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The Political Economy of Soda Taxation

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Abstract

There has been an increase in the prevalence of obesity in the United States over the past several decades. The academic literature has highlighted numerous possible causes, including the consumption of soda and other sugar-sweetened beverages. Soda taxes have been suggested as a way of reducing the consumption of sugar-sweetened beverages and a number of U.S. states ``disfavor' sugar-sweetened beverages relative to food in their tax code. In this note we employ a political economy model to explain the adoption of these ``soda taxes.' We find that more Democratic states and those with a higher rate of adult obesity are more likely to have soda taxes and states with more convenience stores per capita are less likely to have adopted a tax. Our results inform future attempts to pass SSB taxes.

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1. Introduction

Obesity has emerged as a cause of serious concern in the United States in recent decades (Philipson, 2001). In the early 1970s, approximately 15% of U.S. adults were obese (Cutler et al., 2003). By 2010 that number had risen to approximately 35% (Flegal et al., 2012). A prominent explanation for this change has been the falling price of calorie-dense foods such as sugar-sweetened beverages (SSBs) (Lakdawalla and Philipson, 2009). Of the 250 to 300 of additional calories Americans consume today versus several decades ago, Brownell and Frieden (2009) estimate that half of those calories are due to SSBs.

Given the effectiveness of cigarette taxes on tobacco consumption (Stehr, 2007), public health officials in numerous states have called for higher taxes on SSBs (Brownell and Frieden, 2009). A one cent per ounce tax on SSBs could lead to between a 12 and 20% decline in consumption according to one estimate (Brownell et al., 2009). While studies showing large effects of SSB taxes on consumption and health outcomes have been criticized for not fully accounting for substitution effects (Fletcher et al., 2015), the call for taxes on SSBs continues to intensify.

To this point the economic literature has focused entirely on the effect of SSB taxes on consumption, health outcomes, and health disparities (Dharmasena and Capps, 2012; Sharma et al., 2014; Etilé and Sharma, 2015). While it is crucially important to understand the effects of SSB taxes, it is also important to understand the factors underlying the adoption of these taxes. For those concerned with the normative implications of SSB taxes, an understanding of the political economy of SSB tax adoption can help inform future attempts to pass add-on SSB taxes, like the four city-level taxes that passed in early November of 2016.

To better understand the factors driving SSB tax adoption, we build on the literature on the political economy of taxation (Holcombe, 1997; Kenny and Winer, 2006; Hall and Ross, 2010; Hoffer, 2016). This literature remains agnostic on whether a particular tax is normatively good or bad and instead focuses on how the political and economic factors associated with a jurisdiction influence tax use and structure. As of January 1, 2014 there were twenty-two states where the sales tax on soda sold through grocery and convenience stores was higher than the rate applied to regular food products Chriqui et al. (2014). Following Congleton and Bennett (1995), we use a combined median voter and special interest empirical political economy model and find evidence in favor of both median voter and special interest influence in the adoption of soda taxes at the state level.

2. Data

While much of the political discussion regarding soda and other SSBs taxes has focused on the imposition of new or higher rates on SSBs, in practice much of what is called a "soda tax" occurs by states' exempting groceries but taxing SSBs at the general sales tax rate. For example, West Virginia eliminated its sales tax on food purchased for home consumption in 2013 but chose to continue to tax SSBs at the normal sales tax rate of 6 percent. Conversely, Idaho has a state sales tax of 6 percent on regular food sold for home consumption and soda is taxed at that rate. The five states without statewide sales taxes levy no additional tax on SSBs. We define any state as having a tax on soda if the sales tax on regular soda is higher

than the general sales tax on food as of January 1, 2014. This is often called a "disfavored" tax.

Our political economy model is one where both the interests of the median voter and special interests can play a role. The median voter model assumes that political outcomes reflect the preferences of the median voter (Congleton and Bennett, 1995). Empirically, variables representing the median voter's interests and preferences should help explain outcomes of majoritarian decision-making. At the same time, special interest models of political economy emphasize that public programs have different effects on different groups of citizens in society. Therefore, those with the most to gain (or lose) from a policy will want to play a large role in the political process (Congleton and Bennett, 1995).

