New Findings from Research on the Economics of Tobacco Use

Frank J. Chaloupka, University of Illinois at Chicago
Food & Drug Administration, Center for Tobacco Products, May 8, 2013
Monitoring and Assessing the Impact of Tax and Price Policies on US Tobacco Use
Funding Acknowledgment

- Funding provided by the National Cancer Institute under the **State and Community Tobacco Control Initiative**, grant number UO1-154248, University of Illinois, Frank Chaloupka, PhD, PI

- Overarching aim: To improve our understanding of the impact of tobacco tax and price policies on tobacco use and related behaviors

- Builds on work funded by the Robert Wood Johnson Foundation for the Bridging the Gap research program
Project Team

• University of Illinois at Chicago
  • Jamie Chriqui, David Merriman, Jidong Huang, John Tauras, Sandy Slater, Camille Gourdet, Hilary DeLong
  • Kevin Gibbs, Joanie Wright, others

• Roswell Park Cancer Institute
  • Andy Hyland, Maansi Travers, Cheryl Rivard

• Barker Bi-Coastal Consultants, Inc.
  • Dianne Barker

• Burness Communications
  • Chuck Alexander, Laurie Lennon, others
Project Team

• Consultants
  • Geoffrey Fong, Lloyd Johnston, Patrick O’Malley, Mike Cummings

• Advisory Panel
  • Carolyn Dresler (FDA), Cynthia Hallet (Americans for Nonsmokers’ Rights Foundation), David Hankins (Attorney General of Washington), Patricia Henderson (Black Hills Center for American Indian Health), Lois Keithly (Massachusetts Tobacco Cessation and Prevention Program), April Roeseler (California Tobacco Control Program)
Aim 1: Policy Surveillance
Specific Aims

Aim 1: Compile a historical data set of codified law (statutes, regulations, and case law) and policies affecting retail tobacco product prices

- cigarette & other tobacco product excise taxes, tax stamps
- Minimum pricing/markup policies
- policies addressing direct purchases/sales
- tribal compacts and other policies targeting reservation sales
- policies limiting price promotions
- policies strengthening tax and MSA administration and enforcement
Policy Collection Process

• **Initial Research**
  - Relevant statutes and regulations identified in Lexis
  - 8 Pilot states: CA, MA, NY, OK, OR, PA, VA, WA

• **Verification**
  - Sources: Westlaw, State Case Law, Attorney General Opinions, Law Reviews, State Websites, SCLD, STATE

• **Develop Coding Scheme**

  **Coding Parameters: 2001-2015**
  - Year One - Laws in effect as of January 1, 2012
Progress – Broad View

**Tier 1:** Coding Scheme Completed/Year One Coding Initiated
- Cigarette Tax
- Minimum Markup

**Tier 2:** Coding Scheme and Law Verification in Progress
- OTP Tax
- Tribal Taxation

**Tier 3:** Law Collection and Verification in Initial Stages
- Direct Sales
- MSA
Cigarette Tax

State laws related to the use of tax stamps, meter impressions, or other indicia to indicate payment of state and local taxes on cigarettes.

Status:
- Coding scheme developed
- Testing scheme against pilot states
- Final adjustments being made to coding scheme as necessary
- Decision Rules document being formed to guide future coding
Cigarette Tax: Scope

All 51 states tax cigarettes, and 48 of them utilize tax stamps.

- 3 of the 51 states use **recordkeeping** in lieu of tax stamps.

---

**Tax Stamp States**

**Recordkeeping States:**
NC, SC, ND

---

[Map of Cigarette Taxation Methods in the United States]
Cigarette Tax: Areas of Interest

Stamps:
• Encryption/Anti-Counterfeit Technology

Taxation:
• Border Zone Tax Rates
• Enabling/Preemption Laws

Penalties:
• Broad view of cigarette tax-related penalties

*Note: Due to a wide variance of penalties across all states, this category has been simplified to reflect the presence of general enforcement mechanisms in regards to both 1st offenses and graduated penalties. (e.g. Fines, Imprisonment, License Revocation/Suspension)
Minimum Markup

State laws promoting fair competition through the creation of minimum pricing schemes for cigarettes and OTP.

Status:
• Coding scheme complete
• Relevant laws collected and verified
• Illustrative PATH charts being developed for all 32 states
Minimum Markup: Scope

32 of the 51 states utilize some form of minimum markup laws.
Minimum Markup: Types

Minimum Markup
Require adding a specific retail or wholesale markup percentage to the basic (or invoice) cost of cigarettes and OTP.
  • 26 States: AK, AR, CT, DE, DC, IN, IA, KY, LA, MA, ME, MD, MN, MS, MT, NE, NJ, NY, OH, OK, PA, RI, SD, TN, WV, WI

Minimum Pricing (Tobacco Specific)
Prohibit selling cigarettes below retail or wholesale cost. No corresponding markup percentage is applied.
  • 3 States: ID, NV, WA

Minimum Pricing (Non-Tobacco Specific)
Prohibit sales below cost, but do not specifically mention tobacco. Included here because these states’ courts have applied these general minimum pricing laws to cigarettes. No corresponding markup percentage is applied.
  • 3 States: CA, CO, HI
Minimum Markup: Illustrations

STATE: Washington

SOURCES:
ARCW § 19.91.300 (2011)
ARCW 82.24.510 (2011)
Minimum Markup: Illustrations
Minimum Markup: Illustrations
Minimum Markup: Areas of Interest

• OTP Application
  • Only three states apply their minimum pricing laws to OTP:
    • Oklahoma, Rhode Island, Wisconsin

• Complexity of pricing formulas

• Trade Discounts:
  • Who may use them?
  • Where are they located within the pricing formula?

• Coupons, Rebates, and Concessions
OTP Tax

State laws related to the distribution and application of tax stamps, meter impressions, or other indicia used to indicate payment of state excise taxes on OTP.

Status:
• Laws collected
• Verification in progress
• Coding scheme in initial stages.

Areas of Interest:
• Differential treatment of OTP types
• Emerging products (e.g. e-cigarettes, dissolvables, etc.)
• Roll-Your-Own machines
OTP Tax: Scope

50 of the 51 states tax OTP; only 7 states use tax stamps.
Tribal Taxation

State and tribal laws related to the taxation of cigarette and OTP on tribal lands.

Status:
• State laws collected
• Verification of state laws in progress
• Tribes targeted for internal law collection; some internal tribal laws collected.
• Coding scheme in initial stages

Scope: 22 of the 51 states have laws related to tribal tobacco taxation
• AK, AZ, CA, FL, ID, IA, KS, MI, MN, MT, ND, NE, NM, NV, NY, OK, OR, SD, UT, WA, WI, WY

Areas of Interest:
• State’s jurisdiction over tribal sales
• State laws touching on state-tribe relationship
• Internal tribal laws governing taxation of cigarettes and OTP.
Direct Sales/MSA

Direct Sales
State laws either prohibit or restrict the sale of cigarettes through the mail, by phone, online, or through other non-face-to-face means. Most are in conjunction with the PACT Act, a federal law enacted in 2010 to curb widespread state cig tax evasion.

• **Scope**: 41 of the 51 states have Direct Sales laws.
  • States without direct sales laws: CO, DC, GA, IA, KY, MS, NE, NH, NC, SC

MSA
State laws requiring compliance with the Master Settlement Agreement’s reporting and monetary requirements. Distinguishes between “participating” or “non-participating” manufacturers.

• **Scope**: All 51 states have MSA/related laws.

**Status**: Laws for both categories have been collected and are awaiting verification.
Aim 2: Tobacco Pricing & Promotion
Specific Aims

Aim 2: Assess the impact of price-related policies on retail prices and price-reducing promotions for tobacco products

- Combines policy data from Aim 1 with data from:
  - BTG-COMP observational data collections
  - Self-reported data on prices and price promotions from multiple surveys
  - Store-based scanner data on prices and price promotions
Point of Sale Observations

• Engaged in analyzing retail outlet observational data in 150+ nationwide communities per year
  • 1999-2003 (available for comparative trend analysis)
  • 2010-2012 (n=154,157,161 communities)

• Several descriptive analyses underway

• POS Data will be merged with tobacco policies to:
  • Assess the impact of price-related policies on retail prices and price-reducing promotions (Aim 2)
  • Assess the impact of tobacco product prices, price reducing promotions, and related policies on tobacco product purchasing behaviors (Aim 3)
  • Examine the impact of tobacco product prices, price-reducing promotions, and related policies on tobacco use behaviors from MTF and expanded ITC survey (Aim 5)
BTG-COMP 2012 Tobacco Instrument

• Product Availability and Placement
  • Traditional products, including loose/rolling tobacco and moist snuff
  • New products: snus, e-cigarettes, dissolvable products by brand
  • Flavored and unflavored cigar products

• Product Pricing and Promotion
  • Marlboro, Camel, Newport, Cheapest cigs
  • Marlboro and Camel snus
  • Cheapest pipe tobacco (no promotion data)

