

Price, Food Consumption, and Obesity

**Evidence from Bridging the Gap: Research
Informing Practice and Policy for Healthy
Youth Behavior**

Jamie F. Chriqui & Frank J. Chaloupka
Health Policy Center
University of Illinois at Chicago

Fifth Conference on Public Health, Law, and Obesity - A Time for Action: An
Obesity Agenda for the Next Administration, Boston, MA, September 20, 2008



Overview

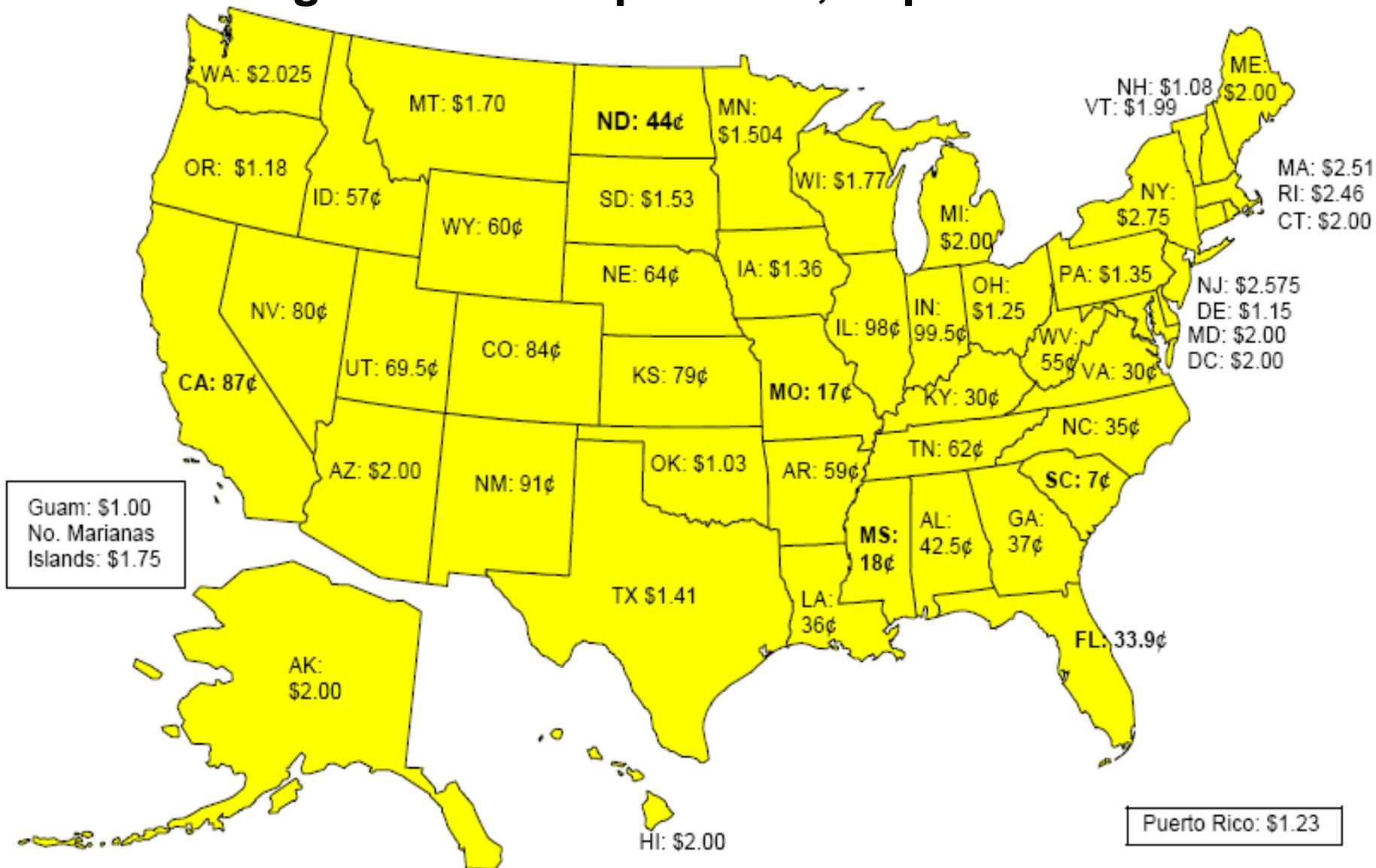
- Using pricing policies to promote healthy behavior – excise taxes and cigarette smoking
- Bridging the Gap research on price and adolescent healthy eating and obesity
- State taxes on sodas and snack foods