We employ four variables to model the preferences of the median voter. First, Chriqui et al. (2008) point out that many states adopt SSB taxes during time of fiscal crisis. We use state debt per capita during the fiscal year 2013 from Tax Foundation (2015) to proxy for the extent to which the median voter feels they need revenue from taxing SSBs. Second, citizen preferences regarding the prevalence of the obesity problem might inform their views towards SSB taxes. We therefore control for the adult obesity rate in each state in 2012 obtained from the Behavioral Risk Factor Surveillance System (Winterfield, 2014). Third, we control for overall voter ideology and political preferences by including the percentage of votes in the 2012 Presidential election received by the Democratic candidate. Fourth, we control for the prevalence of "regular" soda consumption by state for a limited number of states with data in BRFSS. *A priori*, the sign on this variable is ambiguous. On the one hand, regular soda drinkers should be against disfavoring soda through the tax code. On the other hand, higher consumption prevalence means greater potential tax revenue in the eyes of the median voter.

Special interests, such as soda companies, have played a prominent role in many city and state SSB tax battles (Onshi, 2012; Sanger-Katz, 2016). Empirically, however, it is difficult to measure the influence of so-called "Big Soda" at the state level. Instead, we identify four potential special interest groups that have a strong incentive to influence SSB tax policy and may be able to influence policy due to their low cost of organizing: sugar producers, corn producers, fast food restaurants, and convenience stores. State-level production of beet and cane sugar (1,000 of short tons, raw value) in 2013 was obtained from Economic Research Service (2015) and put into per capita terms. Similarly, corn production (per 1000 bushels) by state was obtained from National Agricultural Statistics Service (2015) and also placed in per capita terms. Our prior is that states with higher production of corn and sugar will, *ceteris paribus*, be less likely to disfavor SSBs. Fast food restaurants per 1000 population was obtained from the Economic Research Service of the U.S. Department of Agriculture's "Food Environment Atlas." Although the method of taxing SSBs detailed in this paper does not affect syrup purchased by fast food establishments, disfavoring of SSBs could be seen as a step towards more widespread soda taxation. Finally, the number of convenience stores per capita in each state in 2013 was calculated from data obtained from Convenience Store News (2014). States with more convenience stores per capita, we hypothesize, will be less likely to disfavor SSB since convenience stores owners are a well-identified group with a strong interest against an SSB tax. Table 1 presents summary statistics of all independent variables in natural logs.

Table 1: Summary Statistics

Variable	Mean	St. Dev.	Min	Max
Corn Production Per Capita	0.074	0.156	0	0.841
Sugar Production Per Capita	0.00045	0.00134	0	.000797
Convenience Stores Per Capita	0.00053	0.00016	0.00028	0.00098
State Government Debt Per Capita	8.18	0.66	6.82	10.82
% Democratic Presidential Votes, 2012	3.85	0.22	3.20	4.25
Fast Food Restaurants Per Capita (in 1000s)	0.531	0.037	0.449	0.631
Adult Obesity Rate	3.35	0.12	3.06	3.56
Regular Soda Consumption	3.45	0.28	2.89	3.86

Note: N=50, except for Soda Consumption, where n=25. For sources of data, see discussion in text. All variables are in natural logs. All variables for 2013 unless otherwise noted.

3. Empirical Results

Due to the binary nature of our dependent variable, we estimate our empirical model using probit, although results using logit and a linear probability model are quantitatively and qualitatively similar.[1] Table 2 shows the probit results. Specification (1) is our preferred specification as it includes data on all 50 states. Specification (2) adds soda consumption but drops fast food restaurants and adult obesity due to the limited degrees of freedom as the soda consumption data is only available for 25 states in BRFSS. In terms of our median voter model variables, we find that the adult obesity rate and the % of individuals voting Democratic during the 2012 Presidential election both positively explain the "disfavoring" of SSBs in the state tax code in a statistically significant manner across both specifications. The marginal effect of soda consumption is positive, but the estimated coefficient is not. Our special interest variables do not perform as well, with corn and sugar production per capita not explaining the likelihood of a state disfavoring SSBs. This is very different than the political economy of tobacco taxation, which finds production to be very important (Holcombe, 1997; Hoffer, 2016). The number of convenience stores per capita, however, is negatively related in a statistically significant way to a state disfavoring SSBs relative to food across both specifications. Fast food restaurants are not statistically significant, even in more parsimonious models where convenience stores are excluded.

