoholic beverage, candy, vanilla, honey, cocoa, dessert, herb, or spice. Internet searches were

conducted to determine the flavored status of items with non-specific descriptors (“concept flavors”), and the items were coded as flavored if the product description appeared to be consistent with the NYC policy’s definition of a flavored tobacco product (eg, if “Blue Haze” was described as blueberry flavored on the manufacturer’s website). A list of ambiguous flavor descriptions was reviewed and validated as flavored or unflavored by NYC DOHMH staff. We also analyzed trends in total cigar sales (flavored and non-flavored combined) in NYC and comparison areas for possible product substitution by consumers.

Analyses

Trends in unit sales of flavored non-cigarette tobacco products in NYC and the 2 comparison areas (PCA, US) were graphically observed for any obvious changes in level or slope of sales coincident with implementation of the NYC policy. Regression models controlling for serial correlation and heteroskedasticity (STATA’s Prais-Winston transformed regression estimator) were used to assess the degree to which changes in the level and slope of unit sales of restricted products in NYC were coincident with ordinance implementation and different from those seen in the comparison areas. STATA’s “prais” regression command was used to control for serial correlation. The data were centered on August 15–September 11, 2010, which is the first full 4-week period in the Nielsen dataset following the policy implementation date. The Wald test of composite linear hypotheses was used to determine whether the level and slope of sales immediately before the time of the policy implementation (“pre”) and the level and slope of sales at the time of policy implementation (“post”) were significantly different. The analysis measures the shift in the level of sales from the time just prior to policy implementation to the time of policy implementation, and the difference in predicted average sales between the pre- and post-policy periods.

RESULTS

Figure 1 displays trends in unit sales of all flavored products combined, and for flavored cigars, SLT, and RYO tobacco individually, in NYC (panel A) and in 2 comparison areas: the PCA (panel B), and the US (panel C). Data are displayed as raw unit sales for each of the 53 4-week periods from January 2010 through January 2014. In NYC, sales for all flavored tobacco products began to decline just prior to ordinance implementation (July 2010), but the rate of decline was not equal across product types. Trends in unit sales of all flavored products combined are largely driven by flavored cigar sales in NYC. Although sales of flavored SLT and RYO tobacco declined to near-zero levels around the time of policy implementation in July 2010, sales of flavored cigars in NYC started to decline just prior to implementation but stabilized at a relatively high level after policy implementation. Rather than following the trends seen for flavored SLT and RYO, which experienced nearly 100% declines in sales from the first (January 2010) to the last (January 2014) 4-week period in the study, flavored cigar sales in NYC were down only 28%, from 38,709 to 28,025 units per period. Indeed, NYC flavored cigar sales trended upwards during 2013, 3 years after policy implementation.

Trend variations in unit sales of flavored tobacco products in the PCA and the US did not occur simultaneously with implementation of the NYC policy. Sales of flavored cigars

trended upward from January 2010 through January 2014 for the PCA (+7%), and the US (+23%). Conversely, unit sales of flavored SLT declined from January 2010 to January 2014 (PCA -13%; US -46%), as did unit sales of flavored RYO tobacco (PCA -51%; US -53%).

Table 1 presents the regression results for the effect of the NYC policy on unit sales of flavored non-cigarette tobacco products by type (combined, cigars, SLT and RYO) and by location (NYC, PCA and the US). In NYC, statistically significant negative shifts in the level of unit sales from the time just prior to policy implementation to the time of policy implementation were seen for all flavored products combined, and for flavored cigars, flavored SLT, and flavored RYO (all $p < .01$). Variations across products were seen for percent declines in NYC sales levels at the time of implementation: flavored cigars (-22.3%), all flavored products combined (-27.1%), flavored RYO (-42.5%), and flavored SLT (-97.6%). Average pre-post % decreases in sales in NYC were substantial for flavored SLT (-99.2%) and RYO (-78.1%), whereas the average change was statistically significant but more muted for flavored cigars (-25.5%), which attenuated the effect for all flavored products combined (-31.8%) (all $p < .01$).

