

**tobacconomics**

Economic Research Informing Tobacco Control Policy

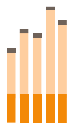
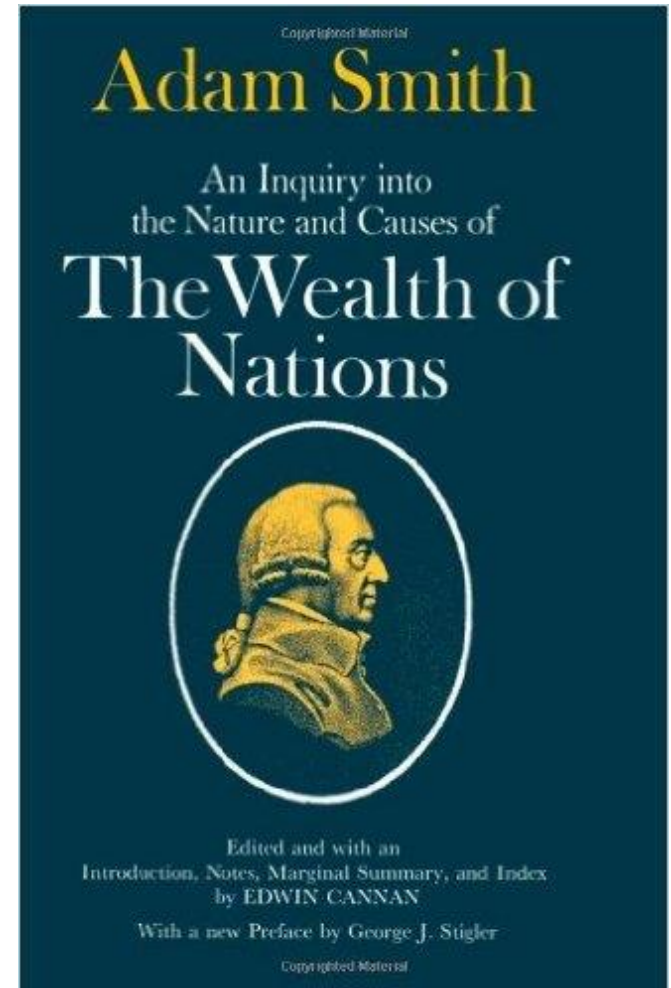
# Research on Tobacco Taxation

Frank J. Chaloupka, University of Illinois at Chicago

South Eastern Europe Tobacco Tax Workshop

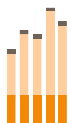
Warsaw, Poland, 10 May 2018

**" Sugar, rum, and tobacco, are commodities which are no where necessaries of life, which are become objects of almost universal consumption, and which are therefore **extremely proper subjects of taxation.****



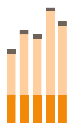
# Taxes, Prices & Tobacco Use

- **Aggregate demand studies**
  - Variety of studies:
    - Pooled cross-sectional time-series studies
      - State, provincial, other subnational data
    - Time-series studies
    - Many countries, states
  - Alternative modeling of addiction
    - No accounting for addiction
    - Myopic addiction
    - Rational addiction

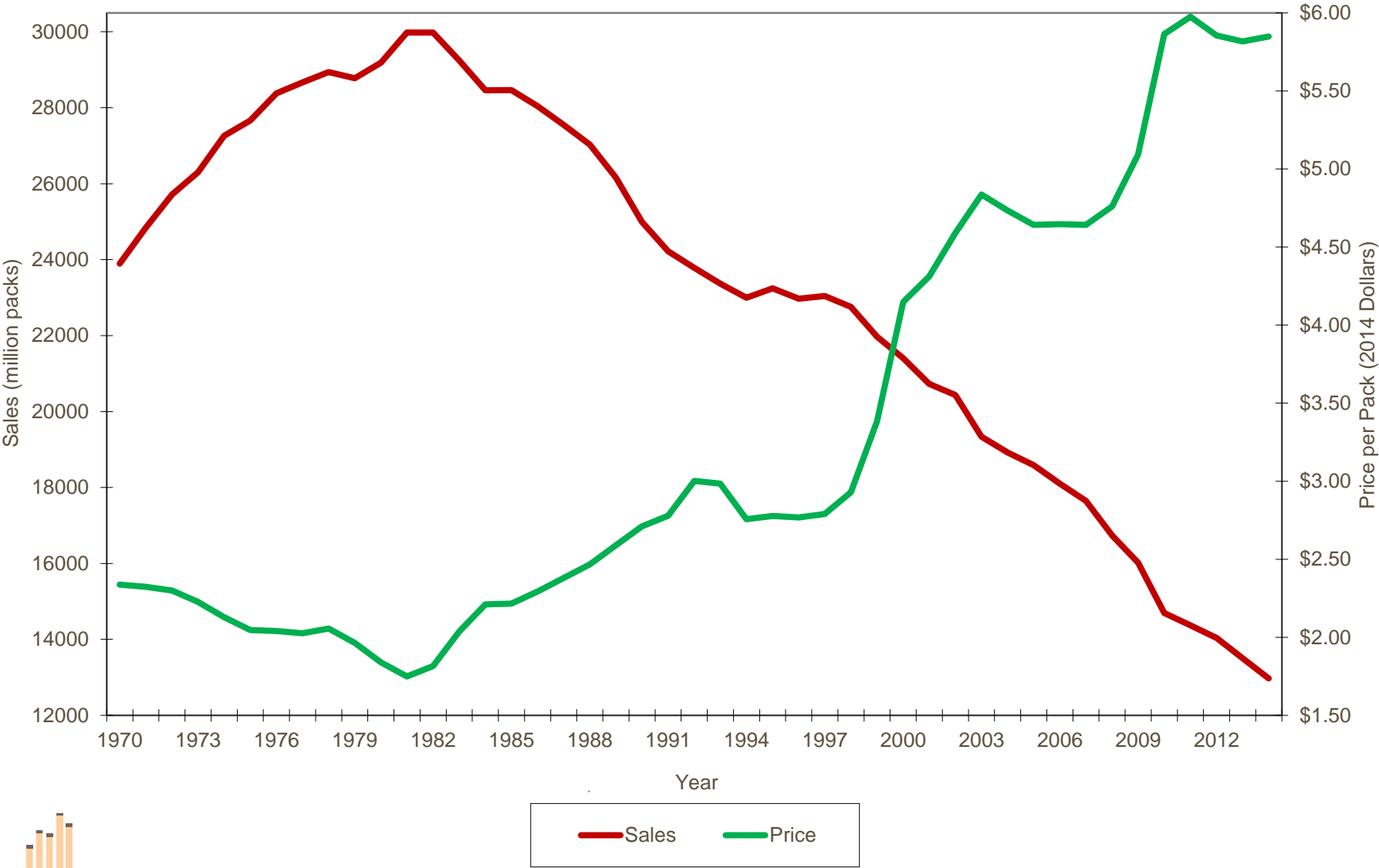


# Taxes, Prices & Tobacco Use

- **Aggregate demand studies**
  - Modeling issues
    - Account for opportunities for tax avoidance and evasion
      - Use of tax paid sales data will overstate elasticity when significant opportunities exist
    - Control for other policies
    - Potential endogeneity of prices, policies
    - Functional form
    - Fixed/random effects models for CSTS data



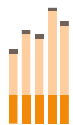
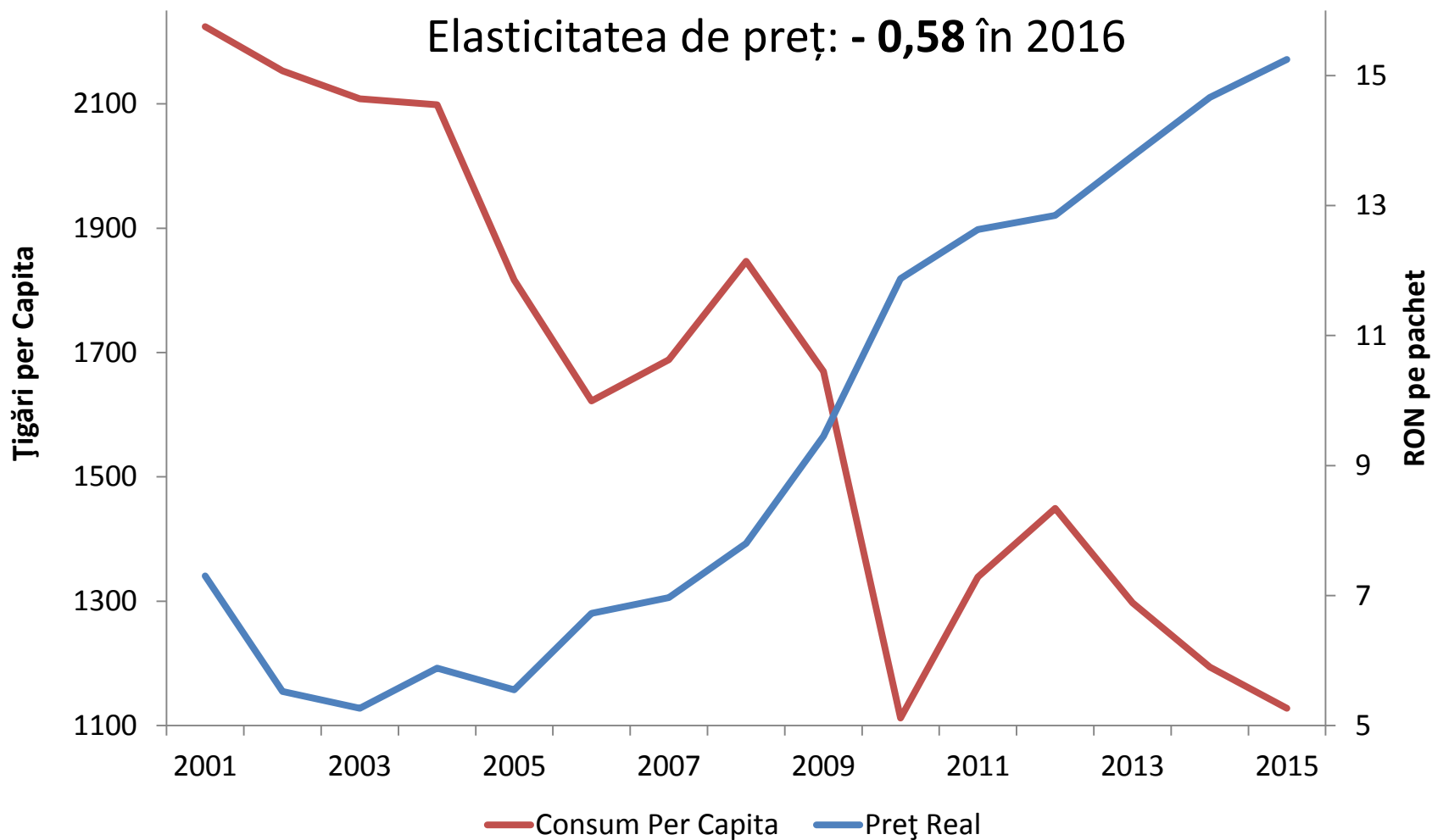
# Cigarette Prices and Cigarette Sales United States, 1970-2014



Source: *Tax Burden on Tobacco*, 2015, and author's calculations

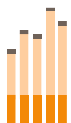


# Prețurile țigărilor ajustate la inflație și consumul de țigări pe cap de locuitor, România, 2001 – 2015



# Taxes, Prices & Tobacco Use

- **Individual/household demand studies**
  - Variety of data:
    - Cross-sectional data on prevalence, frequency, consumption
    - Repeat cross-sectional data
    - Retrospective data
    - Cohort/longitudinal data
    - Expenditure data
  - Alternative modeling of addiction
    - No accounting for addiction
    - Myopic addiction
    - Rational addiction



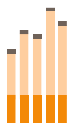
# Compensatory Model of Price Effects



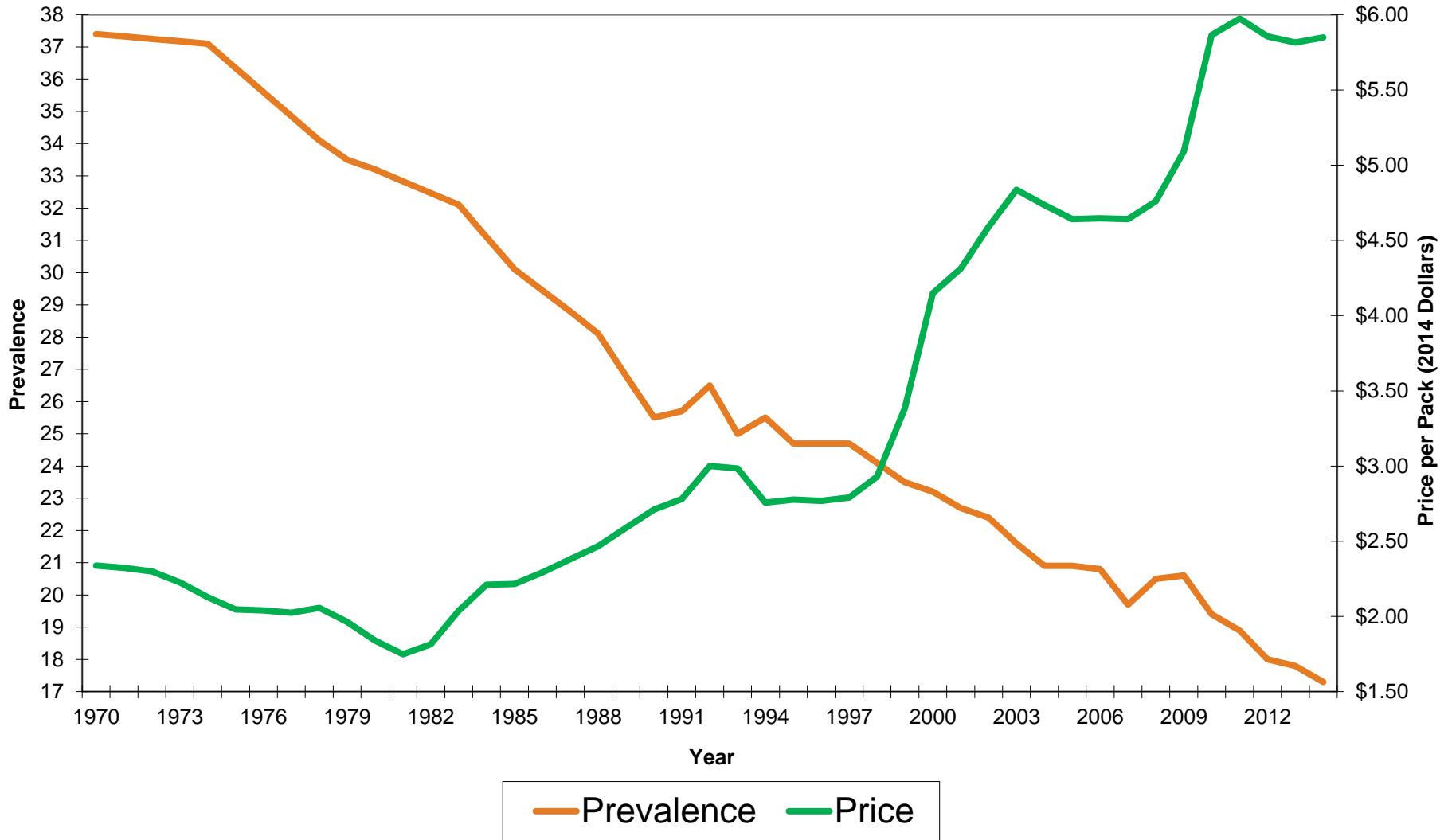


# Taxes, Prices & Tobacco Use

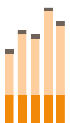
- **Individual/household demand studies**
  - Modeling issues
    - Price data
      - Matched from external sources; less concern about endogeneity
      - From self-report - endogeneity of price a problem
    - Treatment of opportunities for tax avoidance and evasion
      - Use of external price data will understate elasticity when significant opportunities exist
    - Consider impact on multiple behaviors
      - Prevalence, frequency, intensity, initiation, cessation, substitution, brand choice, purchase behavior, tax avoidance.....
    - Examine impact in different populations
      - By age, gender, race/ethnicity, SES.....