• Interior Marketing
  • Presence of cigs, snus, moist snuff, dissolvable product ads
  • Type and characteristics of tobacco ads, including health content

• Exterior Marketing on Building Exterior and Property
  • Counts of cigs, snus, moist snuff, dissolvable product ads

• OTC NRT Availability and Store Exterior Characteristics
BTG-COMP Tobacco Instrument Reliability Analysis (preliminary)

- Convenience sample in 120 food stores in 50-mile buffer around Chicago MSA conducted in January, 2010

- Two raters coding independently in each store

<table>
<thead>
<tr>
<th>Item Category</th>
<th># Items with calculated Kappa or ICC</th>
<th>% with substantial agreement (Kappa or ICC .61 – 1.00)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product Availability</td>
<td>15</td>
<td>87%</td>
</tr>
<tr>
<td>Product Pricing</td>
<td>10</td>
<td>100%</td>
</tr>
<tr>
<td>Product Promotions</td>
<td>13</td>
<td>31%</td>
</tr>
<tr>
<td>Interior Marketing</td>
<td>23</td>
<td>78%</td>
</tr>
<tr>
<td>Exterior Marketing</td>
<td>13</td>
<td>38%</td>
</tr>
</tbody>
</table>
BTG-COMP Community Definition

- School Enrollment Zone

  - 2nd year Monitoring the Future public middle and high schools
    - 2008 Focus Groups confirmed adolescents stay pretty close to school and home to eat

- May be multiple policy jurisdictions surrounding the school enrollment zone

<table>
<thead>
<tr>
<th></th>
<th># Communities</th>
<th># Policy Jurisdictions</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>154</td>
<td>360</td>
</tr>
<tr>
<td>2011</td>
<td>157</td>
<td>378</td>
</tr>
<tr>
<td>2012</td>
<td>161</td>
<td>Still under review</td>
</tr>
</tbody>
</table>

- Environmental observations in food stores, tobacco stores, fast food restaurants, parks, physical activity facilities, school grounds and on streets
bridging the gap

www.bridgingthegapresearch.org
BTG-COMP Field Logistics

- Centralized management
  - Field Service Manager located at UIC, 9-7 ct telephone coverage
  - All field staff live in Chicago MSA
  - 3.5 week interactive training (tobacco: 5 hours plus reviews, sampling, field procedures)

- Field teams consist of 2 people, may be multiple teams per site
  - Rotate every 3 weeks
  - Teams return every Friday, and fly out Monday am
  - Average 10-12 teams per week

- Field materials
  - Use UPS to ship materials to/from site
  - Each team has a car GPS and a hand-held GPS unit
  - Each person carries own manual and help sheets
BTG-COMP Sampling Approach:
Preparation of Business List Sample

- Identify SIC Codes and purchase InfoUSA and Dun & Bradstreet data
  - Supplemented with store names including “Dollar,” “99 cents,” “Value”
  - Added Walmart, Target, K-Mart, Meijer

- Merge InfoUSA and Dun & Bradstreet data, and de-duplicate

- Screen over 12,000 businesses (food store, fast food, pa facilities) by phone
  - Additional 40% ineligible (e.g., business closed, not reached, did not meet criteria)

- Sample stores from business lists; add stores in field to account for errors in business lists
# BTG-COMP Tobacco Outlets (preliminary, 2012)

**Food Stores with Tobacco Sales** (n=2,429)
- Supermarket (n=274)
- Grocery (n=132)
- Limited Service (n=2023)
  - Convenience
  - Gas
  - Pharmacy
  - Small Discount Store (e.g., Dollar General, 99cent Store)
  - Liquor store if sells drinks and snacks and 5 or more food items

**Tobacco Stores** (n=154)
- Primarily engaged in retail sales of cigarettes, cigars, tobacco and other smokers’ supplies. At least 50% of its merchandise is tobacco or smoking-related.
- Not a food store, cigar/tobacco/hookah club or lounge
Availability of Tobacco Products in Stores which Sell Cigarettes, 2010 and 2011

Percentage of Stores Which Sell Flavored and Unflavored Cigarillos / Little Cigars
By African American and White Quartiles, 2011

Notes: The following comparisons are significantly different at p < 0.05
African American Quartiles: flavored cigarillos / little cigars: Overall and Low vs. High
White Quartiles: no significant difference
FIGURE 1
Average Price of Cigarette Packs
By African American and Latino Quartiles, 2011

Notes: The following comparisons are significantly different at p < 0.05:
African American Quartiles: Newport and Cheapest Low vs. High
Latinos Quartiles: Newport and Marlboro: Low vs. High

Cheapest Cigarette Pack

- Data collectors instructed to look for the lowest priced cigarette sold by the pack in regular or king size (95 mm).
- Told it could be a premium brand and/or same as recorded for Marlboro, Newport/Kool or Camel
- Multiple brands same price---first code Marlboro- Newport- Kool-Other

Preliminary 2011 Data Top 5 by Brand:

<table>
<thead>
<tr>
<th>Brand</th>
<th>% of Stores</th>
<th>Average Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pall Mall</td>
<td>33%</td>
<td>4.19</td>
</tr>
<tr>
<td>Maverick</td>
<td>12%</td>
<td>4.92</td>
</tr>
<tr>
<td>Pyramid</td>
<td>10%</td>
<td>4.15</td>
</tr>
<tr>
<td>L&amp;M</td>
<td>8%</td>
<td>4.82</td>
</tr>
<tr>
<td>Marlboro Red</td>
<td>5%</td>
<td>6.45</td>
</tr>
</tbody>
</table>
Percent of Stores with Premium Brand Promotions, by Store Type

Presence of In-Store Promotions,
% Retail Stores with Tobacco Products,
2010 and 2011 (weighted)

* p < .001
Percent of Stores with Interior Cigarette Ads Away from Cash Register, by Store Type

Presence of Interior Cigarette Advertising
% Retail Stores that Sell Tobacco Products, 2010 and 2011 (weighted)
Presence of Interior Snus Advertising
% Retail Stores that Sell Tobacco Products, 2010 and 2011 (weighted)

* p < .001
Presence of Exterior Advertising

% Retail Stores that Advertise Cigarette and Snus Products, 2010 and 2011 (weighted)

- **Cigarette Ads on Building Exterior**: 2.55 in 2010, 3.02 in 2011
- **Cigarette Ads on Property**: 3.17 in 2010, 3.62 in 2011
- **Snus Ads on Building Exterior**: 0.13 in 2010, 0.07 in 2011
- **Snus Ads on Property**: 0.01 in 2010, 0.02 in 2011

*p < .001

bridging the gap

www.bridgingthegapresearch.org
Percent of Stores with Exterior Cigarette Ads on Building and on Property, by Store Type

Aim 3: Purchase Behaviors
Specific Aims

Aim 3: Assess the impact of tobacco product prices, price reducing promotions, and related policies on tobacco product purchasing behaviors

• Combines policy data from Aim 1 and price data from Aim 2 with various survey data on:
  
  • tobacco product and brand choices (substitution, switching-down, etc.)
  
  • purchase type and location (single pack vs. carton; discount outlets; reservations and cross-border; etc.)
  
  • use of price-reducing promotions (e.g. multi-pack offers, coupons)
  
  • differences by age, gender, SES, race/ethnicity, tobacco use
Methods

- Probability sampling methods are used to generate a pool of phone numbers from which Computer-Assisted Telephone Interviewing (CATI) staff call.
- The interviewer asks screening questions regarding the size of household, and asks to speak to the adult whose birthday is coming up next.
- The interviewer conducts a short tobacco use screening survey to determine whether the selected adult has used any tobacco products in the past 12 months.
Methods

• The interviewer indicates that, to thank the respondent for his/her time, we will send a check for $20.
• The survey takes approximately 45 minutes.
• Survey questions include:
  ➢ Tobacco product use history and current tobacco product use
  ➢ Beliefs about tobacco use, for example, beliefs about the health effects of smoking
  ➢ Warning labels: salience, perceptions of effectiveness, and reports of respondent’s reactions to the labels
  ➢ Price of tobacco products and location/frequency of product purchases
Preliminary Results

- April 2013 - Completed Adult Tobacco Survey in 161 communities where POS observations were conducted; 1,441 completed surveys

