Erika Ross
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The Impact of Seattle's Proposed Sugary Tax on Quantity Demanded

Introduction

Recently the Seattle City Council approved an ordinance, CB 118965, that imposed an excise tax on sugary drinks, including soda. The new ordinance, expected to take effect on January 1, 2018, imposes an excise tax on businesses that "distribute sweetened beverages" (City of Seattle Council Bill 118965, 2017). This memo analyzes the effect that this tax will have on the consumer, particularly whether the demand of soda will change in response to the imposed tax. The excise tax was passed in an effort to address health problems linked to the consumption of soda and other sweetened beverages that have negative impacts on health (Beekman, 2017). The law is intended to limit the consumption of sugary beverages in the City of Seattle, as seen in cities around the country that have imposed a similar tax (Reuters, 2017). Although the tax is placed on the producers (i.e. the distributors of sugary drinks), there will be a burden placed on consumers (i.e. the price they pay at the register) (Riski, 2017).

Problem Statement

Will the implementation of Seattle's sugary beverage tax affect the quantity demanded on the consumption of soda?

Policy Background

Seattle, Washington, is one of the many cities around the country to recently pass a bill that would place a tax on sugary beverages. The imposed sugary beverage tax has two goals: 1. To limit the consumption of sugary drinks in order to reduce negative health impacts associated with its consumption; and 2. To raise revenue for programs aimed at "closing the achievement gap (Riski, 2017)." According to the Tax Foundation, the tax will create an estimated $15 million in revenue for the new programs (James, 2017). The new ordinance is expected to place a "1.75 cent per

ounce" tax, once put into effect (Riski, 2017). There are approximately 67.6 ounces in a 2-liter bottle of soda. The new ordinance will impose a 1.75 cent per ounce tax which equates to a $1.18 cent tax on a 2-liter bottle of soda. In addition to the proposed excise tax, Seattle has an estimated combined sales tax of 9.6% (Department of Revenue Washington State, 2017).

Methodology

To understand how the proposed tax will affect the quantity of soda demanded, we calculate the following:

1. The price of a 2-liter bottle of soda prior to the proposed tax, P_{old}
2. The new price of a 2-liter bottle of based on the new tax, P_{new}
3. The estimated number of 2-liter bottles of soda (in gallons) sold in Seatttle, Q_{old}
4. Calculate how price affects the consumption of 2-liter bottles of soda (in gallons), Q_{new}

Note: The following calculations will be made based on the price and quantity of a 2-liter bottle of soda. The price and consumption of other sugary drinks are not considered in determining the price elasticity of demand of soda.

Calculations

1. The current price of a 2-liter bottle of soda is $1.99 (K5 Connecting Western Washington, 2017). This price includes both the excise tax and combined sales tax. The current combined sales tax in Seattle is 9.6% (Department of Revenue Washington State, 2017). The sales tax describes a combined rate of 6.5% for state of Washington, 2.7% for the City of Seattle, and 0.4% for the Regional Transit Authority (Department of Revenue Washington State, 2017).
2. To understand the effect that a 1.75 cent per ounce tax would have on the quantity demanded on a 2-liter bottle of soda, we must consider who bears the tax burden and how

much. For the sake of this memo, I will provide multiple elasticity estimates based on the burden of the tax. Firstly, statutory incidence is placed on distributors. This means that the distributors or producers are responsible for writing a check to the government for the tax (Goolsbee, Austan, Levitt, Steven, & Syverson, (2016). Although the tax is levied on the distributors, ultimately, both the distributors and consumers bear the burden of the tax. The table below describes the percentage of the tax burden that either the consumer, distributor or both groups will bear.

a. Price estimate 1 (P_{new1}) – If the consumer bears ¾ of the $1.18 tax, the new price would be $3.15.
b. Price estimate 2 (P_{new2}) If the producers bears ¼ of the $1.18 tax, the new price would be $2.50.
c. Price estimate 3 (P_{new3})- If the distributors and consumers equally share the burden of the imposed tax, the new price of a 2-liter bottle of soda would be $2.83.

