Behavioral Responses to Taxation: Cigarette Taxes and Food Stamp Take-Up

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Research Question

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
   ⇒ Cigarette taxes less effective stick with public assistance programs
3. Explains small part of the recent staggering increase in food stamp participation

Theoretical Model

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

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
p	is the after tax price of a pack of cigarettes
W	is income
FS	is the amount received from food stamps (if enrolled)

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:

$$S_i^* \leq v(p, W + FS) - v(p, W)$$

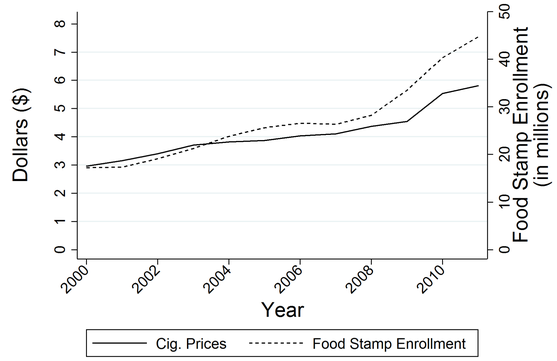
- What happens to S_i^* when prices increase?
  - Answer depends on sign of $\frac{\partial S_i}{\partial p}$.

Model Prediction

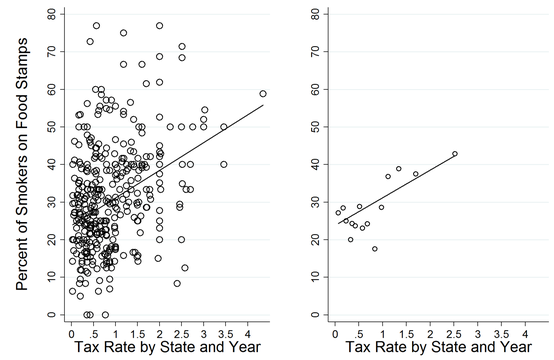
$$\frac{\partial S_i}{\partial p} = \frac{1}{p}\left[\left(\frac{\partial u}{\partial x}\right)_{FS=0} - \left(\frac{\partial u}{\partial x}\right)_{FS>0}\right] > 0$$

⇒ Increases in taxes can induce eligible smoking households to enroll in food stamps.

Motivation & Graphical Results



Source: Authors graph using Tax Burden on Tobacco (cigarette price) and official yearly statistics from the Department of Agriculture.
Note: prices adjusted by CPI to 2011 dollars



Source: CPS 2001-2011
Note: Right figure uses mean percent of smokers on food stamps for each bin reported

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

Methods

$$y_{imt} = \alpha + \beta Tax_{smt} + \gamma X_i + \delta_t \times \phi_m + \theta_s + \epsilon_{it}$$

for household i living in state s in month m and in year t

X_i	is a vector of household socio-demographics
$\delta_t \times \phi_m$	are month-year fixed effects
θ	are state fixed effects
α	is the constant term

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

Empirical Results

	On Food Stamps This Month				*New On Food Stamps This Month*			
Variable	**Year + State FE (1)**	**+ Covariates (2)**	**+ Month-Year Time Trend (3)**	**+ State FE (4)**	**Year + State FE (5)**	**+ Covariates (6)**	**+ Month-Year Time Trends (7)**	**+ State FE (8)**
State cig. tax	0.0238***	0.0222***	0.0219***	0.0186**	0.0010**	0.0009**	0.0009*	0.0009**
	(0.0079)	(0.0075)	(0.0075)	(0.0075)	(0.0004)	(0.0004)	(0.0005)	(0.0004)
Mean	0.1641	0.1641	0.1641	0.1641	0.007	0.007	0.007	0.007
in%	14.5	13.5	12.6	11.3	13.3	13.2	13.1	12.9
Covariates employed								
Month FE	yes	yes	no	yes	yes	yes	no	yes
Year FE	yes	yes	no	yes	yes	yes	no	yes
State FE	yes	yes	yes	no	yes	yes	yes	no
Socio-Demo	no	yes	yes	yes	no	yes	yes	yes
State time trend	no	no	no	yes	no	no	no	yes
Month-Year FE	no	no	yes	yes	no	no	yes	yes
Observations	345,665	345,665	345,665	345,665	345,665	345,665	345,665	345,665
R-squared	0.0225	0.1940	0.1941	0.1942	0.0075	0.0118	0.0121	0.0118

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<0.1, ** p<0.05, *** p<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 information on household food stamp take-up in the FSS. Each column represents one regression as in equation (1). The binary dependent variable in the first four models simply indicates whether the household is on food stamps in the current month, t_0. The binary dependent variable in the last four models indicates food stamp take up in between the previous and the current month (t_0 -t_{-1}) . The variable of interest indicates the state cigarette tax level in month t_{-1}.