Table 1 also presents the regression results for the effect of the NYC policy on unit sales of flavored non-cigarette tobacco products in the PCA and the US. This analysis reveals an immediate reduction in sales of flavored SLT and RYO in the PCA at the time of the NYC policy implementation, as well as an immediate reduction in sales of flavored RYO in the US at that time (all $p < .01$); however, sales of flavored SLT increased in the US at the time of NYC policy implementation ($p < .01$). As measured by percent level change, unit sale shifts for each flavored product observed in the comparison areas were far smaller than those seen in NYC. Moreover, unlike the decreases seen in NYC, increases in average pre-post policy changes were seen for sales of flavored cigars in the PCA and US (3.2% and 14.6%, respectively; both $p < .01$), and for all flavored products combined in the PCA (2.2%; $p < .05$) and the US (10.9%; $p < .01$).

Examining the change in slope of the regression lines from the pre- to post-period tells us whether or not the outcome (eg, sales) is increasing or decreasing over time in the post period relative to the pre-period. A significant negative slope change would indicate the slope became more negative (if negative in the pre-implementation period) or less positive (if positive in the pre-implementation period). For example, the pre-implementation slope for all flavored products in the PCA was 7,584.33 and the post-implementation slope was -96.03. In this case the slope goes from positive to negative, and thus, relative change in the slope was negative and significant. As another example, the slope for flavored cigar sales in the PCA goes from 6,869.61 to 76.5, ie, becoming less positive and representing a significant negative slope change. Our results indicate that, for only certain outcomes and locations, the slope of the regression line in the post period became more negative: flavored SLT in NYC; flavored cigars, SLT and all products combined in the PCA; and flavored RYO in the US (all $p < .05$). This suggests that product sales were decreasing at a faster rate in the period following policy implementation than in the period prior to implementation. No other outcomes showed relative slope changes in the study areas.

Table 2 displays regression results for the effect of the NYC policy on unit sales of all cigars (flavored and non-flavored) in NYC and comparison areas. Policy implementation was associated with an immediate, statistically significant 11.6% decrease in total NYC cigar sales ($p < .05$), whereas a non-significant 6.4% decrease was observed in the PCA, and a non-significant 2.1% increase in sales was seen nationally. Average sales of all cigars in NYC were 7.4% lower in the post-policy period compared to the pre-policy period ($p < .01$), and average cigar sales in the PCA and nationally were higher in the post-policy period compared to the pre-policy period (9.8% and 12.0%, respectively; both $ps < .01$). Although there was a reduction in the level of total cigar sales in NYC from pre- to post-policy periods, there was no relative change in the slope of total cigar sales in NYC. In the PCA, there was an increase in the level of total cigar sales from the pre- to post-policy periods, and a negative change in the slope of total cigar sales ($p < .05$).

DISCUSSION

This study supports the conclusion that implementation of the NYC policy restricting sales of flavored non-cigarette tobacco products was associated with significant reductions in flavored product sales, and no similar changes in sales of these products were observed in comparison areas. Although sales of flavored SLT and RYO decreased to near-zero levels in assessed NYC retail outlets after policy implementation, flavored cigar sales stabilized at a high volume relative to the intended effect of the sales restriction policy. Thus, these results are supportive of, but not fully consistent with, a previous evaluation of the NYC policy,¹⁹ with the main difference being our observation of continued sales of flavored cigars in NYC following policy implementation.

Possible reasons for the difference in findings include distinctive outcome measures, policy implementation dates, and data sources used for the 2 studies. The current study used unit sales volume as the outcome measure, rather than dollar sales as used in the previous study. Dollar sales measures are sensitive to retail price changes as well as to changes in sales volume; for example, decreases in dollar sales of flavored cigars could reflect continued unit sales of lower-priced flavored cigars after policy implementation. Additionally, this study set policy implementation as the Notice of Adoption date (July 28, 2010), rather than the date of first enforcement (November 22, 2010) used in the previous study, which allowed for assessment of immediate compliance actions by NYC tobacco retailers. Most importantly, the inconsistency in findings between the 2 studies might be due to differences in data sources. The previous study used scanner data provided by a different vendor, which only included tobacco product sales from a sample of larger, high-volume retail outlets in NYC, and these estimates were not projected to the population of stores in NYC. Moreover, the limited data from convenience stores in the previous study could largely explain the difference in findings reported in the 2 studies.

This analysis demonstrated that post-policy sales of all restricted products in NYC diverged from the trends seen in the comparison areas, arguing more strongly for attribution of the effect being due to the NYC policy. By including data from a comparison area proximal to NYC, the current study allowed for consideration of possible cross-border purchasing that might have been stimulated by implementation of the NYC policy. A non-significant

decrease in flavored cigar sales was measured in the PCA at the time of NYC policy implementation, while there was an increasing trend in total cigar sales nationally. This finding suggests that NYC consumers did not cross the border to purchase flavored cigars when these products were no longer legally sold in the city, possibly because consumers were aware of local retailers who continued to sell restricted products in violation of the law.

