Commodity Taxation with Honesty, Avoidance and Evasion: Evidence from the United States

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Sales and use taxes: main difference

- In the United States, taxation of commodities falls under both sales and use taxes.
- Sales taxes are due at the point of sale.
- Use taxes are due on goods purchased in other jurisdictions and on remote online transactions.
- One important difference: sellers remit the sales tax to the tax authority but cannot be required to remit use taxes unless they have a physical presence (nexus) in a state from which they profit.
- In case the seller cannot be required, consumers are legally required to remit use taxes.

Motivation: Tax avoidance vs. evasion vs. honesty

- Tax avoidance occurs when an individual takes advantage of sales tax rate differential by changing the location of the purchase.
- Tax evasion occurs when an individual has the obligation to remit the tax but fails to report it.
- A taxpayer is honest if they report remote transactions truthfully.
- Despite its importance, few commodity tax studies have analyzed the evasion decision and have instead focused on the avoidance decision (Fox 1986, etc....).

Motivation: Commodity tax evasion is different

- Evasion is quite different from other taxes because third party information reporting (Kopczuk and Slemrod 2006) is of limited availability.
- Intrinsic motivation and extrinsic motivation (Luttmer and Singhal 2014; Dwenger, Kleven, Rasul, and Rincke 2016) are different given the perception of widespread use tax evasion.
- We are the first (since Trandel 1992) to study what is arguably the most evaded tax in the U.S. It informs us of how the use tax can be used as an instrument to engage in tax competition and mitigate tax avoidance.
  - Not a useless tax: use tax forms the majority of commodity tax revenue in small towns and provides 10% of revenue in large towns given enforcement on large purchases is high because of registration requirements (e.g., cars).

Features of the use tax

- A use tax equal to the sales tax can enforce destination taxation and reduce harmful tax competition.
- However, if the use tax has to be remitted by the consumer, it can easily be evaded because of a lack of third party reporting.
- Compliance rates for the use tax are dismally low (tax returns which declared a non-zero tax liability range from 10% to <1%).
  - Compliance on some goods (motor vehicles) is almost perfect because of registration requirements.
- The use tax affects two margins: (i) Decision to shop at home vs abroad, (ii) Conditional in cross-border shopping the decision to evade or honestly declare.

Sales taxes and use taxes: States allowing for local sales taxes

	full sample	9/2003	12/2011
Total Local Sales Tax	1.85	1.68	1.98
	(1.45)	(1.38)	(1.49)
Total Local Use Tax	1.54	1.45	1.59
	(1.45)	(1.41)	(1.49)
Number Where Local Sales Tax $\neq$ Local Use Tax	341,541	3,172	3,444
Total Number Observations	1,826,232	18,401	18,429

Includes ban and no ban states.

In this paper

- We derive the conditions under which a government sets the use tax rate below the sales tax rate.
- We analyze theoretically how state-level tax shocks affect the optimal local use tax rate.
  - Thus, informing us about tax avoidance and evasion.
- We estimate the effect of use tax rate changes on the composition of sales and use tax revenues.
  - Informative of the relative magnitude of the elasticity of use tax revenues vs. sales tax revenues.
- Understanding the optimal use tax rate represents an important contribution to be able to understand tax evasion with respect to commodity taxes and its relationship to tax avoidance.

The model I

- Two border towns located in the interval of $[-1;1]$. Large jurisdiction ranges from -1 to b, $b > 1$.
  - Large [small] jurisdiction is in a state with exogenous sales tax rate T_h $[T_l]$; $(T_h > T_l)$.
- Jurisdictions impose local sales taxes t_h and t_l, endogenously.
- The high-tax jurisdiction also imposes a use tax, τ_h in addition to the state use tax rate Γ_h.
- Define $\Delta = t_h - \tau_h$ as the difference in the sales and use tax rates.
- Perfect competition between firms offering a homogeneous good at price 1.
- Purchasing abroad is associated with travel costs δS_i.
- Governments maximize welfare $W = \lambda R + CS$.

