Taxation as Public Health Policy

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"Sugar, rum, and tobacco, are commodities which are nowhere necessaries of life, which are become objects of almost universal consumption, and which are therefore extremely proper subjects of taxation."

Overview

- Overview of tobacco and alcohol taxation
- Impact of taxes/prices on tobacco and alcohol use, consequences of use
- Earmarking revenues for control programs
- Industry price marketing & policy options
- Counterarguments – Myths & Facts
- Implications for obesity prevention
Overview of Tobacco and Alcohol Taxation
Why Tax?

**Efficient revenue generation**

- Primary motive historically and still true in many countries today
- Very efficient sources of revenue given:
  - Historically low share of tax in price in many countries
  - Relatively inelastic demand for tobacco products, alcoholic beverages
  - Few producers and few close substitutes
  - One of many goods/services that satisfies the “Ramsey Rule”

- “This vice brings in one hundred million francs in taxes every year. I will certainly forbid it at once – as soon as you can name a virtue that brings in as much revenue” – Napoleon III on tobacco tax
Federal Cigarette Tax and Tax Revenues Inflation Adjusted, 1955-2010

Source: Tax Burden on Tobacco, 2011, and author’s calculations
Federal Beer Tax and Tax Revenues
Inflation Adjusted, 1940-2009

Source: Brewers Almanac, 2010, and author’s calculations
Why Tax?

- **Promote public health**
  - Increasingly important motive for higher tobacco taxes in many high income countries
    - Less so for alcoholic beverage taxes
  - Based on substantial and growing evidence on the effects of tobacco taxes and prices on tobacco use
    - Particularly among young, less educated, and low income populations

- "... We [] have a package of six policy measures, known as MPOWER, that can help countries implement the provisions in the Convention. All six measures have a proven ability to reduce tobacco use in any resource setting. **But tobacco taxes are by far the most effective.**" Director General Dr. Margaret Chan, WHO, 2008

Lung Cancer Deaths: males age 35-44

Number/cigarettes/adult/day

Relative Price

Source: Jha, 2009
Why Tax?

- Cover the external costs of tobacco and excessive alcohol use
  - “Pigouvian” tax
  - Less frequently used motive
  - Account for costs resulting from tobacco, alcohol use imposed on non-users
    - Increased health care costs, lost productivity, property damage, criminal justice costs, etc. caused by exposure to tobacco smoke among non-smokers, harms incurred by non/moderate drinkers
  - Can also include “internalities” that result from addiction, imperfect information, and time inconsistent preferences
Types of Taxes

- **Variety of tobacco, alcohol taxes**
  - Taxes on value of production
  - Customs duties on tobacco leaf, tobacco products, alcoholic beverage imports and/or exports
  - Sales taxes/Value added taxes
  - Implicit taxes when government monopolizes production and/or distribution
  - Excise taxes (or similar taxes)
  - Many of these are applied to variety of agricultural and/or consumer goods and services
  - Excise taxes are of most interest given specificity to tobacco products, alcoholic beverages
Types of Taxes

- **Excise Taxes**
  - Two types of excises
    - **Specific Taxes**: excises based on quantity or weight (e.g. tax per pack of 20 cigarettes, wine gallons)
    - **Ad Valorem taxes**: excises based on value of products (e.g. a specific percentage of manufacturer’s prices for tobacco products, alcoholic beverages)
  - Federal, state, and local cigarette taxes and federal alcoholic beverage taxes all specific taxes
  - State taxes on other tobacco products, alcoholic beverages are mix of specific and *ad valorem*
Federal Tobacco Taxes

• Federal cigarette tax
  – Specific (per unit) excise tax
  – Initially adopted in 1864
  – Raised during war time/lowered during peace time
  – Set at 8 cents per pack in 1951
  – Doubled to 16 cents per pack in 1983
  – Eventually raised to 39 cents per pack in 2002
    • Less than 60% of inflation adjusted value of 1951 tax
  – Significant increase – 61.66 cents – April 1, 2009
    • Earmarked for S-CHIP expansion
Federal Tobacco Taxes

- Specific federal excise taxes on most other tobacco products, including
  - cigars: $1.0066 per pack on small cigars; 52.75% of price for low priced cigars; cap of 40.26 cents per cigar for high priced cigars
  - chewing tobacco: 3.1 cents per ounce
  - moist snuff: $1.51 per pound
  - roll-your-own tobacco $24.78 per pound
  - pipe tobacco: $2.83 per pound
  - rolling papers: 1.26 cents per pack
  - Until latest increases, most were lower than cigarette tax; more equivalent now
  - Similarly infrequent increases in taxes
Federal Cigarette Taxes, United States, 1954-2010
(August 2011 dollars)