Furthermore, the average pre-post policy reduction in total cigar sales in NYC (-7.4%) at the same time that there were average increases in cigar sales in the PCA (+9.8%) and nationally (+12.0%) suggests that NYC consumers did not substitute non-flavored cigars for flavored cigar varieties following policy implementation. This implies that the changes seen in NYC were not likely due to some unknown factor affecting cigar sales in all US markets, and reinforces the conclusion that the NYC flavored sales restriction resulted in a decline in total cigar sales in NYC.

Our data do not allow us to examine why implementation of the NYC policy did not eliminate sales of flavored cigars completely. Possible causes for persistent sales of these prohibited products include: lack of awareness of the policy by some retailers; intentional violation of the policy by some retailers; and increasing availability of cigars with ambiguous flavor descriptions (eg, “purple” instead of “grape”), which could serve to circumvent policy enforcement.^{4,5} Regardless of the cause, continuing sales of flavored cigars in NYC indicates that more intensive, tailored enforcement is needed to ensure full achievement of the policy’s intended outcomes.

The strengths of this study include use of a quasi-experimental time-series design with comparison groups, which increases the internal validity of the study and confidence in attribution of effects, and inclusion of retail scanner data projected from a large sample of various retail outlets including convenience stores. Nonetheless, we acknowledge a few limitations. First, Nielsen uses proprietary methods to project sales using data from barcode scans shared by cooperating retailers, which are not shared publicly; moreover, scanner data from certain retailers (eg, grocery stores selling less than \$2 million per year, convenience and drug stores selling less than \$1 million per year, and cigar shops) are not available. Thus, this study is unable to estimate the degree of compliance with the NYC policy among stores excluded from Nielsen sales estimates, which may limit the generalizability of our results. Second, whereas product sales provide a reasonable proxy for consumption, the observed changes in retail sales could reflect changes in NYC consumer buying preferences (eg, shifts to purchasing products online or from outlets without scanners) rather than reductions in flavored tobacco product use. Third, the pre-policy (“baseline”) period is relatively short and may not depict the trend in flavored product sales accurately prior to policy implementation.

Conclusions

Implementation of the NYC flavored non-cigarette tobacco product sales policy was associated with significant reductions in unit sales of all restricted products, both in absolute terms and relative to trends observed in comparison areas. Compared with average total unit sales before the policy, cigar sales in NYC decreased by almost 20% compared with sales in

the US after the policy. Despite the decline in aggregate sales of flavored non-cigarette tobacco products, however, flavored cigar sales continued in NYC after policy implementation. It is unclear whether the barriers to achieving more consistent policy impact across all product types are idiosyncratic to NYC or whether the same barriers would exist elsewhere. To the extent that the observed reduction in overall cigar sales reflects a decrease in the number of cigar smokers there will be a public health benefit to the NYC policy. Future research investigating changes in reported consumption of tobacco products could provide data regarding the population-level impact of the NYC policy restricting sales of flavored non-cigarette tobacco products. Additionally, research on the associations among flavored product descriptions, packaging, and trends in flavored cigar sales by cigar types and sub-brands would help advance our understanding of these dynamic issues.

IMPLICATIONS FOR TOBACCO REGULATION

This study demonstrates that a local policy restricting retail sale of flavored non-cigarette tobacco products can reduce aggregate sales of these products. Moreover, consumers do not appear to substitute non-flavored cigars for flavored cigar varieties, and sales of all cigars (flavored and non-flavored) can be decreased following implementation of a flavored non-cigarette tobacco product sales policy. The persistently high levels of flavored cigar sales that continued following policy implementation, however, suggest that more intensive enforcement is needed to ensure greater compliance with the provisions of a retail sale restriction policy.

Human Subjects Statement

This study was deemed exempt from IRB review by the RTI Committee for the Protection of Human Subjects.