The model II

- Cross-border shopping (CBS) = tax *avoidance*.
  - Consumers are responsible for remitting the use tax on a cross-border purchase.
  - Failure to remit results in tax *evasion* although some taxpayers are *honest* and comply.
- Evasion causes idiosyncratic costs $m_i \in [0; \bar{m}]$ such as psychic costs, stigma, other expected costs given that zero use taxes might trigger an income tax audit. m_i is distributed according to a cdf $G(m_i)$ with density $g(m_i)$.
  - See Gordon (1981), Dharmapala (2016), Traxler (2010).
- If an individual evades the use tax, she gets caught with an exogenously given probability of p and has to pay an additional exogenous fine f.
  - Exogenous to the municipality because done by the state.

Optimal behavior of individuals I

- Home vs. abroad without evasion

$$\begin{aligned} V-1-\Gamma_h-\tau_h-\delta S_i &\geq V-1-T_h-t_h, \\ \delta S_i \leq T_h+t_h-\Gamma_h-\tau_h &= t_h-\tau_h. \end{aligned} \tag{1}$$

- Home vs. abroad with evasion

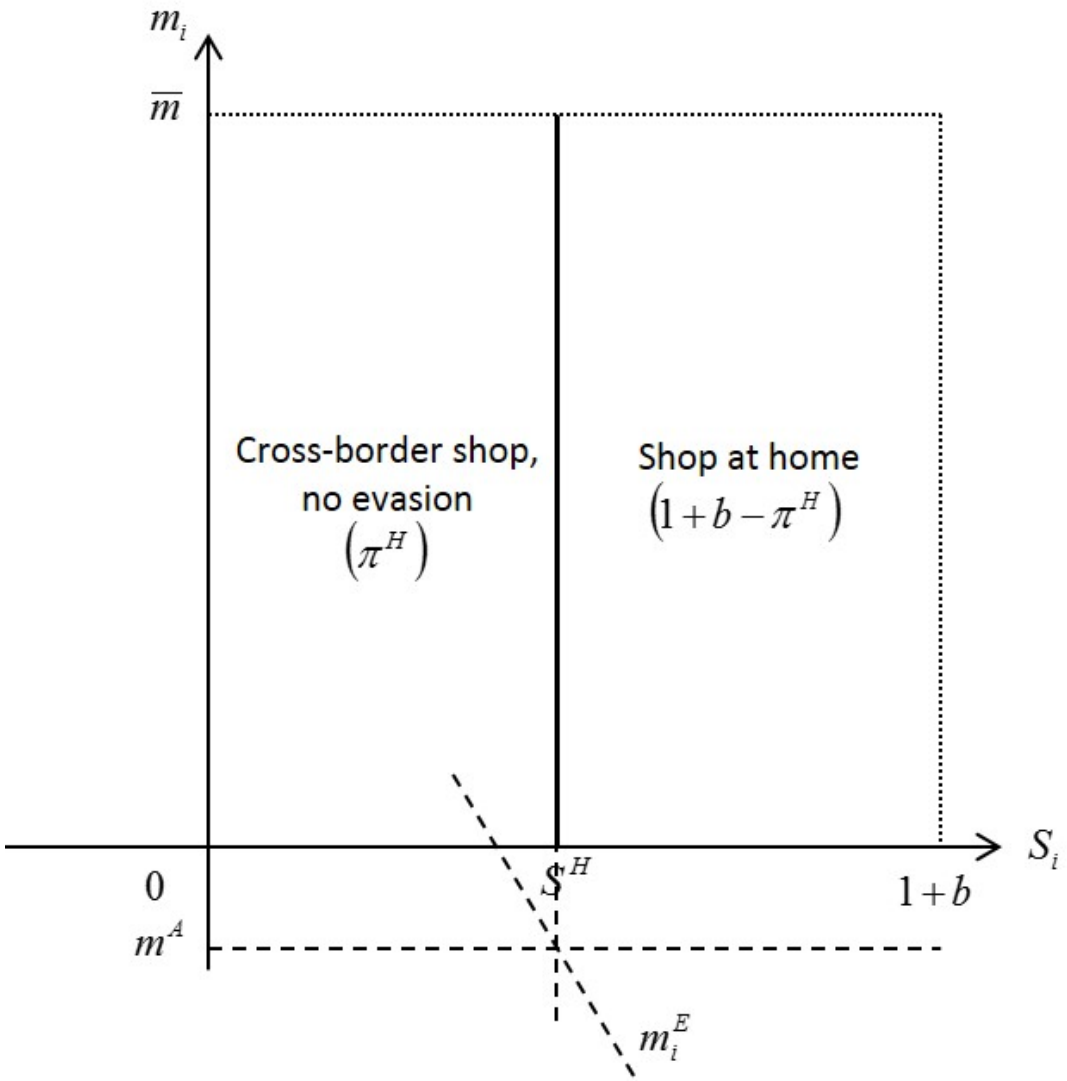
$$\begin{aligned} V-1-\delta S_i-m_i-(1-p)(T_l+t_l)-p(\Gamma_h+\tau_h+f) &\geq V-1-T_h-t_h, \\ m_i \leq t_h-\tau_h-\delta S_i+(1-p)(\Gamma_h+\tau_h-T_l-t_l)-pf &\equiv m_i^E. \end{aligned} \tag{2}$$