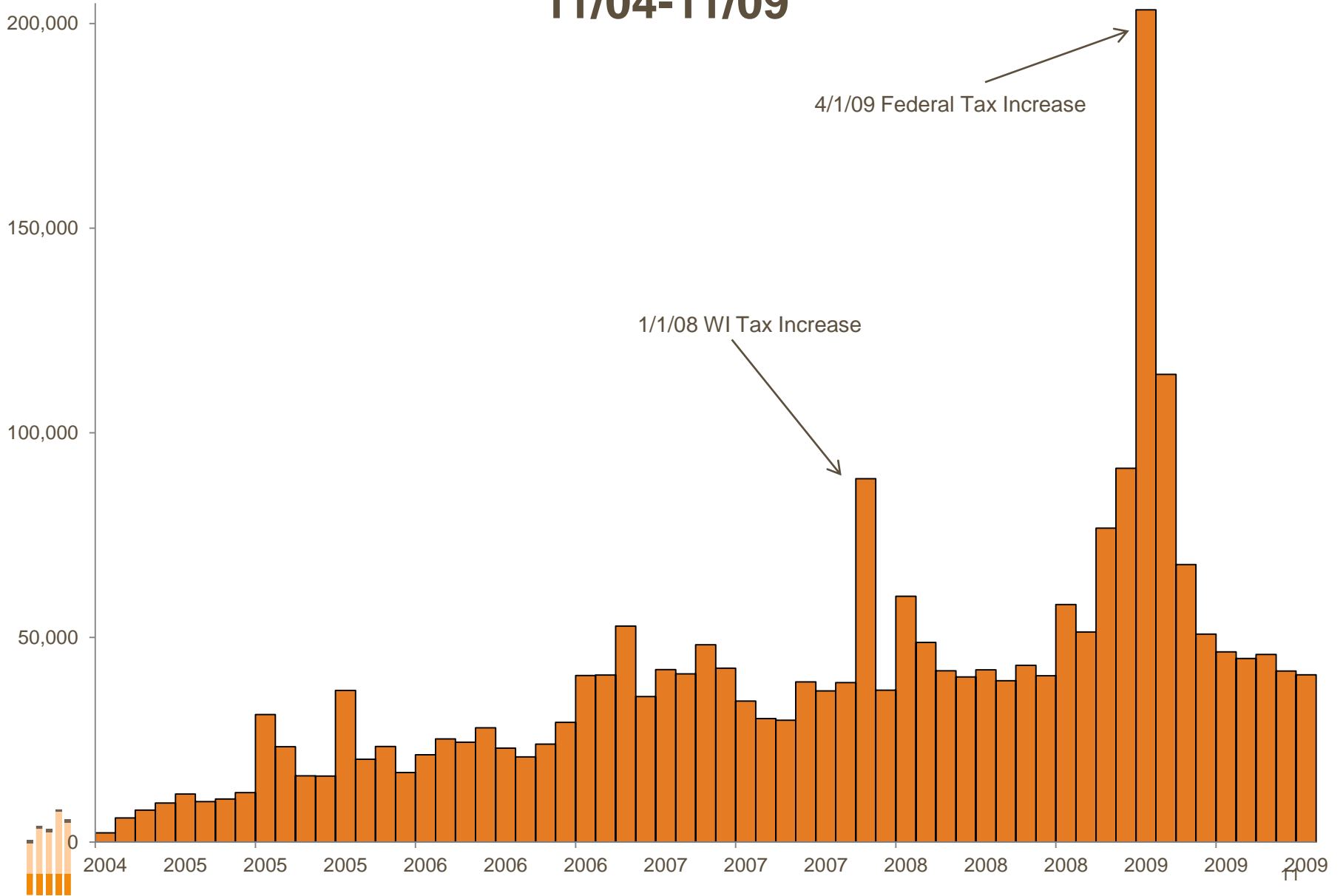
# Cigarette Prices and Adult Smoking Prevalence United States, 1970-2014



Source: NHIS, *Tax Burden on Tobacco*, 2015, and author's calculations  
 Note: green data points for prevalence are interpolated assuming linear trend

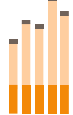
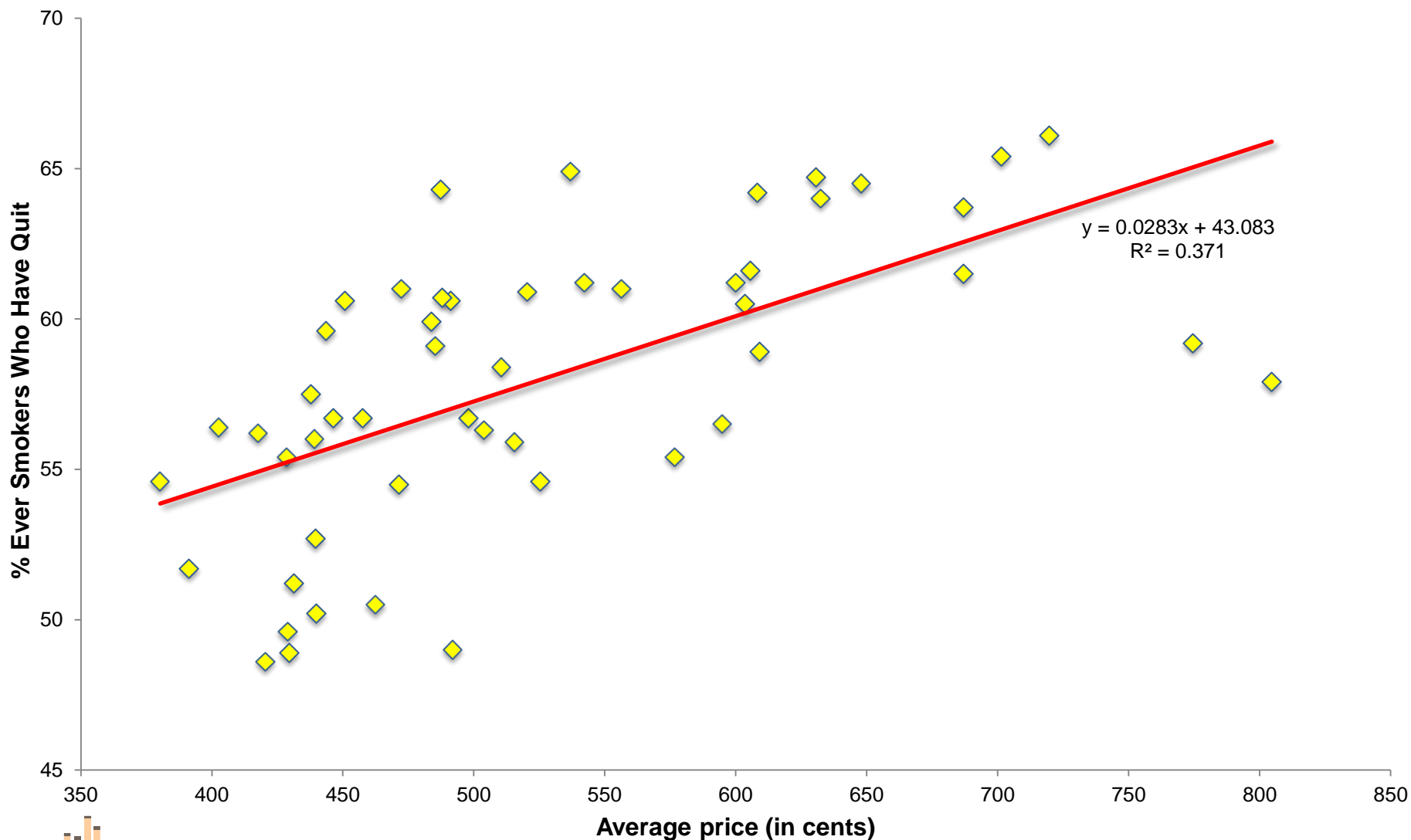


# Monthly Quit Line Calls, United States 11/04-11/09

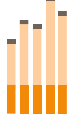
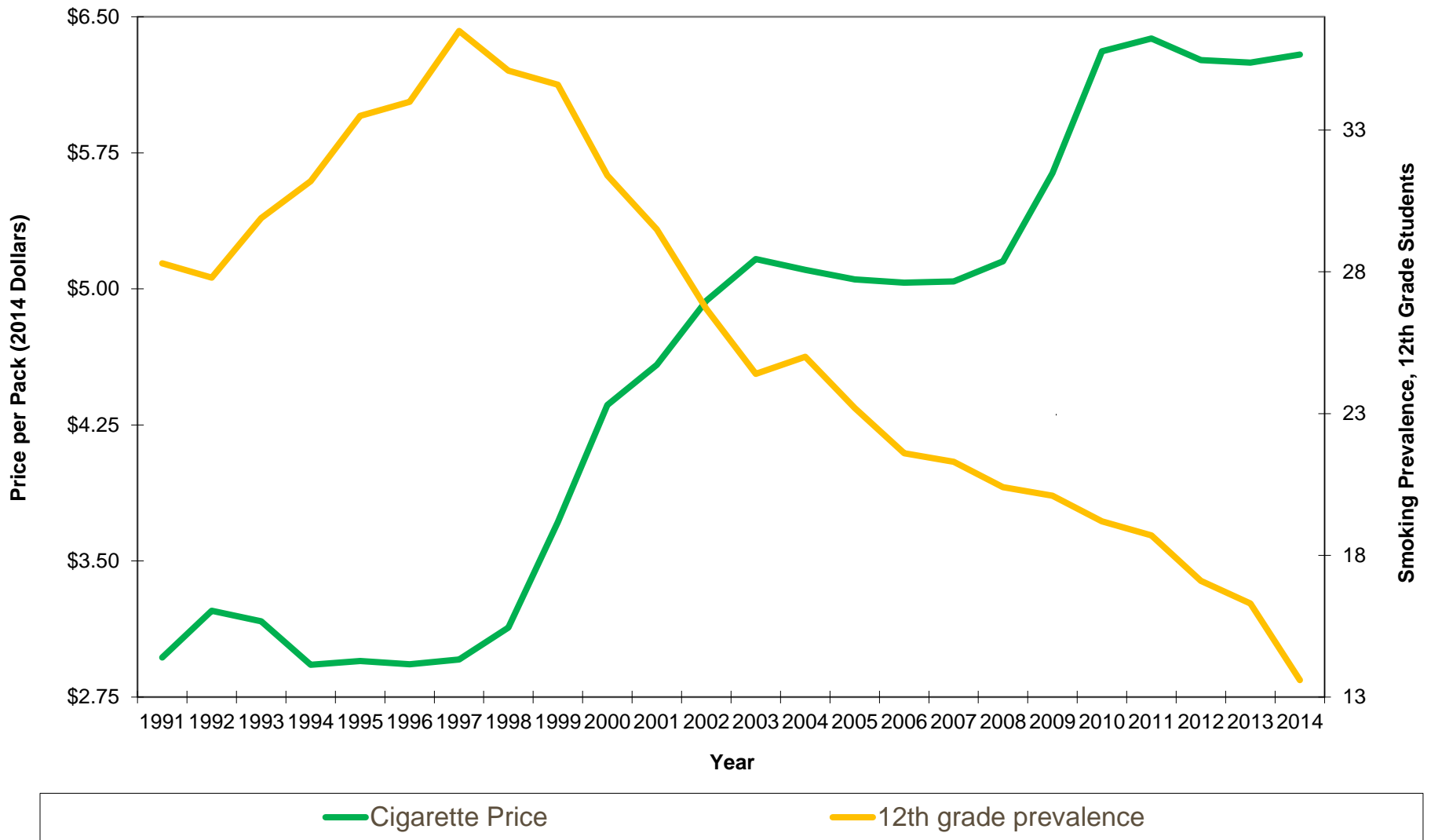


# Cigarette Prices and Cessation

## US States & DC, 2009

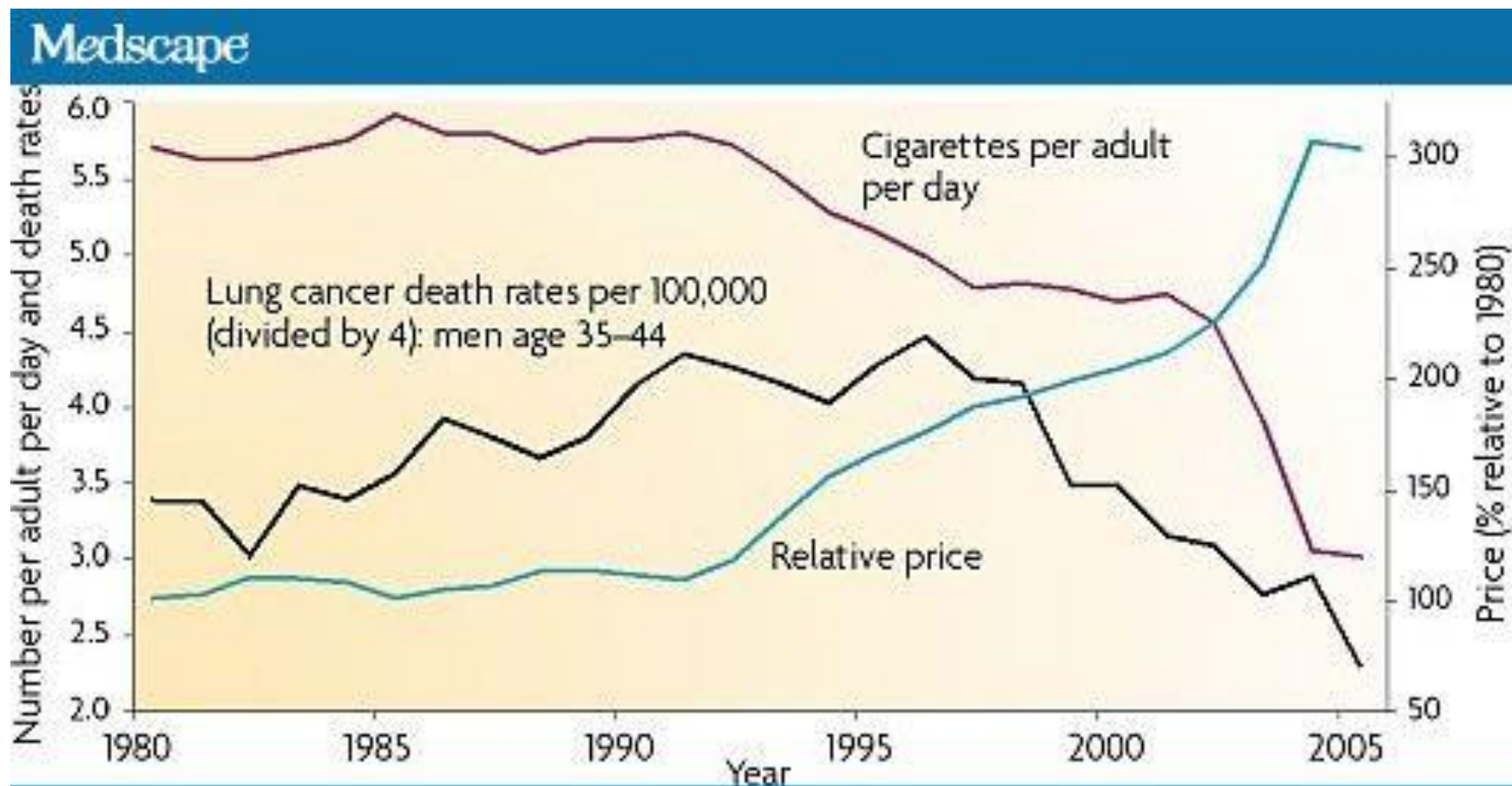


# Cigarette Price and Youth Smoking Prevalence Seniors, United States, 1991-2014



Source: MTF, *Tax Burden on Tobacco*, 2015, and author's calculations

# Taxes, Prices and Health: US, 1980-2005

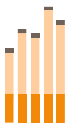


Source: Nat Rev Cancer © 2009 Nature Publishing Group



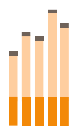
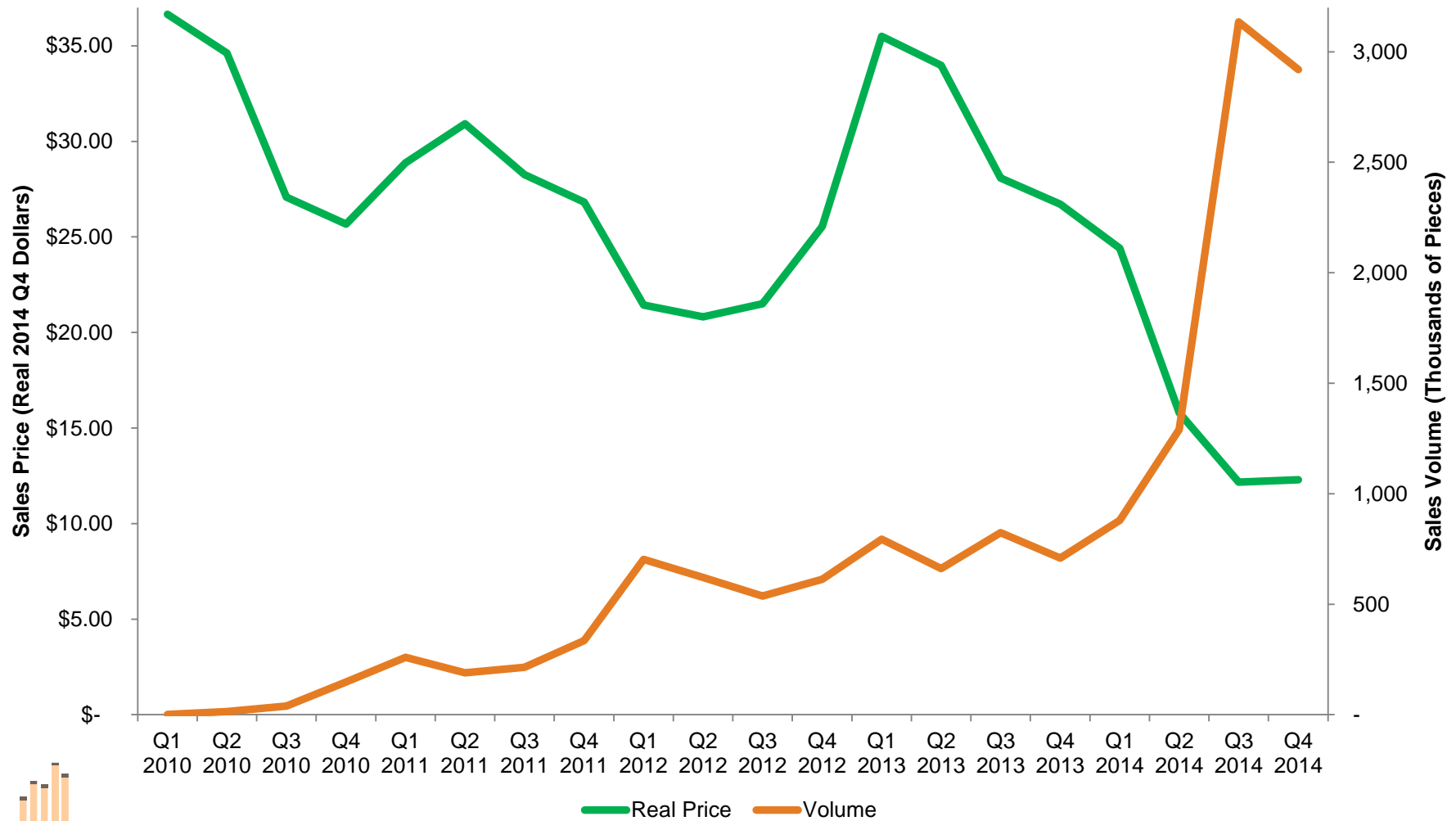
# Prices and Tobacco Use