Source: Burden on Tobacco, 2011, and author’s calculations
Federal Alcohol Taxes

- Specific (per unit) excise taxes
- Beer, spirits taxes adopted in 1862; wine 1916
- Raised during war time/lowered during peace time
- Spirits tax: $10.50 per proof gallon in 1951
  - $12.50 in 1985; $13.50 in 1991
- Table wine tax: $0.17 per wine gallon in 1951
  - $1.07 in 1991
- Beer tax: $9.00 per barrel in 1951
  - $16.00 in 1991
- Tax per ounce of ethanol varies by type of alcoholic beverage
Federal Alcoholic Beverage Taxes per Drink
Inflation Adjusted, 1953-2009

Year

Dollars per Drink (June 2007 dollars)

Beer
Wine
Spirits
State Tobacco Taxation

• State cigarette taxes
  – First adopted by IA in 1921; NC last to adopt in 1969
  – Specific excise tax in all states
  – Currently: 17.0 cents/pack (MO) to $4.35/pack (NY)
  – Average $1.45 per pack (48.5 cents in tobacco growing states; $1.57 in other states)

• Several proposing additional increases
State Cigarette Excise Tax Rates – 2000

CDC, Office on Smoking and Health. State Tobacco Activities Tracking and Evaluation (STATE) System.
State Cigarette Excise Tax Rates – 2001

CDC, Office on Smoking and Health. State Tobacco Activities Tracking and Evaluation (STATE) System.
State Cigarette Excise Tax Rates – 2002

CDC, Office on Smoking and Health. State Tobacco Activities Tracking and Evaluation (STATE) System.
State Cigarette Excise Tax Rates – 2004

<50 cents per pack
50-99 cents per pack
$1.00-$1.49 per pack
$1.50-$1.99 per pack
$2.00+ per pack

CDC, Office on Smoking and Health. State Tobacco Activities Tracking and Evaluation (STATE) System.
State Cigarette Excise Tax Rates – 2005

CDC, Office on Smoking and Health. State Tobacco Activities Tracking and Evaluation (STATE) System.
State Cigarette Excise Tax Rates – 2006

CDC, Office on Smoking and Health. State Tobacco Activities Tracking and Evaluation (STATE) System.
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State Cigarette Excise Tax Rates – 2008

CDC, Office on Smoking and Health. State Tobacco Activities Tracking and Evaluation (STATE) System.
## State Cigarette Excise Tax Rates – 2010

<table>
<thead>
<tr>
<th>Tax Range</th>
<th>States</th>
</tr>
</thead>
<tbody>
<tr>
<td>≥ $3.00 per pack</td>
<td>AK, NY, NJ, DE, MD, VA, DC</td>
</tr>
<tr>
<td>$2.00-$2.99 per pack</td>
<td>CA, CO, MD, ME, NH, RI, VT</td>
</tr>
<tr>
<td>$1.50-$1.99 per pack</td>
<td>CT, ID, IL, IN, KS, LA, PA, ND, OH, SD</td>
</tr>
<tr>
<td>$1.00-$1.49 per pack</td>
<td>AR, FL, IA, ME, MI, MO, MS, NC, TN, UT</td>
</tr>
<tr>
<td>50-99 cents per pack</td>
<td>AZ, CO, GA, HI, MO, NE, OK, OR, TX</td>
</tr>
<tr>
<td>&lt;50 cents per pack</td>
<td>CA, CO, ID, IL, IN, IA, KS, MO, MS, NJ</td>
</tr>
</tbody>
</table>

CDC, Office on Smoking and Health. State Tobacco Activities Tracking and Evaluation (STATE) System.
State Cigarette Excise Tax Rates – 2011

CDC, Office on Smoking and Health. State Tobacco Activities Tracking and Evaluation (STATE) System.
State Tobacco Taxation

- State taxes on other tobacco products
  - All but PA tax other tobacco products
  - Mostly *ad valorem* taxes, but increasing movement towards specific taxes
    - Typically applied to wholesaler/distributor price
    - Highest taxes include:
      - Wisconsin – 100%; Washington - 95%
    - Lowest taxes include:
      - South Carolina – 5%; Tennessee 6.6%
    - Average about 35%
    - Generally below equivalent rate on cigarettes
State Alcohol Taxation

- Generally adopted following repeal of Prohibition
  - Follow 3-tier system with excises on licensed products
  - Some excises in control states; mark-ups as/more important

- Mostly specific taxes, but many states include *ad valorem component*
  - Different taxes for on- and off-premise sales

- Tend to tax beer lowest, spirits highest

- Considerable variation across states
  - Beer: $0.02 (WY) - $1.07 (AK); $0.19/gallon median
  - Wine: $0.20 (CA, TX) - $2.50 (AK); $0.67/gallon median
  - Spirits: $1.50 (DC, MD) - $12.80 (AK); $3.75/gallon median
Number of State Cigarette and Beer Excise Tax Increases, 2000-2009

- Cigarettes
- Alcohol
Local Taxation in the U.S.