- Evasion vs. truthful declaration

$$\begin{aligned} V-1-\delta S_i-m_i-(1-p)(T_l+t_l)-p(\Gamma_h+\tau_h+f) &\geq V-1-\Gamma_h-\tau_h-\delta S_i, \\ m_i \geq (1-p)(\Gamma_h+\tau_h-T_l-t_l)-pf &\equiv m^A \end{aligned} \tag{3}$$

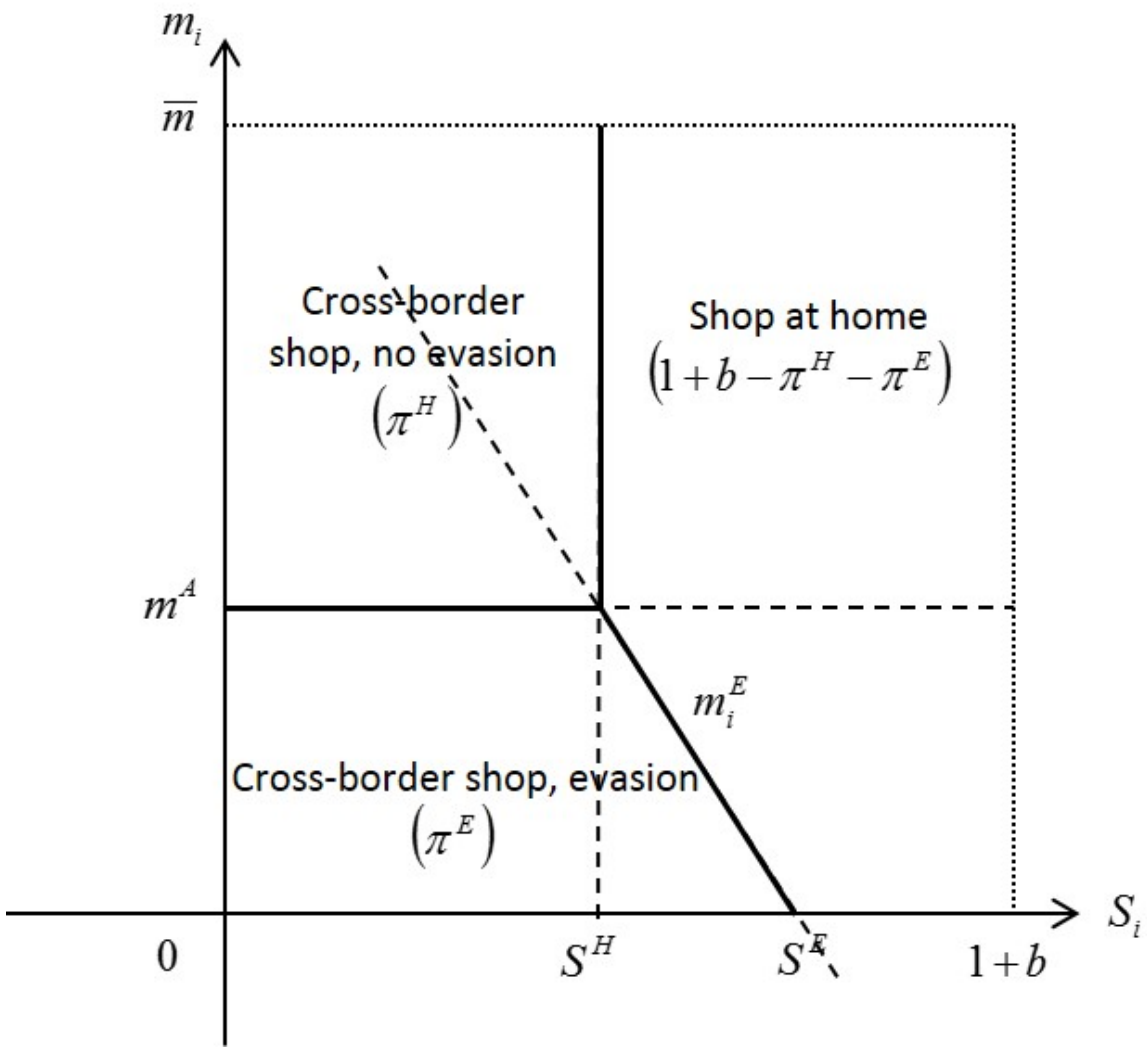
Optimal behavior of individuals II

Figure: Individuals' Shopping and Evading Decision With High Expected Fines: All Honest



Optimal behavior of individuals II

Figure: Individuals' Shopping and Evading Decision With Low Expected Fines : Honest and Evading



The optimal use tax with honest and evaders

- Total tax revenues are

$$R_h = t_h\left(1+b-\pi^H-\pi^E\right)+\left(\tau_h-t_l\right)\left(\pi^H+p\pi^E\right) \quad ,$$

- Consumer surplus is

$$CS_h = (1+b)\left(V-1-T_h-t_h\right)+\frac{\left(t_h-\tau_h\right)^2}{2\delta}+ \int_0^{S^H}\int_0^{m^A} G\left(m_i\right)\,\mathrm{d}m_i\mathrm{d}S_i+\int_{S^H}^{S^E}\int_0^{m_i^E} G\left(m_i\right)\,\mathrm{d}m_i\mathrm{d}S_i,$$

- Similar calculations for jurisdiction l.
- Optimal sales use tax (for jurisdiction h and l) determined in a Nash game by best response functions.

Result I

- *When all individuals are honest, the use tax rate ensures taxation based on the destination principle of the sales tax and eliminates tax competition for cross-border shoppers.*
- INTUITION:
  - Use tax rate enforcement effectively closes the border and achieves destination taxation. This eliminates harmful cross-border shopping and tax competition.
  - In Kanbur and Keen (1993), tax avoidance is sufficient to generate tax competition because of the presence of only sales taxes. In our model, the presence of tax avoidance is not sufficient to generate tax competition.

Result II

- *Local sales and use tax rates only differ if the probability of detecting use tax evasion is sufficiently small.*