- Similar evidence for variety of other tobacco products
  - Generally see evidence of greater elasticity for non-cigarette tobacco products
  - Substitution among similar products, particularly combustible products
  - Some complementarity among combustible and non-combustible products



# Reusable ENDS

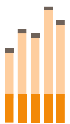
## Sale Volume and Price, US 2010 - 2014





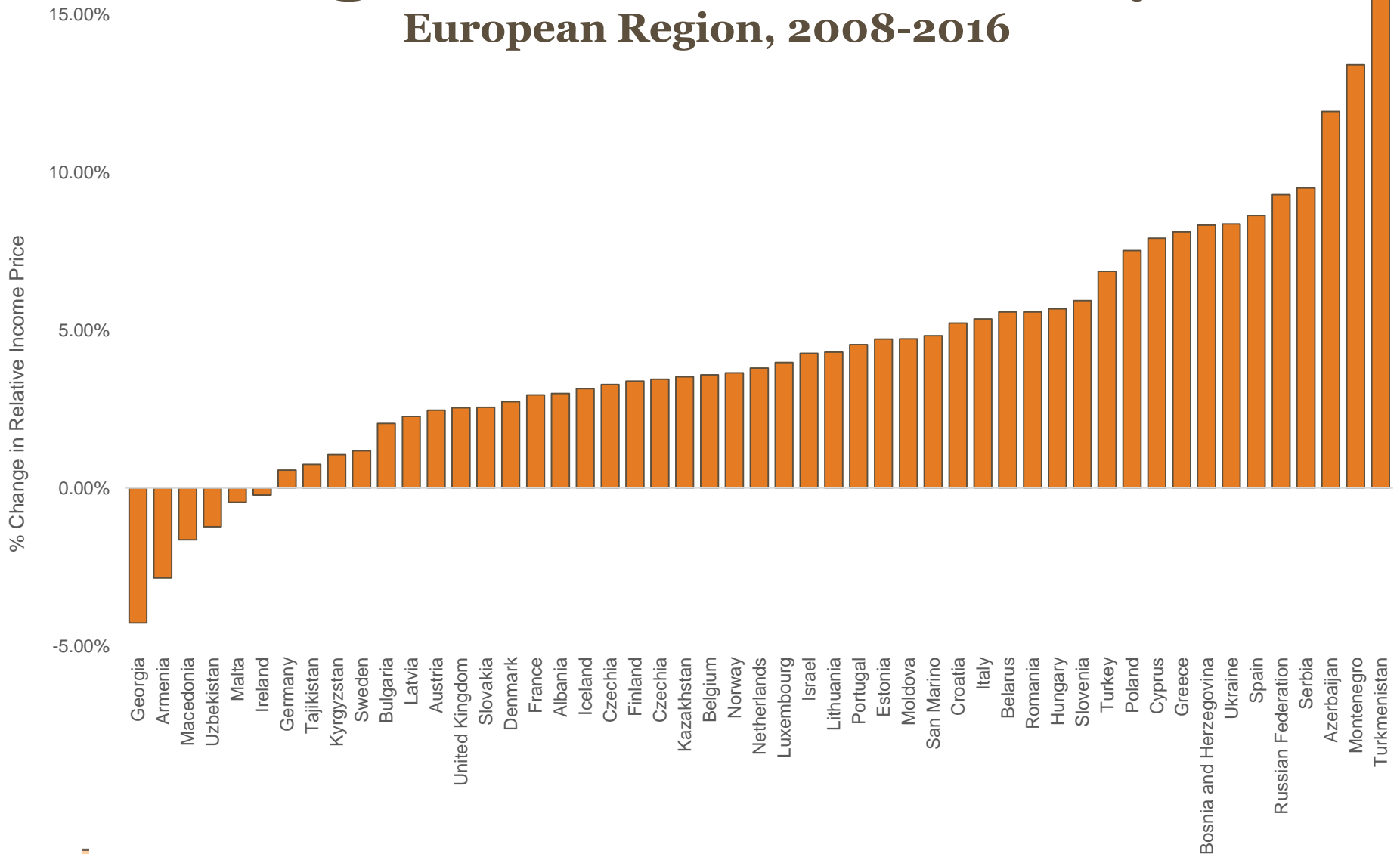
# E-Cigarette Prices & Sales

- Stoklosa, Drope & Chaloupka (2016)
  - 2011-2014 monthly Nielsen data on e-cigarette sales in six EU countries (Estonia, Ireland, Latvia, Lithuania, Sweden, and UK)
  - Own price elasticities range from -0.83 to -0.87
  - E-cigarette sales generally positively associated with cigarette prices, but mostly not statistically significant



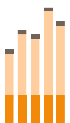
# Cigarette Affordability

European Region, 2008-2016



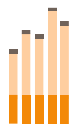
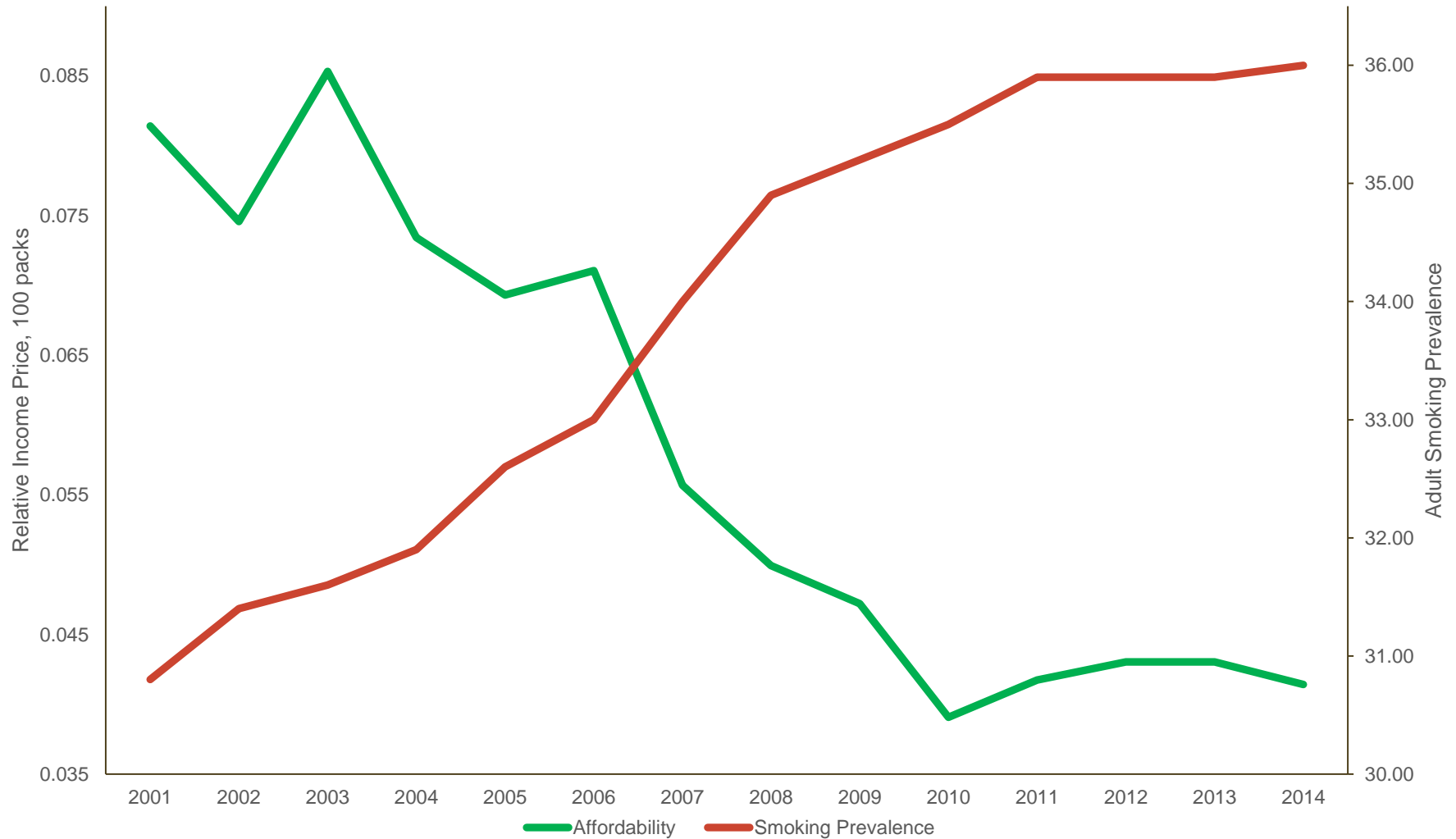
Notes: Relative income price is the percentage of annual per capita GDP required to buy 100 packs of most popular brand of cigarettes.

Source: WHO 2017



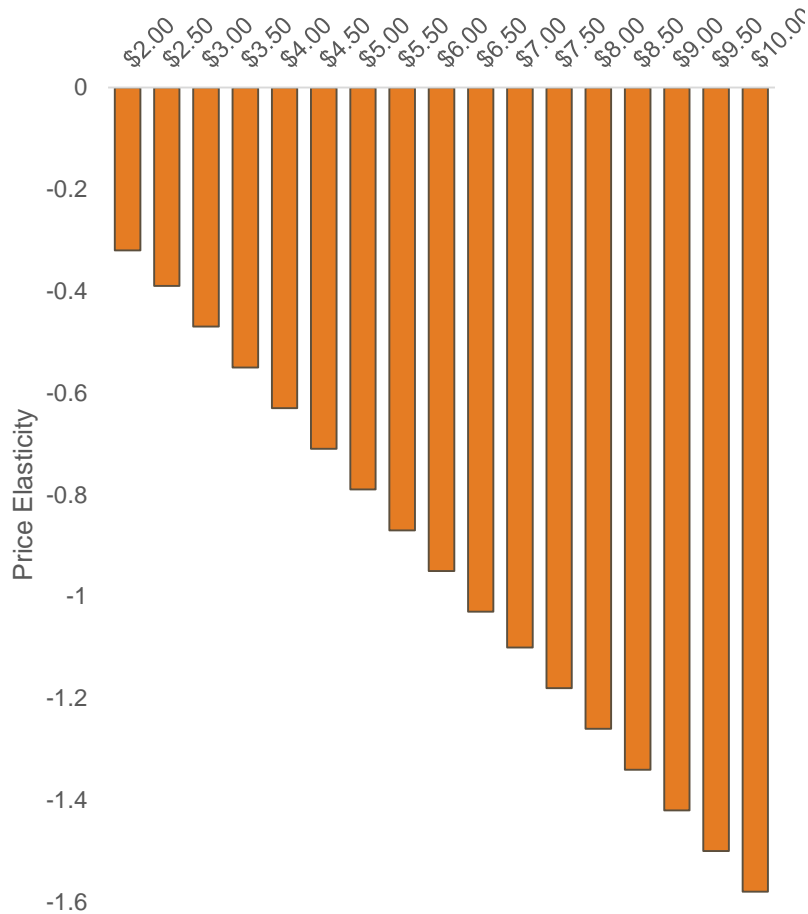
# Affordability & Tobacco Use

## Adult Smoking Prevalence, Indonesia, 2001-2014

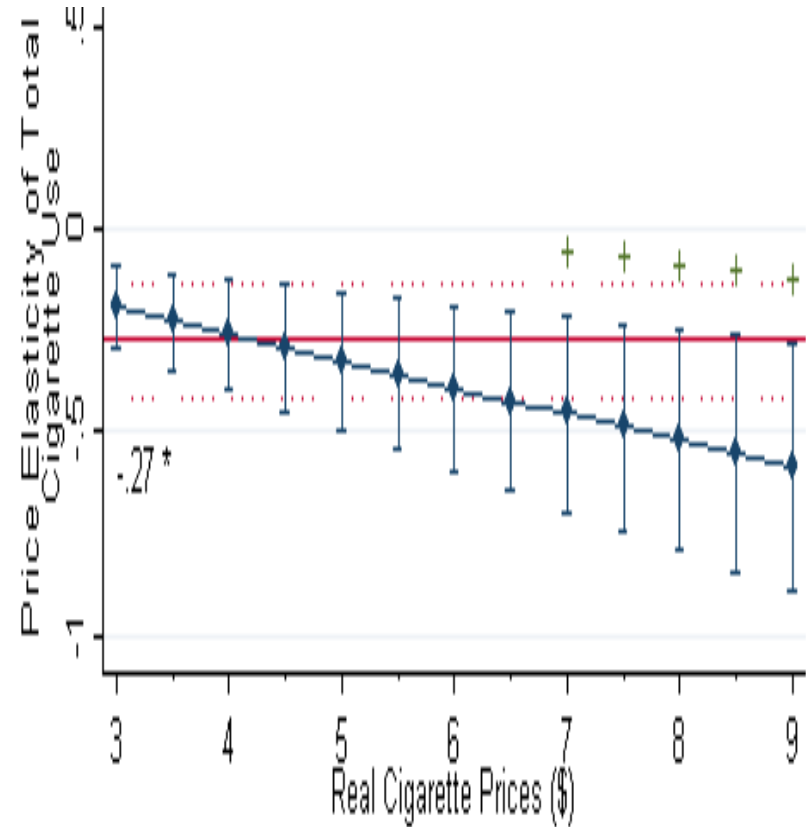


Sources: Euromonitor, EIU, World Bank, and Authors' Calculations

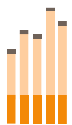
# Increasing Elasticity with Increasing Price



State tax-paid sales

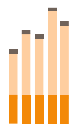
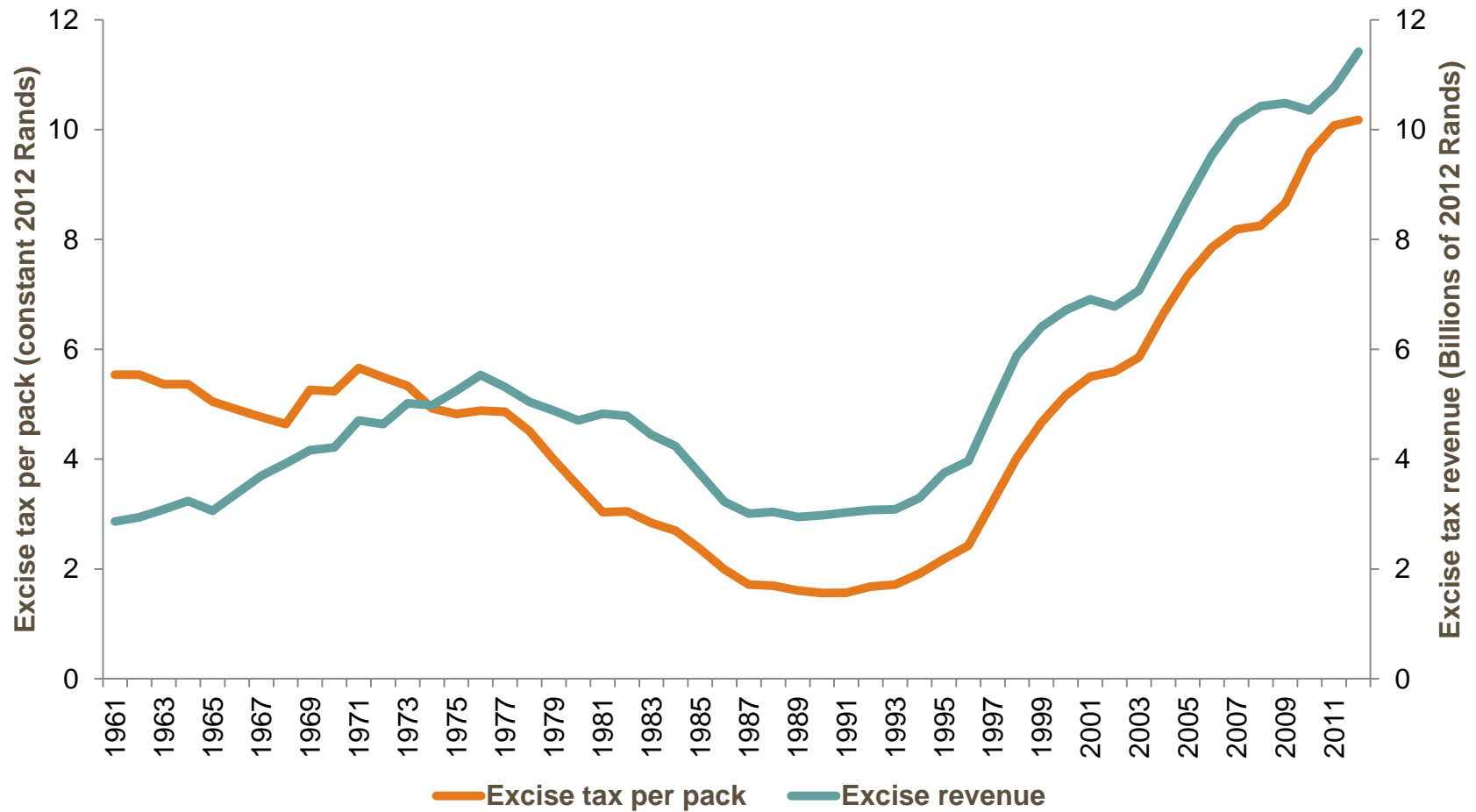