- Many localities add additional cigarette tax
  - Typically a few cents/pack; some exceptions:
    » $1.50 in New York City
    » $2.68 in Chicago/Cook county
- Some local alcoholic beverage taxes
  - Generally modest

- Sales tax applied to tobacco products, alcoholic beverages in most states
  - Usually, but not always, applies to price inclusive of excise taxes
Average State and Federal Cigarette and Beer Taxes
Inflation Adjusted, 1973-2010

Source: Tax Burden on Tobacco (2010), Brewers Almanac (2010) and author’s calculations
Source: Tax Burden on Tobacco, 2011, and author’s calculations
Impact of Tax and Price on Tobacco Use
Prices and Tobacco Use

- **Increases in tobacco product prices:**
  - Induce current users to try to quit
    - Many will be successful in long term
  - Keep former users from restarting
  - Prevent potential users from starting
    - Particularly effective in preventing transition from experimentation to regular use
  - Reduce consumption among those who continue to use
  - Lead to other changes in tobacco use behavior, including substitution to cheaper products or brands, changes in buying behavior, and compensation
Cigarette Prices and Cigarette Sales, United States, 1970-2009

Sales (million packs) vs. Price (Oct., 2009 dollars)


Source: Tax Burden on Tobacco, 2009, and author’s calculations
Cigarette Prices and Adult Smoking Prevalence, United States, 1970-2008

Source: NHIS, *Tax Burden on Tobacco*, 2009, and author’s calculations
Note: green data points for prevalence are interpolated assuming linear trend
Monthly Quit Line Calls, United States
11/04-11/09

- 4/1/09 Federal Tax Increase
- 1/1/08 WI Tax Increase
Cigarette Prices and Cessation
US States & DC, 2009

Source: BRFSS, Tax Burden on Tobacco, 2010, and author’s calculations

\[ y = 0.0283x + 43.083 \]

\[ R^2 = 0.371 \]

Source: BRFSS, *Tax Burden on Tobacco*, 2010, and author’s calculations

\[ y = 0.0219x + 16.737 \]

\[ R^2 = 0.2306 \]
Cigarette Prices and Youth Smoking Prevalence US States & DC, 2009

Source: YRBS, *Tax Burden on Tobacco*, 2010, and author’s calculations

\[ y = -0.0129x + 25.34 \]

\[ R^2 = 0.1721 \]
Cigarette Price and Youth Smoking Prevalence, United States, 1991-2010

Price per pack (8/11 dollars)

Year

1991 1993 1995 1997 1999 2001 2003 2005 2007

12th grade prevalence
10th grade prevalence
8th grade prevalence

Cigarette Price

Source: MTF, *Tax Burden on Tobacco*, 2011, and author’s calculations
Taxes, Prices and Health: US, 1980-2005

Medscape

Lung cancer death rates per 100,000 (divided by 4): men age 35–44

Cigarettes per adult per day

Relative price

Source: Nat Rev Cancer © 2009 Nature Publishing Group
Impact of Tax and Price on Alcohol Use
Alcohol Prices and Drinking

Extensive econometric and other research shows that higher prices for alcoholic beverages significantly reduce drinking:

• 10 percent price increase would reduce:
  • Beer consumption by 1.7 to 4.6 percent
  • Wine consumption by 3.0 to 6.9 percent
  • Spirits consumption by 2.9 to 8.0 percent
  • Overall consumption by 4.4 percent
  • Heavy drinking by 2.8 percent
  • Generally larger effects on youth and young adults

Source: Wagenaar et al., 2009; Xu & Chaloupka, in press
Beer Taxes and Binge Drinking

Source: CSPI Factbook on State Beer Taxes
Extensive econometric and other research shows that higher prices for alcoholic beverages significantly reduce:

- Drinking and driving, traffic crashes, and motor-vehicle accident fatalities
- Deaths from liver cirrhosis, acute alcohol poisoning, alcohol-related cancers, cardiovascular diseases, and other health consequences of excessive drinking
- Violence, including spouse abuse, child abuse, and suicides
- Other consequences of drinking, including work-place accidents, teenage pregnancy, and incidence of sexually transmitted diseases
Earmarking Tobacco Tax Revenues for Tobacco Control
Tobacco Industry is Outspending Prevention Efforts 24:1 — FY2011

- State Tobacco Revenue (taxes and settlement funds): $25.3 billion
- Tobacco Industry Marketing & Promotion Expenditures (2006): $12.5 billion
- Total CDC-Recommended Spending Level: $3.7 billion
- State Tobacco Program Budgets: $0.5 billion

Campaign for Tobacco Free Kids, Federal Trade Commission, American Heart Association, American Cancer Society, American Lung Association, SmokeLess States National Tobacco Policy Initiative
Program Funding

Source: Tobacco Free Kids, 2010
Comprehensive Programs

- Impact of state program funding
  - Increased funding associated with:
    - Reductions in overall cigarette sales
    - Lower youth smoking prevalence
    - Lower adult smoking prevalence
    - Increased interest in quitting, successful quitting
  - Much of impact results from large scale mass-media anti-smoking campaigns
State Tobacco Control Program Funding and Youth Smoking Prevalence

Total Funding: Millions (FY10 dollars)