<table>
<thead>
<tr>
<th>Products</th>
<th>Current Users</th>
<th>Former Users</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cigarettes</td>
<td>1013 (70.2%)</td>
<td>86 (6.0%)</td>
</tr>
<tr>
<td>E-cigarettes</td>
<td>97 (6.8%)</td>
<td>84 (5.9%)</td>
</tr>
<tr>
<td>Regular Cigars</td>
<td>131 (9.1%)</td>
<td>43 (3.0%)</td>
</tr>
<tr>
<td>Cigarillos</td>
<td>128 (8.9%)</td>
<td>64 (4.4%)</td>
</tr>
<tr>
<td>Little Filtered Cigars</td>
<td>69 (4.8%)</td>
<td>38 (2.6%)</td>
</tr>
<tr>
<td>Pipe</td>
<td>45 (3.1%)</td>
<td>11 (0.8%)</td>
</tr>
<tr>
<td>Hookah</td>
<td>37 (2.6%)</td>
<td>15 (1.0%)</td>
</tr>
<tr>
<td>Snus</td>
<td>19 (1.3%)</td>
<td>9 (0.6%)</td>
</tr>
<tr>
<td>Smokess Tobacco</td>
<td>96 (6.7%)</td>
<td>25 (1.7%)</td>
</tr>
<tr>
<td>Dissolvable Tobacco</td>
<td>4 (0.3%)</td>
<td>0 (0.0%)</td>
</tr>
</tbody>
</table>
### Preliminary Results

**E-cigarette use**

<table>
<thead>
<tr>
<th>E-Cigarette use</th>
<th>Number (percent of sample)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never used</td>
<td>990 (68.7%)</td>
</tr>
<tr>
<td>Current daily users</td>
<td>25 (1.7%)</td>
</tr>
<tr>
<td>Current someday users</td>
<td>72 (5.0%)</td>
</tr>
<tr>
<td>Experimented (1 or fewer)</td>
<td>233 (16.2%)</td>
</tr>
<tr>
<td>Recent (&lt;12 months) former user</td>
<td>84 (5.8%)</td>
</tr>
<tr>
<td>Long term (&gt;12 months) former user</td>
<td>36 (2.5%)</td>
</tr>
<tr>
<td>Don’t know</td>
<td>1 (0.1%)</td>
</tr>
<tr>
<td>Exclusively use e-cigarettes</td>
<td>9 (0.6%)</td>
</tr>
<tr>
<td>Use 1 or more combustible, no non-combustible, &amp; e-cigs</td>
<td>162 (11.2%)</td>
</tr>
<tr>
<td>Use combustible, non-combustible &amp; e-cigs</td>
<td>10 (0.7%)</td>
</tr>
</tbody>
</table>
## Preliminary Results

- **Multi-product use**

<table>
<thead>
<tr>
<th>Products</th>
<th>Current Users</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>211 (14.6%)</td>
</tr>
<tr>
<td>1</td>
<td>941 (65.3%)</td>
</tr>
<tr>
<td>2</td>
<td>209 (14.5%)</td>
</tr>
<tr>
<td>3</td>
<td>58 (4.0%)</td>
</tr>
<tr>
<td>4</td>
<td>13 (0.9%)</td>
</tr>
<tr>
<td>5</td>
<td>36 (0.4%)</td>
</tr>
<tr>
<td>6</td>
<td>1 (0.1%)</td>
</tr>
</tbody>
</table>
### VERY Preliminary Results
(among 225 completes interviews as of 12/10/12)

#### Reasons for Use - Percent who responded 'Important to me':

<table>
<thead>
<tr>
<th>Product</th>
<th>N*</th>
<th>Cost less</th>
<th>People in media</th>
<th>Can use where smoking not allowed</th>
<th>Less harmful</th>
<th>Come in appealing flavors</th>
<th>Help quit</th>
<th>Don't smell</th>
<th>Feels like smoking</th>
<th>More acceptable to non-smokers</th>
<th>People important to me use it</th>
</tr>
</thead>
<tbody>
<tr>
<td>E-Cigarettes</td>
<td>38</td>
<td>52.6</td>
<td>2.6</td>
<td>55.3</td>
<td>68.4</td>
<td>34.2</td>
<td>73.7</td>
<td>73.7</td>
<td>73.7</td>
<td>57.9</td>
<td>23.7</td>
</tr>
<tr>
<td>Regular cigars</td>
<td>36</td>
<td>5.6</td>
<td>0.0</td>
<td>-</td>
<td>19.4</td>
<td>27.8</td>
<td>16.7</td>
<td>8.3</td>
<td>8.3</td>
<td>5.6</td>
<td>5.6</td>
</tr>
<tr>
<td>Cigarillos</td>
<td>39</td>
<td>30.8</td>
<td>7.7</td>
<td>-</td>
<td>28.2</td>
<td>38.5</td>
<td>20.5</td>
<td>20.5</td>
<td>17.9</td>
<td>7.7</td>
<td>12.8</td>
</tr>
<tr>
<td>Little Filtered Cigars</td>
<td>21</td>
<td>42.9</td>
<td>9.5</td>
<td>-</td>
<td>14.2</td>
<td>28.6</td>
<td>23.8</td>
<td>14.3</td>
<td>33.3</td>
<td>9.5</td>
<td>4.8</td>
</tr>
<tr>
<td>Pipes</td>
<td>15</td>
<td>13.3</td>
<td>0.0</td>
<td>-</td>
<td>13.3</td>
<td>26.7</td>
<td>20.0</td>
<td>13.3</td>
<td>-</td>
<td>6.7</td>
<td>20.0</td>
</tr>
<tr>
<td>Hookah</td>
<td>22</td>
<td>0.0</td>
<td>0.0</td>
<td>9.1</td>
<td>22.7</td>
<td>40.9</td>
<td>9.1</td>
<td>18.2</td>
<td>-</td>
<td>27.3</td>
<td>9.1</td>
</tr>
<tr>
<td>Snus</td>
<td>15</td>
<td>13.3</td>
<td>0.0</td>
<td>33.3</td>
<td>20.0</td>
<td>26.7</td>
<td>20.0</td>
<td>26.7</td>
<td>-</td>
<td>20.0</td>
<td>13.3</td>
</tr>
<tr>
<td>Smokeless</td>
<td>43</td>
<td>25.6</td>
<td>4.7</td>
<td>23.3</td>
<td>20.9</td>
<td>16.3</td>
<td>16.3</td>
<td>23.3</td>
<td>-</td>
<td>7.0</td>
<td>18.6</td>
</tr>
<tr>
<td>Disolvable</td>
<td>0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
</tbody>
</table>

*Note: questions were asked among current users, try users, and recent (12-month) former users of each product
Specific Aims

Aim 4: Estimate the extent of and determinants of tax avoidance and tax evasion

• uses multiple methods including:
  • littered cigarette pack collections
  • individual self-reports
  • archival data
  • econometric modeling

• identifies key individual and policy influences on tax avoidance and evasion and differential impact on key subpopulations
Using littered cigarette packs to detect tax avoidance and evasion

Methodology:

• Data collection teams used a strict protocol to collect littered cigarette packs at each BTG-COMP data collection site
• Packs were returned to UIC and about 15 items of information relating to each pack were coded
• Most important items were
  • Location found
  • Brand
  • Whether cellophane was present and
  • Type of tax stamp found, if any
Overview

- Total number of packs: 3,840
- Number of catchment area: 139
- Number of states: 36
- % of packs with cellophane: 55.5%
Tax Compliance

• Among all packs with cellophane:

<table>
<thead>
<tr>
<th>Pack with</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>A state tax stamp</td>
<td>92.12%</td>
<td>26.95%</td>
</tr>
<tr>
<td>the state tax stamp matches the state in which pack was found</td>
<td>81.89%</td>
<td></td>
</tr>
</tbody>
</table>
## Statistics by Catchment

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td># of packs</td>
<td>65.13</td>
<td>42.75</td>
<td>0</td>
<td>172</td>
</tr>
<tr>
<td># of packs with cellophane</td>
<td>35.41</td>
<td>21.97</td>
<td>0</td>
<td>82</td>
</tr>
<tr>
<td># of packs with tax stamps</td>
<td>32.66</td>
<td>20.28</td>
<td>0</td>
<td>71</td>
</tr>
<tr>
<td># of packs with tax stamps that match the state in which they were found</td>
<td>29.51</td>
<td>19.42</td>
<td>0</td>
<td>71</td>
</tr>
</tbody>
</table>
Key Preliminary Findings

- We found 9 or more packs with cellophane (so stamp can be identified) in 50% of catchment areas. For these catchment areas we can estimate “population” compliance with reasonable statistical confidence.