**Price Policies and Healthy
Behavior:
Cigarette Taxes, Prices
and Cigarette Smoking**

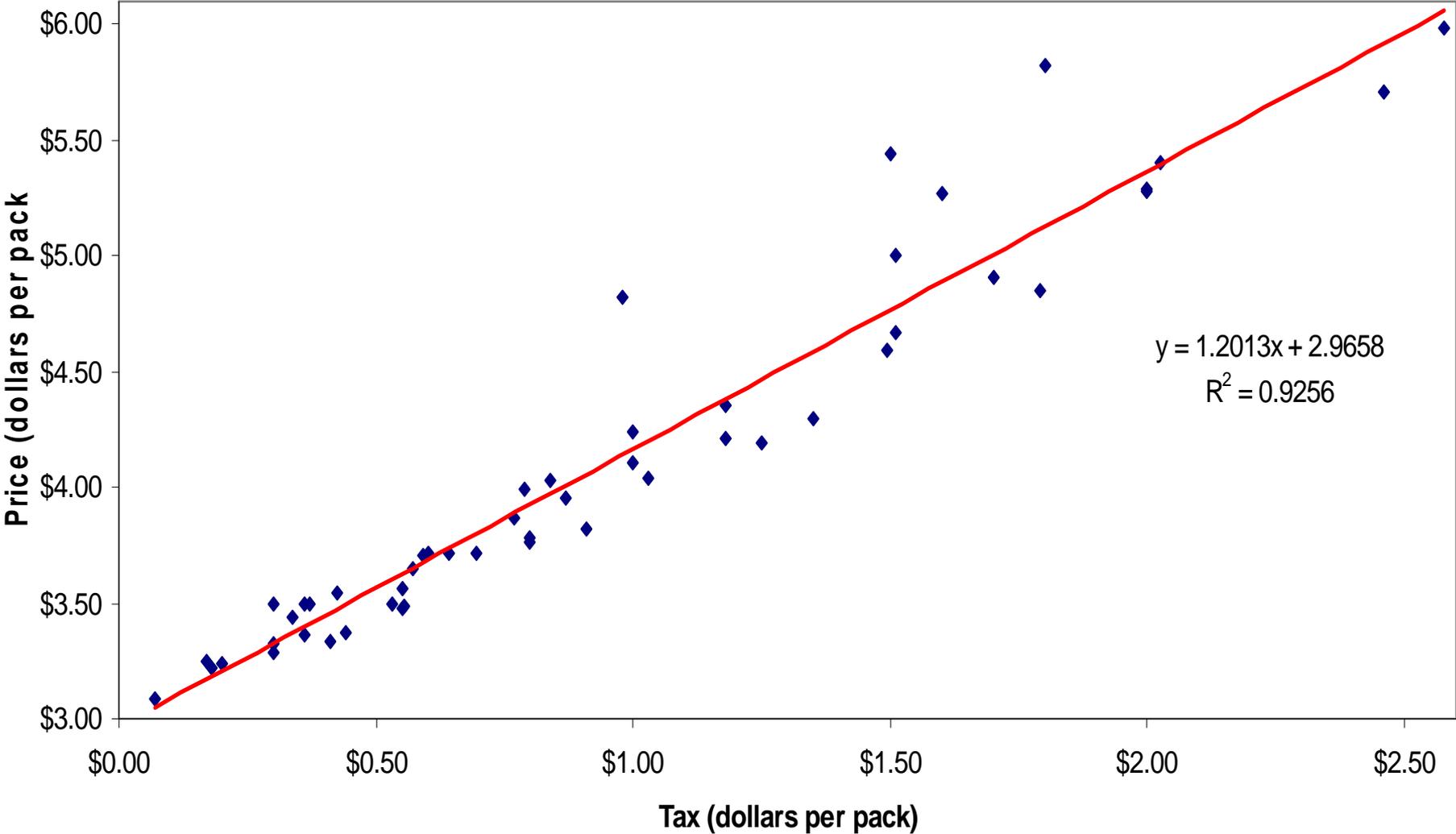


State Cigarette Taxes per Pack, September 2008



Source: Campaign for Tobacco Free Kids, 2008

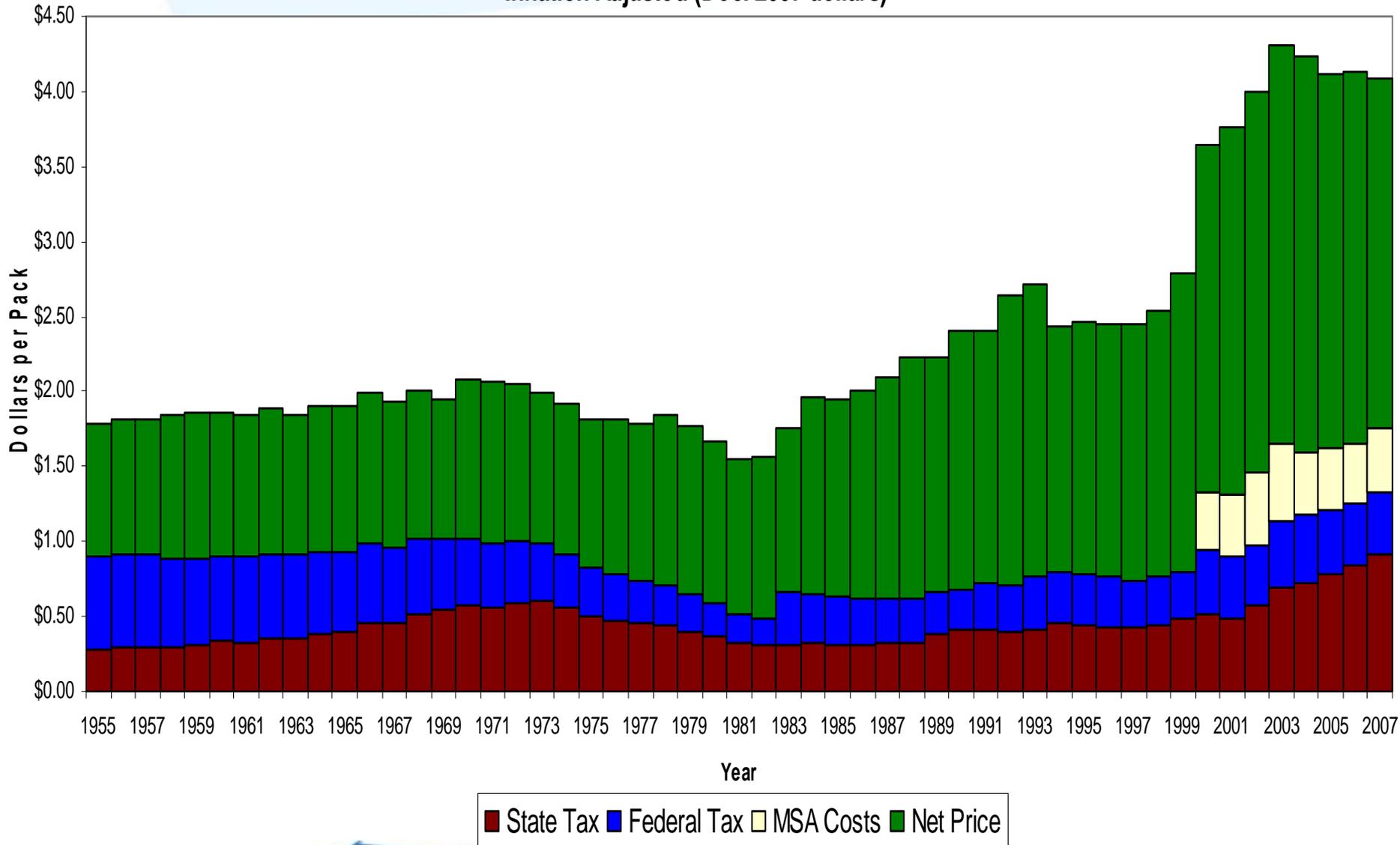
State Cigarette Taxes and Prices, November 1, 2006