Year:
- 1991
- 1994
- 1997
- 2000
- 2003
- 2006
- 2009

Percent Current Smoking:
- 19
- 21
- 22
- 23
- 25
- 27
- 29
- 31
- 33
- 35
- 37

Source: ImpacTeen Project, UIC; YRBS
Earmarking Alcohol Tax Revenues for Alcohol Control
Earmarked Alcohol Taxes

Source: CSPI Factbook on State Beer Taxes
Earmarked Alcohol Taxes

- Small share of tax revenues earmarked
- Fund variety of alcohol prevention, treatment and enforcement efforts

<table>
<thead>
<tr>
<th>State</th>
<th>Program</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arizona</td>
<td>Drug and Alcohol Treatment Fund</td>
</tr>
<tr>
<td>Idaho</td>
<td>Alcoholism Treatment Account</td>
</tr>
<tr>
<td>Kansas</td>
<td>Community Alcoholism and Intoxication Programs Fund</td>
</tr>
<tr>
<td>Mississippi</td>
<td>Alcoholism Treatment and Rehabilitation Fund</td>
</tr>
<tr>
<td>Montana</td>
<td>Treatment, rehabilitation, and prevention of alcoholism and chemical dependency</td>
</tr>
<tr>
<td>New Jersey</td>
<td>Alcohol Education, Rehabilitation and Enforcement Fund</td>
</tr>
<tr>
<td>Nevada</td>
<td>Increase services for prevention and treatment of alcoholism and alcohol abuse.</td>
</tr>
<tr>
<td>Oregon</td>
<td>Mental Health Alcoholism and Drug Services Account</td>
</tr>
<tr>
<td>Tennessee</td>
<td>To assist municipalities and counties in carrying out the provisions of the state’s 1973 Comprehensive Alcohol and Drug Treatment Act</td>
</tr>
<tr>
<td>Utah</td>
<td>Programs or projects related to prevention, treatment, detection, and prosecution</td>
</tr>
</tbody>
</table>

- No research linking funding to reduced alcohol use, problems
  - research demonstrates cost-effectiveness of interventions that could be funded by earmarked taxes

Source: CSPI *Factbook on State Beer Taxes*
Popular Support for Tobacco & Alcohol Taxes
Popular with Voters

- Tobacco Excise Tax Increases:
  - Generally supported by voters
  - Supported by those likely to vote for either party
  - More support when framed in terms of impact on youth tobacco use
  - More support when some of new revenues are used to support tobacco control and/or other health-related activities
    - Comprehensive state tobacco control programs
    - Expanded public health insurance programs (e.g. S-CHIP; Arkansas)
  - Greater support than for other revenue sources
Earmarking for Youth Smoking Prevention Increases Support For Tobacco Tax Hikes

Would you favor or oppose an increase in the state tobacco tax?

...as part of an effort to help reduce smoking, particularly among kids

...if part of the money is used to fund programs to reduce tobacco use, particularly among kids

RWJF, National survey of registered Voters - June 2002
The Mellman Group/Market Strategies; from McGoldrick 2010
A Majority Also Supports Increasing the Tax on Alcohol, and 4 in 10 Voters Strongly Favor the Increase

Some leaders in New York State are considering increasing the tax to 10 cents per drink on alcoholic beverages, including beer, wine and liquor, and using a portion of the money to prevent youth alcohol use and provide for the treatment of alcohol abuse. Based on what you know, would you support or oppose this new tax?
Industry Price Marketing
Cigarette Company Marketing Expenditures, by Type, 1975-2008

Source: author’s calculations from data reported in FTC (2011)
Cigarette Company Marketing Expenditures, % of Total by Type, 2008

Source: author’s calculations from data reported in FTC (2011)
Tobacco Industry Efforts to Offset Tax Increase

On February 4th, 2009, the Federal Government enacted legislation to fund the expansion of the State Children's Health Insurance Program (SCHIP) that increases excise taxes on cigarettes by 158%. As a result, you will see the price of all cigarettes, including ours, increase in retail stores.

We know times are tough, so we'd like to help. We invite you to register at Marlboro.com to become eligible for cigarette coupons and special offers using this code: MAR1558

Thank You,

Philip Morris USA
Price-Related Cigarette Marketing and Tobacco Control

- Greater price-related marketing since the Master Settlement Agreement and related price increases (Ruel, et al., 2004; Loomis et al., 2006; FTC, 2007)

- More price-related marketing in states with greater spending on comprehensive tobacco control programs (Loomis, et al., 2006; Slater et al., 2001)

- Growing use of point-of-sale ads to highlight sales promotions (e.g. special price, special offer, cents off, reduced price, multi-pack special) (Feighery et al., 2008)
Restricting Marketing?