- 25% of catchment areas had perfect (100%) compliance

- 15% of catchment areas had compliance of less than 50%
Next Steps

• Clean and benchmark the data
  • Check for data anomalies/miscoding
  • Compare brand distribution in our data to expected brand distribution

• Map the geographical variation in tax compliance and provide more descriptive statistics

• Investigate determinants of cigarette tax avoidance
  • Rate of tax
  • Tax related policies
  • Availability of alternative supplies (e.g. cross border, reservation)
  • Economic and demographic characteristics of community

• Compare our results with other measures/predictions
Aim 5: Tobacco Use
Specific Aims

Aim 5: Examine the impact of tobacco product prices, price-reducing promotions, and related policies on tobacco use behaviors

• extends Aims 3 and 4 by estimating impact on:
  • prevalence, frequency, and intensity of tobacco use
  • substitution among tobacco products
  • uptake and cessation
• assesses differential impact by age, gender, SES, race/ethnicity, and tobacco use

• identify non-linearities in the impact of price on tobacco use
2009 Federal Tax Increases

- 2008 & 2009 Monitoring the Future Surveys
  - compare within 2009
  - compare same schools 2008-2009
  - alternative cut points
  - cigarette smoking & smokeless tobacco use
  - control for variety of individual, school, state factors
  - alternative estimation strategies
Results

Figure 3. Percent of 8th, 10th and 12th Graders Who Reported Smoked Cigarettes in the Past 30 Days

bridging the gap

www.bridgingthegapresearch.org
Results

Figure 4. Percent of 8th, 10th, and 12th Graders Who Reported Used Smokeless Tobacco in the Past 30 Days
## Results - Summary

<table>
<thead>
<tr>
<th>Cigarette Smoking (Pre-tax: before April 1, 2009; Post-tax: on or after May 1, 2009)</th>
<th>2009 MTF Model 2</th>
<th>2008 and 2009 MTF Model 2</th>
<th>DD Model 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre Tax Increase Mean (%)</td>
<td>13.4%</td>
<td>12.8%</td>
<td>12.8%</td>
</tr>
<tr>
<td>Estimated Percentage Point Decrease after Tax Increase</td>
<td>-1.3</td>
<td>-1.4</td>
<td>-1.7</td>
</tr>
<tr>
<td>Estimated Percent Decrease in Smoking after Tax Increase</td>
<td>-9.7%</td>
<td>-11.0%</td>
<td>-13.3%</td>
</tr>
<tr>
<td>Estimated Price Elasticity</td>
<td>-0.44</td>
<td>-0.50</td>
<td>-0.60</td>
</tr>
<tr>
<td>Number of FEWER Students (age 14 - 18) Smoking in the Past 30 Days Due to the Tax Increase (in 1,000)</td>
<td>220</td>
<td>237</td>
<td>287</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Smokeless Tobacco (Pre-tax: before April 1, 2009; Post-tax: on or after May 1, 2009)</th>
<th>2009 MTF Model 2</th>
<th>2008 and 2009 MTF Model 2</th>
<th>DD Model 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre Tax Increase Mean (%)</td>
<td>6.1%</td>
<td>5.0%</td>
<td>5.0%</td>
</tr>
<tr>
<td>Estimated Percentage Point Decrease after Tax Increase</td>
<td>-1.2</td>
<td>-1.2</td>
<td>-0.8</td>
</tr>
<tr>
<td>Estimated Percent Decrease in Use of Smokeless Tobacco after Tax Increase</td>
<td>-19.8%</td>
<td>-24.0%</td>
<td>-16.0%</td>
</tr>
<tr>
<td>Estimated Price Elasticity</td>
<td>-1.46</td>
<td>-1.84</td>
<td>-1.23</td>
</tr>
<tr>
<td>Number of FEWER Students (age 14 - 18) Using Smokeless Tobacco in the Past 30 Days Due to the Tax Increase (in 1,000)</td>
<td>203</td>
<td>203</td>
<td>135</td>
</tr>
</tbody>
</table>
UPC – Universal Product Code

Short Definition:
A UPC Barcode consists of a scannable strip of black bars with white spaces, it must contain a 12 numerical digit sequence. Letters and characters are not allowed to appear.

Picture Source: http://www.nytimes.com/2013/01/06/magazine/who-made-that-universal-product-code.html?_r=0

bridging the gap
## Nielsen Store Scanner Data

<table>
<thead>
<tr>
<th>Dataset</th>
<th>Population and Sample Size</th>
<th>Years</th>
<th>Key Constructs</th>
</tr>
</thead>
</table>
| Nielsen Store Scanner Data (cross-sectional) | Populations: all food, drug, mass, and convenience stores  
Sample: participating food, drug, and mass stores in 52 markets defined by Nielsen, and participating convenience stores in 25 markets defined by Nielsen | Quarterly data from 2007 - 2014 for food, drug, mass stores; Quarterly data from 2010 - 2014 for convenience stores | • Types of tobacco products and stop-smoking products.  
• Prices for all tobacco products and stop-smoking products at UPC / market level  
• Types and sizes of price promotions associated with each tobacco product  
• Sales of tobacco products and stop-smoking products at UPC/market level. |
Nielsen Store Scanner Data
# Nielsen Store Scanner Data: Convenience Stores

<table>
<thead>
<tr>
<th>Organization</th>
<th>Store Count</th>
<th>Organization</th>
<th>Store Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 ELEVEN</td>
<td>6000</td>
<td>UNITED DAIRY FARMERS</td>
<td>185</td>
</tr>
<tr>
<td>SHELL</td>
<td>4665</td>
<td>BP CONNECT</td>
<td>183</td>
</tr>
<tr>
<td>CIRCLE K</td>
<td>3139</td>
<td>FAST STOP</td>
<td>179</td>
</tr>
<tr>
<td>CHEVRON</td>
<td>3081</td>
<td>FLASH FOODS</td>
<td>178</td>
</tr>
<tr>
<td>MOBIL</td>
<td>2415</td>
<td>XTRA MART</td>
<td>172</td>
</tr>
<tr>
<td>BP</td>
<td>2297</td>
<td>UNI MART</td>
<td>171</td>
</tr>
<tr>
<td>EXXON</td>
<td>2286</td>
<td>WHITE HEN PANTRY</td>
<td>170</td>
</tr>
<tr>
<td>CITGO</td>
<td>2034</td>
<td>THORNTONS</td>
<td>159</td>
</tr>
<tr>
<td>CASEYS GENERAL STORE</td>
<td>1450</td>
<td>MEIJER GAS STATION</td>
<td>152</td>
</tr>
<tr>
<td>SPEEDWAY</td>
<td>1353</td>
<td>TETCO</td>
<td>148</td>
</tr>
<tr>
<td>AMOCO</td>
<td>1333</td>
<td>KV MK FILL/RED APPLE</td>
<td>146</td>
</tr>
<tr>
<td>KANGAROO EXPRESS</td>
<td>1197</td>
<td>SINCLAIR</td>
<td>138</td>
</tr>
<tr>
<td>MARATHON</td>
<td>1111</td>
<td>VILLAGE PANTRY</td>
<td>138</td>
</tr>
<tr>
<td>VALERO</td>
<td>1052</td>
<td>KRAUSZERS</td>
<td>136</td>
</tr>
<tr>
<td>SUNOCO</td>
<td>1034</td>
<td>WILSON FARMS STORE</td>
<td>134</td>
</tr>
<tr>
<td>AM PM MINI MARKET</td>
<td>890</td>
<td>KV MK SHOP/KROGER</td>
<td>132</td>
</tr>
<tr>
<td>TEXACO</td>
<td>806</td>
<td>TOM THUMB/KROGER</td>
<td>129</td>
</tr>
<tr>
<td>CONOCO</td>
<td>681</td>
<td>QUICK CHEK</td>
<td>120</td>
</tr>
<tr>
<td>A PLUS</td>
<td>639</td>
<td>AMERISTOP</td>
<td>117</td>
</tr>
<tr>
<td>Hess</td>
<td>599</td>
<td>ROYAL FARMS</td>
<td>117</td>
</tr>
<tr>
<td>WAWA FOODMARKET</td>
<td>582</td>
<td>HESS EXPRESS</td>
<td>115</td>
</tr>
<tr>
<td>CUMBERLAND FARMS</td>
<td>572</td>
<td>GETGO</td>
<td>109</td>
</tr>
<tr>
<td>PHILLIPS 66</td>
<td>534</td>
<td>QUIK STOP/CA</td>
<td>106</td>
</tr>
<tr>
<td>Kum &amp; Go</td>
<td>444</td>
<td>SPEEDY STOP</td>
<td>106</td>
</tr>
<tr>
<td>76</td>
<td>405</td>
<td>FAVORITE MARKET</td>
<td>106</td>
</tr>
<tr>
<td>AMPRIDE/CENEX</td>
<td>388</td>
<td>BP SHOP</td>
<td>96</td>
</tr>
<tr>
<td>HOLIDAY STATIONS</td>
<td>366</td>
<td>GO MART FOOD STORE</td>
<td>95</td>
</tr>
<tr>
<td>SHEFFIELD</td>
<td>357</td>
<td>TRUE NORTH</td>
<td>94</td>
</tr>
<tr>
<td>VALERO</td>
<td>338</td>
<td>TEDESCHI FOOD SHOP</td>
<td>93</td>
</tr>
<tr>
<td>KV MK TRIP</td>
<td>308</td>
<td>TRADE WILCO</td>
<td>93</td>
</tr>
<tr>
<td>PILOT TRAVEL CENTER</td>
<td>301</td>
<td>FAS MART</td>
<td>93</td>
</tr>
<tr>
<td>EZ M RT</td>
<td>299</td>
<td>LIL CRICKET</td>
<td>89</td>
</tr>
<tr>
<td>TURKEY HILL</td>
<td>246</td>
<td>SCOTCHMAN STORE</td>
<td>88</td>
</tr>
<tr>
<td>MAPCO EXPRESS</td>
<td>232</td>
<td>GAS AMERICA</td>
<td>87</td>
</tr>
<tr>
<td>ARCO</td>
<td>231</td>
<td>BIG APPLE</td>
<td>85</td>
</tr>
<tr>
<td>CLARK</td>
<td>228</td>
<td>FARM STORE</td>
<td>84</td>
</tr>
<tr>
<td>MLCO FOOD MART</td>
<td>215</td>
<td>LIL CHAMP</td>
<td>83</td>
</tr>
<tr>
<td>CONVENIENT FOOD MART</td>
<td>208</td>
<td>GATE FOOD POST</td>
<td>83</td>
</tr>
<tr>
<td>MAVERIK COUNTRY STORE</td>
<td>196</td>
<td>NICE N EASY GROCER</td>
<td>82</td>
</tr>
<tr>
<td>SUPERAMERICA</td>
<td>194</td>
<td>TIMEWjährige FOOD STORE</td>
<td>82</td>
</tr>
<tr>
<td>FLYING J</td>
<td>187</td>
<td>ADMIRAL PETROLEUM</td>
<td>81</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 GO MART</td>
<td>77</td>
</tr>
</tbody>
</table>
### Nielsen Store Scanner Data: Food Stores