$y = 1.2013x + 2.9658$
 $R^2 = 0.9256$

Cigarette Taxes and Prices, 1976-2007

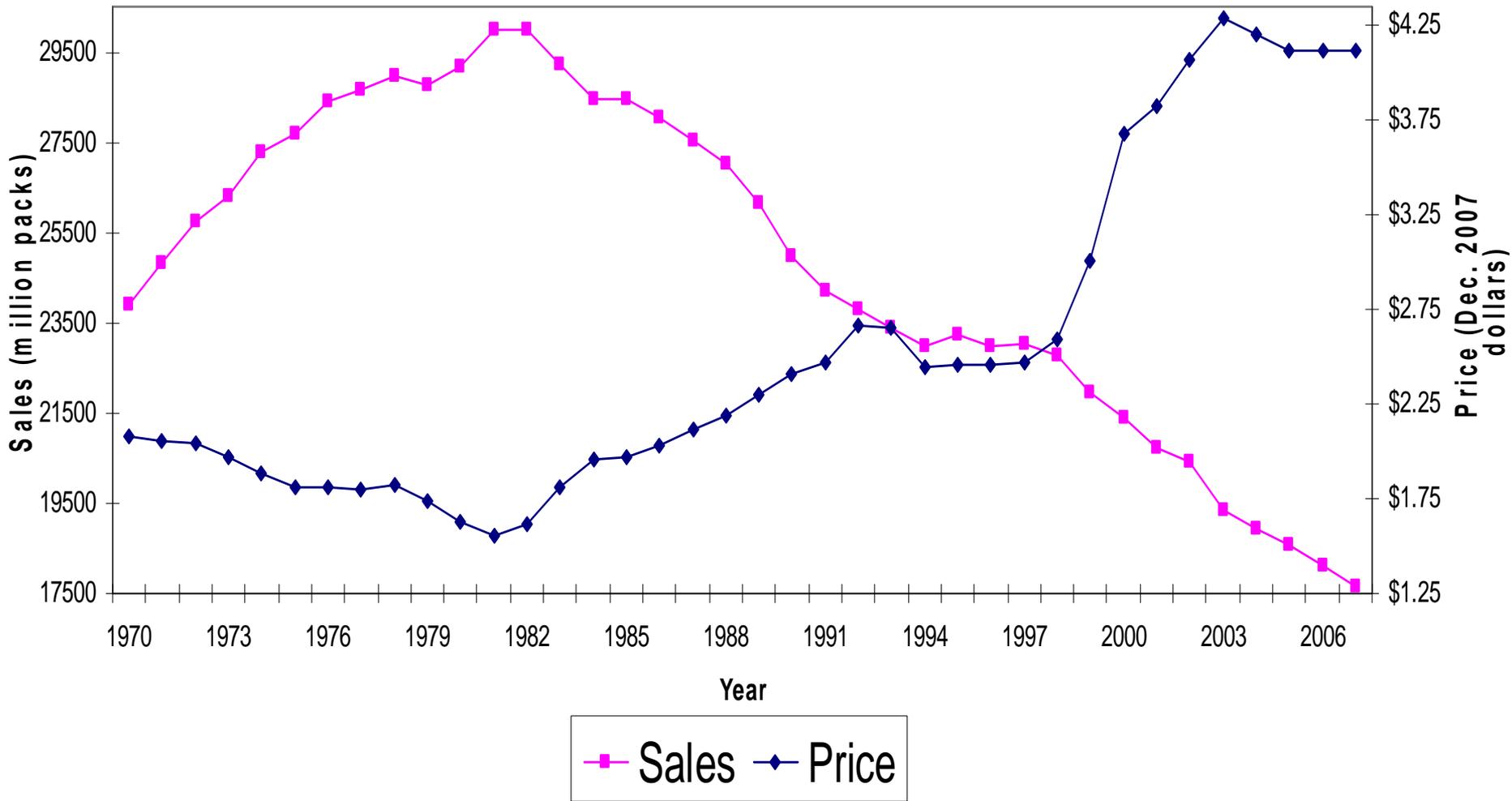
Inflation Adjusted (Dec. 2007 dollars)