- Family Smoking Prevention and Tobacco Control Act, 2009
  - Eliminates federal pre-emption of stronger state, local restrictions on tobacco company marketing
    - Allows limits on time, place or manner of tobacco company marketing
    - Comprehensive state and/or local marketing bans possible?
Minimum Pricing Policies

• 25 states with minimum pricing policies

• Typically mix of minimum markups to wholesale and retail prices
  ▪ Median wholesale markup 4%
  ▪ Median retail markup 8%

• 7 states prohibit use of price promotions in minimum price calculation

• Little impact on actual retail prices
  ▪ Greater impact where promotions excluded

Sources: CDC, 2010; Feighery, et al., 2005
Common Oppositional Arguments

Myths & Facts
AUGUSTA — “A coalition of health groups today urged lawmakers to increase the cigarette tax by a $1 per pack, saying the increase will encourage more people to quit smoking and generate more money for health programs.

Translation: Fewer people smoking equals more cigarette tax revenue? Someone needs a math lesson.”
Cigarette Tax and Tax Revenues
Georgia, 1965-2009
Positive Effect of Tax Increase on Revenue Results from:

Low share of tax in price:
- state taxes account for about 25% of price
- total taxes account for less than half of price
- *Implies large tax increase has much smaller impact on price*

Less than proportionate decline in consumption:
- 10% price increase reduces consumption by 4%
Positive Effect of Tax Increase on Revenues

Example – with significant tax avoidance

- Price $4.00, State tax $1.00, Sales 500 million packs
  - Revenues: = $500 million
- Double tax to $2.00; price rises to $5.00
  - 100% tax increase; 25% price increase
  - 25% price increase reduces sales by 20% (reduced consumption plus tax avoidance)
    - new sales 400 million packs
  - 80% of original sales at double the tax increases revenues by 60%
  - new revenues = $800 million
Revenue Impact

- Increases in alcoholic beverage taxes:
  - Increase government tax revenues
    - Even smaller share of tax in price
    - Less than proportionate reductions in consumption in response to price increase
    - Broader tax base implies greater potential revenues
  - Revenue increases sustained over time
  - Changes in revenues gradual and predictable

Source: Brewers’ Almanac, 2009, and author’s calculations
Impact on Jobs

JULY, 14, 2010 – The Associated Press

- RICHMOND, Va. — The tobacco industry is running a full-court press ahead of a federal scientific panel's meeting to discuss how to regulate menthol cigarettes, a still-growing part of the shrinking cigarette market.

- The union representing nearly 4,000 tobacco workers sent a letter to the Food and Drug Administration committee examining the public health effects of the minty smokes, warning that a ban could lead to "severe jobs loss" and black market cigarettes.
Impact on Jobs

- Tobacco excise tax will lead to decreased consumption of tobacco products
  - Small loss of jobs in tobacco sector

- Money not spent on tobacco products will be spent on other goods and services
  - Gains in jobs in other sectors

- Increase in tax revenues will be spent by government
  - Additional job gains in other sectors

- Net increase in jobs in most states
A pack of premium cigarettes in New York City now costs $7 or $8; prices would rise to above $9. Opponents of the tax increase argue that higher prices would drive smokers to seek ways to evade the law and purchase cheaper cigarettes from smugglers or in neighboring states, blunting potential revenue gains for the state. "It's a black market gold mine," a senior fellow at the Manhattan Institute, E.J. McMahon, said of the proposed tax.
Tax Avoidance

US Smokers, Last Purchase, November 2002-June 2011

Source, ITC project, US survey, Waves 1-8
Cigarette Prices and Adult Prevalence, New York, 1995-2007

Source: Tax Burden on Tobacco, 2008 and BRFSS
Tax Avoidance & Evasion Do NOT Eliminate Revenue Impact of Higher Taxes

Cook County Cigarette Tax and Tax Revenues - FY01-FY06

- Chicago tax rises from 16 to 48 cents
- Chicago tax up to 68 cents, 1/1/06
- Chicago smoking ban, 1/16/06

Tax Avoidance & Evasion Do NOT Eliminate Revenue Impact of Higher Taxes
Combating Tax Evasion

- High-tech tax stamps
- Licensing of all involved in distribution and sale
- Strong enforcement
- Swift, severe penalties
- Focus on large scale, criminal activity
- Coordinated efforts
  - NAAG efforts targeting Internet
  - Agreements with tribes
Impact on the Poor

July 23, 2010 – San Francisco Examiner

• “Democrats are relying more heavily in their midterm 2010 election message that Republicans care nothing about the poor. Conveniently absent from this analysis is Republican opposition to President Barack Obama’s cigarette tax increase...... While higher cigarette taxes do discourage smoking, they are highly regressive. Analyzing a slightly less severe proposal in 2007, the Tax Foundation noted that ‘no other tax hurts the poor more than the cigarette tax.’” Peyton R. Miller, special to the Examiner.
Impact on the Poor

- Concerns about the regressivity of higher tobacco taxes
  - Tobacco taxes are regressive, but tax increases can be progressive
    - Greater price sensitivity of poor – relatively large reductions in tobacco use among lowest income populations, small reductions among higher income populations
    - Health benefits that result from tax increase are progressive
Who Pays & Who Benefits
Impact of Federal Tax Increase, U.S., 2009