<table>
<thead>
<tr>
<th>Organization</th>
<th>Store Count</th>
<th>Organization</th>
<th>Store Count</th>
<th>Organization</th>
<th>Store Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>KROGER</td>
<td>1345</td>
<td>A&amp;P SAV A CENTER</td>
<td>95</td>
<td>BIG M</td>
<td>39</td>
</tr>
<tr>
<td>FOOD LION</td>
<td>1250</td>
<td>PICK N SAVE (CORP)</td>
<td>95</td>
<td>REDNERS</td>
<td>39</td>
</tr>
<tr>
<td>SAVE A LOT</td>
<td>1176</td>
<td>FRESH MARKET</td>
<td>88</td>
<td>CITY MARKET</td>
<td>38</td>
</tr>
<tr>
<td>PUBLIX</td>
<td>1010</td>
<td>RAYES FOOD &amp; DRUG</td>
<td>84</td>
<td>GENUARDI/MD GROCER</td>
<td>37</td>
</tr>
<tr>
<td>SAFEWAY</td>
<td>987</td>
<td>BASHPAS</td>
<td>83</td>
<td>GRISTEDES</td>
<td>35</td>
</tr>
<tr>
<td>ALBERTSONS</td>
<td>747</td>
<td>DOMINICKS</td>
<td>80</td>
<td>COBORN/CASH WISE</td>
<td>35</td>
</tr>
<tr>
<td>MINN</td>
<td>506</td>
<td>DILLION</td>
<td>80</td>
<td>ROUSES</td>
<td>35</td>
</tr>
<tr>
<td>STOP &amp; SHOP</td>
<td>378</td>
<td>CUB FOODS</td>
<td>80</td>
<td>GLENS MARKETS</td>
<td>34</td>
</tr>
<tr>
<td>PIGGLY WGGLY CAROLINA</td>
<td>378</td>
<td>HOMELAND</td>
<td>78</td>
<td>GREERS/FOOD TIGER</td>
<td>33</td>
</tr>
<tr>
<td>VONS</td>
<td>291</td>
<td>TOPS</td>
<td>75</td>
<td>RAMEY SUPER MARKET</td>
<td>33</td>
</tr>
<tr>
<td>HEB</td>
<td>269</td>
<td>WEGMANS</td>
<td>74</td>
<td>TOP FOOD/HAGGENS</td>
<td>33</td>
</tr>
<tr>
<td>RALPHS GROCERY</td>
<td>360</td>
<td>QUALITY</td>
<td>74</td>
<td>SENTRY/SUPER SAVER</td>
<td>32</td>
</tr>
<tr>
<td>GIANT EAGLE INC</td>
<td>219</td>
<td>PIGGLY WGGLY/FOOD GIANT</td>
<td>71</td>
<td>HARDING'S</td>
<td>32</td>
</tr>
<tr>
<td>SHOP RITE/MAKEFERN</td>
<td>218</td>
<td>LUCKY STORES</td>
<td>70</td>
<td>FAMILY FARE</td>
<td>31</td>
</tr>
<tr>
<td>BILO</td>
<td>215</td>
<td>HARVEYS SUPERMARKET</td>
<td>69</td>
<td>RAINBOW (ROUNDY’S)</td>
<td>31</td>
</tr>
<tr>
<td>INGLES</td>
<td>202</td>
<td>SOUTHERN FAMILY MARKETS</td>
<td>68</td>
<td>MARKET BASKET</td>
<td>30</td>
</tr>
<tr>
<td>HYVEE</td>
<td>200</td>
<td>PIGGLY WGGLY</td>
<td>67</td>
<td>G’U MARKETS</td>
<td>30</td>
</tr>
<tr>
<td>MEMORIAL</td>
<td>189</td>
<td>SHOPPERS FOOD WAREHOUSE</td>
<td>63</td>
<td>JAY C STORE</td>
<td>29</td>
</tr>
<tr>
<td>HARRIS TEETER</td>
<td>186</td>
<td>WALDBAUM</td>
<td>63</td>
<td>FULMER SUPERMARKET</td>
<td>29</td>
</tr>
<tr>
<td>GIANT (MD)</td>
<td>180</td>
<td>HARPS</td>
<td>63</td>
<td>STRACK &amp; VAN TIL</td>
<td>29</td>
</tr>
<tr>
<td>SHAW’S SUPERMARKETS</td>
<td>178</td>
<td>SUPER FRESH</td>
<td>63</td>
<td>UKROPS</td>
<td>28</td>
</tr>
<tr>
<td>JEWEL OSCO</td>
<td>175</td>
<td>TOM THUMB</td>
<td>62</td>
<td>SUPER ONE</td>
<td>27</td>
</tr>
<tr>
<td>HANNAFORD/SHOP N SAVE</td>
<td>167</td>
<td>PRICE CHOPPER</td>
<td>62</td>
<td>COPPS CO</td>
<td>26</td>
</tr>
<tr>
<td>STATER BROS MARKET</td>
<td>166</td>
<td>HOUCHENS/SAVE-A-LOT</td>
<td>62</td>
<td>FOOD EMPORIUM</td>
<td>25</td>
</tr>
<tr>
<td>BROOKSHIRE</td>
<td>155</td>
<td>DEMOULAS/MARKET BASKET</td>
<td>59</td>
<td>KINGS</td>
<td>25</td>
</tr>
<tr>
<td>VONS</td>
<td>152</td>
<td>FIESTA MART</td>
<td>59</td>
<td>DAVIDS</td>
<td>24</td>
</tr>
<tr>
<td>GIANT (CARY)</td>
<td>148</td>
<td>BASHAS FOOD CITY</td>
<td>59</td>
<td>QUALITY MARKETS</td>
<td>23</td>
</tr>
<tr>
<td>FOOD 4 LESS</td>
<td>146</td>
<td>LOWES/PAY N SAVE</td>
<td>58</td>
<td>NOB HILL</td>
<td>23</td>
</tr>
<tr>
<td>PATHMARK</td>
<td>142</td>
<td>BIG Y</td>
<td>57</td>
<td>DIERBERGS</td>
<td>23</td>
</tr>
<tr>
<td>SMITHS</td>
<td>133</td>
<td>NASH-FINCH</td>
<td>57</td>
<td>PIONEER/MET FD/ASSOCIATED</td>
<td>23</td>
</tr>
<tr>
<td>SAVE MART</td>
<td>129</td>
<td>RAYS FOOD PLACE</td>
<td>57</td>
<td>MORGANS HOLIDAY MARKET</td>
<td>22</td>
</tr>
<tr>
<td>FRED MEYER INC</td>
<td>128</td>
<td>SHOP N SAVE</td>
<td>56</td>
<td>THRIFTY FOODS</td>
<td>22</td>
</tr>
<tr>
<td>ACE MARKETS</td>
<td>124</td>
<td>UNITED</td>
<td>56</td>
<td>BUEHLER FOODS</td>
<td>22</td>
</tr>
<tr>
<td>FRY’S</td>
<td>121</td>
<td>RANDALLS</td>
<td>50</td>
<td>KNOWLANS SUPERMKT</td>
<td>22</td>
</tr>
<tr>
<td>PRICE CHOPPER</td>
<td>120</td>
<td>KING KULLEN</td>
<td>49</td>
<td>TOP VALU</td>
<td>22</td>
</tr>
<tr>
<td>LOWES</td>
<td>110</td>
<td>SUPER S</td>
<td>48</td>
<td>BOYERS IGA INC</td>
<td>22</td>
</tr>
<tr>
<td>SCHNUCK MARKETS</td>
<td>106</td>
<td>COUNTRY MART</td>
<td>48</td>
<td>LUND’S INC</td>
<td>21</td>
</tr>
<tr>
<td>KING SOUPER</td>
<td>106</td>
<td>P &amp; C</td>
<td>46</td>
<td>BELL AIR MARKETS</td>
<td>21</td>
</tr>
<tr>
<td>MARSH</td>
<td>104</td>
<td>FARM FRESH</td>
<td>45</td>
<td>ROSAVERS</td>
<td>21</td>
</tr>
<tr>
<td>FOOD CITY/ KVAT</td>
<td>103</td>
<td>FOOD MAXX STORES</td>
<td>45</td>
<td>Q&amp;W FOODS/FARMERS</td>
<td>21</td>
</tr>
<tr>
<td>SWEETBAY</td>
<td>102</td>
<td>NIEMANN FOODS</td>
<td>43</td>
<td>BILIO</td>
<td>20</td>
</tr>
<tr>
<td>FRESH BRANDS/PIGGY WGGLY</td>
<td>96</td>
<td>PRICE RITE</td>
<td>40</td>
<td>MARTINS</td>
<td>20</td>
</tr>
</tbody>
</table>
# Nielsen Store Scanner Data: Drug Stores