- INTUITION – Reduction in the use tax has two effects:
  1. Some home shopping individuals switch to CBS because use tax payments decrease <u>if caught</u> $\rightarrow$ more evasion
  2. Conditional on having purchased abroad more individuals decide to honestly declare because potential tax savings decrease $\rightarrow$ less evasion
  - If p is low the second effect dominates and an increase in the use tax reduces evasion

Comparative statics

- *An increase in the state level sale tax rate differential, $T_h - T_l$, decreases the local sales and use tax rate differential $\Delta = t_h - \tau_h$ in municipalities with a use tax ban but increases Δ in municipalities without a use tax ban.*
- Intuition for ban case:
  - When municipalities are banned from setting a use tax, the only strategic instrument available to the municipality is the sales tax rate.
  - Then, a higher state sales tax differential at the border will increase cross-border shopping out of the municipality in the high-tax state.
  - In order to reduce revenue leakages, the municipality lowers the sales tax rate closer to zero.

Comparative statics, continued

- *An increase in the state level sale tax rate differential, $T_h - T_l$, decreases the local sales and use tax rate differential $\Delta = t_h - \tau_h$ in municipalities with a use tax ban but increases Δ in municipalities without a use tax ban.*
- Intuition for no ban case:
  - Increase in $T_h - T_l$ increases evasion without changing the number of honest CBS.
  - The government reduces the use tax rate because this reduces tax evasion if the probability of audit is sufficiently low.
  - Reduction in the use tax spurs additional CBS by individuals that have purchased at home (S_h increases).
  - The government also reduces the sales tax (by less) to counteract additional CBS without changing CBSs' incentive to evade.