In addition to the logit and linear probability model regressions in Appendix Table 1, we estimated the above model controlling for the average number of sunshine days and median household income. These additional variables were not statistically significant and only slightly improved the size and significance of the results reported here. We were also concerned that there might be a big difference between the administrative decision to not treat SSBs like food and the decision to tax SSBs if the state does not have a sales tax. We therefore re-estimated the probit regression reported here for a sample excluding the five states without a statewide sales tax. Our findings were unchanged. Finally, it might be more difficult to disfavor SSBs in states with a higher sales tax rate since the "cost" of disfavoring soda relative to food is larger. We therefore calculated the difference between the sales tax

[1] Appendix Table 1 presents these results.

on food and SSBs and employed that as our dependent variable in an OLS regression with the same controls included in 2. The observed relationships were the same.

Table 2: Probit Results

Variables	(1)		(2)	
	Estimated Coefficient	Marginal Effects	Estimated Coefficient	Marginal Effects
Corn Production Per Capita	0.166	0.052	8.310	1.358
	(1.885)	(0.591)	(7.564)	(1.151)
Sugar Production Per Capita	152.80	47.90	55.43	9.061
	(212.4)	(65.5)	(504.5)	(82.5)
Convenience Stores Per Capita	**-2809.0**	**-880.5**	**-7161.0**	**-1171.0**
	(1443.0)	(396.6)	(3837.0)	(470.3)
State Government Debt Per Capita	-0.198	-0.062	-0.139	-0.023
	(0.349)	(0.108)	(0.588)	(0.095)
% Democratic Presidential Votes, 2012	**3.727**	**1.168**	**9.774**	**1.598**
	(1.548)	(0.406)	(4.427)	(0.429)
Fast Food Restaurants (in 1000s)	-1.456	-0.456		
	(5.983)	(1.875)		
Adult Obesity Rate	**4.189**	**1.313**		
	(2.330)	(0.667)		
Regular Soda Consumption			4.732	**0.774**
			(3.041)	(0.416)
N	50		25	

Note: Dependent variable is a binary variable equaling 1 if the tax on SSBs is higher than the sales tax applied to food purchased for home consumption. Pseudo-R^2=0.19 for specification 1 and 0.56 for the second. Statistical significant at the 10% level or higher indicated by bold text. Numbers in parentheses are absolute standard errors. Marginal effects are average marginal effects. Constant included but not reported.

4. Conclusion

The economics literature has used the disfavoring of SSBs relative to food as a measure of the impact of soda taxes on individual behavior. In this letter, we investigate the political economy forces driving the disfavoring of SSBs. We find that adult obesity and voter ideology positively influences the disfavoring of SSBs, while the number of convenience stores per capita make it more likely that soda is treated like food sold for home consumption. To the extent that treating soda as a non-food for tax purposes is similar to enacting a separate higher rate on SSBs, our results inform ongoing attempts by public health policymakers to enact taxes on SSBs at the state and local levels.

In particular, our results suggest that cities and states that are more Democratic will find it easier to pass SSB taxes, other things equal. In November 2016, four U.S. cities passed SSB taxes by referendum: Albany, Oakland, San Francisco, and Boulder. All four are

heavily Democratic cities, which is likely why they were successful despite over $30 million in industry spending against the measure (Sanger-Katz, 2016). Given the 40 previous defeats at the ballot box (Sanger-Katz, 2016), it is important to understand which areas a referendum is most likely to be successful. The passage of SSB taxes in some localities has consequences for other localities given that tax policies often spread spatially to neighboring jurisdictions (Hall and Ross, 2010; Hoffer, 2016).

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Appendix Table 1: Logit and LPM Results

Variables	Logit	LPM
Corn Production Per Capita	0.044	-0.060
	(0.437)	(0.557)
Sugar Production Per Capita	48.67	54.10
	(48.67)	(63.34)
Convenience Stores Per Capita	**-860.7**	**-976.5**
	(322.6)	(385.7)
State Government Debt Per Capita	-0.056	-0.056
	(0.093)	(0.098)
% Democratic Presidential Votes, 2012	**1.215**	**0.986**
	(0.452)	(0.284)
Fast Food Restaurants (in 1000s)	-0.605	-0.348
	(1.729)	(2.093)
Adult Obesity Rate	1.377	1.145
	(0.947)	(0.761)
N	50	50

Note: Dependent variable is a binary variable equaling 1 if the tax on SSBs is higher than the sales tax applied to food purchased for home consumption. Pseudo-R^2=0.19 for the Logit and 0.22 for the LPM. Statistical significant at the 10% level or higher indicated by bold text. Numbers in parentheses are absolute standard errors. For the Logit model, average marginal effects are reported. Constant included but not reported.