Source: Chaloupka et al., in progress; assumes higher income smokers smoke more expensive brands
Impact on the Poor

• Need to consider overall fiscal system
  ▪ Key issue with tobacco taxes is what’s done with the revenues generated by the tax
  ▪ Greater public support for tobacco tax increases when revenues are used for tobacco control and/or other health programs
  ▪ Net financial impact on low income households can be positive when taxes are used to support programs targeting the poor
  ▪ Concerns about regressivity offset by use of revenues for programs directed to poor
Taxation and Obesity?
Selected Food Price & Adult Weight Trends
1961-2009, Inflation Adjusted

Selected Food Price & Youth Weight Trends
1971-2009, Inflation Adjusted

Extensive economic research on the impact of food and beverage prices on consumption of various products; estimates suggest a 10% own-price increase would reduce:

- Cereal consumption by 5.2%
- Fruit consumption by 7.0%
- Vegetable consumption by 5.9%
- Soft drink consumption by 7.8%
- Sweets consumption by 3.5%
- Food away from home consumption by 8.1%

Source: Andreyeva, et al., 2010
Food Prices and Weight Outcomes

Relatively limited research to date on impact of food and beverage prices and weight outcomes:

• Higher prices for sugary foods would significantly reduce prevalence of overweight and obesity among adults (Miljkovic et al., 2008)

• 10% increase in fast food prices would reduce prevalence of adolescent obesity by almost 6% (Powell, et al., 2007)

• Weight outcomes among low-income populations and those with higher BMI more responsive to prices
  • BMI of kids in families below poverty level about 50% more responsive to F&V prices
  • BMI for kids at unhealthy weight levels 39% more responsive to F&V prices
  • BMI of adolescents at unhealthy weight levels about 4 times more responsive to F&V and fast food prices.

Source: Powell and Chaloupka, 2009; Chaloupka et al., 2009
Emerging evidence on prices suggests that significant changes in relative prices of healthy and unhealthy foods could reduce BMI and likelihood of obesity.

- Increases in prices of less healthy foods and beverages
  - taxes
  - elimination of corn subsidies
  - disallow purchases under food assistance programs

- Reductions in prices of more healthy foods and beverages
  - subsidies
  - expanded or favored treatment under food assistance programs

Source: Powell and Chaloupka, 2009; Chaloupka et al., 2009
Sugar Sweetened Beverage Taxes
Public Health Rationale for SSB Taxes

• Link to obesity
  • Several meta-analyses conclude that increased SSB consumption causes increased weight, obesity
  • Increased calories from SSBs not offset by reductions in calories from other sources

• Other health consequences
  • type 2 diabetes, lower bone density, dental problems, headaches, anxiety and sleep disorders
Soda Consumption & Obesity
California Counties, 2005

\[ y = 16.44\ln(x) + 6.1142 \]
\[ R^2 = 0.6656 \]

Source: Babey, et al., 2009 and authors' calculations.
SSB Taxes & Prices

Consumption and Weight
Existing evidence

• Growing literature demonstrating the higher prices for SSBs lead to reductions in SSB consumption

• Andreyeva, et al.’s (2010) comprehensive review concluded that price elasticity of soft drink consumption was -0.78
  • Price elasticity: % change in consumption resulting from 1% price change
  • 10% increase in soft drink prices would reduce consumption by nearly 8%

• Limited, mixed evidence on impact of taxes/prices on weight outcomes
Empirically examine associations between state-level soda taxes and consumption and weight outcomes, using nationally representative data sets including:

- A.C. Nielsen Homescan Data
- Early Childhood Longitudinal Study-Kindergarten Cohort (ECLS-K)
- Monitoring the Future (MTF)
- National Longitudinal Survey of Youth 1997 (NLSY97)
AC Nielsen HomeScan

• Objective
  • To examine the association of soda taxes with household soda purchases

• Data Description
  • Cross-section of household purchase information based on scanner data from a variety of stores, 2nd Q 2007
  • Household demographic data
  • Final sample includes 66,211 non-military households
  • Outcome variable: soda volume in ounces of carbonated beverages purchased per household over the sample period (m=566 ounces ~ 2 cases of 12 oz cans)
  • Control variables: household income, size, race, educational attainment, presence of children/age, female head of household employment status, and census regions
# Preliminary Results

## OLS Regression Results: Soda Volume

<table>
<thead>
<tr>
<th>Disfavored Soda Tax Amount</th>
<th>All Households</th>
<th>Households with Children</th>
<th>Households without Children</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-9.352**</td>
<td>-10.983**</td>
<td>-8.417**</td>
</tr>
</tbody>
</table>

Policy Simulations

• Results imply small tax elasticities for purchases of -0.06.

• If all states increased sales taxes to the maximum tax rate of 7% (an increase of 60.6% from the current sample mean of 4.36%), household purchases of regular soda are estimated to be 3.6% lower.

• Consider the imposition of a **new 20% tax** → assuming constant elasticity, household regular soda purchases are estimated to be **33% lower**.
  
