

Seminar on Public Finance

Lecture #7: February 27

Empirical Public Finance: Individual Taxation

Why don't we see more bunching at kink points?

- True elasticity of response maybe small
- There maybe a random component in the income generation process; lack of the complete control implied by theory
- Salience: what do people know and respond to
- What are the adjustment costs

Salience and Taxation (1)

- Tax Salience Definition: Tax policy a is more salient than tax policy b if calculating the gross-of-tax price under policy a requires less computation than calculating gross-of-tax price under policy b .
- Basic tax results relevant for this analysis:
 - Incidence of a tax does not depend on whether tax is levied on consumer (e.g. added at point of sale) or levied on firm (e.g. posted price is inclusive of the tax)
 - Behavior should respond to the net of tax price
 - Behavioral response should be identical to prices and taxes
 - (Optimal tax result-Ramsey Rule-inverse elasticity rule) Tax more heavily goods that have a lower elasticity

Salience and Taxation (2)

- Idea of tax salience comes from work in behavioral economics
- Key idea from behavioral econ: bounded rationality
 - Agents face a cost of processing information. They therefore (rationally) use heuristics to solve complex problems.

Salience and Taxation (3)

If there are costs of processing information, then the salience of the tax can lead to the following results:

- Salience of the tax can affect measured elasticities:
 - If you are not aware that the tax changes, does your behavior respond?
 - If the costs of processing information are large, then you do not adjust in the same way
- Optimal tax result: Higher taxes being levied on the less visible or less salient taxes (because lower elasticity)
- Political economy result: preference to raise less salient taxes
- Tax incidence: neutrality no longer holds
- Deadweight loss: taxes with small utility losses if ignored by individuals can still create large DWL overall. Ultimately, they still pay the tax and the DWL effects depend on HOW they adjust other spending and what the other spending is.

Salience and Taxation (4)

- Connections to other literatures:
 - I/O: There is empirical evidence on the differential responsiveness to different components of prices, costs, etc. Examples include: cost of appliance and energy costs, car purchases and manufacturer rebates.
 - Taxes and the size of the government: the less visible the tax → tendency to have a larger government.
 - This was actually a point made by the 2005 Presidents Advisory Panel on Federal Tax Reform in a concern to recommend a VAT (which was perceived as being less salient than an income tax)
 - Liebman and Zeckhauser “Schmeduling”: labor supply responds more to average tax rates than marginal tax rates

Salience and Taxation (5)

- These papers illustrate the kind of work being done by the best young people in empirical public finance
 - A move away from the pure “policy evaluation” of the identification-emphasized, reduced form (difference-in-difference, regression discontinuity) literature
 - Instead use those methods to reveal something about behavior, theory
 - Much more connected to economics and economic theory.
 - Also part of emerging area of “behavioral public finance” - Individual faces cognitive constraints in achieving true optimum when faced with a complex tax system

Salience and Taxation (6)

- Chetty, Looney and Kroft conduct a nice experiment with the sales tax.
 - Theoretical literature assumes that agents optimize fully to incentives including tax rates
 - In practice tax schedules can be complex, are they sufficiently transparent to agents?
 - If not, what are the welfare consequences?
 - Test: does the effect of a tax depend on whether it is included in the posted price?

Salience and Taxation (7)

- Empirical framework
 - Consider two goods, one taxed one not
 - If consumers fully optimize, then relative demand depends only on total tax-inclusive price (even though the tax isn't in the posted price.)
 - Hypothesis: that agents under-react to the tax because it is less salient since it isn't included in the posted price
 - Estimate the log of the demand function:

$$\log X(p, t) = \alpha + \beta \log(p) + \theta \beta \log(1 + t)$$

- θ measures the degree that there is an under-reaction to the tax. If consumers fully optimize then $\theta = 1$ and if they ignore the tax then $\theta = 0$.

Saliency and Taxation (8)

- Strategy 1: Variation in Tax Saliency
 - Post tax-inclusive prices on shelf for items subject to sales tax (normal treatment is to only post tax exclusive prices)
 - Use scanner data on price and weekly quantity sold
 - Results imply that $\theta \simeq 0.35$
 - Note that this paper is a nice example of DDD (triple difference). They remove both the within store and within products time trend effects.



Source: Chetty, Looney, and Kroft (2009)

Effect of Posting Tax-Inclusive Prices: Mean Quantity Sold

TREATMENT STORE			
Period	<u>Control Categories</u>	<u>Treated Categories</u>	<u>Difference</u>
Baseline	26.48 (0.22)	25.17 (0.37)	-1.31 (0.43)
Experiment	27.32 (0.87)	23.87 (1.02)	-3.45 (0.64)
Difference over time	0.84 (0.75)	-1.30 (0.92)	DD_{TS} = -2.14 (0.64)