TUS-CPS Prevalence & Consumption

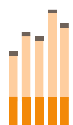
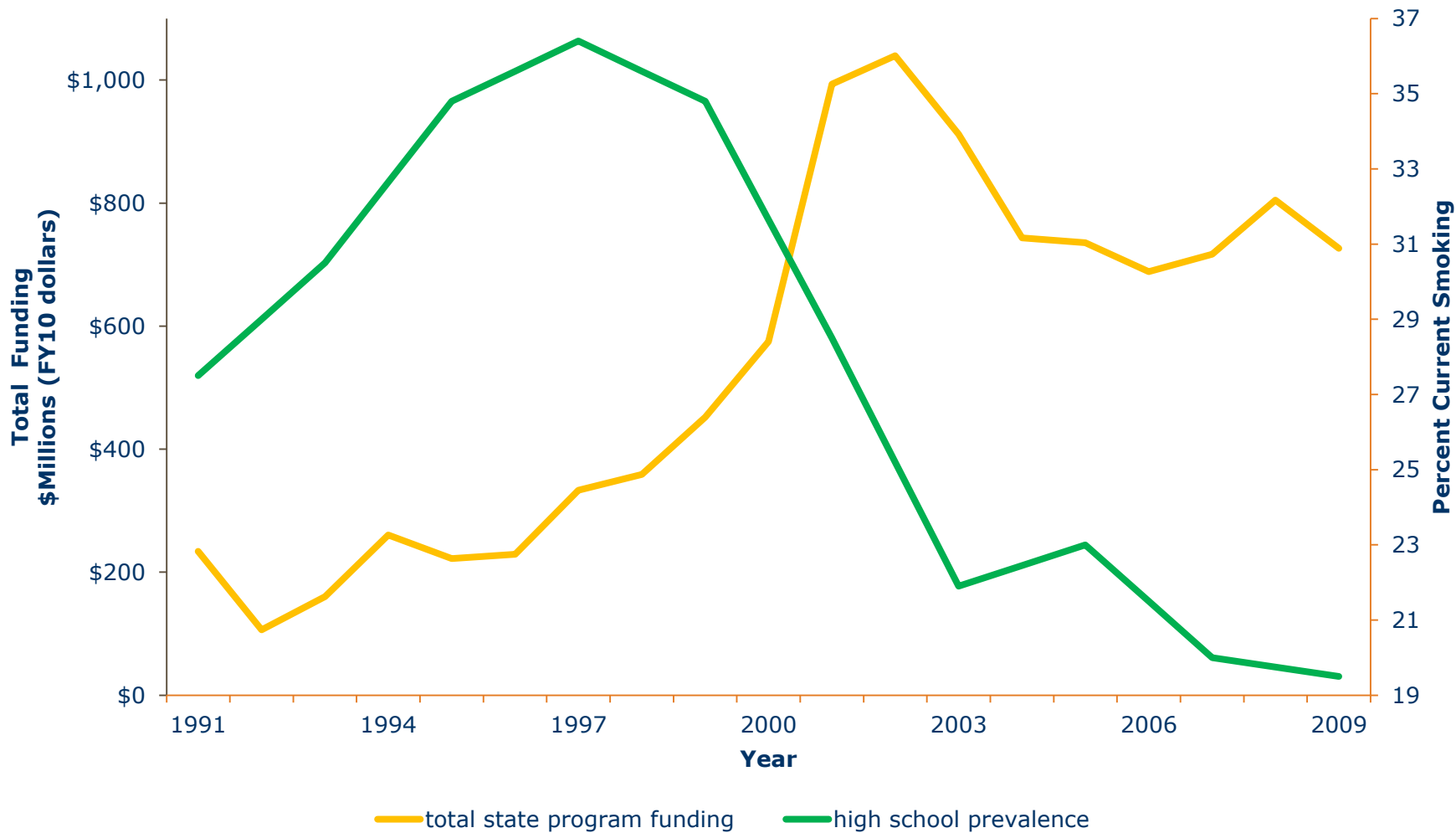


# Tobacco Taxes and Revenues

South Africa, 1961-2012



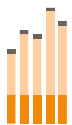
# State Tobacco Control Program Funding and Youth Smoking Prevalence, United States, 1991-2009



Source: ImpacTeen Project, UIC; YRBS

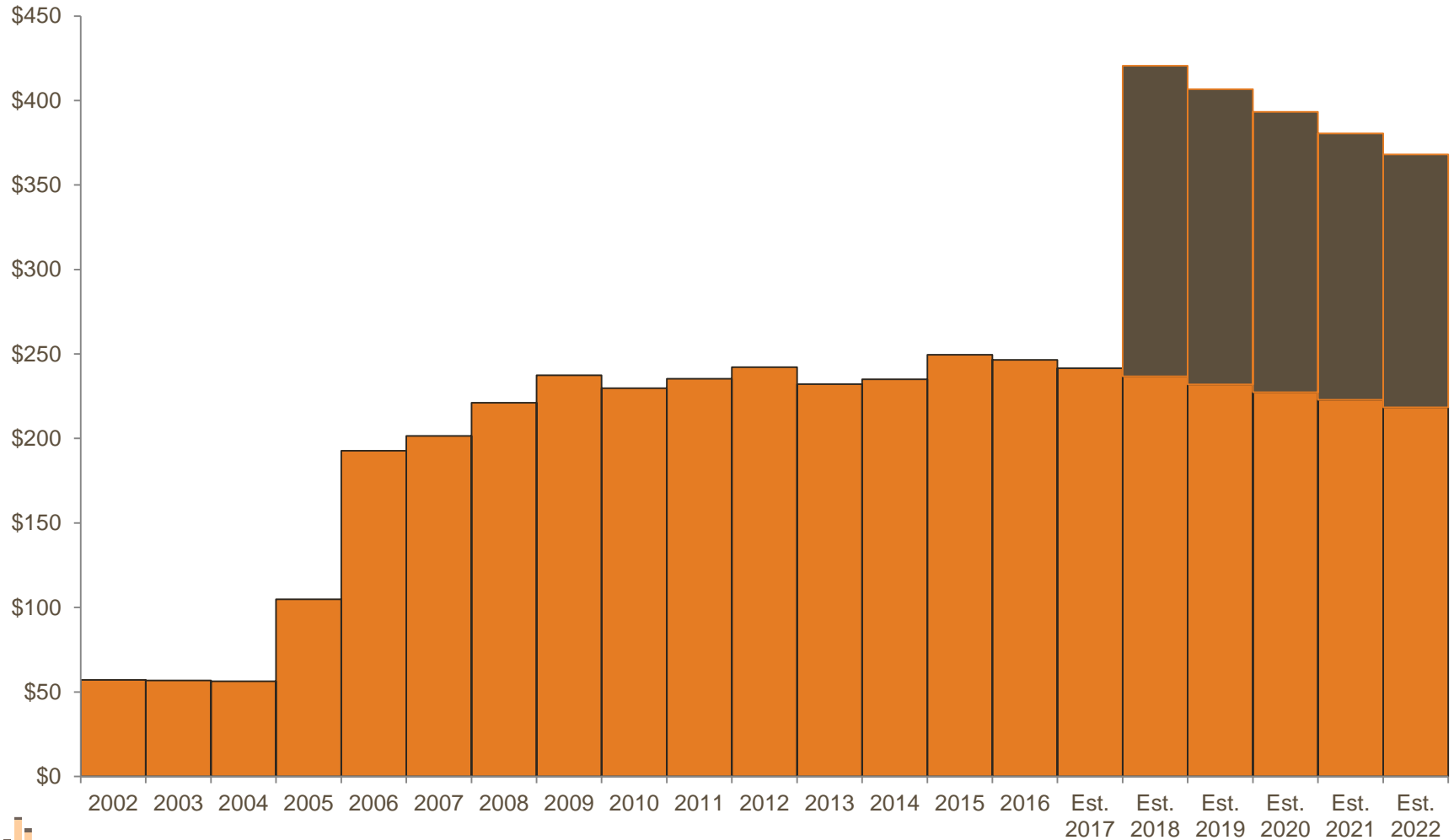
# Potential Impact

- \$1.50 Increase in cigarette excise tax in Oklahoma would:
  - Raise \$183.9 million in *new* tax revenue
  - Prevent 28,200 kids from taking up smoking
  - Encourage 30,400 adult smokers to quit
  - Prevent 16,700 premature deaths from smoking
  - Reduce smoking-complicated pregnancies and births by 4,900 in first 5 years
  - Save \$3.9 million in Medicaid spending in first 5 years

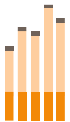


# Estimated Future Cigarette Tax Revenues Oklahoma

Without Increase    With \$1.50 Increase



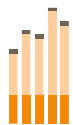
Source: CTFK, ACS-CAN & Tobacconomics, 2017





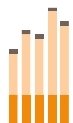
# Health Impact of Tax Increases: Philippines

	50% of price accounted for by uniform tax	Uniform specific tax of 28.3 pesos per pack (current maximum)	Uniform specific tax of 30 pesos per pack
New average cigarette tax	23.8	28.3	30.0
New average cigarette pack price	47.6	52.6	54.5
Cigarette excise tax as a percentage of price	50.0%	53.8%	55.0%
Reduction in number of current smokers (millions)	3.20	4.05	4.37
Reduction in number of future smokers (millions)	3.35	4.24	4.57
Total reduction in number of smokers (millions)	6.55	8.29	8.95

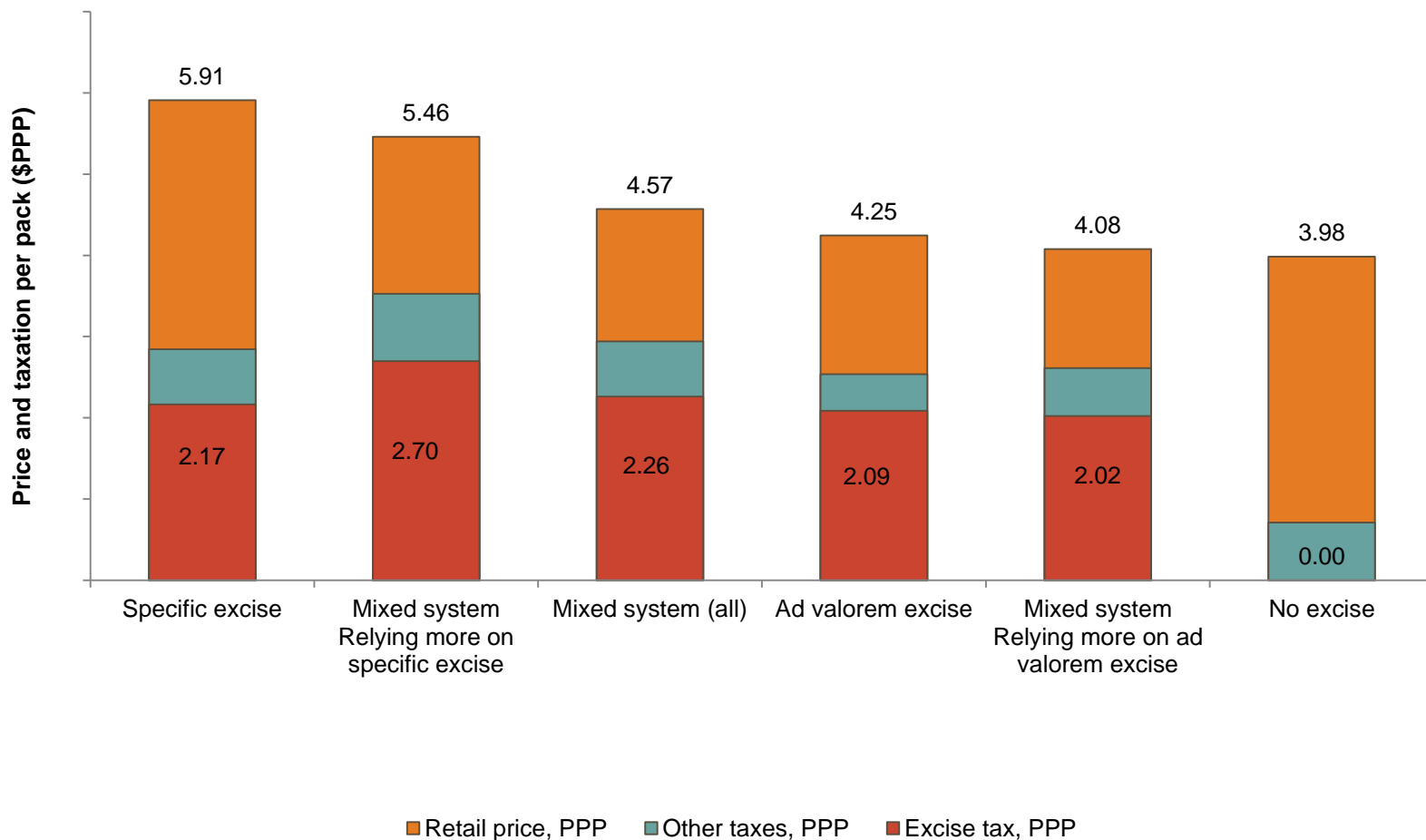


# Health Impact of Tax Increases: Philippines

	50% of price accounted for by uniform tax	Uniform specific tax of 28.3 pesos per pack (current maximum)	Uniform specific tax of 30 pesos per pack
Reduction in Premature Deaths Caused by Smoking among Current Smokers (Millions)	1.12	1.42	1.53
Reduction in Premature Deaths Caused by Smoking among Future Smokers (Millions)	1.67	2.12	2.29
Total Reduction in Premature Deaths Caused by Smoking (millions)	2.79	3.54	3.82
Percentage of premature deaths in current and future smokers averted by higher taxes	19.3%	24.4%	26.4%
Additional Excise Tax Revenues (PhP billions)	52.6	53.8	53.3

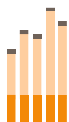


# Figure 5: Excise tax structure: Specific and mixed relying more on the specific component tend to lead to higher prices

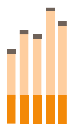
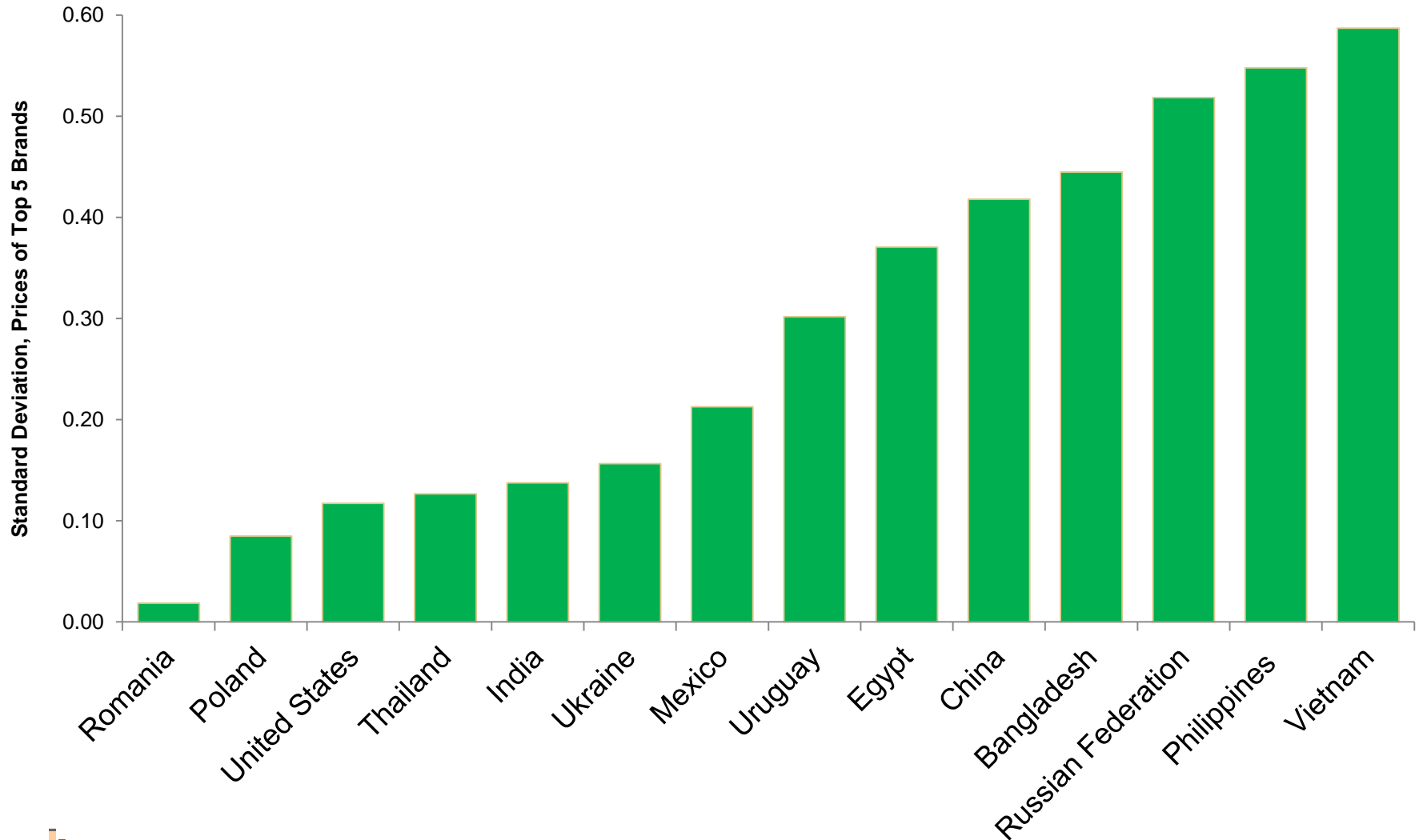


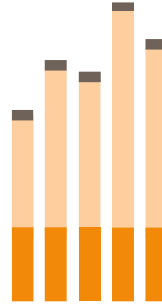
Source: WHO 2017 GTCR data; unpublished figure.

Notes: Averages are weighted by WHO estimates of number of current cigarette smokers ages 15+ in each country in 2015; Prices are expressed in Purchasing Power Parity (PPP) adjusted dollars or international dollars to account for differences in the purchasing power across countries. Based on prices as of July 2016 for 53 high-income, 100 middle-income and 27 low-income countries with data on prices of most sold brand, excise and other taxes, and PPP conversion factors.