Source: *Tax Burden on Tobacco, 2007*, and author's calculations

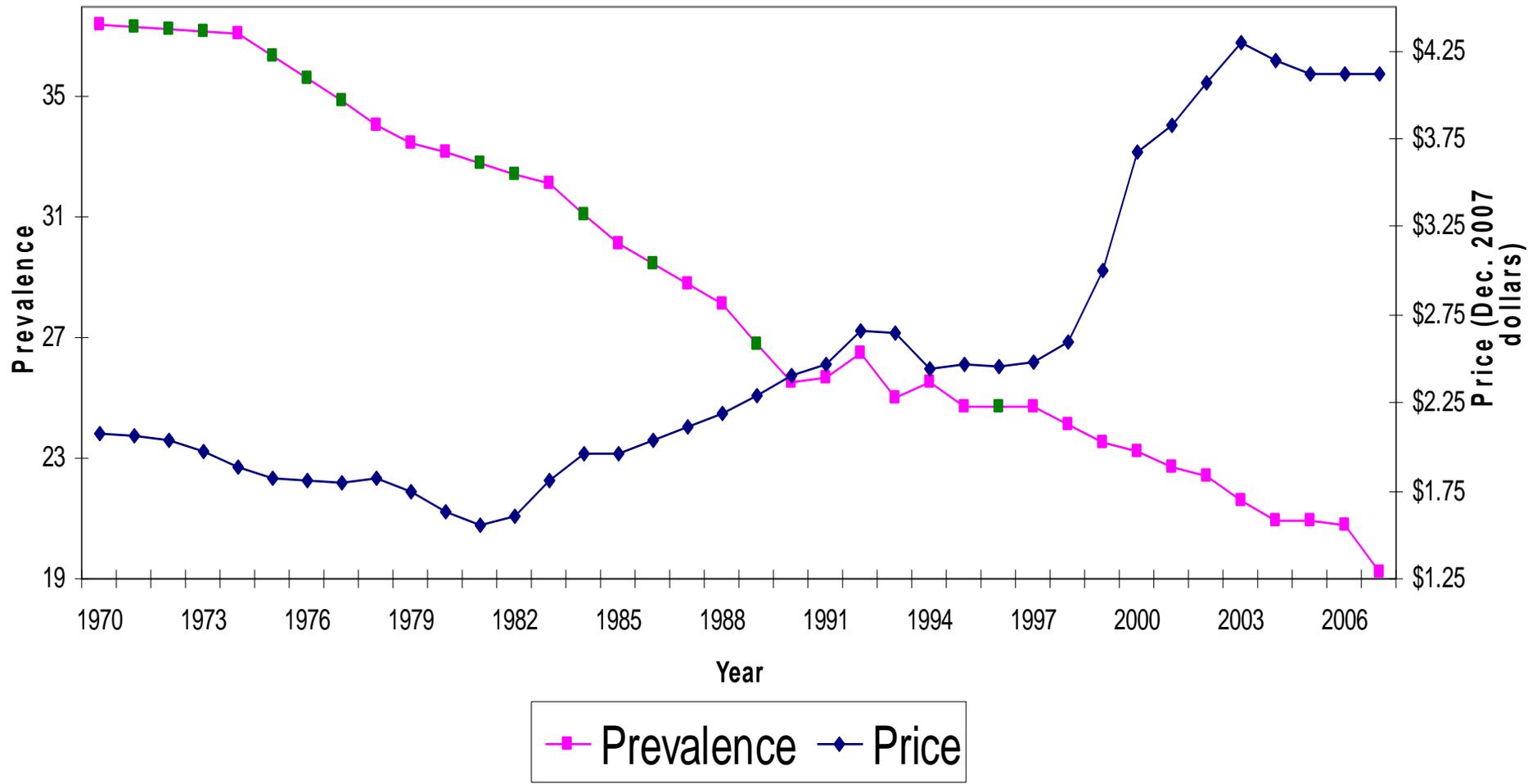
Cigarette Prices and Cigarette Sales

United States, 1970-2007



Source: *Tax Burden on Tobacco, 2007*, and author's calculations

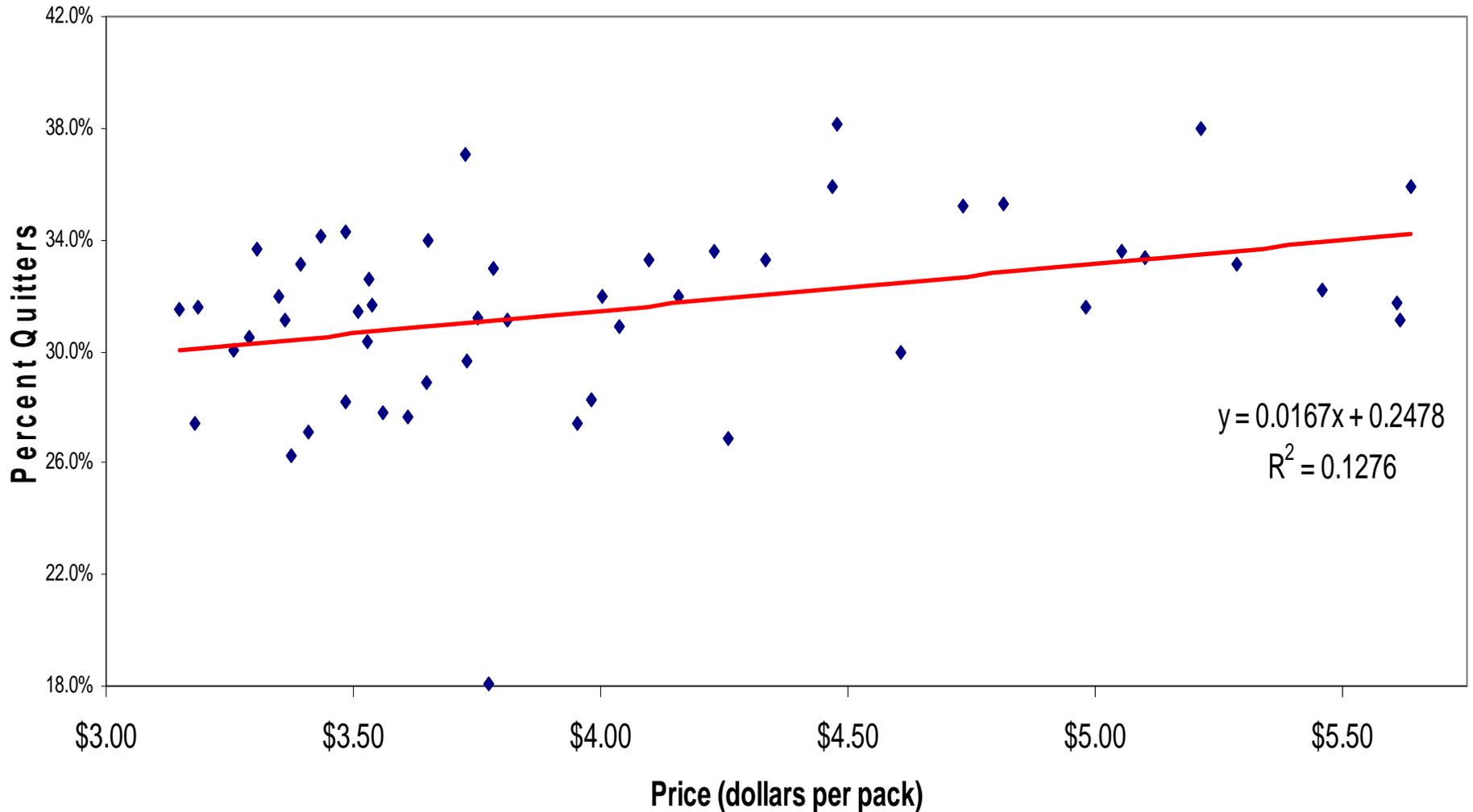
Cigarette Prices and Adult Smoking Prevalence, United States, 1970-2007



