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Over the borderline: How the characteristics of lines shape optimal tax policy

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ABSTRACT

Using the example of geographic borders, I demonstrate how the permeability of lines in the tax system and the ability of the tax authority to reduce tax evasion across lines are essential determinants of the optimal commodity tax policy.

1. Introduction

Beyond tax rate considerations, optimal tax policy should consider where to draw lines in the tax system. Lines are demarcations of goods into different categories based on the characteristics of the good. For example, borders are lines that divide goods based solely on the location of the retailer as the defining characteristic. Unlike most lines, in the case of borders, where to draw the lines are generally not a matter of policy. Because different lines have different features, optimal tax policy must also consider these attributes of the line. Some lines are likely to easily result in distortions, while others will not. The characteristics of some goods may be altered easily in some circumstances and tax evasion may be easily enforced around other lines. I refer to the heterogeneous ability to distort behavior across a line as the *permeability* of the line. I demonstrate how the permeability of lines influences optimal tax policy for the specific case of border-lines, but the results apply more generally.

Kleven and Slemrod (2009) focuses on optimal line drawing using a characteristics based approach to optimal taxation. Lines result in "tax-driven product innovation", where new goods arise on the tax-favored side of the line. In the case of borders, tax-driven product innovation is the bunching of firms on the low-tax side of the border. Although lines induce tax-driven product innovation in Kleven and Slemrod (2009), the degree of permeability of a particular line is not emphasized.

In the case of tax competition (Kanbur and Keen, 1993; Nielsen, 2001, 2002), the characteristics of borders are not central to the analysis and the papers focus on country size.[1] But, the resulting tax rates from a competitive game will be determined by the attributes of the borders between sovereign jurisdictions. I make this point for two extreme cases—where the enforcement system is perfect at borders and where the border's characteristics prohibit all cross-border shopping.

In a sub-set of the tax competition literature, Kessing (2008), Nielsen (2010) and Agrawal (2012) study the equilibrium and optimum pattern of sales tax rates within a state. This literature has demonstrated that in the context of asymmetries across states, states have incentives to set different rates near the state border such that the commodity tax system features two rates within a state. In all of these papers, the border is open and no enforcement mechanism exists. Yet, in practice, some borders are more susceptible to tax evasion or tax-driven product innovation, which suggests the optimal pattern of taxes within a state is a function of the border's characteristics.

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[1] For example, the title of Kanbur and Keen (1993) translates from the French to "Games Without Borders". Tax competition is analyzed in a world where individuals cross borders freely – constrained only by their own travel costs and not the border.

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This paper demonstrates that preferential taxation will not be optimal in two scenarios *even if regions within a state differ in their population or size*. First, if the tax authority has the ability to enforce commodity taxation on the basis of where the good is consumed (the destination principle), then the state should set uniform tax rates across the jurisdictions within the state. Second, if natural features of the border effectively close the state border to cross-border shopping, then the state should also set uniform commodity tax rates across its regions. Although these points are made for the case of borders, the results apply more generally to lines in the Kleven and Slemrod (2009) context.

2. Model

The model setup is similar to Agrawal (2012), which expands on Haufler (1996). Two states $l = H, N$ are located along a line segment. The home state (H) has two regions indexed $i = A, B$. Region B (Border) touches the neighboring state (N), while region A (Away) does not. Both regions are identical in their preferences, but differ in their proximity to the neighboring state and differ in their populations.

Consumers with M dollars of income live in each region. Each region has ρ_i identical consumers and the neighboring state has ρ_N consumers.[2] The consumer has a choice over where to purchase a consumption good such that c^i_j denotes the quantity of the consumption good that the resident of region i purchases in region j and c^i denotes the total consumption of the resident of region i.[3] Firms supply goods to a perfectly competitive market at a pre-tax price of one. For goods purchased in the resident's own region, no transportation costs are incurred. If the individual shops in a neighboring jurisdiction, a transportation cost of $D_i(c^i_j)$ is incurred. The transportation cost function is strictly convex.