<table>
<thead>
<tr>
<th>Organization</th>
<th>Store Count</th>
<th>Coop Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVS</td>
<td>6914</td>
<td>YES</td>
</tr>
<tr>
<td>WALGREENS</td>
<td>6727</td>
<td>YES</td>
</tr>
<tr>
<td>RITE AID</td>
<td>4817</td>
<td>YES</td>
</tr>
<tr>
<td>DUANE READE</td>
<td>247</td>
<td>YES</td>
</tr>
<tr>
<td>KERR DRUG STORES</td>
<td>85</td>
<td>YES</td>
</tr>
<tr>
<td>KINNEY DRUGS INC</td>
<td>84</td>
<td>YES</td>
</tr>
<tr>
<td>SUPER D</td>
<td>81</td>
<td>YES</td>
</tr>
</tbody>
</table>
**Nielsen Store Scanner Data: Mass Stores**

<table>
<thead>
<tr>
<th>Organization</th>
<th>Store Count</th>
<th>Coop Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kmart Discount</td>
<td>1287</td>
<td>YES</td>
</tr>
<tr>
<td>Target Discount</td>
<td>1477</td>
<td>YES</td>
</tr>
<tr>
<td>Target Supercenter</td>
<td>247</td>
<td>YES</td>
</tr>
<tr>
<td>Alco Discount</td>
<td>206</td>
<td>LMP only</td>
</tr>
<tr>
<td>Pamida</td>
<td>187</td>
<td>YES</td>
</tr>
<tr>
<td>Shopko</td>
<td>136</td>
<td>YES</td>
</tr>
<tr>
<td>Roses Stores</td>
<td>103</td>
<td>YES</td>
</tr>
<tr>
<td>Bi-Mart</td>
<td>70</td>
<td>YES</td>
</tr>
<tr>
<td>Kmart Supercenter</td>
<td>38</td>
<td>YES</td>
</tr>
</tbody>
</table>
Sales Volume – Cigarettes

Total US Market – Combined Convenience and FDM Stores

July 2010:
- Ban on Misleading Descriptors
- Enhanced Smokeless Warning Labels

bridging the gap
**Price Per Pack – Cigarettes**

**Total US Market – Combined Convenience and FDM Stores**

---

**July 2010:**
- Ban on Misleading Descriptors
- Enhanced Smokeless Warning Labels
Cigarette Sales by Brand Type:
Total US Market – Combined Convenience and FDM Stores (in billions of pieces)

July 2010:
• Ban on Misleading Descriptors
• Enhanced Smokeless Warning Labels

bridging the gap
Cigarette Per Pack Price by Brand Type:
Total US Market – Combined Convenience and FDM Stores

July 2010:
• Ban on Misleading Descriptors
• Enhanced Smokeless Warning Labels
Cigarette Sales by Type:
Total US Market – Combined Convenience and FDM Stores (in billions of pieces)

July 2010:
• Ban on Misleading Descriptors
• Enhanced Smokeless Warning Labels
Cigarette Price Per Pack by Type:
Total US Market – Combined Convenience and FDM Stores

July 2010:
- Ban on Misleading Descriptors
- Enhanced Smokeless Warning Labels
Cigarette Sales by Flavor:
Total US Market – Combined Convenience and FDM Stores (in billions of pieces)

July 2010:
• Ban on Misleading Descriptors
• Enhanced Smokeless Warning Labels
Cigarette Price Per Pack by Flavor:
Total US Market – Combined Convenience and FDM Stores

July 2010:
• Ban on Misleading Descriptors
• Enhanced Smokeless Warning Labels
Cigar Sales
Total US Market – Combined Convenience and FDM Stores (in millions of pieces)

July 2010:
- Ban on Misleading Descriptors
- Enhanced Smokeless Warning Labels

bridging the gap
Cigar Price (Per Piece)
Total US Market – Combined Convenience and FDM Stores

Price per piece (adj. to 2012 Q4 dollars)

Cigar, Cigarillo, Little Cigar

bridging the gap

www.bridgingthegapresearch.org
Loose and Pipe Tobacco Sales
Total US Market – Combined Convenience and FDM Stores (in millions of ounces)

Loose Tobacco   Pipe Tobacco

July 2010:  
• Ban on Misleading Descriptors  
• Enhanced Smokeless Warning Labels

Sales Volume (millions of ounces)
Loose and Pipe Tobacco Products Price (per ounce)
Total US Market – Combined Convenience and FDM Stores

Loose Tobacco
Pipe Tobacco

Price per ounce (in adjusted 2012 Q4 dollars)

July 2010:
• Ban on Misleading Descriptors
• Enhanced Smokeless Warning Labels

bridging the gap

www.bridgingthegapresearch.org
Smokeless Tobacco Products: Moist Snuff Sales and Price
Sales (in millions of ounces) and Price (per ounce)
Total US Market – Combined Convenience and FDM Stores
Smokeless Tobacco Products: Snus Sales and Price
Sales (in millions of pieces) and Price (per piece)
Total US Market – Combined Convenience and FDM Stores
Dissolvable Lozenge Sales and Price
Total US Market – Combined Convenience and FDM Stores (in millions of pieces)

July 2010:
• Ban on Misleading Descriptors
• Enhanced Smokeless Warning Labels

bridging the gap
Dissolvable Tobacco Products: Sticks Sales and Price
Sales in pieces and Price per piece
Total US Market – Combined Convenience and FDM Stores

July 2010:
- Ban on Misleading Descriptors
- Enhanced Smokeless Warning Labels

www.bridgingthegapresearch.org
Dissolvable Tobacco Products: Orbs
Sales in ounces and Price per ounce
Total US Market – Combined Convenience and FDM Stores

July 2010:
- Ban on Misleading Descriptors
- Enhanced Smokeless Warning Labels

bridging the gap
Dissolvable Tobacco Products: Strips
Sales in pieces and Price per piece
Total US Market – Combined Convenience and FDM Stores

July 2010:
• Ban on Misleading Descriptors
• Enhanced Smokeless Warning Labels

bridging the gap

www.bridgingthegapresearch.org
Electronic Cigarette Sales
Total US Market – Combined Convenience and FDM Stores (in thousands of pieces)

Sales Volume (thousands of pieces)

Cartridge
- E-Cig Disposable
- Cartomizer & Automizer
- E-Cig Starter Kit

July 2010:
- Ban on Misleading Descriptors
- Enhanced Smokeless Warning Labels

Sep-Oct 2012:
- TV Broadcast of E-Cig adds

bridging the gap
Electronic Cigarettes Price
Total US Market – Combined Convenience and FDM Stores (dollars per piece adjusted to 2012 4 quarter dollars)

July 2010:  
• Ban on Misleading Descriptors  
• Enhanced Smokeless Warning Labels

Sep-Oct 2012:  
• TV Broadcast of E-Cig adds
Number of Markets with E-cig Sales
2010 - 2012
E-Cig Brand Market Share
in millions of sales dollars 2010 - 2012

Millions

Blu
Njoy
Mistic
21st Century Smoke
Logic
Finiti
Nicotek
Cigirex
Cig2O
Green Smart Living
Krave
Cigaletric
X Hale O2
Elektro
Smoker’s One Choice
Gammuci
Other

bridging the gap

www.bridgingthegapresearch.org
E-Cig Brand Market Share
in percent of sales dollars 2010 - 2012

[Diagram showing market share of various e-cigarette brands from Q1 2010 to Q4 2012.]

bridging the gap
Media Expenditures on Electronic Cigarettes in thousands of dollars 2010 - 2012
NRT Patch Sales and Price
Sales (in millions of pieces) and Price per piece
Total US Market – Combined Convenience and FDM Stores

 bridging the gap
NRT Gum
Sales (in millions of pieces) and Price per piece
Total US Market – Combined Convenience and FDM Stores

bridging the gap

www.bridgingthegapresearch.org
Demand Model

\[ \ln Q_{mt} = f(\ln P_{mt}, D_m, D_t) \]