  The extent to which this applies to all regular soda consumption depends on constant elasticity noted above, and whether regular soda consumed away-from-home is similarly price/tax responsive.
Objective
To examine association between soda taxes, consumption and weight of children

Data Description
Nationally representative panel of elementary school students.
Food consumption 5th grade; measured height and weight
Final sample: 7,414 children who reported their food consumption and 7,300 children for which height and weight information exists
Outcome variables: soda consumption in last week (m=6), soda purchases at school (m=0.4), and weight change 3rd to 5th grade (m=1.9)
Control variables: age in months, race/ethnicity, family income, mother’s education level, physical activity, TV watching, parent-child interactions.
<table>
<thead>
<tr>
<th>Outcome Variable</th>
<th>Total Consumption</th>
<th>School Consumption</th>
<th>BMI Change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Higher Soda Tax Amount</td>
<td>Higher Soda Tax Indicator</td>
<td>Higher Soda Tax Amount</td>
</tr>
<tr>
<td>Full Sample</td>
<td>-0.004</td>
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<td>-0.010</td>
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<tr>
<td>At Risk of Overweight</td>
<td>-0.026</td>
<td>-0.078</td>
<td>-0.011</td>
</tr>
<tr>
<td>Low-Income</td>
<td>-0.142*</td>
<td>-0.811</td>
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</tr>
<tr>
<td>African American</td>
<td>-0.125</td>
<td>-0.767</td>
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</tr>
<tr>
<td>9+ Hrs TV</td>
<td>-0.073</td>
<td>-0.376</td>
<td>-0.029**</td>
</tr>
</tbody>
</table>

Source: Sturm, Powell, Chriqui, and Chaloupka, *Health Affairs*, 2010
## Associations by Sub-populations

<table>
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</tr>
</tbody>
</table>

Source: Sturm, Powell, Chriqui, and Chaloupka, *Health Affairs*, 2010
Policy Simulations

• Assuming a constant elasticity, an 18% differential soda tax would correspond to a -0.23 BMI units in the change in BMI between 3rd and 5th grade, or a 20% reduction in the excess BMI gain.
NLSY-97

• **Objective**
  - To examine association of soda taxes with youths’ BMI using cross-sectional *and* longitudinal models

• **Data Description**
  - Estimation sample includes 11,900 person-year observations living at home
  - Information on parental characteristics available from parental questionnaire and annual household roster data
  - **Outcome variable**: weight status: BMI and overweight prevalence
  - **Control variables**: age, gender, race, ethnicity, income, mother’s education, mother’s employment status
  - **Neighborhood controls**: median household income
### Preliminary Regressions Results - Cross Sectional Analysis

<table>
<thead>
<tr>
<th></th>
<th>Female</th>
<th></th>
<th>Male</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>BMI</td>
<td>Overweight</td>
<td>BMI</td>
<td>Overweight</td>
</tr>
<tr>
<td><strong>Full Sample</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0&lt;tax\leq4%</td>
<td>0.0552</td>
<td>0.0019</td>
<td>-0.0337</td>
<td>-0.0055</td>
</tr>
<tr>
<td>4&lt;tax\leq5%</td>
<td>0.1339</td>
<td>0.0017</td>
<td>-0.1457</td>
<td>-0.0160</td>
</tr>
<tr>
<td>5&lt;tax\leq6%</td>
<td>-0.0797</td>
<td>-0.0105</td>
<td>0.2203</td>
<td>0.1010</td>
</tr>
<tr>
<td>tax&gt;6%</td>
<td>-0.0548</td>
<td>-0.0053</td>
<td>0.5410*</td>
<td>0.0257</td>
</tr>
<tr>
<td><strong>Low Income</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0&lt;tax\leq4%</td>
<td>-0.5963</td>
<td>-0.0371*</td>
<td>-0.5030</td>
<td>-0.0556**</td>
</tr>
<tr>
<td>4&lt;tax\leq5%</td>
<td>0.2401</td>
<td>-0.0094</td>
<td>-0.2245</td>
<td>-0.0073</td>
</tr>
<tr>
<td>5&lt;tax\leq6%</td>
<td>-0.3359</td>
<td>-0.0436**</td>
<td>-0.1683</td>
<td>-0.0470**</td>
</tr>
<tr>
<td>tax&gt;6%</td>
<td>-0.4483</td>
<td>-0.0369*</td>
<td>-0.4099</td>
<td>-0.0435**</td>
</tr>
</tbody>
</table>

Source: Powell, et al., in progress
## Preliminary Regressions Results - Longitudinal Analysis (FE)