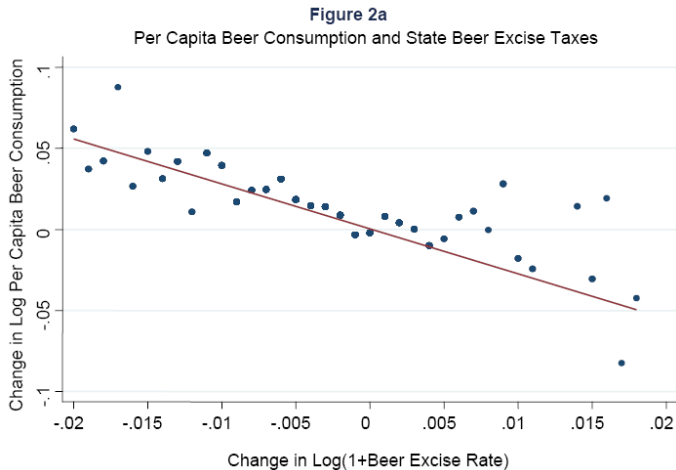
CONTROL STORES			
Period	<u>Control Categories</u>	<u>Treated Categories</u>	<u>Difference</u>
Baseline	30.57 (0.24)	27.94 (0.30)	-2.63 (0.32)
Experiment	30.76 (0.72)	28.19 (1.06)	-2.57 (1.09)
Difference over time	0.19 (0.64)	0.25 (0.92)	DD_{CS} = 0.06 (0.90)

DDD Estimate **-2.20**
(0.58)

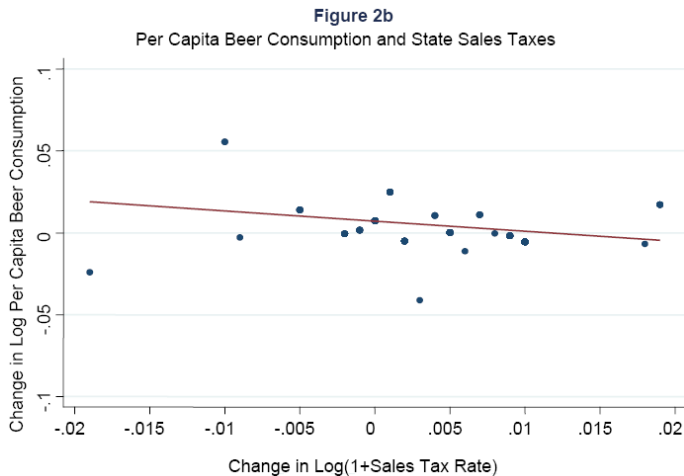
Salience and Taxation (9)

- Strategy 2: Variation in Tax Rates
 - They compare the effects of price changes and tax changes
 - Use alcohol since it often faces both a fixed excise tax and a sales tax. The excise tax is included in the posted price but sales tax is not
 - They use state level changes in the two taxes to estimate θ
 - They find differing effects for the two forms of tax and $\theta \approx 0.06$

Salience and Taxation (10)



Salience and Taxation (11)



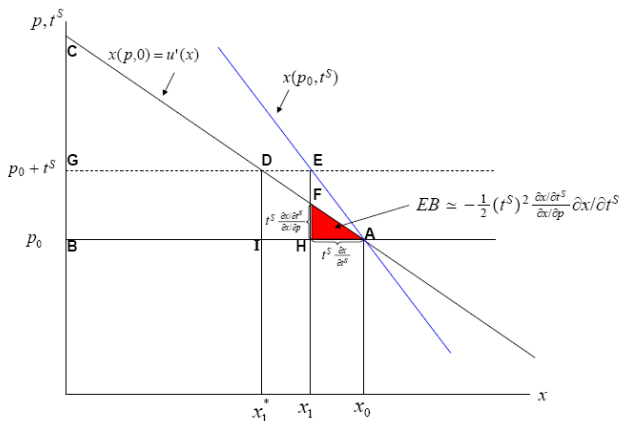
Salience and Taxation (12)

Effect of Excise and Sales Taxes on Beer Consumption

Dependent Variable: $\Delta \text{Log}(\text{per capita beer consumption})$				
	Baseline	Bus Cyc, Alc Regs.	3-Year Diffs	Food Exempt
	(1)	(2)	(3)	(4)
$\Delta \text{Log}(1+\text{Excise Tax Rate})$	-0.87	-0.89	-1.11	-0.91
	(0.17)***	(0.17)***	(0.46)**	(0.22)***
$\Delta \text{Log}(1+\text{Sales Tax Rate})$	-0.20	-0.02	-0.00	-0.14
	(0.30)	(0.30)	(0.32)	(0.30)
Business Cycle Controls		x	x	x
Alcohol Regulation Controls		x	x	x
Year Fixed Effects	x	x	x	x
F-Test for Equality of Coeffs.	0.05	0.01	0.05	0.04
Sample Size	1,607	1,487	1,389	937

Salience and Taxation (13)