Source: NHIS, *Tax Burden on Tobacco*, 2007, and author's calculations

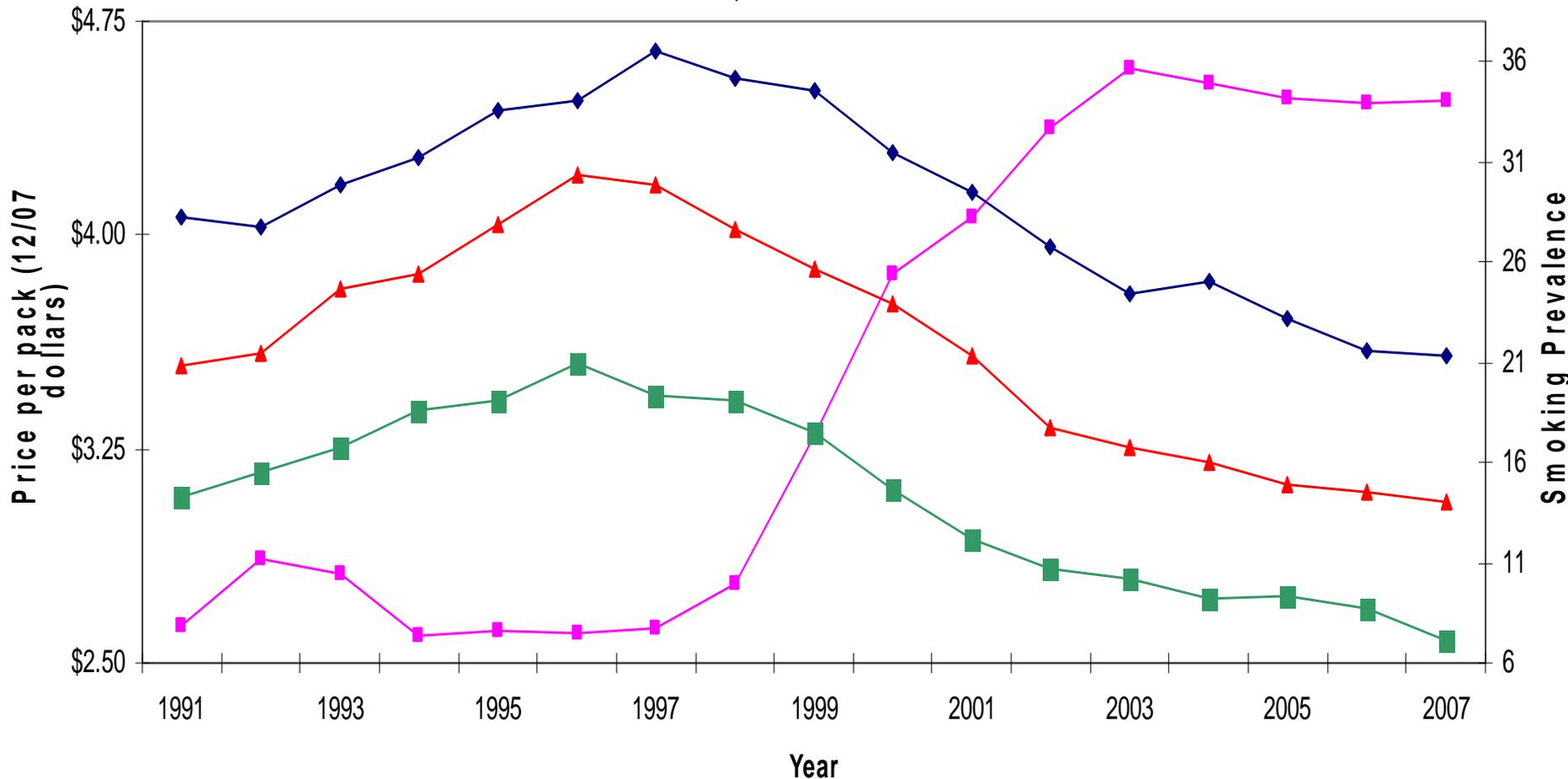
Note: green data points for prevalence are interpolated assuming linear trend

Cigarette Prices and Percentage of Ever Smokers Who Have Quit Smoking



$y = 0.0167x + 0.2478$
 $R^2 = 0.1276$

Cigarette Price and Youth Smoking Prevalence, United States, 1991-2007



■ Cigarette Price
 ◆ 12th grade prevalence
 ▲ 10th grade prevalence
 ■ 8th grade prevalence



Source: MTF, *Tax Burden on Tobacco*, 2007, and author's calculations



**Associations between
Prices and
Youth Diet and
Weight Outcomes**



Previous Research

- Relatively little economic research on the impact of environmental factors such as price and availability on physical activity, diet, and weight among adolescents
 - Lakdawalla and Philipson (2002) argue that upward trend in obesity results from drop in relative price of calorie consumption and increase in opportunity cost of burning calories
 - Chou et al. (2004) conclude that increases in restaurant availability, lower real food prices, and higher real cigarette prices contribute to upward trend in obesity
 - Sturm and Datar (2005) find that lower fruit & veg. prices have small impact on BMI among children, but that other food prices and availability have little impact

Previous Research

- Non-economic research suggests importance of availability and pricing; for example:
 - French and colleagues, others find evidence that changes in relative prices of healthy/unhealthy foods changes youth consumption
- Few studies on other environmental determinants of BMI and prevalence of overweight/obesity

Prices and Youth Diet & Weight

Data:

- ACCRA data on food prices
 - Fast food: burger, pizza, fried chicken
 - “basket” of fast foods
 - Fruit & Vegetables: lettuce, potatoes, bananas
 - “basket” of fruit and vegetables
- D&B data on restaurant availability
- MTF data on student reports of healthy eating, height and weight (1997-2003)
 - frequency of fruit and vegetable consumption; BMI, and indicator for overweight

Prices and Youth Diet & Weight

- Find that:
 - youth in communities with lower fruit and vegetable prices have more frequent fruit & vegetable consumption and lower BMI
 - youth in communities with lower fast food prices have less frequent fruit & vegetable consumption, higher BMI, and are more likely to be overweight
 - *10 percent rise in fast food prices would increase probability of frequent F&V consumption by 3%, reduce BMI by 0.4% and lower probability of being overweight by 5.9%*

Prices and Youth Diet & Weight

Follow up analysis explores differential impact on youth at greater risk for obesity

- Data
 - ACCRA data on food prices
 - Dun & Bradstreet outlet data
 - MTF data on BMI and overweight (1997-2003)
- Quantile regression analysis
 - Allows assessment of differential impact of price/availability for youth at different BMI
 - Highlight upper end of the distribution (90th and 95th percentiles for BMI)

Prices and Youth Diet & Weight

- Find that:

- *Impact of both fast food and fruit & vegetable prices greatest among youth in top of BMI distribution (most at risk group)*