Data

- We assemble the first panel dataset of all local sales and use tax rates in the USA.
  - All county, town, and district taxes.
  - At the monthly frequency so that we can observe the timing of changes.
- Represents the first ever use tax database assembled in the economics literature (no prior work even with cross-sectional data).
- We match this data to previously assembled panel data on local sales tax rates assembled in Agrawal (2014).
- We also assemble the first ever panel data base of local use tax revenue (but these data are confined to one state).

Do jurisdictions respond to tax shocks?

- Theory makes it clear that places should adjust the use tax rate in response to changes in state sales taxes.
- We estimate a panel data model where $z_{i,t}$ takes on several different exogenous shocks that affect tax avoidance and evasion, but in the presentation we only focus on:
  1. The differential in the state sales tax rate $(T_i - T_i^{neighbor})$

$$\Delta_{i,t} = X_{i,t}\beta + \gamma z_{i,t} + \nu_t + \zeta_i + \varepsilon_{i,t} \tag{4}$$

or

$$\Delta_{i,t} = X_{i,t}\beta + \gamma z_{i,t} + \lambda z_{i,t} \times ln(dist_i) + \nu_t + \zeta_i + \varepsilon_{i,t}. \tag{5}$$

Results

	States Where Use Not Equal Sales	No Ban	Ban
	Panel I: State Sales Tax Rate		
State Differential	-.289***	.109**	-.521***
	(.053)	(.042)	(.058)
	Panel II: State Tax Rate By Distance		
State Differential	-.872***	.101	-.960***
	(.149)	(.125)	(.211)
Differential × ln(distance)	.135***	.001	.113**
	(.031)	(.026)	(.041)
Controls	Y	Y	Y
Time FE?	Y	Y	Y
Town FE?	Y	Y	Y

Results: Big Towns

	States Where Use Not Equal Sales	No Ban	Ban
	Panel I: State Sales Tax Rate		
State Differential	-.266***	.097*	-.576***
	(.067)	(.057)	(.061)
	Panel II: State Tax Rate By Distance		
State Differential	-.882***	.161	-.923***
	(.142)	(.157)	(.182)
Differential × ln(distance)	.135***	-.011	.093*
	(.030)	(.030)	(.045)
Controls	Y	Y	Y
Time FE?	Y	Y	Y
Town FE?	Y	Y	Y

Results: Exclude $\Delta = 0$

	States Where Use Not Equal Sales	No Ban	Ban
	Panel I: State Sales Tax Rate		
State Sales	-.429***	.126**	-.666***
Tax Rate	(.067)	(.048)	(.074)
	Panel II: State Tax Rate By Distance		
State Sales	-1.105***	.139	-1.173***
Tax Rate	(.174)	(.129)	(.189)
Rate ×	.162***	-.002	.132
ln(distance)	(.041)	(.027)	(.039)
Controls	Y	Y	Y
Time FE?	Y	Y	Y
Town FE?	Y	Y	Y

Tax revenue

- What happens to use tax revenue following a use tax increase? Let χ denoted the fraction of total commodity tax revenue coming from use taxes.

$$R_h = t_h \left(1 + b - \pi^H - \pi^E\right) + (\tau_h - t_l)\left(\pi^H + p\pi^E\right), \tag{6}$$

- Differentiating with respect to τ_h and manipulating to obtain elasticities:

$$\varepsilon_{\chi_h,\tau_h} = (1 - \chi_h)(\varepsilon_{UR_h,\tau_h} - \varepsilon_{SR_h,\tau_h}), \tag{7}$$

- where $\varepsilon_{UR_h,\tau_h} \gtrless 0$ and $\varepsilon_{SR_h,\tau_h} > 0$.

Tax revenue

- *An increase in the use tax rate will increase the share of use tax revenues in commodity tax revenues if the elasticity of use tax revenues is greater than the elasticity of sales tax revenue.*
- INTUITION:
  - When the use tax rate increases, the increase reduces cross-border shopping and hence sales tax revenues.
  - Moreover, the effect on use tax revenues is ambiguous.
  - First, an increase in the use tax mechanically increases use tax revenues (tax rate effect) because the rate is higher.
  - Second, it unambiguously shrinks the use tax base (tax base effect) because less people cross-border shop.