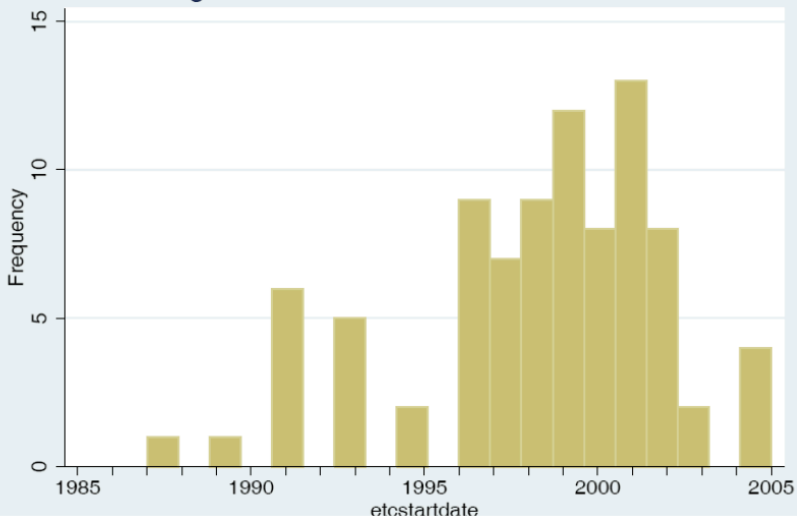
- Result is that consumers seem under-respond to taxation.
- This lack of response implies that taxation is less distortionary than it would be if agents fully responded.



Finkelstein “E-ZTax: Tax Salience and Tax Rates”, (*Quarterly Journal of Economics*, 2009)

- Paper is motivated by the view that less salient taxes lead to larger government: slip in lots of new taxes without people noticing.
- The setting is the introduction of electronic toll collections (ETC) on U.S. roads, tunnels, and bridges.
- She collects data on tolls, traffic, and the timing of introduction of toll collections in 123 of the 183 sites with tolls in place in 1985.
- She examines how the introduction of ETC affects
 - Tolls (analogy to size of government, or tax rates)
 - Elasticity of road use to toll price

Figure 1: Distribution of ETC Start Dates



Finkelstein (2)

Prediction of the model for electronic toll introduction:

- Gov't uses inverse elasticity rule to maximize social welfare subject to budget constraint
 - with electronic toll, the tax is less salient
 - therefore a change in the tax (toll) will lead to smaller changes in behavior (driving); elasticity falls
 - with less salient tax, tolls more likely to increase (=big government)
- This analysis is predicated on the assumption that income effects of this change are small (which makes sense since tolls are small share of individual spending and government revenue)

Finkelstein (3)

- Basic approach amounts to two steps:
 1. Establish that ETC is associated with an increase in tolls.
 2. Present evidence in support of the hypothesized mechanism, namely that ETC increases the equilibrium toll rate by decreasing its salience.
 - She also conducts a survey of Mass Pike drivers and uses a commuter survey in NY/NJ
 - Shows that those using ETC are less likely to know amount of toll they pay

Finkelstein (4)

- Results:
 - Evidence is compelling that tax rates rise when less salient tax is created (tolls rise with ETC introduction)
 - Installing ETC leads to 75% more increase in tolls
 - Idea: once you use electronic payment you no longer pay attention to the toll amount
 - Political economy result:
 - Baseline assumption is that legislators do not want to increase taxes in election years.
 - If less salient taxes do not change behavior (people are less aware of the tax changes) then there should be less of an election year effect with the less salient tax
 - Indeed, under ETC there is less of an election year effect. Less sensitive to electoral cycle.

Teaching the Tax Code (1)

- “Teaching the Tax Code: Earnings Responses to an Experiment with EITC Recipients” by Chetty and Saez
 - Similar in theme to the salience paper
 - Natural experiment, provides data to EITC recipients to see if the earnings response differs
 - Background:
 - Economists like the incentive effects that the EITC would theoretically provide. Expected to both increase participation in the labor market and increase hours worked.
 - In practice, it seems to do a better job of encouraging participation than encouraging additional hours worked.

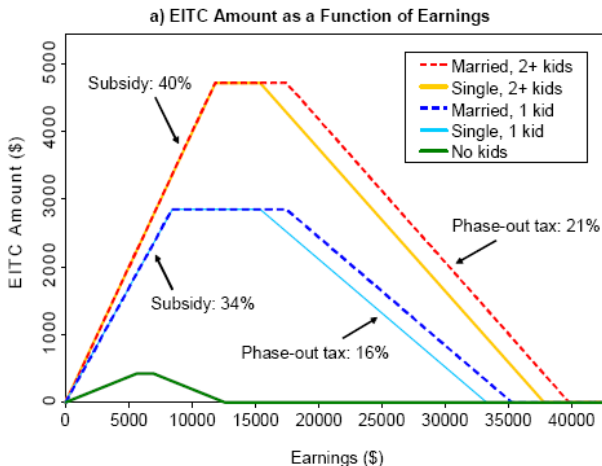
Teaching the Tax Code (2)

Experiment:

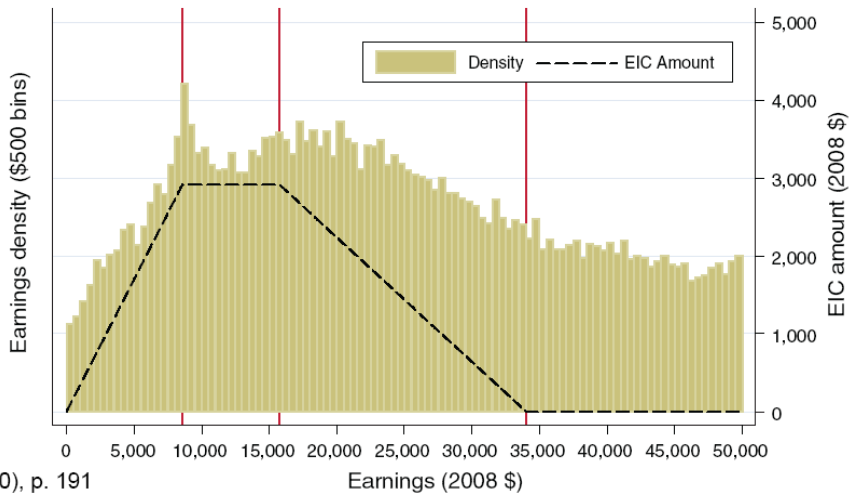
- Takes 43,000 H&R Block clients who claimed the EITC
- Provides half with a 2+ minute explanation of how the EITC works and the marginal incentives given where they currently were on the EITC schedule
- Also provides them with a personalized handout to take home
- Question is whether the treatment altered the behavior of the EITC claimants

Teaching the Tax Code (3)

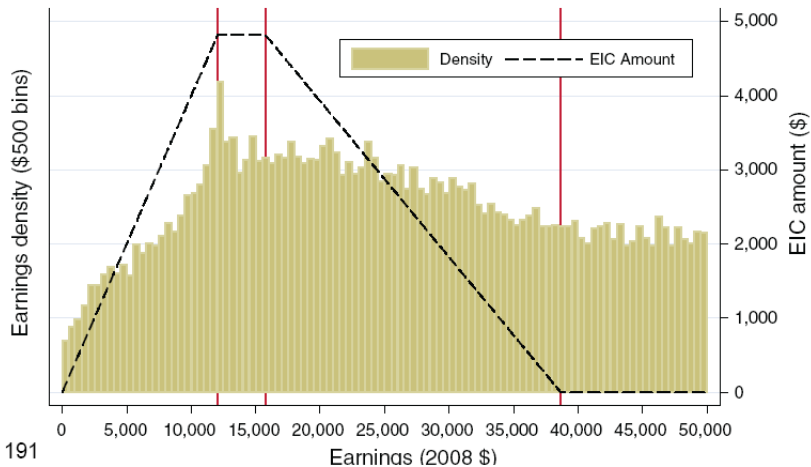
Recall how the EITC works



Panel A. One child



B. Two children or more



The EIC (Earned Income Credit) is a tax refund that gives families as much as \$4,500 per year.

We want to explain how the EIC works to help you decide how much to work and earn this year.

In 2006, you made \$ 10,000 → you are getting an EIC of \$ 4,000 in your refund.

- Your earnings this year (in 2007) will determine the size of your EIC refund next year
- The EIC has 3 ranges: 1) Increasing, 2) Peak, 3) Decreasing



1. Fill in earnings, EIC amount

2. Explain and dot graph

3. Take-home Message

You are in the increasing range of the EIC. Think about it like this:

- (increasing) Suppose you earn \$10 an hour, then you are really making \$14.00 an hour.
- (peak) Your earnings are maxing-out the EIC amount
- (decreasing) If you earn \$10 more, your EIC is reduced by \$2.10

4. Table

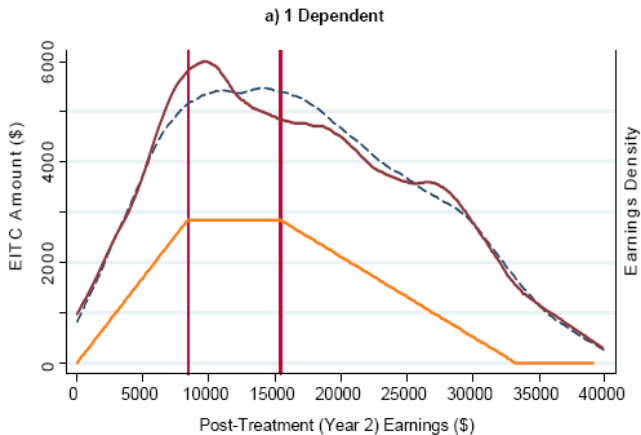
EIC Range	If you earn between	EIC refund will be	If you earn \$10 more, the EIC...
Increasing	\$0-\$11,790	\$0 up to \$4,716	Increases by \$4
Peak	\$11,790-\$15,390	\$4,716	Stays the same
Decreasing	\$15,390-\$37,800	\$4,716 down to \$0	Decreases by \$2.10

Teaching the Tax Code (7)

How do we test the hypothesis?