- Above 90th percentile, fast food price impact 4 times larger than average effect for full sample

- Above 95th percentile, fruit & vegetable price impact 5 times larger than average effect

- Less impact of prices at low/mid-ranges of BMI

Prices and Youth Diet & Weight

- Estimate that:
 - 10 percent drop in fruit/vegetable prices would
 - lower BMI by almost 5% among males in 95th percentile
 - Lower BMI by almost 6% among females in 95th percentile
 - 10 percent rise in fast food prices would
 - lower BMI by 10% among males in 90th percentile
 - Lower BMI by 11% among females in 90th percentile

Limitations

- Potential measurement error in self-reported weight outcomes
 - Some evidence of under-reporting; other studies find mostly accurate
- Limited measures of physical activity and diet
- Measurement error in price and outlet density measures matched by school not student location
- Cross-sectional data can't establish causality



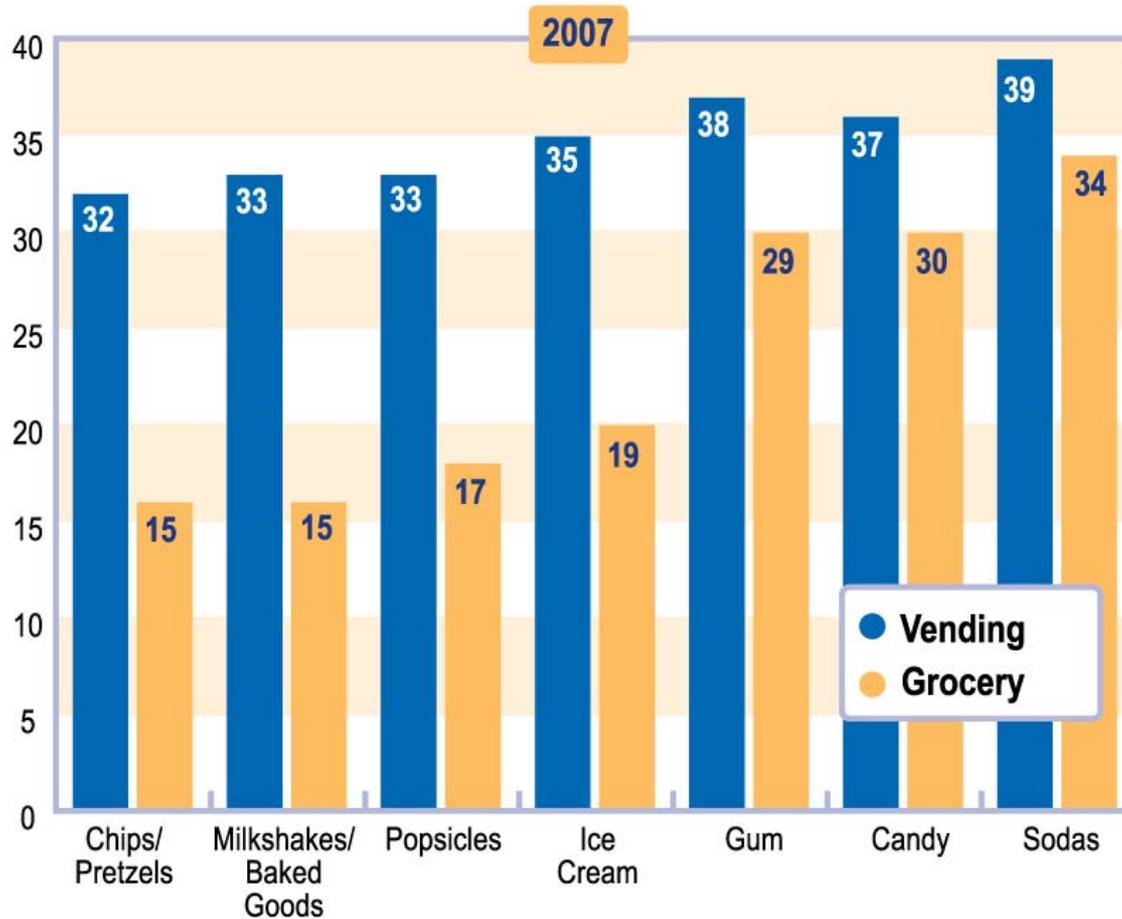
State Tax Policy: Food Consumption and Obesity