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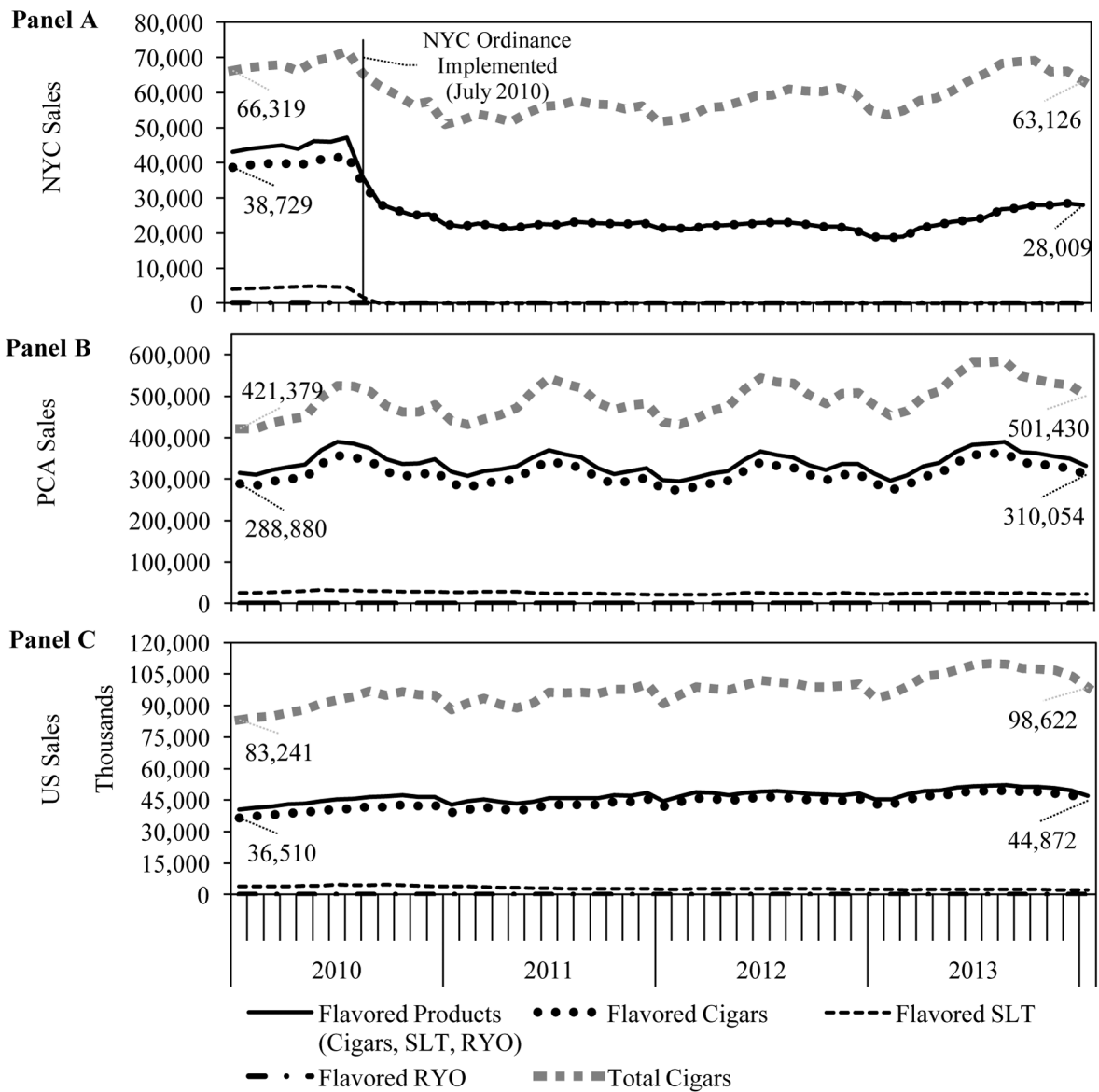


Figure 1. Unit Sales of Flavored Products (All Products Combined, Cigars, Smokeless Tobacco [SLT], and Loose [RYO] Tobacco) and Total Cigars (Flavored and Non-Flavored) in New York City (NYC, Panel A) and 2 Comparison Areas (the 10 Counties Surrounding NYC in the Proximal Comparison Area [PCA, Panel B], and the US, Panel C), January 2010–January 2014

Table 1

Regression Results for the Effect of the NYC Flavored Tobacco Sales Restriction on Unit Sales of Flavored Tobacco Products in NYC and Comparison Areas