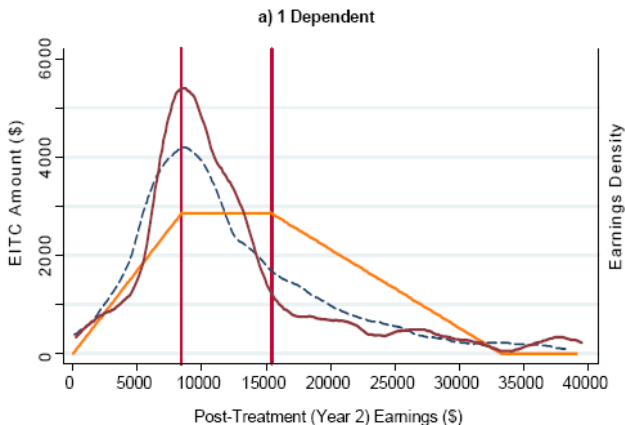
- One option is simply compare year over year to see if treated taxpayers in the phase-in range increase their earnings while those in the phase-out range work less than the untreated taxpayers.
 - Problem is that there is too much variation
- Alternative, rather than looking at year-over-year changes for a given taxpayer, is to simply look at the shapes of the distribution.
 - Is the year 2 distribution more concentrated at the peak of the EITC schedule for the treated group?
 - Do the treated get bigger refunds on average?

Teaching the Tax Code (8)



Teaching the Tax Code (9):

Self Employed



Teaching the Tax Code (10)

- When compared with other policy instruments, providing information has large effects
 - The tax preparers who encouraged taxpayers to maximize the value of their EITC benefits generated the same labor supply response as a 33 percent expansion of the EITC program, while the other preparers induced the same response as a 5 percent tax rate cut.
- It may be surprising that a two-to-three-minute explanation can have substantial effects on labor supply over the subsequent year.
 - The authors suggest that is the case because the session combines simple information with advice from an expert at precisely a time when individuals are thinking about taxes.
 - Shows that providing information can be a powerful policy tool because perceptions can be modified at low cost.

Compliance

- There is a literature on optimal tax enforcement that emphasizes the trade-off between:
 - the tax rate
 - the probability of detection (which is a function of enforcement)
 - the size of penalties
- Models lead to the conclusion that we should have high penalties and low audit rate.
 - Not consistent with the reality that high penalties are not politically viable.
- The literature also points out that revenue maximizing choices are unlikely to be the welfare maximizing as well.

Empirical Applications: Marion & Muehlegger (*JPE*, 2008)

Marion and Muehlegger study DWL of diesel tax

- Two uses of diesel fuel: business/transport and residential (heating homes).
 - Residential use untaxed
 - Business use taxed (Federal: 24.4 cents/gallon, State: 8-32)
- Low to no cost to move between two uses (can buy for home use and resell for truck use and thus evade the tax)
- Substantial scope for evasion
- Oct 1, 1993: Government added red dye to residential diesel fuel.
- Easy to check if a truck is using illegal fuel by just opening the gas tank.
 - Evasion effectively much more costly.
 - Sharp time setting?

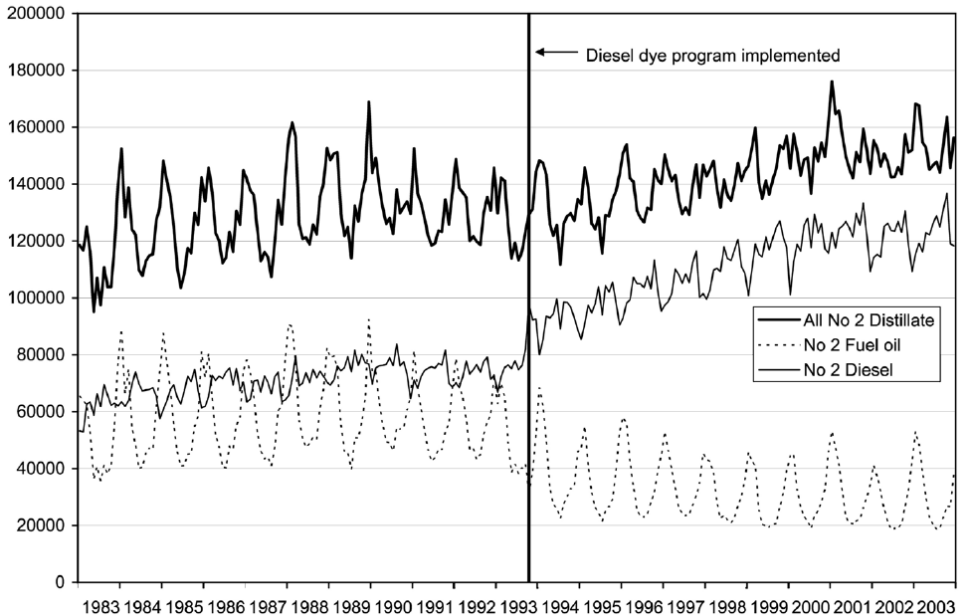
Empirical Applications: Marion & Muehlegger (2)

- This paper is interesting because: High MTR can lead to DWL through (at least) two channels:
 1. Changes in quantity demanded (or supplied)
 2. Evasion (no change in quantity demanded, but behavior changes)
- It is hard to differentiate between these two sources. Suppose you observe taxes increasing and taxable income declining. You do not know if true economic activity has changed or if money has just been moved between taxable and untaxable sources. Surely both matter for DWL (that is why Feldstein's method is a useful one) but it is interesting to know which source is the one that matters.
- Their setting allows for a direct test of evasion, which is unusual in the literature
 - Most common is using audit study data