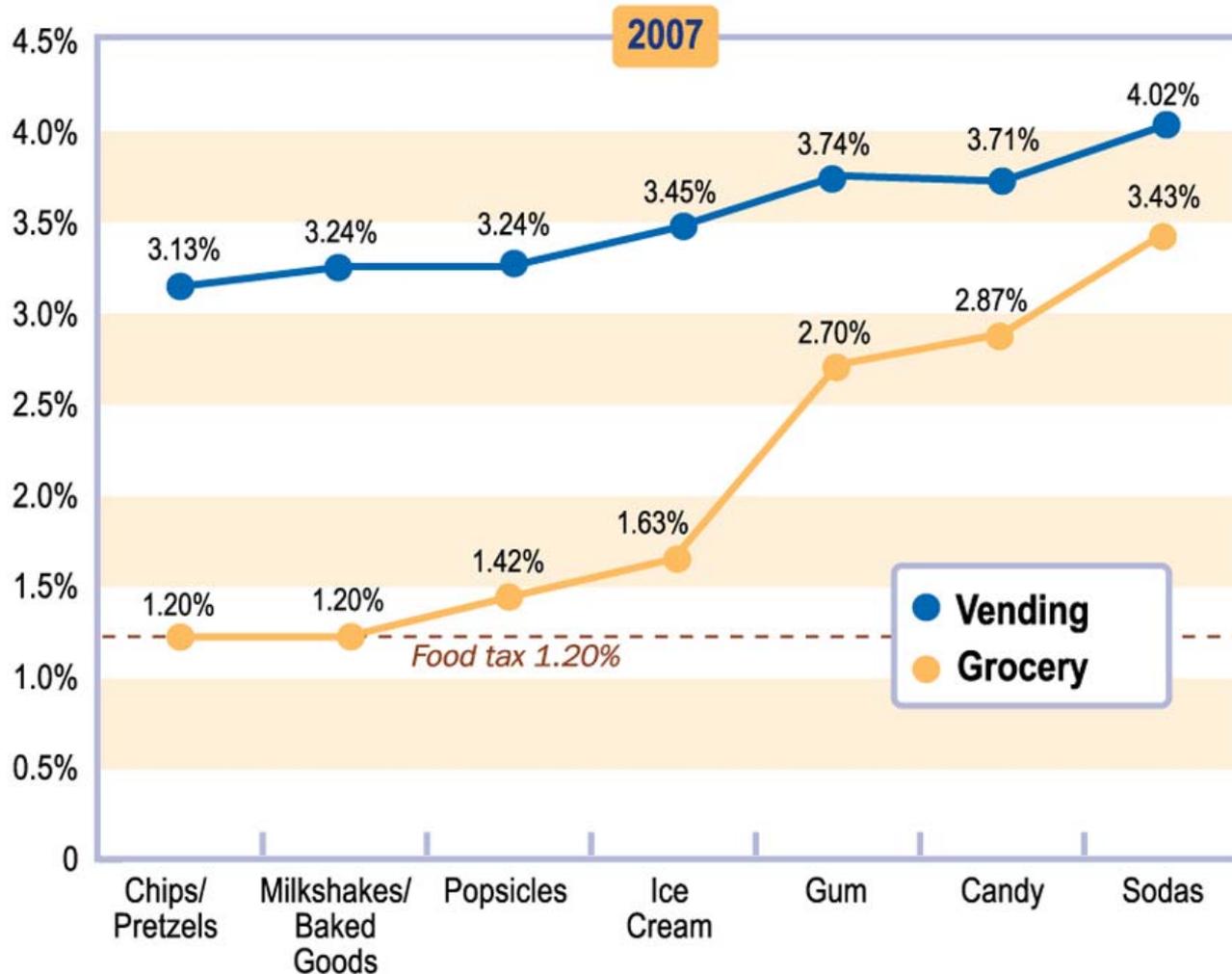
State Policy Monitoring

- State sales tax rates for snacks and sodas sold through grocery stores and vending machines
 - Annual data compiled for 1/1/97 through 1/1/08
 - Descriptive manuscript regarding the 2007 data published in *Journal of Public Health Policy*, 2008
- State sales tax rates for restaurants, fast food/carryout
 - Annual data compiled for 1/1/97 through 1/1/08

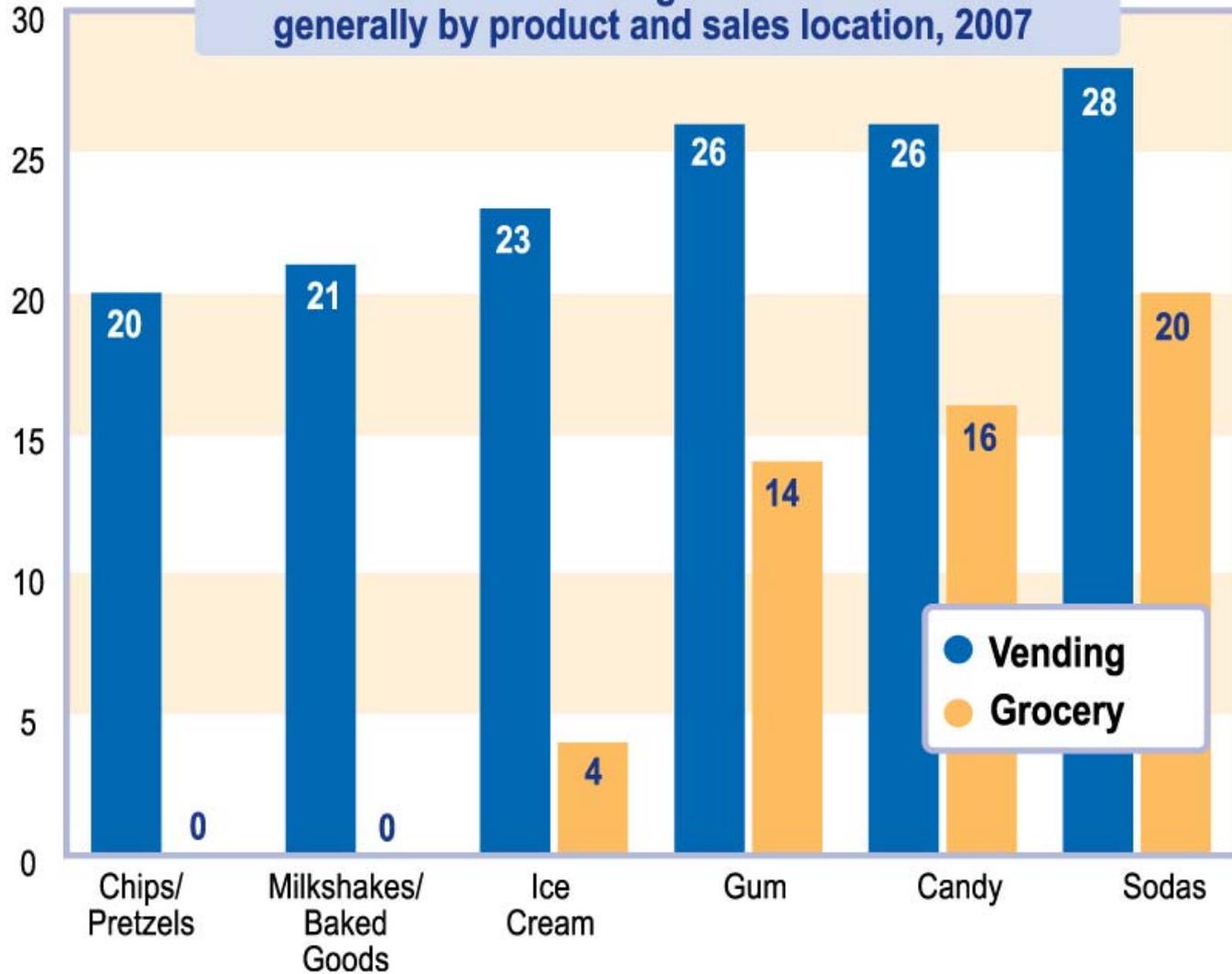
Number of states with sales taxes for selected snacks and sodas by sales location, 2007



State sales tax rates for selected snacks and sodas by sales location, 2007



Number of states with higher sales tax than food generally by product and sales location, 2007