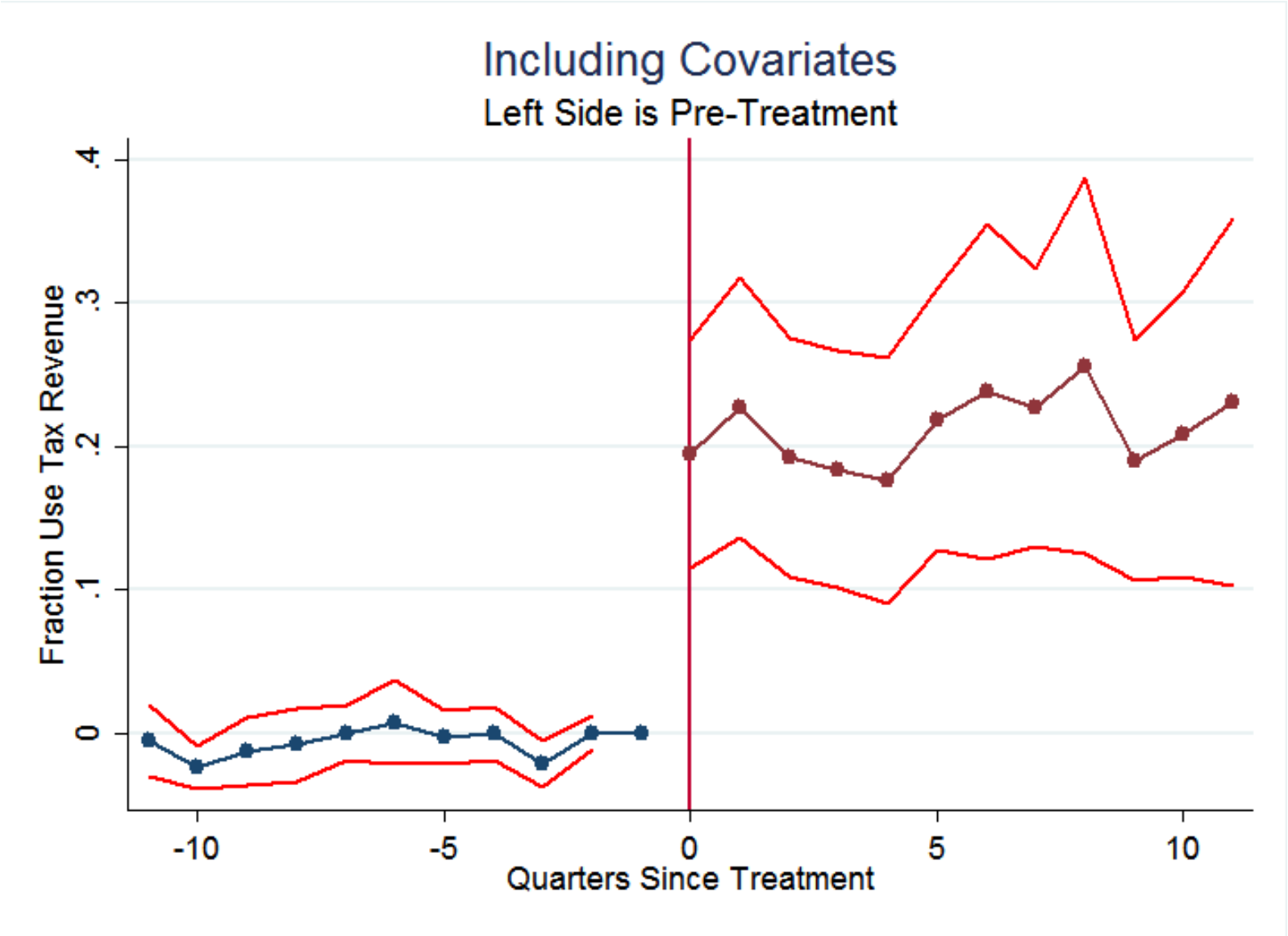
Tax revenue: empirics

- Implement an event study specification (Bailey 2012)

$$\chi_{i,t} = \alpha + X_{i,t}\beta + \nu_t + \zeta_i + \tag{8}$$
$$Treat_i \times \left[\sum_{t=-10}^{-2} \pi_y 1\{t - t_i^* = y\} + \sum_{t=0}^{11} \gamma_y 1\{t - t_i^* = y\} \right] + \varepsilon_{i,t}$$

- Where *Treat* equals one if a municipality has its use tax and sales tax become equal to each other during the sample and zero otherwise.
- We verify all of these are due to use tax rate increases.
- Control group is all others that do not have a change in equality of sales and use tax rate.