\( \ln Q \): Natural log of Sales volume in market \( m \) in year-quarter \( t \)

\( \ln P \): Natural log of average real price per unit in market \( m \) in year-quarter \( t \)

\( D_m \): Market level dummies

\( D_t \): Year Quarter dummies
## Smoking Tobacco Products

Price Elasticity Estimates

<table>
<thead>
<tr>
<th></th>
<th>Cigarette</th>
<th>Cigar</th>
<th>Cigarillo</th>
<th>Little Cigar</th>
<th>Pipe Tobacco</th>
<th>Loose Tobacco</th>
</tr>
</thead>
<tbody>
<tr>
<td>Price Elasticity</td>
<td>-0.767***</td>
<td>-1.204***</td>
<td>-1.775***</td>
<td>-1.228***</td>
<td>-2.090***</td>
<td>-1.838**</td>
</tr>
<tr>
<td></td>
<td>(0.186)</td>
<td>(0.0494)</td>
<td>(0.233)</td>
<td>(0.051)</td>
<td>(0.273)</td>
<td>(0.904)</td>
</tr>
<tr>
<td>Observations</td>
<td>360</td>
<td>320</td>
<td>320</td>
<td>320</td>
<td>306</td>
<td>320</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.988</td>
<td>0.965</td>
<td>0.947</td>
<td>0.98</td>
<td>0.817</td>
<td>0.91</td>
</tr>
</tbody>
</table>

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1
## Other Tobacco Products
### Price Elasticity Estimates

<table>
<thead>
<tr>
<th></th>
<th>Chewing Looseleaf</th>
<th>Moist Snuff</th>
<th>Snus</th>
<th>E-Cig Rechargable</th>
<th>E-Cig Disposable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Price Elasticity</td>
<td>-1.427*** (0.378)</td>
<td>-1.167*** (0.183)</td>
<td>-0.390** (0.188)</td>
<td>-2.781*** (0.364)</td>
<td>-2.000* (1.094)</td>
</tr>
<tr>
<td>Observations</td>
<td>320</td>
<td>320</td>
<td>320</td>
<td>260</td>
<td>265</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.962</td>
<td>0.967</td>
<td>0.878</td>
<td>0.739</td>
<td>0.751</td>
</tr>
</tbody>
</table>

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1
Next Steps: Modeling

• Adding state/local smoke-free air policies to model
  • Preliminary estimates show negative impact on sales of combusted products, but positive impact on sales of some smokeless products (moist snuff, snus)
    • Negative, weak association with e-cig sales
  • Develop cross-price elasticity models (e.g., what happens to consumption of OTP when cigarette prices increase?)
    • Early estimates mixed – some evidence of substitution between some products, but not consistent
Aim 6: Household Spending
Specific Aims

Aim 6: Evaluate the impact of prices, price-reducing promotions, and related policies on other household spending

• builds on Aims 3, 4 and 5 to examine impact of spending on tobacco products on:
  • household spending on food, housing, clothing, health care, education, transportation, and other goods/services
  • focuses on impact of tax changes on low-income households
  • assess differential impact based on use of tobacco tax and other tobacco revenues to support programs targeting low-income populations

• planning to start in 2014
Collaborative/Developmental Projects
FDA/Merriman – Littered Pack Inspection

- Uses littered packs collected as part of UIC/Chaloupka UO1 and project with NYC Department of Health and Mental Hygiene
  - 2012, national sample of 161 secondary public school catchment areas (BTG-COMP)
  - Late 2011, 5 East Coast cities (New York, Providence, Boston, Philadelphia and Washington DC) (NYC DOHMH)
    - 30 census tracts in each city sample
  - Focus of initial data collections on tax evasion and tax avoidance
  - Focus of FDA collaborative project on cigarette packaging and compliance with FDA policies
    - Use of flavors, descriptors, and warning labels
FDA – Littered Pack Inspection

- UO1/BTG-COMP Sample
  - 3,840 packs collected in 139 catchment areas located in 36 states
  - 55.5% with cellophane
  - Generally high compliance with ban on flavors

<table>
<thead>
<tr>
<th>Flavor</th>
<th># of Packs</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Flavor</td>
<td>3,073</td>
<td>80.0%</td>
</tr>
<tr>
<td>Menthol</td>
<td>755</td>
<td>19.7%</td>
</tr>
<tr>
<td>Fruit (illegal)</td>
<td>6</td>
<td>0.2%</td>
</tr>
</tbody>
</table>

- Still coding descriptors, warning labels
FDA – Littered Pack Inspection

• NYC DOHMH Sample
  • Completed coding for 633 cigarette packs from Providence and New York City
    • additional 12 packs in too poor condition to code
    • another 38 packs for little cigars
  • All pack in compliance with bans on flavors and descriptors
  • All packs included warning labels
    • 10 with non-US warning labels
  • Still coding packs from Boston, Philadelphia, and DC
ANRF/Chriqui – Local Tobacco Taxes

• ANRF Local Tobacco Ordinance data
  • Relatively comprehensive data on variety of local tobacco control policies collected from local departments of health and tobacco control advocacy groups; includes
    • smoke-free air policies
    • advertising restrictions
    • conditional use permits
  • Less complete data on local excise taxes
    • 59 localities included in ANRF database as of 12/31/12
    • CTFK reports 39 top local taxes (20 cents per pack and higher)
    • TBOT reports 594 city and county taxes in FY2012
      • only identifies states and number of cities/counties
  • Considerable variability in local taxes
    • From a few cents per pack in many AL, MO, and VA cities to $3.00 per pack in Cook County IL
ANRF – Local Tobacco Taxes

• Collaborative project aims:
  • Compile local tax and fee data from communities nationwide for inclusion in ANRF local ordinance databases
  • Examine variation in local taxes and fees and construct measures that include both state and local taxes on cigarettes and other tobacco products
  • Use state and local tax measures in analyses linked to tobacco product prices and tobacco use

• 2 Phase project
  • Phase 1 (current phase)
    • collect copies of local tax laws (also requesting licensing laws)
  • Phase 2 (grant year 3)
    • coding and entry of local tax laws collected in Phase 1
ANRF – Local Tobacco Taxes

• Phase 1:
  • 13 target states based on ANRF, CTFK, and TBOT databases
  • States called to identify sources of hard copies of local tax laws
  • Electronic mailing lists obtained from the National League of Cities and National Association of Counties; supplemented with information from Municipal Yellow Pages and news reports
  • Copies of local tax laws requested from city/county clerks and from local tax administrators
  • Second e-mail solicitation, calls to follow up with:
    • non-respondents in jurisdictions known to have local taxes/fees
    • respondents who provided incomplete information
    • random sample of other non-respondents
  • Limited success to date; effort will continue through summer
  • Phase 2 focus likely to change to e-cig related policies
Aim 7: Communication & Dissemination
Aim 7 – Disseminate & Communicate Widely

• Our approach
  • Identify policy relevant research questions
  • Obtain/collect/analyze data needed to address these questions
  • Include clear statement of key findings and policy implications in resulting publications/products
  • Work with other interested groups and use variety of approaches to disseminate policy relevant findings
  • Listen to policy makers, advocates, and others to identify unanswered questions for further research

• Key partner: Burness Communications
  • media relations
  • policy communications
  • stakeholder communications
Aim 7 – Disseminate & Communicate Widely

• Key products
  • peer reviewed journal articles, book chapters, etc.
    • pre-publication working papers (NBER, Tobacconomics)
    • recent NBER WP on 2009 federal tax increases
  • presentations, webinars, etc.
    • academic conferences (SRNT, APHA, etc.)
    • meetings with broader constituencies (NCTOH, TTAC, state programs, etc.)
    • meetings with key agencies (CDC/OSH, FDA, etc.)
• Special reports
  • state tax reports, chartbooks, etc.
• Research briefs & fact sheets
  • syntheses of findings from multiple studies
  • original research findings (recent BTG brief on cigarette pricing)
• Data
  • state tax/price-related policy data
Aim 7 – Disseminate & Communicate Widely

• Key activities/channels
  • engagement with key partners
    • CTFK, ACS-CAN, state/local health departments, state tobacco control programs, NAAG, OSH, FDA, ANRF, others
      • e.g. incorporating findings from analyses into state tobacco excise tax modeling
    • bi-directional: share research findings & learn about questions faced in the trenches
  • meetings/briefings with policy makers
  • media outreach
    • press releases, video-news releases
  • website – tobacconomics.org
  • social media
  • testimony
  • responding to every request
Report Claims SCHIP Cut Smokers,
Increased Revenues
Minnesota anti-tobacco group using findings to push for
tax hike
CSP Daily News | May 10, 2012

CHICAGO -- A new study by researchers at the University of Illinois at Chicago
claims that a large national tax increase “can influence youth tobacco use
prevalence within a very short time period.”