Tax Burden	Calculation	Price
Consumers bear ¾ of tax	(1.99+1.18 (3/4)) * 9.6% (1.99 +.885) *9.6%	$3.15
Distributors bear ¼ of tax	(1.99+1.18 (1/4)) * 9.6% (1.99 +.295) *9.6%	$2.50
Distributors and Consumers share tax equally	(1.99+1.18 (1/2)) * 9.6% (1.99 + .59) *9.6%	$2.83

3. According to the Center for Science in the Public Interest (Center for Science in the Public Interest, 2017) and Beverage Marketing Corp, a Consulting Company (CNBC, 2017), Americans on average consume “38 gallons of soda per year.” The Seattle Office of Financial Management estimates the city’s population at 713,700 people as of April 2017

(2017). Based on these numbers, the City of Seattle consumes an estimated 27,120,600 gallons of soda each year.

4. Soda consumption is rather elastic (Wang, 2014). According to Deaton and Muellbaurer, who base their calculations on Nielsen Homescan's and the National Health and Nutrition Examination Survey (NHANES), the elasticity of demand of "sweetened beverages is -1.264 (Wang, 2014)." However, Wang finds "a much lower prices elasticity of demand for regular sodas, at -0.5744 (Wang, 2014)." To calculate the effect the imposed tax has on quantity demanded on soda, I used two elasticities: 1. (-1.264) and 2. (-0.5744). See the following table for all calculations.

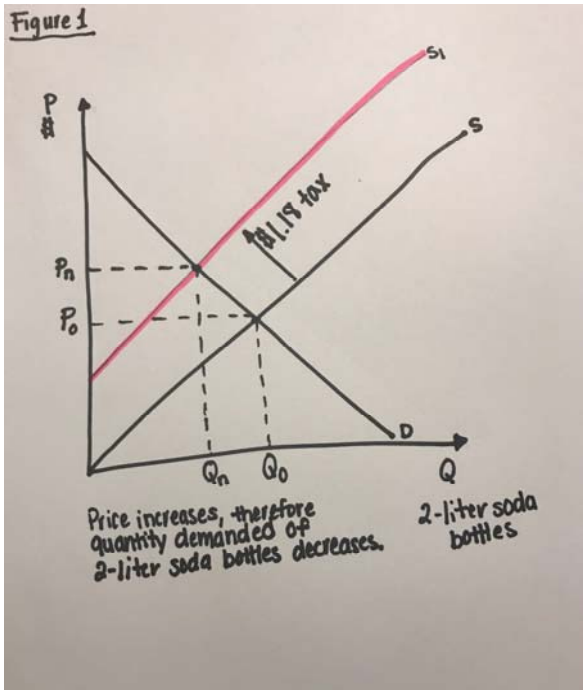
	Elasticity Estimate 1	Elasticity Estimate 2
Calculations for P_{new1}	$Q_{new1} = (ED_1)\ (Q_{old})\ (\Delta P) + Q_{old}$ = (-1.264) (27.1) (3.15-1.99/1.99) + 27.1 = (-1.264) (27.1) (0.583) + 27.1 **= 7.12 Million Gallons**	$Q_{new1} = (ED_2)\ (Q_{old})\ (\Delta P) + Q_{old}$ = (-0.5744) (27.1) (3.15-1.99/1.99) + 27.1 = (-0.5744) (27.1) (0.583) + 27.1 **=18.02 Million Gallons**
Calculations for P_{new2}	$Q_{new2} = (ED_1)\ (Q_{old})\ (\Delta P) + Q_{old}$ = (-1.264) (27.1) (2.50-1.99/1.99) + 27.1 = (-1.264) (27.1) (0.256) + 27.1 **=18.33 Million Gallons**	$Q_{new2} = (ED_2)\ (Q_{old})\ (\Delta P) + Q_{old}$ = (-0.5744) (27.1) (2.50-1.99/1.99) + 27.1 = (-0.5744) (27.1) (0.256) + 27.1 **=23.11 Million Gallons**
Calculations for P_{new3}	$Q_{new3} = (ED_1)\ (Q_{old})\ (\Delta P) + Q_{old}$ = (-1.264) (27.1) (2.83-1.99/1.99) + 27.1 = (-1.264) (27.1) (0.422) + 27.1 **=12.61 Million Gallons**	$Q_{new3} = (ED_2)\ (Q_{old})\ (\Delta P) + Q_{old}$ = (-0.5744) (27.1) (2.83-1.99/1.99) + 27.1 = (-0.5744) (27.1) (0.422) + 27.1 **=20.53 Million Gallons**