Tax revenue: results



Conclusion

- When allowed flexibility to set local use taxes, jurisdictions appear to use the local use tax rate as a strategic instrument to shape patterns of tax avoidance and evasion.
  - In particular, as in the standard model, tax avoidance is not sufficient to generate tax competition.
- When the use tax is not available, the sales tax is the strategic instrument and the standard model seemingly applies.
- We find empirical evidence consistent with the model:
  - When tax avoidance opportunities increase, jurisdictions lower the use tax to counteract the increase in tax evasion.

Applications: Other taxes where evasion and avoidance differ

- Commodity taxes in Europe such as VAT (Keen and Smith 2007; Keen 2013).
- Diesel taxes in the USA: avoidance occurs by driving through different states while evasion occurs by misreporting total miles driven (Marion and Muehlegger 2016).
- Corporate taxes often feature preferential taxes on repatriation (Dharmapala, Foley and Forbes 2011): delaying repatriation may be avoidance but evasion may occur through Abusive Offshore Schemes.
- Personal income taxes feature migration (Moretti and Wilson 2016), which is tax avoidance, and under-reporting of income that amounts to tax evasion.

Bonus slides

Sales Taxes and Use Taxes: By State (2003)

State	Percent with Sales Tax > Use Tax	Percent with Sales Tax < Use Tax	Average Differential (including zeros)
Alabama	24.34	0	.41
Alaska	39.65	0	1.16
Arizona	95.45	0	1.46
Colorado	91.67	0	2.56
Illinois	47.36	0	.35
Iowa	79.20	0	1.10
Missouri	88.39	0	1.69
Mississippi	.003	0	≈ 0
New Mexico	98.64	0	1.20
Oklahoma	39.59	0	1.02

States that ban use tax in red.

Literature

- The public finance literature has focused on the consumer response to sales taxes, e.g. Fox (1986); Braid (1987); Goolsbee (2000); Burge and Piper (2012); Agrawal (2015).
  - Commodity tax competition models have no use tax: Kanbur and Keen (1993); Haufler (1996); Nielsen (2001); Kessing (2008).
- Exception: Trandel (1992), which shows that use tax evasion can be welfare enhancing because it encourages firms near the state border to price goods closer to marginal cost. No tax competition.
- Evasion and avoidance: Allingham and Sandmo (1972); Slemrod (2007); Slemrod and Weber (2012); Stowhase and Traxler (2005).
  - Motives and role of tax rates: Traxler (2010); Berger, Fellner-Rohling, Sausgruber, and Traxler (2016); Pruckner and Sausgruber (2013).

Do jurisdictions respond to tax shocks?

- Theory makes it clear that places should adjust the use tax rate in response to changes in state sales taxes.
  - Changes in the state sales tax rate differential spurs tax avoidance and evasion.
- Thus, we exploit arguably exogenous shocks that affect tax avoidance and evasion.
  1. Changes in the state differential at the border (affect in- and out- flows of cross-border shopping) but is exogenous assuming that municipalities are sufficiently small.

Comparative statics II

- If use taxes and sales taxes differ, a higher weight on tax revenues increases the local sales and use tax rate differential $\Delta = t_h - \tau_h$.
- INTUITION:
  - With a larger weight on tax revenues the government is inclined to increase both the sales and the use tax as the reduction in consumer surplus becomes less important.
  - The reason why the sales tax rate increases to a larger extent is because the potential for tax revenue increases is larger as the use tax base is very small.

Estimating Equation

- Standard panel data model with time and town fixed effects.
- We focus on September 2003 and December 2011.

$$\Delta_{i,t} = X_{i,t}\beta + \nu_t + \zeta_i + \varepsilon_{i,t} \tag{9}$$

- In states allowing local use taxes, a positive coefficient indicates that a government gives more weight to tax revenue. A negative coefficient indicates that an increase in the variable makes the government more likely a social welfare maximizer.

Results

- Variables that are statistically significant at explaining $\Delta_{i,t}$ and suggestive of tax revenue maximization:
  - Large population
  - Higher fraction white
  - Lower income
  - Less educated
- We also verify this is driven by use tax changes and not just by sales tax changes by replacing $\Delta_{i,t}$ with the use tax rate.