# Excise Tax Structure and Price Variability





# Oppositional Arguments

# Figure 6 - State Cigarette Excise Tax Rates, United States, April 2015

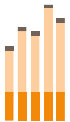
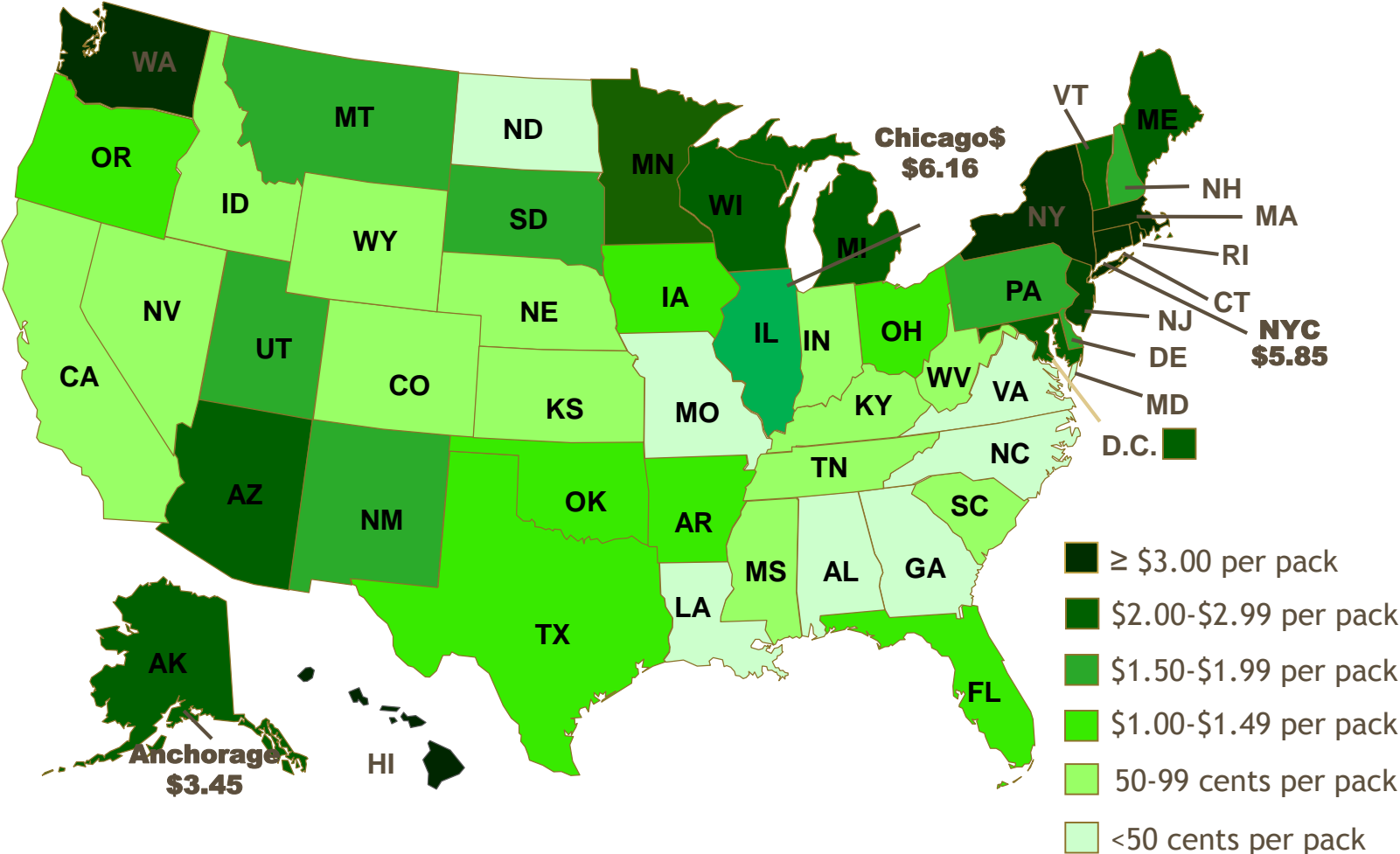
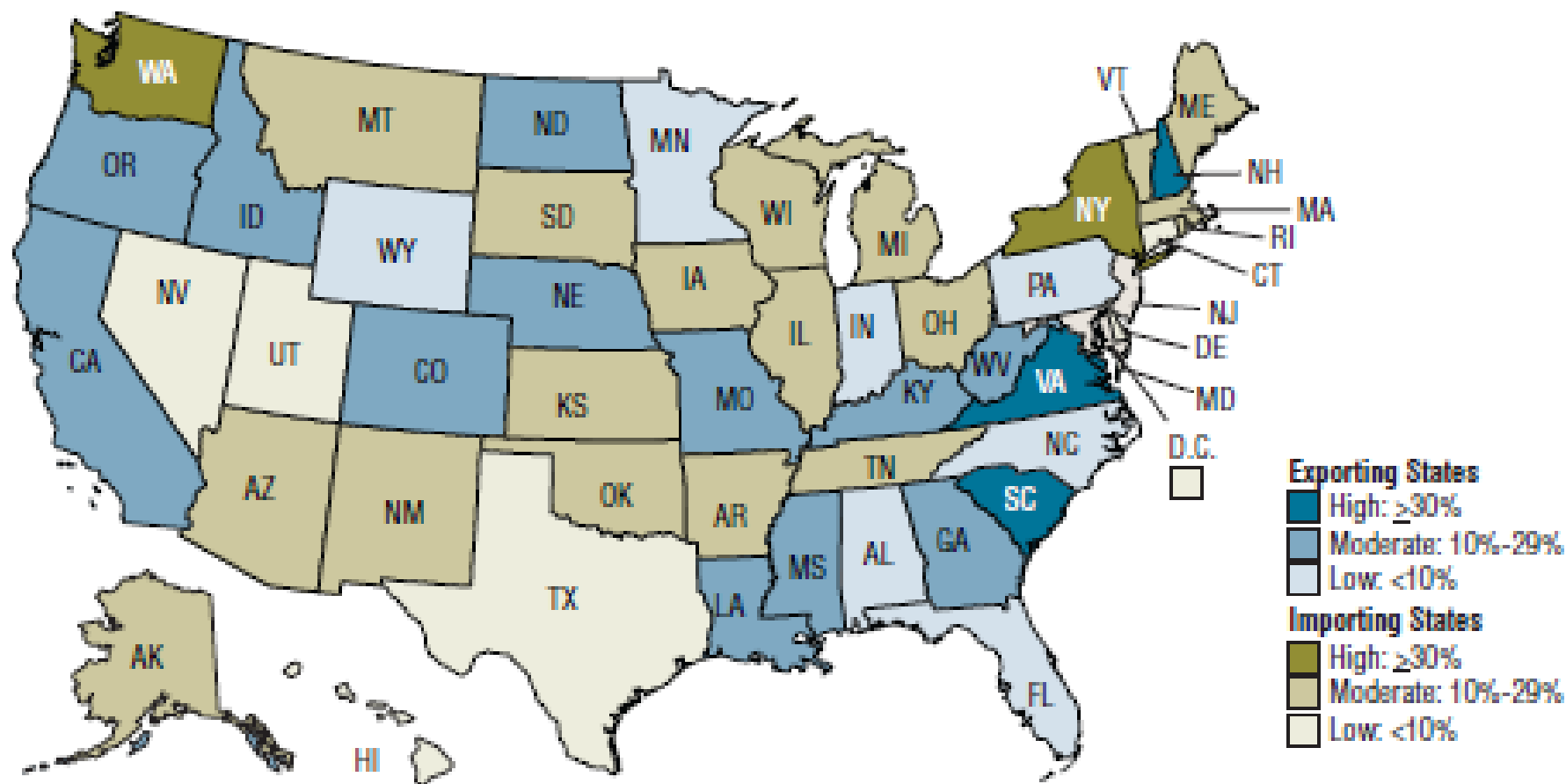
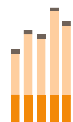


Figure 7. State Cigarette Importing/Exporting Shares, 2010-2011

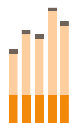
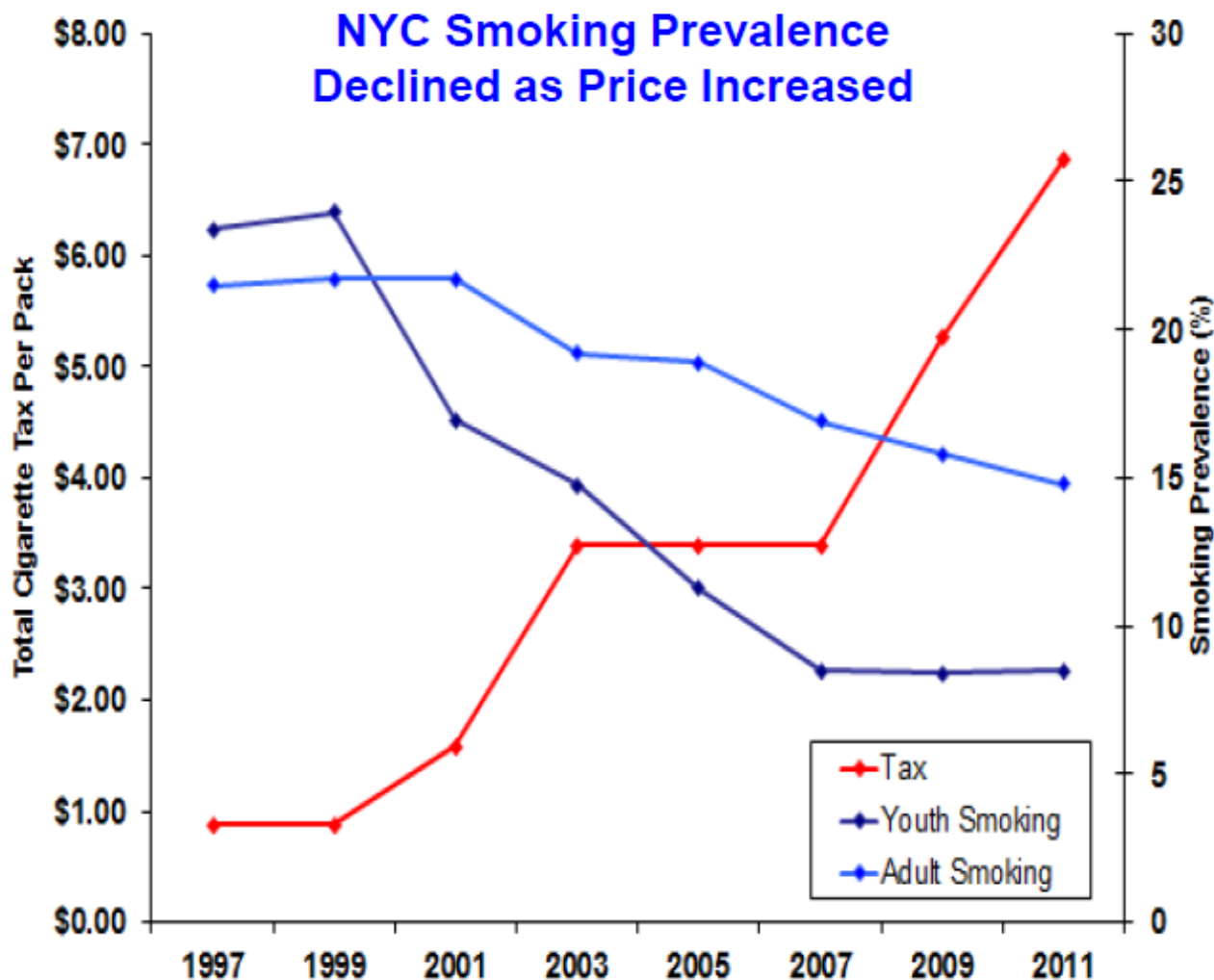


Note: "Importing states" are those where some consumers avoid or evade taxes by obtaining their tobacco products from states or federal tribal lands where taxes are lower. "Exporting states" are those where some tobacco products intended for consumption within that state are purchased by consumers from outside of the state to avoid or evade their "home" taxes.

Source: Created from data in National Research Council and Institute of Medicine, 2015.



# Tax Avoidance & Evasion Do NOT Eliminate Health Impact of Higher Taxes

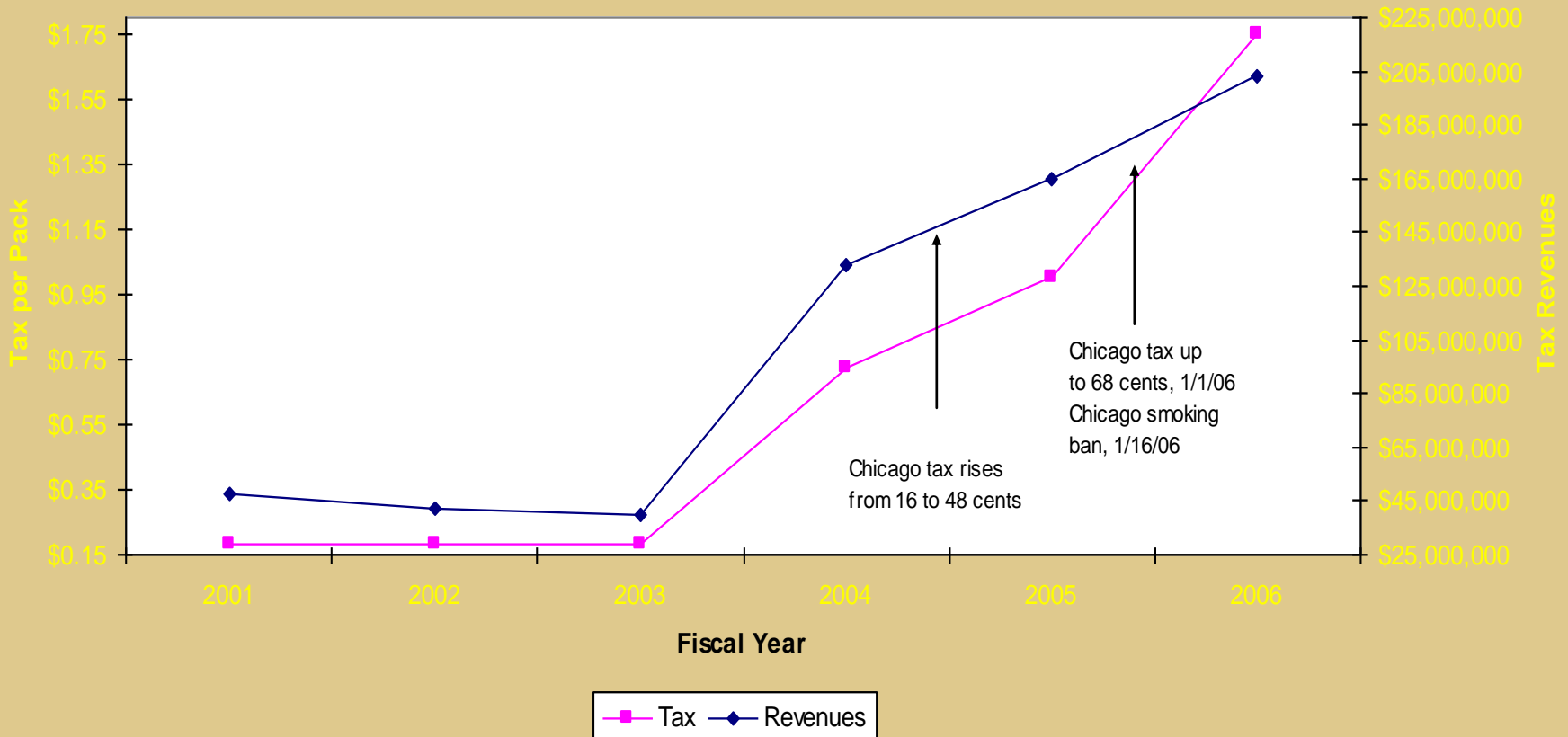




# Tax Avoidance & Evasion

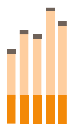
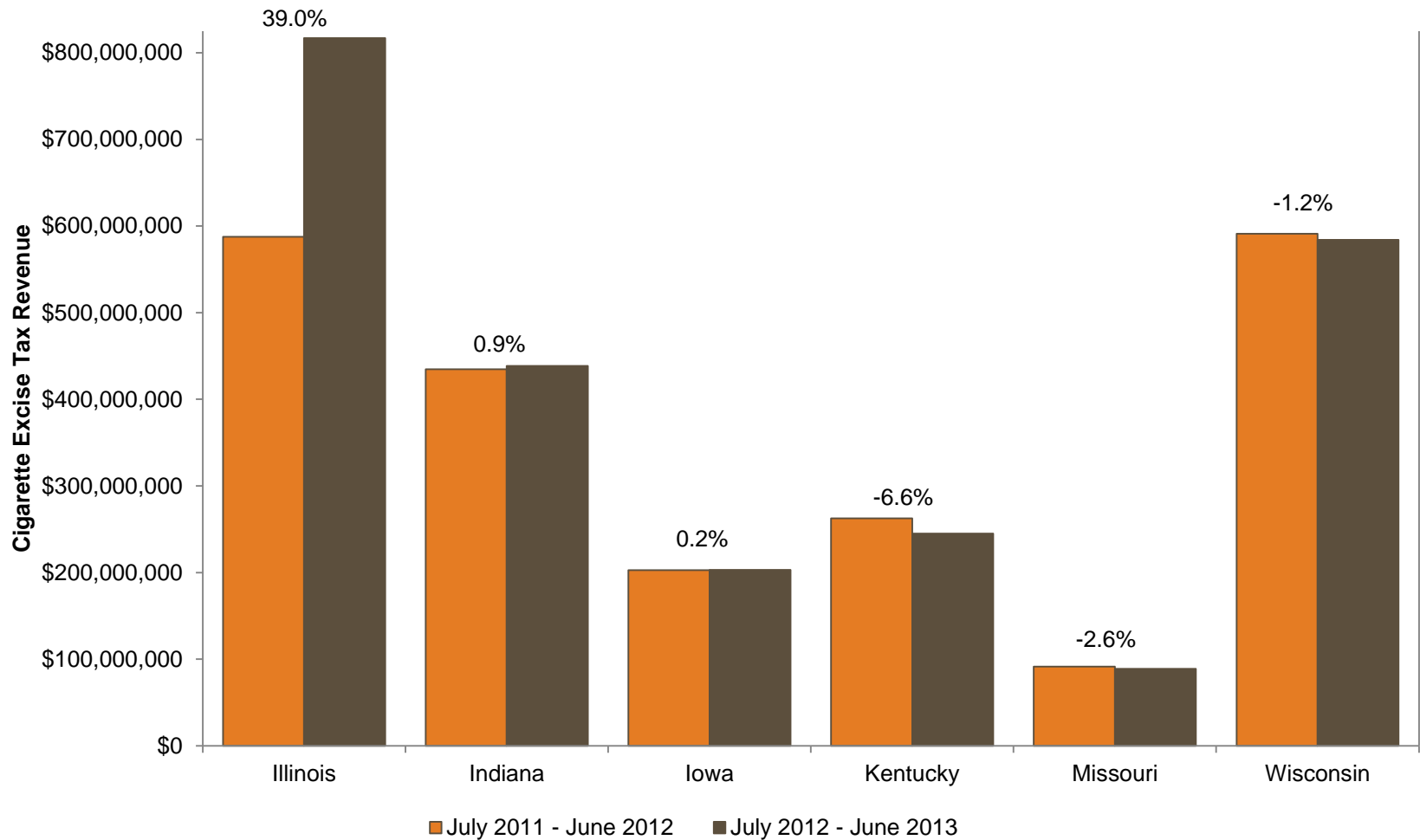
## Do NOT Eliminate Revenue Impact of Higher Taxes