<table>
<thead>
<tr>
<th></th>
<th>Female BMI</th>
<th>Female Overweight</th>
<th>Male BMI</th>
<th>Male Overweight</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Full Sample</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0&lt;tax≤4%</td>
<td>-0.7805**</td>
<td>-0.0078</td>
<td>-0.4054***</td>
<td>-0.0503</td>
</tr>
<tr>
<td>4%&lt;tax≤5%</td>
<td>-0.7938**</td>
<td>-0.0153</td>
<td>-0.0942</td>
<td>-0.0369</td>
</tr>
<tr>
<td>5%&lt;tax≤6%</td>
<td>-0.2033</td>
<td>0.0308*</td>
<td>-0.2297</td>
<td>-0.0591</td>
</tr>
<tr>
<td>tax&gt;6%</td>
<td>-0.5647</td>
<td>0.0667*</td>
<td>0.4693</td>
<td>-0.0212</td>
</tr>
<tr>
<td><strong>Low Income</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0&lt;tax≤4%</td>
<td>-2.1950***</td>
<td>-0.0628***</td>
<td>-1.0196***</td>
<td>-0.0922***</td>
</tr>
<tr>
<td>4%&lt;tax≤5%</td>
<td>-2.3600***</td>
<td>-0.0737**</td>
<td>-0.5907*</td>
<td>-0.0732***</td>
</tr>
<tr>
<td>5%&lt;tax≤6%</td>
<td>-1.1818</td>
<td>-0.0162</td>
<td>-1.5229***</td>
<td>-0.0879***</td>
</tr>
<tr>
<td>tax&gt;6%</td>
<td>-0.2139</td>
<td>0.0847</td>
<td>0.5069</td>
<td>-0.0969**</td>
</tr>
</tbody>
</table>

Source: Powell et al., *in progress*, 2010
Policy Implications of Empirical Results

• Generally very small associations between soda taxes and consumption or weight outcomes based on the existing low tax rates which range up to just 7% in the study samples.

• Larger associations for populations at greater risk for obesity.

• *Substantial* increases in soda tax rates may have some measurable effects on outcomes and even greater effects at the population level.
Alternative SSB Tax Structures

- From a public health perspective, specific excise tax preferable to sales tax or ad valorem excise tax for several reasons:
  - More apparent to consumer
  - Easier administratively
  - Reduces incentives for switching to cheaper brands, larger quantities
  - Revenues more stable, not subject to industry price manipulation
  - Greater impact on consumption; more likely impact on weight outcomes
  - Disadvantage: need to be adjusted for inflation
SSB Taxation & Revenues

- Revenue generating potential of tax is considerable
  - SSB Tax calculator at:
  - Tax of one cent per ounce could generate:
    - $14.9 billion nationally if on SSBs only
    - $24.0 billion if diet included
  - Tax of two cents per ounce:
    - $21.0 billion nationally, SSBs only
    - $39.0 billion if diet included
  - Earmarking tax revenues for obesity prevention efforts would add to impact of tax
Voters Prefer Taxes on Alcohol and Sugar-Sweetened Beverages over Cuts in Government Services by Margins of More than 3 to 1

- As you may know, New York state faces a $14 billion budget shortfall. Let me read you some statements about possible new taxes to generate revenue and proposed cut-backs to deal with this crisis. Please tell me which statement comes closer to your view.

- Tax Sugar-Sweetened Beverages: 68% prefer taxes, 21% prefer cuts.
- Increase Alcohol Tax: 75% prefer taxes, 17% prefer cuts.

I would prefer to tax sugar-sweetened beverages. / I would prefer to cut government services and programs.

I would prefer to increase the alcohol tax. / I would prefer to cut government services and programs.
Voters Prefer Taxes on Alcohol and Sugar-Sweetened Beverages over Increased Property or Sales Taxes

<table>
<thead>
<tr>
<th></th>
<th>Property Tax</th>
<th>Sales Tax</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sweetened Beverages</td>
<td>73% Property Tax: 9%</td>
<td>65% Sales Tax: 16%</td>
</tr>
<tr>
<td>Alcohol</td>
<td>79% Property Tax: 6%</td>
<td>78% Sales Tax: 7%</td>
</tr>
</tbody>
</table>

As you may know, New York state faces a $14 billion budget shortfall. Let me read you some statements about possible new taxes to generate revenue and proposed cut-backs to deal with this crisis. Please tell me which statement comes closer to your view.
Counterarguments

- Same as have been raised against tobacco and alcohol taxes
  - Employment impact
    - Ongoing research assessing impact of reduced SSB consumption on employment
  - Impact on the poor
  - Tax avoidance/evasion
For more information: http://www.bridgingthegapresearch.org/research/sodasnack_taxes/
Summary
Summary

- Tobacco tax increases have significantly reduced tobacco use in the US
- Similar evidence for effectiveness of higher alcoholic beverage taxes to reduce alcohol use and its consequences
  - Few governments have done so
- Potential for using excise taxes on sugar-sweetened beverages to curb SSB consumption and reduce obesity
Summary

- Taxes generate significant revenues and revenues increase when tax increases
  - Added reductions in use/consequences when revenues earmarked for prevention/control efforts

- Generally more public support than for other taxes or budget cuts
  - Particularly when revenues earmarked for prevention and control

- Adverse economic impact false or overstated
For more information:

www.bridgingthegapresearch.org

www.impactteen.org

fjc@uic.edu