Empirical Applications: Marion & Muehlegger (3)

- Two strategies:
 1. directly document evidence of change in evasive behavior: examine discontinuity in sales following regulatory change; look for differences in response by state using differences in state tax and state initial monitoring cost.
 2. estimate price and tax elasticities before and after reform (using cross-state variation in tax rates and world price series).
- Data:
 - state level data from EIA and Fed Hwy Admin by type of fuel use; both price and quantity, 1983-2003

Thousands of gallons/day



Empirical Applications: Marion & Muehlegger (4)

Findings:

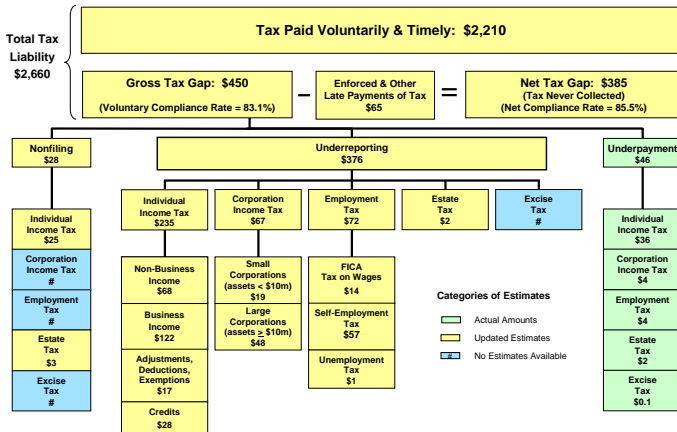
- Sales of diesel fuel rose 26 percent following the regulatory change while sales of heating oil, which is an untaxed perfect substitute, fell by a similar amount.
- The effect on sales was higher in states with higher tax rates and in states likely to have higher audit costs.
- Evidence that heating oil sales are less responsive to demand factors such as temperature prior to the dye program, indicating that a significant fraction of pre-dye sales was illegitimate.
- Estimate that the elasticity of tax revenues with respect to the tax rate was 0.60 prior to the dye program, yet would have been 0.85 in the absence of evasion
- Estimate welfare impact (since resources spent on evasion are pure deadweight loss)
 - Additional tax revenue resulting from compliance efforts represents a first-order approximation of the welfare gain
 - Estimate the welfare gain by multiplying the tax rate by the change in taxed gallons = \$2.8 billion per year
($\$0.39/\text{gallon} \times 7.1 \text{ billion gallons}$)

The Tax Gap

- The Internal Revenue Service developed the concept of the tax gap as a way to gauge taxpayers' compliance with their federal tax obligations.
- The tax gap measures the extent to which taxpayers do not file their tax returns and pay the correct tax on time.
- The tax gap can be divided into three components: nonfiling, underreporting and underpayment.
- Previous estimates of the tax gap relied on detailed research that was conducted for tax years 1988 and earlier.
- To update this research the IRS launched the National Research Program in 2001

The Tax Gap (2)

Tax Gap "Map" Tax Year 2006 (\$ billions)