### Cook County Cigarette Tax and Tax Revenues - FY01-FY06

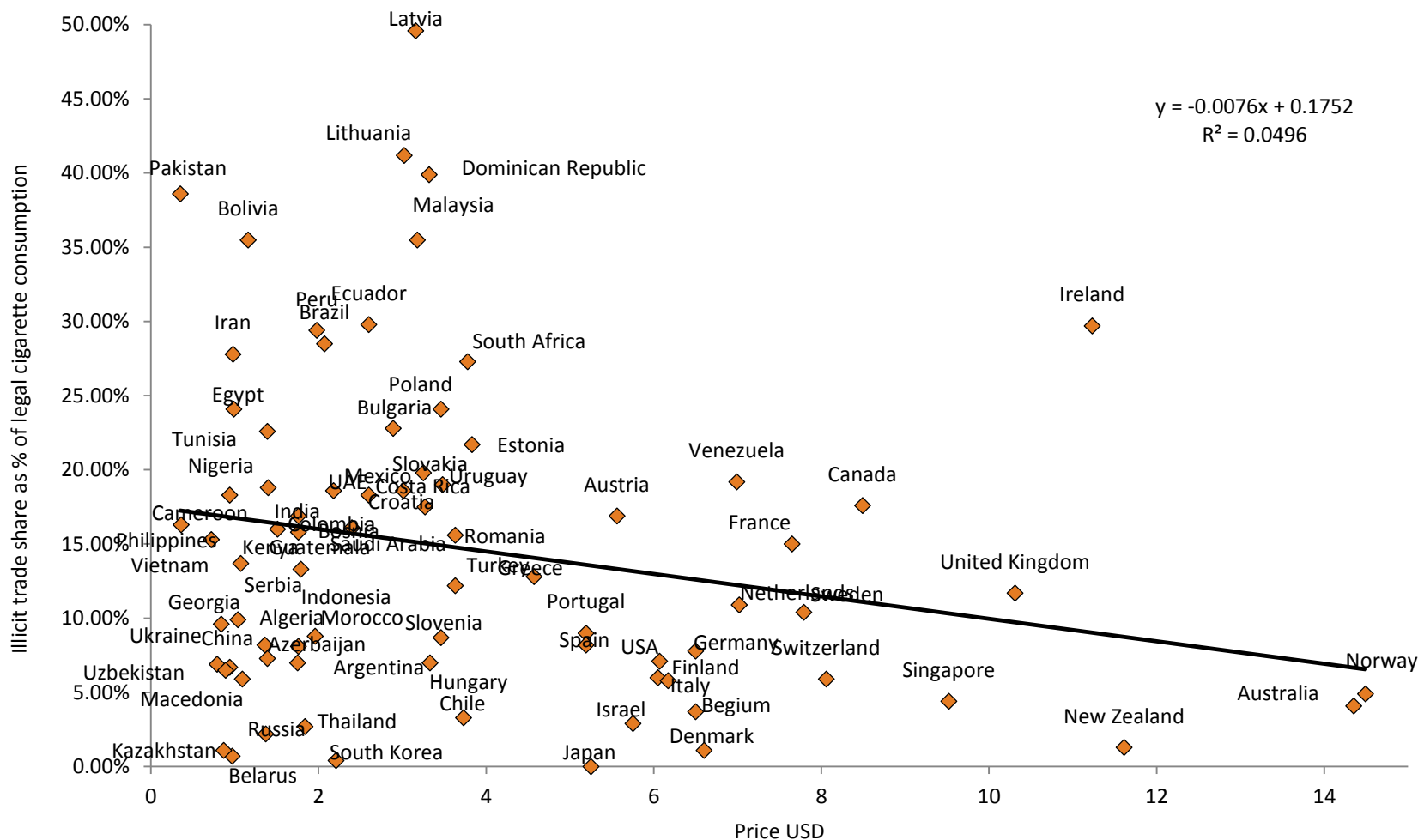


# Tax Avoidance/Evasion & Tax Revenues

Cigarette Tax Revenues, Illinois and Neighboring States  
July 2011 - June 2012



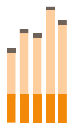
# Illicit Cigarette Market Share & Cigarette Prices, 2012



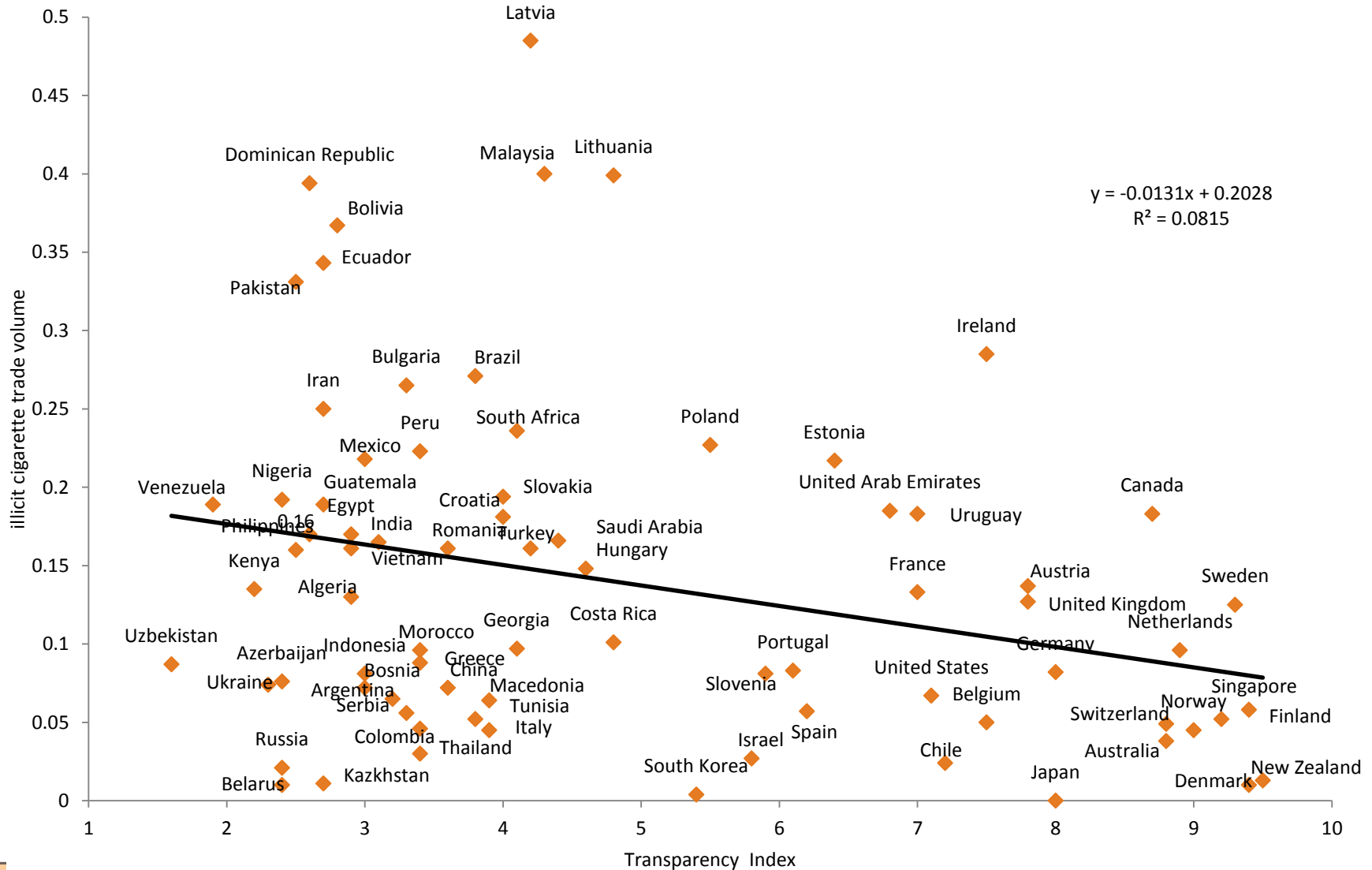
# Drivers of Illicit Tobacco

- Corruption
- Weak tax administration
- Poor enforcement
- Presence of informal distribution networks
- Presence of criminal networks
- Access to cheaper sources

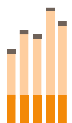
Sources: NRC/IOM 2015; NCI/WHO 2016



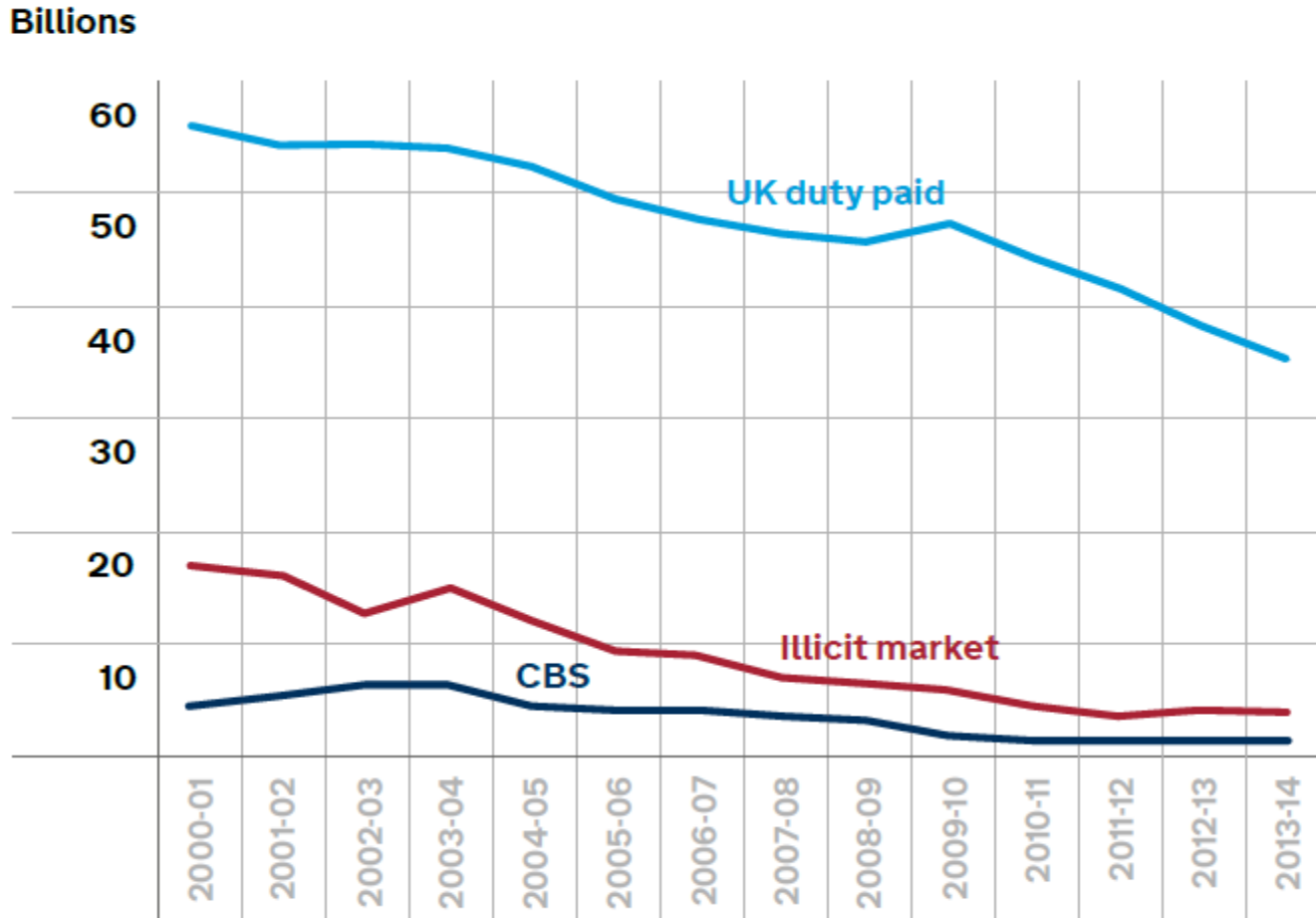
# Smuggling and Corruption, 2011



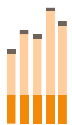
Source: NCI/WHO, 2016



# Figure 12 – Estimated Volumes of Cigarettes Consumed in the U.K. – Duty paid, illicit, and cross-border shopping, 2000-01 – 2013-14



Source: HM Revenue & Customs, 2014



# California's Encrypted Cigarette Tax Stamps

2005-2010 →

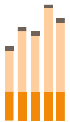


2011-present ↘

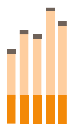
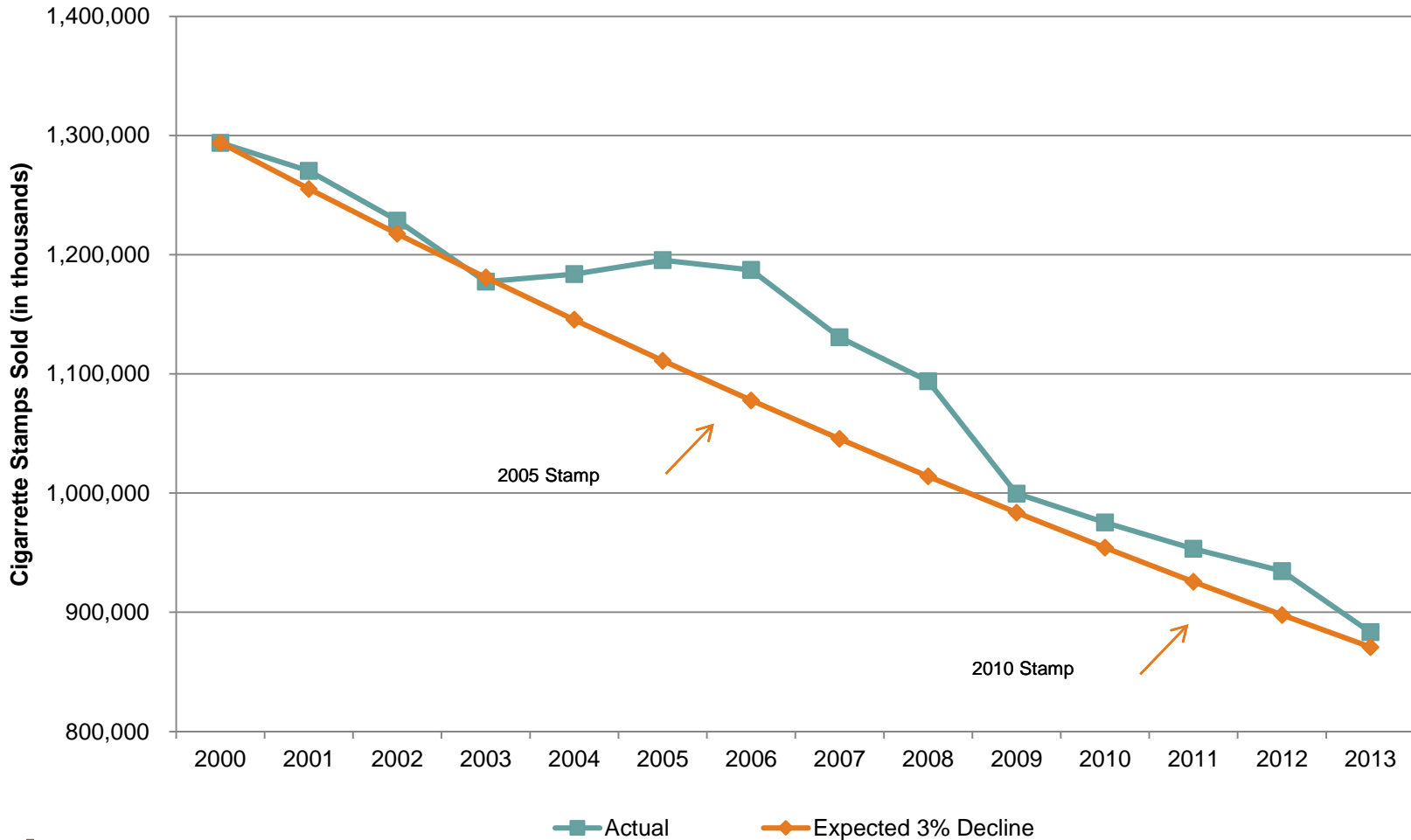
Stamp Front View  
(ink appears green)



Stamp Angled View  
(ink appears blue)



# Cigarette Tax Stamps Sold – projected and actual, California, 2000 - 2013





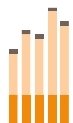
# Who Pays & Who Benefits

## Impact of Federal Tax Increase, U.S., 2009



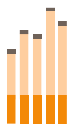
# Impact on the Poor

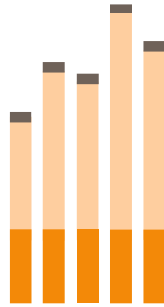
- Need to consider overall fiscal system
  - Key issue with tobacco taxes is what's done with the revenues generated by the tax
  - Greater public support for tobacco tax increases when revenues are used for tobacco control and/or other health programs
  - Net financial impact on low income households 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