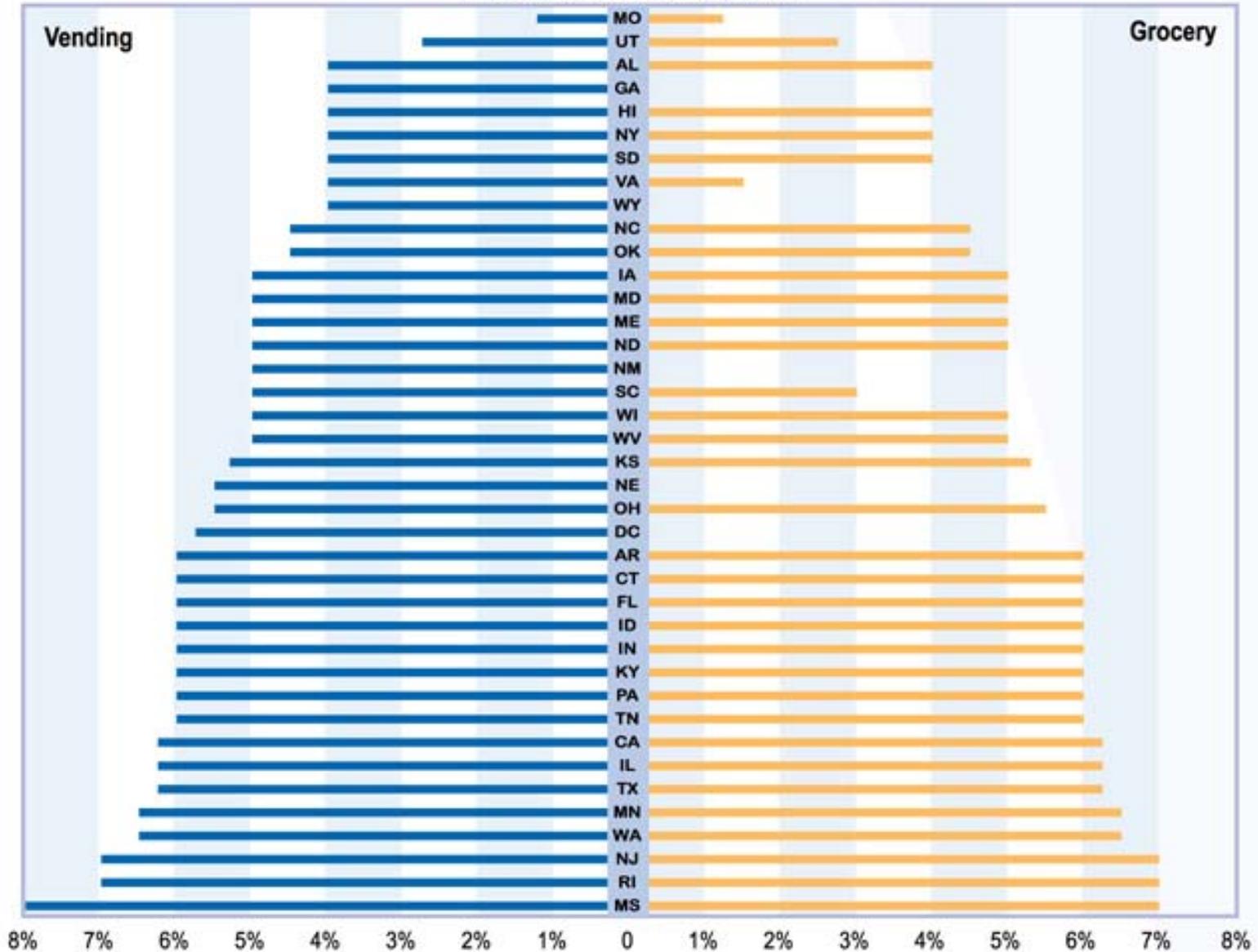


Sales tax rates for candy, 1/1/07



The following states do not impose a sales tax on candy for vending/grocery sales:
 AK, AZ, CO, DE, LA, MA, MI, MT, NH, NV, OH, OR, and PA.

Sales tax rates for sodas, 1/1/07



The following states do not impose a sales tax on sodas for vending/grocery sales:
 AK, AZ, CO, DE, LA, MA, MI, MT, NH, NV, OR, and VT.

State excise taxes

- Historically, limited number of states have applied excise taxes to sodas
 - Applied to manufacturer, wholesaler, distributor, or retailer
 - Tax on bottles, syrup, or powder/mix
- Most of these taxes repealed during 1990s

State Soda and Junk Food Taxes

- No evidence that states have used these taxes to promote healthier consumption and/or reduce obesity
- Primary motive for these taxes appears to be revenue generation
- Some states earmark revenues, but not for obesity prevention efforts

Summary

- Evidence for other health behaviors demonstrates effectiveness of price-related policies in promoting healthy behavior
 - Best example from cigarette smoking
- Fast food and fruit & vegetable prices have relatively strong impact on fruit & vegetable consumption, weight outcomes among adolescents
 - greatest impact at the upper end of weight distribution
 - Suggests that noticeable changes in relative prices of healthier and less healthy foods/beverages can lead to healthier eating and better weight outcomes
- Many states currently tax less healthy foods/beverages at differential rates
 - Primary motive appears to be revenue generation rather than improving public health

Issue: Food Pricing

Recommendation: Modest taxes on unhealthy foods and beverages can generate significant revenues for efforts targeting obesity; more significant taxes can change consumption patterns and improve weight outcomes.

Rationale: Experiences with tobacco demonstrate how taxes can be used as a tool for improving public health. Many states already tax less healthy foods and beverages at different rates than more healthy options. Emerging evidence shows that food and beverage prices significantly affect consumption choices, particularly among youth at greater risk for obesity.

*Author: Frank Chaloupka; see Chriqui JF, Eidson SS, Bates H, Kowalczyk S, Chaloupka FJ (2008) State sales tax rates for soft drinks and snacks sold through grocery stores and vending machines, 2007. *Journal of Public Health Policy* 29:226-249; and Powell LM, Chaloupka FJ (2008) Food Prices, Diet and Obesity: Policy Implications for Taxes and Subsidies, manuscript, under review.*



*A Policy Research Partnership
for Healthier Youth Behavior*



Youth,
Education,
& Society

www.impactteen.org

www.yesresearch.org

www.monitoringthefuture.org