One anti-tobacco group, the ClearWay Minnesota/Raise It for Health coalition, is
already using the report to call for a tobacco price increase in Minnesota of $1.50 per pack.

Implemented on April 1, 2009, the State Children’s Health Insurance Program Reauthorization Act (SCHIP)
increased the federal tax rate on cigarettes by 61.66 cents per pack (from 39 cents to $1.0066 per pack)
and on moist snuff, the most common form of smokeless tobacco, by 92.5 cents per pound (from 58.5
cents to $1.51 per pound). It also increased taxes on other forms of smokeless tobacco.

SCHIP reduced the number of youth smokers by at least 220,000
and the number of youth smokeless tobacco users by at least
135,000 in the first two months, according to the report,
published online by the National Bureau of Economic Research.

The study also found that federal tobacco tax revenues increased
by 147% in the 12 months following the increase. It said—from
$7.1 billion in the 12 months before to $17.5 billion in the 12
months after.

2009 Federal Tobacco Tax Increase Cut Number of Youth Smokers by At Least 220,000 in
First Two Months Alone, New Study Shows
RALEIGH, N.C., May 17 /PRNewswire-USNewswire/ -- As the legislative session begins, a report released today by a tobacco
policy expert at the University of Illinois at Chicago confirms that a significant cigarette tax increase in North Carolina will
produce a large, sustained increase in state tobacco tax revenues. Several states, including South Carolina, have recently
raised tobacco taxes to deal with budget shortfalls.
Press on the Impact of the 2009 tobacco tax hike article

Fewer kids might start smoking, if Quinn’s cigarette-tax hike to help Medicaid passes

BY LILI TAN
MAY 10, 2012

"Part of the purpose of the increase in federal tobacco taxes that went into effect in 2009 was to generate revenues, and a big part was the public health impact, and it’s certainly having that with respect to kids," said Frank Chaloupka, paper co-author and an economics professor at the University of Illinois at Chicago.

Chaloupka found a 16 to 24 percent drop in youth smoking immediately after the tax increase. He and his researchers culled data from Monitoring the Future surveys, which asked eighth-, 10th- and 12th-graders about their tobacco use, and have tracked youth substance use since the 1970s.

Chaloupka also projected that roughly 78,000 fewer youths would start smoking in Illinois if Gov. Quinn’s $1 cigarette tax hike passes.

"Where price really matters is for kids who are making the transition between experimenting with cigarettes – getting them from their friends or sneaking them from their parents – to buying their own and moving into more regular smoking," he said.
Enhancing the Economic Impact Analysis Used in FDA's Rules for Tobacco Products
Enhancing FDA’s Economic Impact Analysis

Aim 1 - Assess the impact of FDA regulatory actions and other tobacco control policies on tobacco use and related knowledge, attitudes, and

Aim 2 - Assess the impact of FDA regulatory actions and other tobacco control policies on the consumer surplus obtained by tobacco users

Aim 3 - Extend the range of costs and benefits including in assessing the economic impact of FDA regulatory actions
Estimating Impact of GWL

FDA Impact Analysis

- Accounts for changes in prices over time
- Difference between projected and actual prevalence in Canada attributed to labels
- 0.088 percentage point reduction (0.4% reduction in prevalence rate)
  - About 213,000 fewer smokers in US in 2013, growing over time
## Comparisons of Cigarette Prices in Canada Between Statistics Canada and the ITC Canada Survey Over Eight Waves of Survey Data Collection (October 2002 to June 2011)

<table>
<thead>
<tr>
<th>Survey Dates</th>
<th>Statistics Canada</th>
<th>Percent Change</th>
<th>ITC</th>
<th>Percent Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>10/30/02-12/30/02</td>
<td>131.3</td>
<td></td>
<td>$7.43</td>
<td></td>
</tr>
<tr>
<td>5/15/03-9/28/03</td>
<td>137.4</td>
<td>4.7%</td>
<td>$7.69</td>
<td>3.5%</td>
</tr>
<tr>
<td>6/3/04-12/27/04</td>
<td>143.9</td>
<td>4.7%</td>
<td>$7.35</td>
<td>-4.4%</td>
</tr>
<tr>
<td>10/10/05-1/31/06</td>
<td>144.3</td>
<td>0.3%</td>
<td>$7.21</td>
<td>-1.9%</td>
</tr>
<tr>
<td>10/11/06-2/17/07</td>
<td>147.8</td>
<td>2.5%</td>
<td>$6.92</td>
<td>-4.0%</td>
</tr>
<tr>
<td>9/21/07-2/12/08</td>
<td>149.9</td>
<td>1.4%</td>
<td>$6.81</td>
<td>-1.6%</td>
</tr>
<tr>
<td>10/25/08-7/28/09</td>
<td>151.6</td>
<td>1.2%</td>
<td>$6.89</td>
<td>1.2%</td>
</tr>
<tr>
<td>7/13/10-6/24/11</td>
<td>157.1</td>
<td>3.6%</td>
<td>$7.13</td>
<td>3.4%</td>
</tr>
<tr>
<td><strong>Average Change</strong></td>
<td></td>
<td><strong>2.6%</strong></td>
<td></td>
<td><strong>-0.5%</strong></td>
</tr>
<tr>
<td><strong>Total Change</strong></td>
<td></td>
<td><strong>19.7%</strong></td>
<td></td>
<td><strong>-4.0%</strong></td>
</tr>
</tbody>
</table>

Notes: The Statistics Canada price reflects an inflation-adjusted measure of the cigarette prices reported by Statistics Canada indexed to January 2000. The ITC price reflects a consumption-weighted average of the prices reported by smokers in the ITC Canada Survey, adjusted for inflation.

www.bridgingthegapresearch.org
Cigarette Prices and Illicit Cigarette Market Share, Canada, 2000-2010

Source: Euromonitor, 2011, Statistics Canada, and ITC project. Note that the two price measures are indexed to 1.0 in November 2002
Comparisons of Cigarette Prices in Canada Between BLS and the ITC Canada Survey Over Eight Waves of Survey Data Collection (October 2002 to June 2011)

<table>
<thead>
<tr>
<th>Survey Dates</th>
<th>BLS-CPI</th>
<th>Percent Change</th>
<th>ITC</th>
<th>Percent Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>10/30/02-12/30/02</td>
<td>1.180</td>
<td></td>
<td>$4.10</td>
<td></td>
</tr>
<tr>
<td>5/15/03-9/28/03</td>
<td>1.148</td>
<td>-2.7%</td>
<td>$3.85</td>
<td>-6.2%</td>
</tr>
<tr>
<td>6/3/04-12/27/04</td>
<td>1.141</td>
<td>-0.6%</td>
<td>$3.61</td>
<td>-6.1%</td>
</tr>
<tr>
<td>10/10/05-1/31/06</td>
<td>1.166</td>
<td>2.2%</td>
<td>$3.73</td>
<td>3.3%</td>
</tr>
<tr>
<td>10/11/06-2/17/07</td>
<td>1.186</td>
<td>1.7%</td>
<td>$3.89</td>
<td>4.2%</td>
</tr>
<tr>
<td>9/21/07-2/12/08</td>
<td>1.218</td>
<td>2.7%</td>
<td>$3.86</td>
<td>-0.7%</td>
</tr>
<tr>
<td>10/25/08-7/28/09</td>
<td>1.420</td>
<td>16.6%</td>
<td>$4.29</td>
<td>11.0%</td>
</tr>
<tr>
<td>11/2/09-1/10/10</td>
<td>1.644</td>
<td>15.8%</td>
<td>$4.76</td>
<td>11.1%</td>
</tr>
<tr>
<td>7/13/10-6/24/11</td>
<td>1.709</td>
<td>4.0%</td>
<td>$5.12</td>
<td>7.5%</td>
</tr>
<tr>
<td>Average Change</td>
<td></td>
<td>5.0%</td>
<td></td>
<td>3.0%</td>
</tr>
<tr>
<td>Total Change</td>
<td></td>
<td>44.9%</td>
<td></td>
<td>24.7%</td>
</tr>
</tbody>
</table>

Notes: Bureau of Labor Statistics inflation adjusted price indexed to one in January 2000. The ITC price reflects a consumption-weighted average of the prices reported by smokers in the ITC Canada Survey, adjusted for inflation.

www.bridgingthegapresearch.org
Cigarette Prices and Illicit Cigarette Market Share, United States, 2000-2010

Source: Euromonitor, 2011, Bureau of Labor Statistics, and ITC project. Note that the two price measures are indexed to 1.0 in November 2002
Estimating Impact of GWL

Our Reanalysis

- Difference-in-difference modeling of combined Canadian/US data
- Accounts for changes in prices paid by smokers over time
- Use estimates to project impact on smoking prevalence rates
- 2.87-4.68 percentage point reduction (12-19.6% reduction in prevalence rate)
  - Does not account for other tobacco control policies & programs in either country
www.bridgingthegapresearch.org

coming soon: www.tobacconomics.org