# Tobacco Taxes and Small Businesses

- More recent argument that higher taxes will harm convenience stores
- Huang & Chaloupka (2012)
  - Number of convenience stores, by state, 1997-2009
  - State cigarette tax rates and smoke-free air policies
  - Economic conditions (income, unemployment, gas prices)
  - Multivariate, fixed effects econometric models
  - Find that higher taxes associated with **increase** in convenience store business
    - Likely due to spending on other products, overshifting of taxes





# Summary and Potential Impact of Tax Increase

# Bridging the Gap



University of Michigan

**Lloyd Johnston, Project Director  
Institute for Social Research**

**Monitoring the Future (MTF)**

**Youth, Education and Society  
(YES!)**

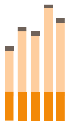
University of Illinois at Chicago

**Frank Chaloupka, Project Director  
Health Policy Center**

**ImpacTeen**

**impacTEEN**

*A Policy Research Partnership  
for Healthier Youth Behavior*



# Bridging the Gap - Tobacco

## State and National

Annual collection of state policies and commercial data (UIC)

## Local and Community

Past and potential future annual community data collection (UIC)

## School and Organizational

Annual YES (ISR-UM) survey

## Individual and Household

Annual MTF surveys (ISR-UM)

Self-reported tobacco use, risk perceptions, attitudes towards tobacco, purchase experiences, and perceived availability

School tobacco use prevention curriculum

School programs to prevent youth tobacco use

School policies limiting tobacco use

School-based youth smoking cessation programs

Point-of-sale tobacco product marketing

Availability of tobacco products

Outdoor tobacco product advertising

Local youth tobacco prevention programs

Allocations to state tobacco control programs

State tobacco control program activities

Strength of tobacco control infrastructure

Local smoke-free air policies

Local policies limiting youth purchase, use or possession of tobacco products

Market-level anti-smoking advertising

State tobacco control program expenditures

State tobacco excise taxes

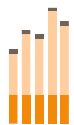
Local youth smoking cessation programs

Local tobacco taxes

Outdoor anti-smoking advertising

State-level limits on youth access to tobacco and PPU policies

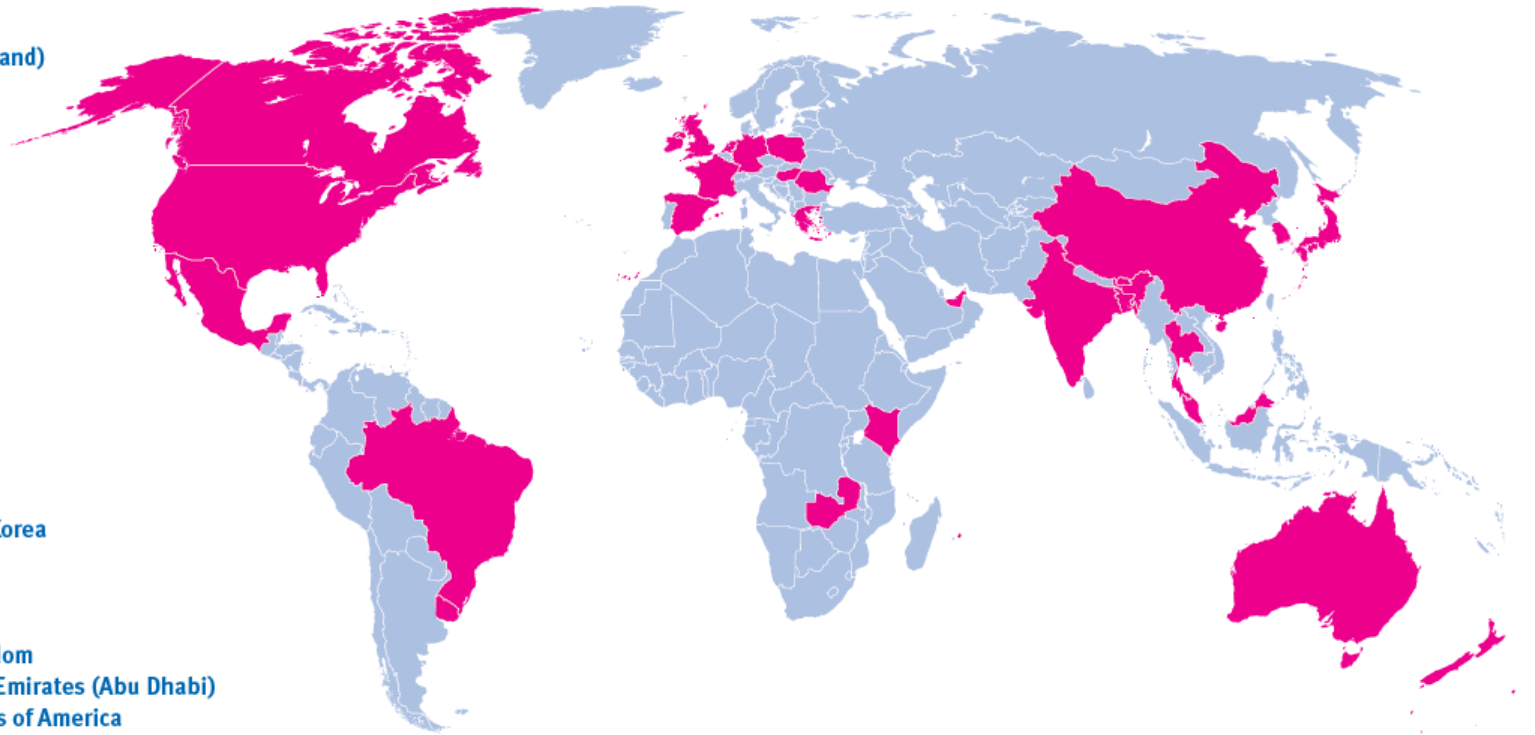
State level smoke-free air policies



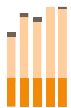
# THE ITC PROJECT: EVALUATING THE IMPACT OF FCTC POLICIES IN...

25+ countries • >50% of the world's population • >60% of the world's smokers • >70% of the world's tobacco users

- Australia
- Bangladesh
- Bhutan
- Brazil
- Canada
- China (Mainland)
- France
- Germany
- Greece
- Hungary
- India
- Ireland
- Japan
- Kenya
- Malaysia
- Mauritius
- Mexico
- Netherlands
- New Zealand
- Poland
- Republic of Korea
- Romania
- Spain
- Thailand
- United Kingdom
- United Arab Emirates (Abu Dhabi)
- United States of America
- Uruguay
- Zambia



November 2017 V2



We are devoted to improving access to economic research and information that can impact and inform tobacco policy. As a program of the University of Illinois at Chicago, Tobacconomics is not affiliated with any tobacco manufacturer.

[Learn about us »](#)

**NEARLY 80%**

of the world's smokers live in low- and middle-income countries

RESEARCH FUNDING PROVIDED BY



### RECENT & FEATURED RESEARCH

#### DECEMBER 2015

Preventing and Reducing Illicit Tobacco Trade in the United States »

Topics: Supply-side issues and interventions / Tax avoidance and evasion

#### NOVEMBER 2015

Cigarette Pricing Lowest in Black Neighborhoods: 2010–2012 »

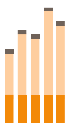
Topic: Tax and price

#### NOVEMBER 2015

Global Hazards of Tobacco and the Benefits of Smoking Cessation and Tobacco Taxes »

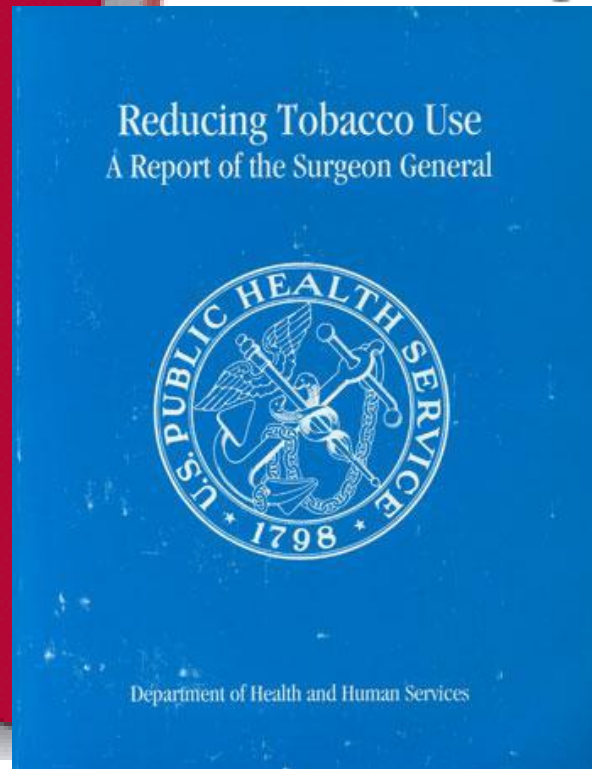
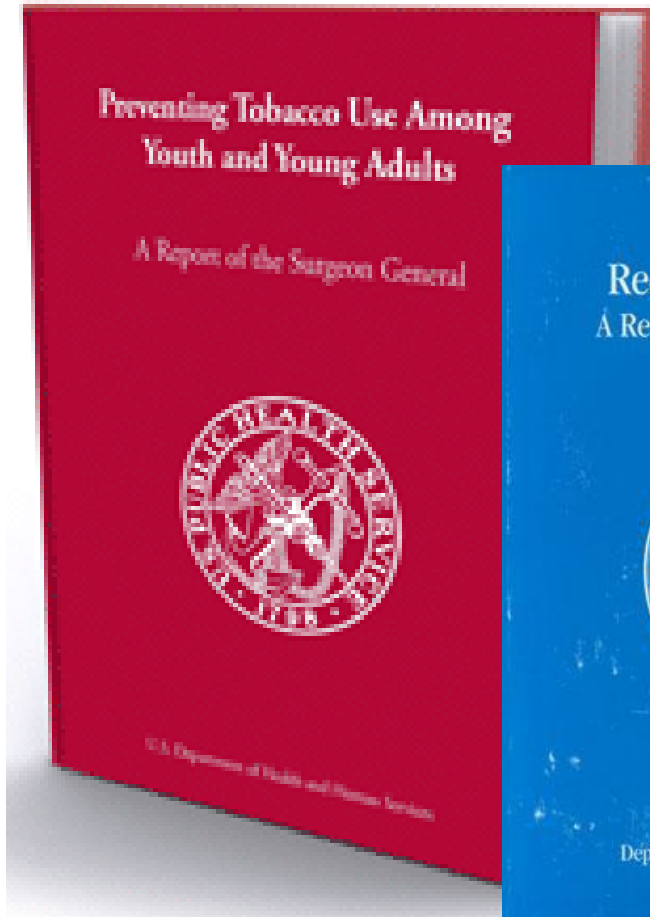
Topics: Prevalence and consumption / Tobacco use / Cost-effectiveness / Tobacco taxes revenues / Economic impact of tobacco control / Impact on the poor / Tobacco control policies and

[www.tobacconomics.org](http://www.tobacconomics.org)    [@tobacconomics](https://twitter.com/tobacconomics)





# US Surgeon General's Reports



## **YOUTH & TOBACCO**

**Preventing Tobacco Use  
Among Young People**

**A Report  
of the  
Surgeon  
General**

by the Departm  
y the U.S. De

**Reducing the  
Health Consequences  
of Smoking**

**15 YEARS OF PROGRESS**

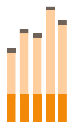
*a report of the  
Surgeon General*

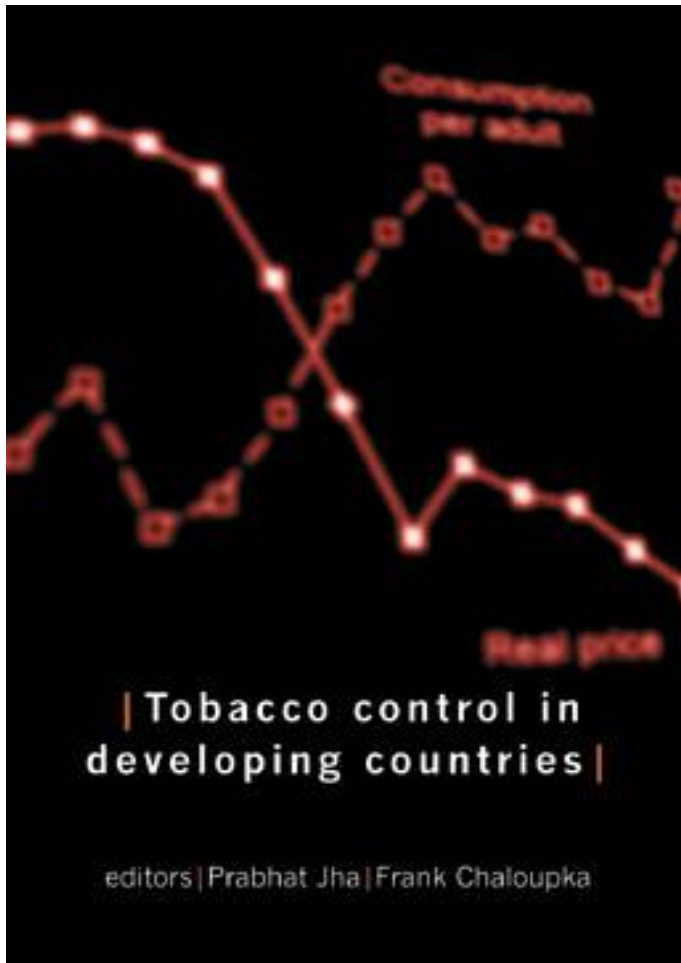
1989

*Executive Summary*



U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES  
OFFICE OF THE SURGEON GENERAL  
1600 Clarendon Avenue, Alexandria, VA 22304  
Public Health Service

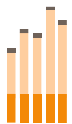
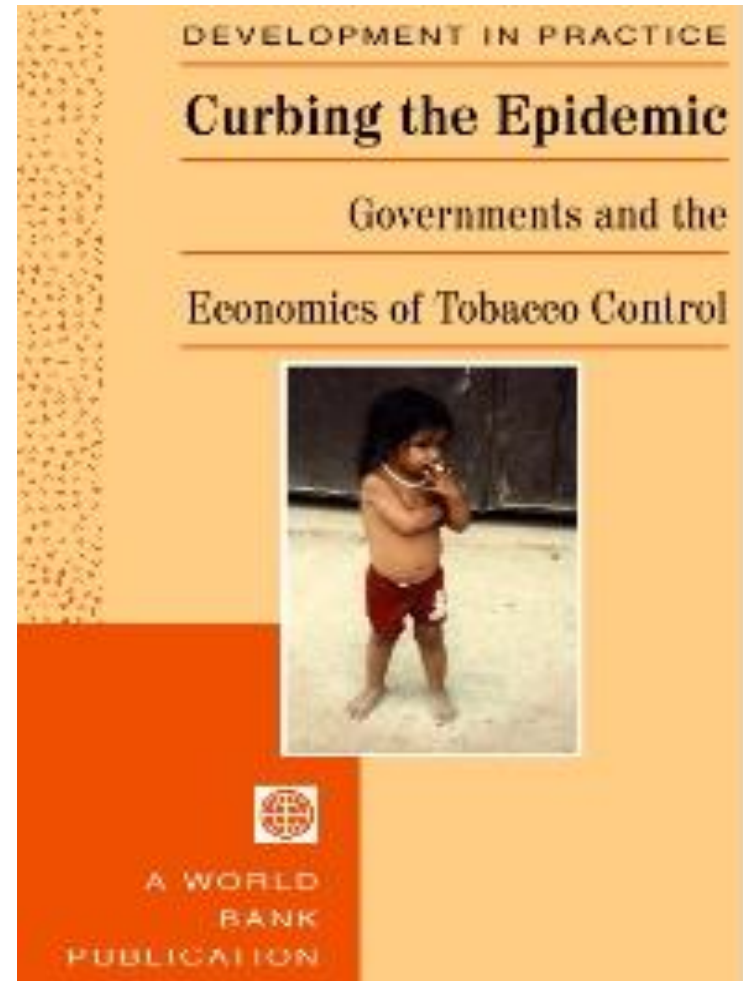