Area	All Flavored Products			Flavored Cigars		
	NYC	PCA	US	NYC	PCA	US
Sales Level Pre ^a	44,167.59** (3,931.07)	367,249.96** (22,730.82)	44,033,095.17** (89,6348.10)	39,733.93** (3,594.72)	335,913.60** (21,418.72)	40,201,393.45** (75,9408.73)
Sales Level Post ^b	32,182.88** (3,672.07)	342,713.16** (17,320.39)	44,776,086.72** (764,536.32)	30,887.71** (3,326.78)	313,199.84** (16,175.36)	40,571,440.54** (685,306.54)
Slope Pre ^a	486.49 (357.68)	7,584.33* (3,201.00)	294,134.86* (138,000.86)	440.81 (343.04)	6,869.61* (3,028.68)	340,516.75** (125,294.52)
Slope Post ^b	-162.39 (117.77)	-96.03 (645.35)	112,676.82** (30,532.04)	-125.67 (114.14)	76.5 (601.70)	163,266.94** (27,949.76)
Level Change	-11,984.71**	-24,536.8	742,991.55	-8,846.2**	-2,2713.8	370,047.09
Percent Level Change	-27.1%	-6.7%	1.7%	-22.3%	-6.8%	0.9%
Average Percent Change ^c	-31.8%**	2.2%*	10.9%**	-25.5%**	3.2%**	14.6%**
Slope Change ^d	0	-*	0	0	-*	0
		Flavored SLT			Flavored RYO	
Area	NYC	PCA	US	NYC	PCA	US
Sales Level Pre ^a	5,057.30** (222.84)	30,558.89** (2,339.29)	3,745,451.02** (29,1686.20)	220.48** (41.14)	795.18** (38.16)	83,809.49** (2,067.93)
Sales Level Post ^b	123.17 (94.89)	28,606.18** (1,831.97)	4,354,275.17** (28,2740.38)	126.85** (37.98)	696.18** (21.00)	79,587.50** (1,357.58)
Slope Pre ^a	103.65** (37.25)	708.79* (315.72)	-21,725.01 (27,279.64)	-5.11 (4.08)	2.53 (6.57)	-154.33 (311.35)
Slope Post ^b	-3.91 (3.20)	-153.03* (59.22)	-52,891.81** (5,806.31)	-3.34** (0.80)	-7.84** (0.75)	-959.84** (52.36)
Level Change	-4,934.1**	-1,952.7**	608,824.15**	-93.63**	-99.0**	-4,221.99**
Percent Level Change	-97.6%	-6.4%	16.3%	-42.5%	-12.5%	-5.0%
Average Percent Change ^c	-99.2%**	-7.8%*	-18.4%*	-78.1%**	-33.2%**	-31.9%**
Slope Change ^d	-**	-*	0	0	0	-*

* p < .05

** p < .01

Note.

NYC = New York City; PCA = proximal comparison area; US = 48 contiguous United States; SLT = smokeless tobacco; RYO = roll your own (loose) tobacco

^aPre = the time just before policy implementation

^bPost = at the time of policy implementation (July 28, 2010)

^cAverage Percent Change = [(average level post-implementation - average level pre-implementation) / average level pre-implementation]

^dRelative Slope Change indicates the direction of the change in slope of the pre-implementation versus post-implementation regression line; – = negative; 0 = no change Standard errors in parentheses

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Table 2

Regression Results for the Effect of the NYC Flavored Tobacco Sales Restriction on Unit Sales of all Cigars (Flavored and Non-Flavored) in NYC and Comparison Areas

Area	NYC	PCA	US
Sales Level Pre^a	66,293.25 ** (4,058.54)	508,351.09 ** (27,799.10)	89,484,800.29 ** (208,8587.26)
Sales Level Post^b	58,633.10 ** (3,616.48)	475,961.32 ** (21,924.31)	91,369,861.89 ** (170,0795.59)
Slope Pre^a	346.82 (548.96)	11,995.63 ** (3,847.07)	417,527.29 (35,0849.16)
Slope Post^b	59.5 (133.27)	1,035.56 (842.45)	294,595.35 ** (68,842.99)
Level Change	-7,660.2 **	-32,389.7	1,885,061.6
Percent Level Change	-11.6%	-6.4%	2.1%
Average Percent Change^c	-7.4% **	9.8% **	12.0%
Slope Change^d	0	-*	0

*
p < .05

**
p < .01

Note.

NYC = New York City; PCA = proximal comparison area; US = 48 contiguous United States

^aPre = the time just before policy implementation

^bPost = at the time of policy implementation (July 28, 2010)

^cAverage Percent Change = [(average level post-implementation - average level pre-implementation) / average level pre-implementation]

^dRelative Slope Change indicates the direction of the change in slope of the pre-implementation versus post-implementation regression line; - = negative; 0 = no change Standard errors in parentheses