A2. Food stamps is cash transfer program

⇒

2. Take-up of programs overlooked form of behavior response to taxation
1. First paper that relates increases in cigarette taxes to food stamp participation

$1 increase in state cigarette taxes

both

Identify program “take-up” using

Deliberately allow for “other” compensating behaviors
•
•

Estimates interpreted as Intent-to-Treat (ITT) - the policy relevant estimates

 Increases households’ annual cigarette expenditures by $150 to $200

increases food stamp take-up by about 15% among eligible smoking households

regardless of optimization failures

⇒

Cigarette taxes less effective stick with public assistance programs

\[
\text{max } u(c, x) - \phi(S) \\
\text{subject to} \\
W + FS \{S > 0 \} \geq pc + x
\]

Model Assumptions

A1. No marginal stigma (Ranney & Kushman, 1987)
⇒ \( \phi(S) = S \)
A2. Food stamps is cash transfer program
A3. Agents must satisfy true budget constraint regardless of optimization failures
A4. Bernheim and Rangel (2004): “hot” state

Model Set Up

• Suppose agents only vary along \( S \sim U(0, 1) \)
• Agent \( i \) with the marginal stigma enrolls if:

\[
S^*_i = \nu(p, W + FS) - \nu(p, W)
\]

What happens to \( S^*_i \) when prices increase?
- Answer depends on sign of \( \frac{\partial \nu}{\partial p} \).

Model Prediction

\[
\frac{\partial S_i}{\partial p} = \frac{1}{p} \left( \frac{\partial u}{\partial x} \right)_{FS=0} - \left( \frac{\partial u}{\partial x} \right)_{FS=0} > 0
\]
⇒ Increases in taxes can induce eligible smoking households to enroll in food stamps.

THEORETICAL MODEL

\( c \) is the number of cigarettes smoked
\( x \) is consumption of the composite food good
\( S \) is the social stigma of enrolling in food stamps
\( \nu \) is the after tax price of a pack of cigarettes
\( W \) is income
\( FS \) is the amount received from food stamps (if enrolled)

DATA: CPS

Tobacco Use Supplements (TUS)
Food Security Supplements (FSS)
Build Two Datasets
- Cross section
- Pseudo-panel (main result)
  * FSS Food Stamp “Panel”
  * TUS Smoking “Panel”
  * Merged TUS “Panel” to FSS “Panel”
  * Ex: Jan ’11 TUS and Dec ’10 FSS
⇒ 12 months in pseudo-panel

EMPIRICAL RESULTS

<table>
<thead>
<tr>
<th>Variable</th>
<th>Year + State FE (b)</th>
<th>+ Covariates (c)</th>
<th>+ Month-Year Time Trends (d)</th>
<th>+ State FE (e)</th>
</tr>
</thead>
<tbody>
<tr>
<td>State cig. tax</td>
<td>0.0239*** (0.0079)</td>
<td>0.0222*** (0.0075)</td>
<td>0.0219*** (0.0075)</td>
<td>0.0186** (0.0075)</td>
</tr>
<tr>
<td>Mean</td>
<td>0.0010** (0.0004)</td>
<td>0.0009** (0.0005)</td>
<td>0.0009** (0.0004)</td>
<td></td>
</tr>
</tbody>
</table>
| in% | 0.05, *** | 0.01; standard errors are in parentheses and clustered at the state level. Regressions are based on a pseudo-panel that makes use of the retrospective monthly

\[ \text{ESULTS} \]

\( y_{int} = \alpha + \beta x_{int} + \gamma X_i + \delta_i + \phi_m + \theta_s + \epsilon_t \)
for household \( i \) living in state \( s \) in month \( t \) and in year \( t \)

\( X_i \) is a vector of household socio-demographics
\( \delta_i \) are month-year fixed effects
\( \phi_m \) are state fixed effects
\( \epsilon_t \) is the constant term

\( y_{int} \) measures
(i) Cigarette expenditures
(ii) Food stamp enrollment
(iii) Take-up of food stamps

METHODS

Source: CPS 2001-2011
Note: Right Figure cases mean percent of voucher or food stamps for each tax level reported

EMPIRICAL RESULTS

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<th>+ Covariates (b)</th>
<th>+ Month-Year Time Trends (c)</th>
<th>+ State FE (d)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Observation</td>
<td>345.665</td>
<td>345.665</td>
<td>345.665</td>
<td>345.665</td>
</tr>
<tr>
<td>E-squared</td>
<td>0.0225</td>
<td>0.0340</td>
<td>0.1941</td>
<td>0.1942</td>
</tr>
</tbody>
</table>

Source: CPS Food Security Supplement (FSS) and Tobacco Use Supplement (TUS) 2001-2011, merged with state-month level cigarette tax information (Tax Burden on Tobacco, 2012), own calculation and illustration. \( p < 0.01 \), \( \alpha < 0.05 \), \( \alpha = 0.10 \), standard errors are in parentheses and clustered at the state level. Regressions are based on a pseudo-panel that makes use of the retrospective monthly information on household food stamp take-up in the FSS. Each column represents one regression in equation (i). The binary dependent variable in the last four models indicates food stamp take-up in between the previous and the current month \( (i, \ldots, l) \). The variable of interest indicates the state cigarette tax level in month \( t \).

CONSULTATION

Do sin taxes drive people to accept government transfers?

RESEARCH DESIGN
Identify program “take-up” using both changes in state taxes and “enrollment”
• Deliberately allow for “other” compensating behaviors
• Estimates interpreted as Intent-to-Treat (ITT) - the policy relevant estimates

EMPIRICAL FINDINGS

$1 increase in state cigarette taxes

• increases households’ annual cigarette expenditures by $150 to $200
• increases food stamp take-up by about 15% among eligible smoking households

CONTRIBUTION
1. First paper that relates increases in cigarette taxes to food stamp participation
2. Take-up of programs overlooked form of behavior response to taxation
⇒ Cigarettes taxes less effective stick with public assistance programs
3. Explains small part of the recent staggering increase in food stamp participation

THEORETICAL MODEL

\[ \max u(c, x) - \phi(S) \]
\[ \text{subject to} \]
\[ W + FS \{S > 0 \} \geq pc + x \]

MODEL SET UP

\( c \) is the number of cigarettes smoked
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MODEL PREDICTION

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