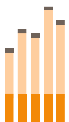
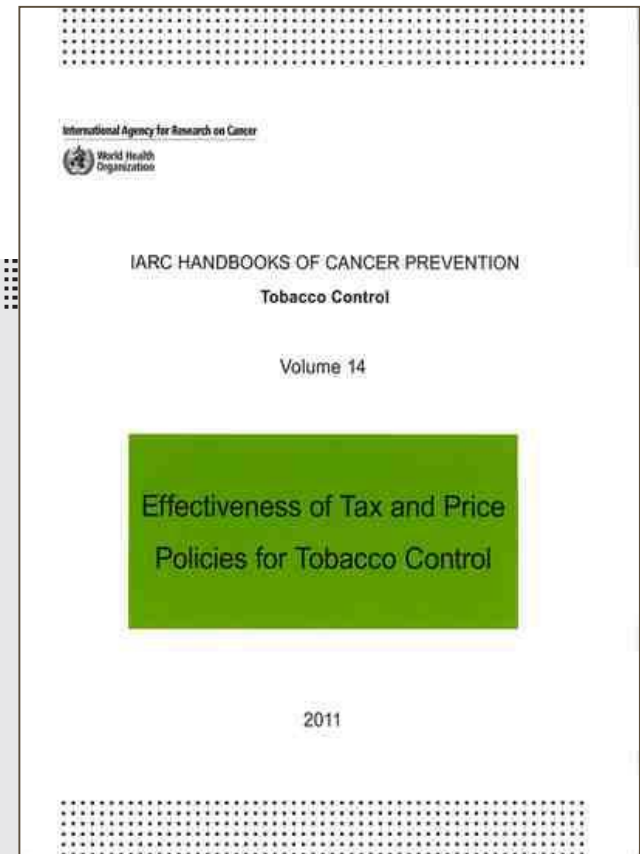
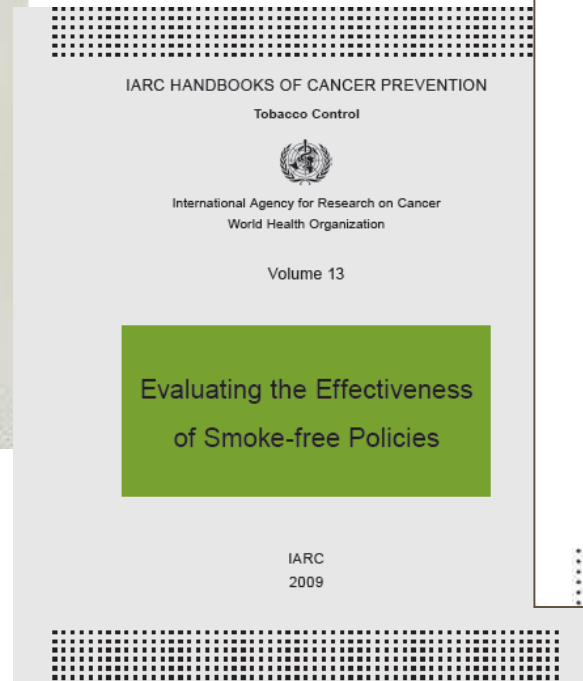
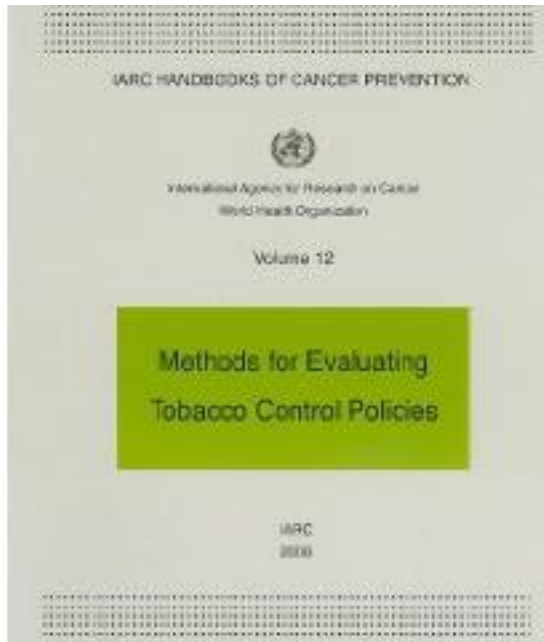
The World Bank



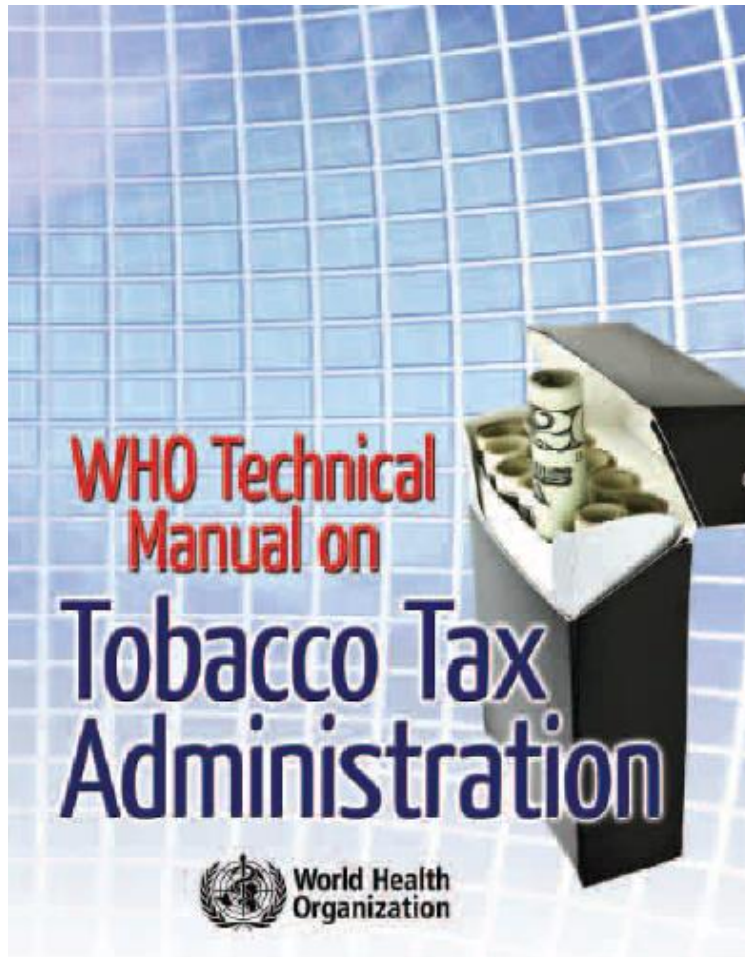
WHO



# IARC Cancer Control Handbooks



# WHO Framework Convention on Tobacco Control

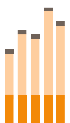


## Guidelines for implementation of Article 6

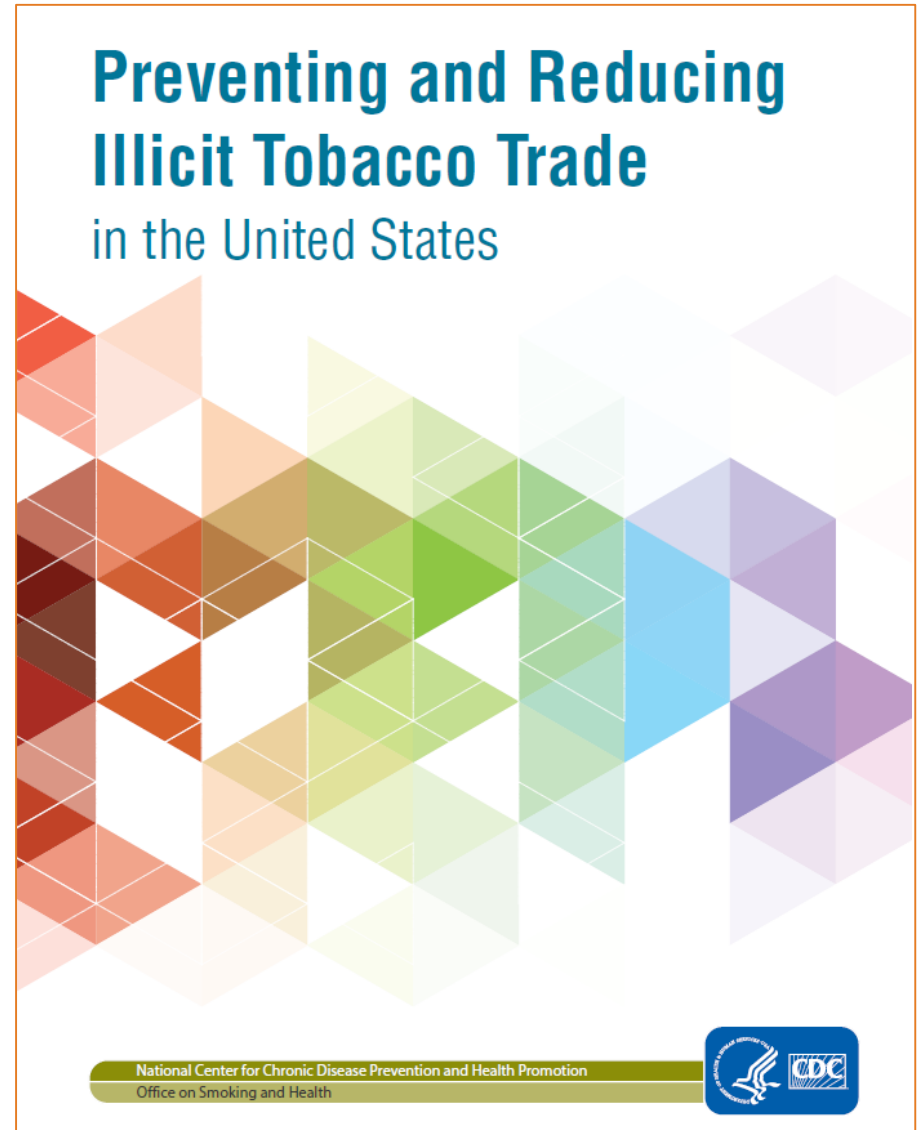
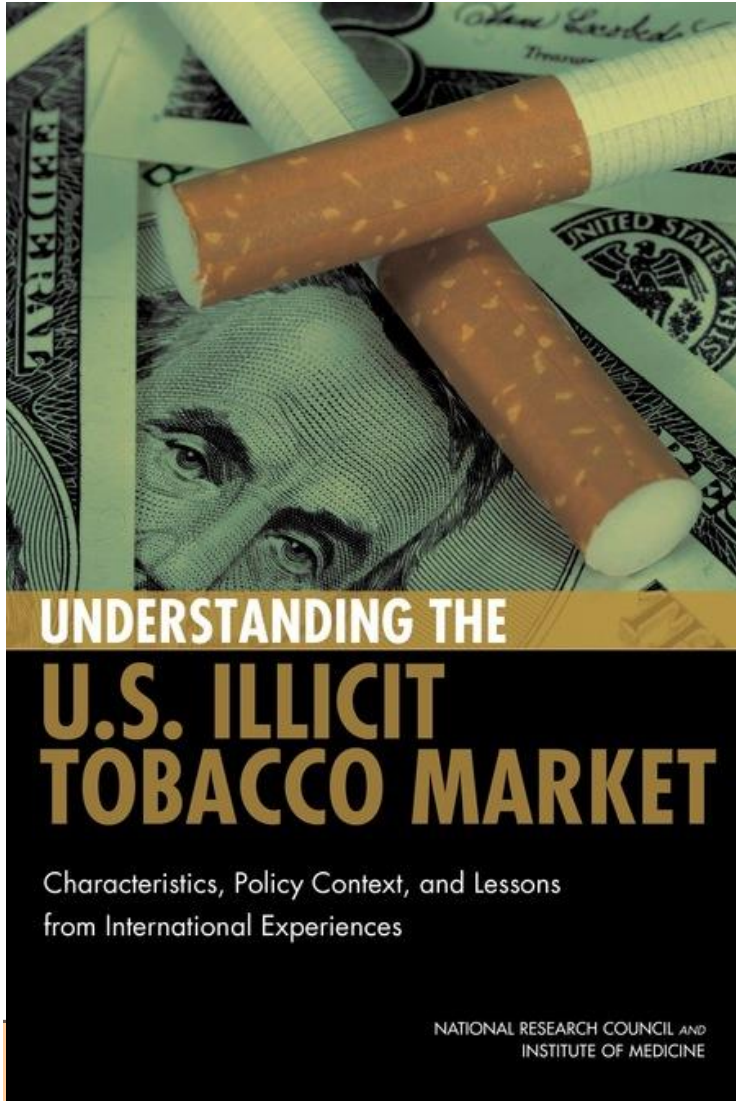
Price and tax measures to reduce the demand for tobacco

Adopted by the Conference of the Parties at its sixth session (decision FCTC/COP6(5))

Online version available at [http://www.who.int/fctc/treaty\\_instruments/Guidelines\\_article\\_6.pdf](http://www.who.int/fctc/treaty_instruments/Guidelines_article_6.pdf)



# Illicit Tobacco Trade





NATIONAL CANCER INSTITUTE

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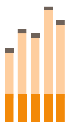
NCI TOBACCO CONTROL MONOGRAPH SERIES

# The Economics of Tobacco and Tobacco Control

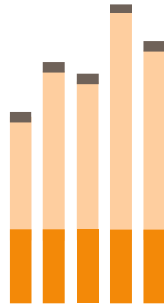
IN COLLABORATION WITH  
WORLD HEALTH ORGANIZATION

*Executive Summary*

U.S. Department of Health & Human Services | National Institutes of Health







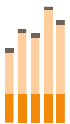
# **Bloomberg Initiative**

-

# **UIC & Tobacconomics**

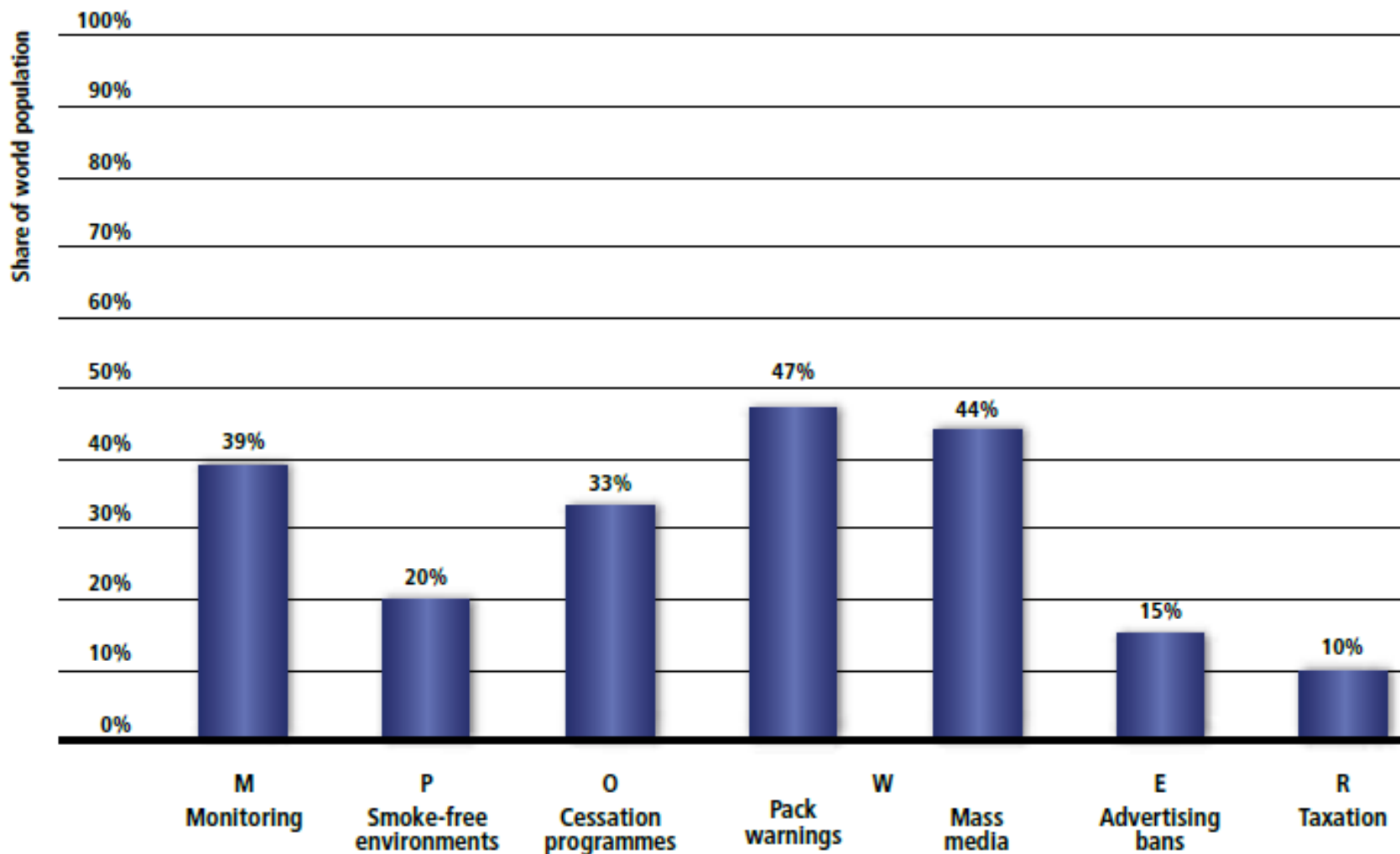
# Bloomberg Initiative

- Ongoing effort to support implementation of evidence based tobacco control measures in highest tobacco using low- and middle-income countries
- Partnership among multiple organizations:
  - World Health Organization
  - US Centers for Disease Control and Prevention and CDC Foundation
  - Campaign for Tobacco-Free Kids
  - International Union Against Tuberculosis and Lung Disease
  - Johns Hopkins University Bloomberg School of Public Health
  - Vital Strategies
  - University of Illinois at Chicago
- Successful efforts on many policies, but little impact on tobacco taxes



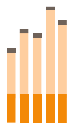


# SHARE OF THE WORLD POPULATION COVERED BY SELECTED TOBACCO CONTROL POLICIES, 2016



# Bloomberg Initiative – UIC

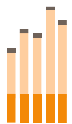
- Engage with ‘think tanks’ in priority countries/regions to develop local evidence for tobacco tax reform and tax increases
  - Indonesia, Vietnam, Latin American, Bangladesh, Pakistan, **South-Eastern Europe**
- Engagement with high level decision makers to build technical capacity and political support for tobacco tax policy
- Develop/disseminate resources (policy briefs, white papers, etc.) on tobacco taxation to build knowledge and support for tobacco tax policy



# Evidence Gaps

Regional/country specific evidence on economic impact of tobacco taxation

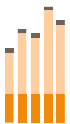
- **Impact on demand for tobacco products**
- Impact on tax revenues
- Impact on employment
- Impact on development



# Evidence Gaps

Regional/country specific evidence on impact of tobacco taxes on poverty

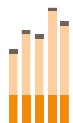
- Progressivity/regressivity of tobacco tax increases
- Impact of tobacco use on poverty
- Effectiveness of tobacco taxation in reducing disparities in tobacco use and its health/economic consequences



# Evidence Gaps

## Regional/country specific evidence on illicit trade

- Extent of illicit trade
- Changes in illicit trade in response to tobacco tax increases
- Determinants of illicit trade
- Impact of measures to control illicit trade



**For more information:**

**Tobacconomics**

**<http://www.tobacconomics.org>**

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