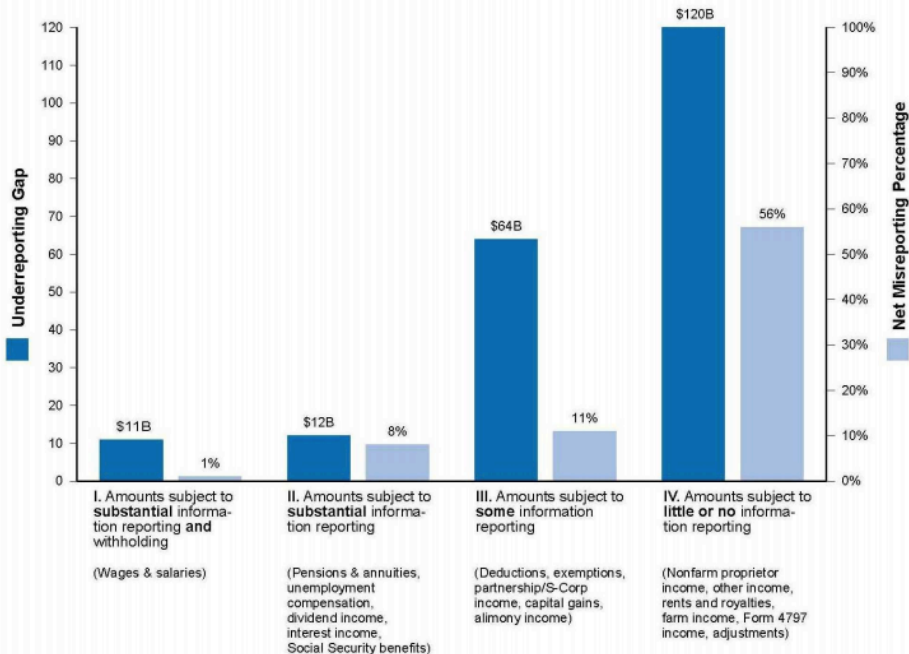


Internal Revenue Service, December 2011

<i>Type of Income or Offset</i>	<i>Tax Gap (\$B)</i>	<i>NMP †</i>
Total Underreporting Gap	197	18%
Underreported Income	166	11%
<i>Non-Business Income</i>	56	4%
Wages, salaries, tips	10	1%
Interest income	2	4%
Dividend income	1	4%
State income tax refunds	1	12%
Alimony income	*	7%
Pensions & annuities	4	4%
Unemployment Compensation	*	11%
Social Security benefits	1	6%
Capital gains	11	12%
Form 4797 income	3	64%
Other income	23	64%
<i>Business Income</i>	109	43%
Nonfarm proprietor income	68	57%
Farm income	6	72%
Rents & royalties	13	51%
Partnership, S-Corp, Estate & Trust, etc.	22	18%
Overreported Offsets to Income	15	4%
Adjustments	-3	-21%
SE Tax deduction	-4	-51%
All other adjustments	1	6%
Deductions	14	5%
Exemptions	4	5%
Credits	17	26%

Chart 1: Effect of Information Reporting on Taxpayer Compliance

Tax Year 2006 Individual Income Tax Underreporting Gap and Net Misreporting Percentage, by "Visibility" Category



The Tax Gap (5)

- Currently there is significant attention being paid to the tax gap
 - Seen as a potential solution to budget problems
- Over the past few years much of the focus has been on corporate tax shelters
- Now attention being paid to investment income like basis for capital gains
- Big money is in small business income reporting
 - Very hard to get this revenue without 3rd party reporting
 - Does this make the government too intrusive?

Distribution of Noncompliance: Slemrod and Johns (NTJ 2010)

- This paper uses newly available data from the IRS's National Research Program to assess the distributional consequences of U.S. federal income tax noncompliance for the tax year 2001.
- They find that, when taxpayers are arrayed by their estimated "true" income, defined as reported income adjusted for underreporting, the ratio of aggregate misreported income to true income generally increases with income, although it peaks among taxpayers with adjusted gross income in the 99.0 to 99.5 percentile.
- However the ratio of underreported tax to true tax is highest for lower-income taxpayers.

**Net Misreporting Percentages of Selected Income Sources,
by Estimated True AGI, Tax Year 2001**

Estimated True AGI	Salaries and Wages	Interest	Dividends	Business (Sch C)	Part., S Corp, Estate & Trust	Capital Gains
Bottom 10%	#	1	1	-12	2	-13
10%-20%	4	3	4	15	*1	-14
20%-30%	2	1	1	38	*3	7
30%-40%	2	3	5	43	8	19
40%-50%	2	2	2	47	6	2
50%-60%	2	3	5	58	20	22
60%-70%	1	2	3	58	7	16
70%-80%	1	3	4	63	11	24
80%-90%	1	7	2	61	8	17
90%-95%	1	2	5	65	19	14
95%-99%	1	3	5	59	22	24
99.0%-99.5%	1	15	5	50	19	20
Top 0.5%	#	2	3	55	19	6
Total	1	4	4	57	18	12

Net Misreporting Percentages by True AGI, Tax Year 2001

True AGI	NMP for AGI	NMP for Tax after Refundable Credits
Bottom 10%	-1	71
10%–20%	4	56
20%–30%	5	38
30%–40%	5	27
40%–50%	6	21
50%–60%	7	20
60%–70%	7	16
70%–80%	8	16
80%–90%	8	14
90%–95%	11	17
95%–99%	18	21
99.0%–99.5%	19	20
Top 0.5%	15	15
Total	11	18

Empirical Applications: Tax Incidence (Doyle and Samphantharak (*JPubE*, 2008))

- Question: who bears the burden of the gas tax?
- Setting: Gas prices spike above \$2.00 in 2000, near election, political desire to provide tax relief
- Led to repeal and subsequent reinstatement of SALES tax in Indiana (and Illinois)
- What's neat about the application:
 - Salient tax, setting where there is attention to prices and gov't intervention
 - Fall and Rise in prices (asymmetry? bounds possible bias)
 - Governor could act alone so policy changed quickly
- Note: This is the SALES tax that is changed not the EXCISE tax (of which there is a federal and state). Not all states even tax gasoline in the sales tax.

Doyle and Samphantharak (2)

- What happened to taxes:
 - Indiana (IN) suspends 5% sales tax on gas starting July 1, reinstates on Oct 30
 - Extended on August 22 to September 15
 - Extended on September 13 to September 30
 - Extended September 28 to October 29
 - Illinois (IL) suspends 5% sales tax on gas starting July 1, reinstates on Dec 31
- Reforms known to be temporary
- Sales tax does not apply to certain excise taxes
 - Sales tax applies to roughly 90% of the posted price in IL
 - Sales tax applies to roughly 80% of the posted price in IN
- **Full shifting therefore implies a 4.5% change in price in IL & a 4% change in price in IN**

Doyle and Samphantharak (3)