Results/Conclusions

Based on the two elasticities used in the calculations we can see that quantity demanded will decrease due to the excise tax. In each of the cases listed above, quantity demanded decreased as a result of the proposed excise tax. When ¾ of the burden was placed on consumers, quantity demanded decreased the most, ranging from 7.12 million to 18.02 million gallons of soda. When ¼

of the burden was placed on distributors, the quantity demanded decreased the least, ranging from 18.33 million to 23.11 million gallons of soda. When both the consumer and distributor shared the tax burden, the quantity demanded ranged from 12.61 million to 20.53 million.

Though the results show that implementing an increased tax on soda will decrease its consumption, the quantity demanded is more likely to reflect consumer behavior when distributors bear ¼ of the tax with the second elasticity estimate of (-0.5744). The new quantity demanded, under these conditions, after the implementation of the tax is reduced to 23.11 million gallons compared to 27.12 million gallons demanded before the tax. However, taxes on sugary drinks have proven unsuccessful in other cities. For example, the soda tax in Chicago has received so much public opposition and backlash from the soda distributors that the tax has been repealed (Dardick, 2017). I presume that Seattle could receive similar backlash with the passing of this tax.



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Bibliography

Americans drank more bottles water than soda in 2016. CNBC, Food and Beverage, March 10, 2017. https://www.cnbc.com/2017/03/10/americans-drank-more-bottled-water-than-soda-in-2016.html

Beekman, Daniel. 2017. Seattle will tax sugary soda—but not diet. Seattle Times, June 5, 2017. https://www.seattletimes.com/seattle-news/politics/seattle-city-council-says-yes-to-soda-tax/

Center for Science in the Public Interest. 2017. Facts on Sugar Drink Consumption. https://cspinet.org/sites/default/files/attachment/CSPI%202017%20Facts%20on%20Sugar%20Drink%20Consumption_1.pdf (accessed October 22, 2017).

City of Seattle. 2017. Ordinance. http://murray.seattle.gov/wp-content/uploads/2017/04/mo_sweetened_beverage_tax_ord.pdf (accessed October 22, 2017).

Dardick, Hal. 2017. How Preckwinkle's pop tax backfired. Chicago Tribune, September 25, 2017. http://www.chicagotribune.com/news/local/politics/ct-toni-preckwinkle-soda-tax-backfire-met-20170922-story.html

Goolsbee, Austan, Levitt, Steven, & Syverson, Chad. 2016. Microeconomics. (2nd ed.). New York, NY: Worth Publishers.

James, Tom. Seattle to become latest U.S. city to tax sugary drinks. Reuters, June 5, 2017. https://www.reuters.com/article/us-seattle-sodatax/seattle-to-become-latest-u-s-city-to-tax-sugary-drinks-idUSKBN18X09T

Office of Financial Management. 2017. Population and Demographics. https://ofm.wa.gov/washington-data-research/population-demographics/population-estimates/april-1-official-population-estimates (accessed October 22, 2017).

Seattle's soda tax has two goals. K5 Connecting Western Washington, February 24, 2017. http://www.king5.com/news/local/seattle/seattles-soda-tax-propsal-what-it-will-cost-you/411871456

Seattle to Become Latest American City to Tax Sugary Drinks. Reuters, June 6, 2017. http://fortune.com/2017/06/06/seattle-tax-sugary-drinks/

Shupert, Courtney. Seattle Encourages Citizens to Kick the Can in Passing Soda Tax. Tax Foundation, June 13, 2017. https://taxfoundation.org/seattle-encourages-citizens-kick-can-passing-soda-tax/

Wang, E. Y. (2015). The Impact of Soda Taxes on Consumer Welfare: Implications of Storability and Taste Heterogeneity. RAND Journal of Economics, 46(2), 409-441.