Preferences are given by the utility function $U(c^i, G)$, where G is a state-level publicly provided good. The home state sets region-specific tax rates t_i. Preferences for the public good differ across the two states. Denoting the tax rate in the neighboring state as $\bar{t}$ and noting that preferences differ across states, at an optimum, it must be that $\bar{t} \geq t_B$ or $\bar{t} \leq t_B$ where the first inequality corresponds to a greater preference for public goods in the neighboring state.

The home state selects tax rates by maximizing the social welfare of its two residents:

$$W = \sum_{i=A,B} \rho_i U(c^i, G) \tag{1}$$

and for simplicity denote U^i_C and U^i_G as the marginal utility evaluated at region i's consumption bundle.

Using a similar model to Agrawal (2012) allows me to make a stark contrast to the world "without" borders. Agrawal (2012) finds that when public good preferences differ across states and tax differentials arise at the state border, the optimal tax system will almost always feature different tax rates in region A and region B when borders are open. Geographic differentiation also emerges in Kessing (2008) and Nielsen (2010).

[2] The model setup reduces to Agrawal (2012) if $\rho_A = \rho_B = \rho_N = 1$ and if borders are completely open.

[3] Note that the model features a single composite commodity. In practice, different goods are often taxed at different rates due to exemptions, specific excise taxes or reduced Value Added Taxes for certain goods. However, the intuition of the results below may be generalized to multiple goods with varying tax rates.

2.1. The enforcement around lines

Consider the case where taxes are levied and effectively enforced on the basis of where the consumer lives and consumes the good. In the United States, this corresponds to perfect enforcement of the use tax such that taxes are paid on the basis of the consumer's residence and not on the basis of the location of sale. The use tax is notoriously under-enforced, but as I discuss below, enforcement varies by state suggesting that optimal taxes should vary by state all else equal. Perfect enforcement of the use tax effectively closes all borders to cross-border shopping.

Noting that because the borders are effectively closed, $c^i = c^i_i$. The individual and government budget constraints are given by the following equations:

$$(1 + t_i)c^i = M \quad \text{for } i = A, B \tag{2}$$

$$G = \sum_{i=A,B} \rho_i t_i c^i. \tag{3}$$

The state government selects t_A and t_B to maximize equation (1) subject to the two constraints above. The first order conditions for this problem immediately imply that for all i:

$$\sum_{k=A,B} \rho_k U^k_G = U^i_C \quad \text{for } i = A, B. \tag{4}$$

Proposition 1. *If taxes are credibly levied according to the destination principle such that perfect enforcement effectively closes all borders, the optimal tax system features uniform tax rates within a state.*

Proof. Eq. (4) implies $U^A_C = U^B_C$, which means the marginal utility of consumption is equal in both regions at an optimum. Individuals are identical, so tax rates must be identical across all jurisdictions. □

Recall, if the use tax cannot be enforced (or is only imperfectly enforced), uniform tax rates within the state is almost never optimal. But, Proposition 1 suggests that the more effectively the use tax can be enforced, the less likely it is for a state to geographically differentiate its tax rate. States differ in how effective they are at enforcing the use tax. Manzi (2012) shows that only twenty-five states allow residents to report use tax obligations on income tax forms and seven states provide information about the use tax in the income tax booklets. Five states have *de minimis* exemptions for individuals whereby the use tax need not be filed until purchases are greater than thresholds that range from $100 to $2000 by state—making it such that these initial purchases are effectively governed by the origin principle. For states that allow use tax reporting on income tax forms, the average use tax reported per return varies from $12 to $202 and the percent of income tax returns reporting the use tax range from 0.3% to 9.8%. In tax year 2009, California had $10.2 million of use tax liability reported on its forms, while New York received $34.6 million. Although the average use tax liability reported in California was $202, only 0.3% of people filed the use tax. This contrasts with New York where 5% people of people filed the use tax with an average liability of $70. In addition, some states require individuals to clearly declare that no use tax liability is owed. Linking the use tax to the income tax, requiring individuals to explicitly declare no use tax liability, and not having exemptions likely make enforcing the use tax easier (closer to the destination principle) and suggest the optimal degree of tax differentiation will be smaller within such states relative to states with lax enforcement of the use tax.