- Empirical approach in paper: Difference-in-Differences; compare treated states with neighboring states (MI, OH, MO, IA, WI)
 - Flexible event time model; looking for sharp discontinuity
 - Start with graphical evidence (unconditional, local linear regression)
 - Next consider regression equation (controls for area characteristics, brand FE)
- s = station, b = brand, t = time

$$\begin{aligned} \ln(\text{Retail Price}_{sbt}) = & \gamma_0 + \gamma_1(\text{IL or IN}) + \gamma_2(\text{Post Reform}) \\ & + \gamma_3[(\text{IL or IN}) * (\text{Post Reform})] + \\ & \gamma_4 \ln(\text{Wholesale Price}) + \gamma_5 X_s + \delta_b + \varepsilon_{sbt} \end{aligned}$$

- $\frac{\gamma_3}{.04}$ ($(\frac{\gamma_3}{.045})$ for IL) measures incidence

Figure IIA: Summer 2000 Difference in Log Gas Prices
IL/IN vs. Neighboring States: MI, OH, MO, IA, WI

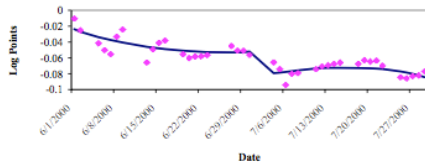


Figure IIB: Fall 2000 Difference in Log Gas Prices
IN vs. Neighboring States: MI, OH, IL

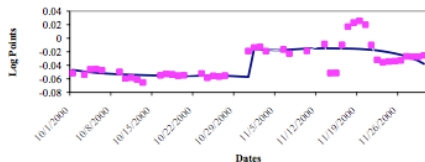
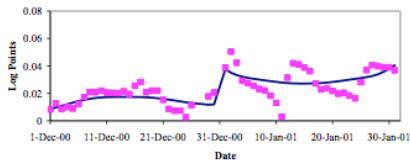


Figure IIC: Winter 2000/2001 Difference in Log Gas Prices
IL vs. Neighboring States: MO, IA, WI, IN



Local linear regressions of the difference in $\log(\text{price})$ against time. Bandwidth=7 days.

Doyle and Samphantharak (4)

Table 2: Regression Results

A: July Tax Repeal

Dependent Variable:	Log(Retail Price)		
	(1)	(2)	(3)
Illinois or Indiana	-0.048 (0.038)	-0.013 (0.025)	-0.014 (0.021)
Post July 1	-0.052 (0.007)	0.029 (0.013)	0.025 (0.015)
(IL or IN)*Post July 1	-0.035 (0.007)	-0.029 (0.008)	-0.029 (0.008)
Observations	29675	29675	29433
R-Squared	0.23	0.60	0.64
Mean of Dep. Var.	0.560	0.560	0.560
Controls:			
Wholesale Price	No	Yes	Yes
ZIP Codes Characteristics & Brand	No	No	Yes

Panel A: Prices observed June 27, June 28, July 5, July 6;

Standard errors are reported, clustered at the state level.

Doyle and Samphantharak (5)

- Interpreting estimated effects: imply a 70% passthrough rate (tax decrease leads to 70% reduction in price for consumers)
- The elasticity of demand is thought to range from -0.05 to -0.25. A pass-through rate of 70% implies that the supply elasticity would range from 0.1 to 0.6. An 80% pass-through would imply a supply elasticity ranging from 0.2 to 1.

Doyle and Samphantharak (6)

Table II: Regression Results

B: October Tax Reinstatement		C: January Tax Reinstatement	
Dependent Variable: Log(Retail Price)		Dependent Variable: Log(Retail Price)	
	(3)		(3)
Indiana	-0.053 (0.007)	Illinois	-0.005 (0.021)
Post Oct. 31	-0.009 (0.006)	Post Jan. 1	-0.020 (0.004)
IN*Post Oct. 31	0.040 (0.006)	IL*Post Jan. 1	0.037 (0.004)
Observations	21884	Observations	7071
R-Squared	0.26	R-Squared	0.39
Mean of Dep. Var.	0.456	Mean of Dep. Var.	0.303
Models include full controls. Standard errors are reported, clustered at the state level.			
Panel B: Prices observed Oct. 26, Oct. 27, Oct. 31, Nov. 1			
Panel C: Prices observed Dec. 29, Dec. 30, Jan. 2, Jan. 3.			

Doyle and Samphantharak (7)

- Competition across borders: are neighboring states a good comparison (control) group?
- Neighboring states may have been affected by reforms
 - Stations on borders in treated states may have had less pressure to reduce prices
 - Stations on borders in control states may have had more pressure to reduce prices
 - One would expect smaller effects of tax changes near borders
 - Evidence mixed; but mostly shows that effects are smaller near the border

Doyle and Samphantharak (8)

- Main results:
 - 70% of tax reductions passed on to consumers in the form of lower prices
 - 80%-100% of tax reinstatements passed on to consumers in the form of higher prices
- Good features: clear graphs, non-parametric, show raw data; multiple “experiments”
 - Graphical analysis combined with regression analysis is convincing
- Critique:
 - They should show “event study” with X s in model to see if pre-trends improve
 - Short-run estimate only
 - Common trends violated?
 - Mixed results on border effects (but honest!)