



Intra-Jurisdictional Tax Competition

JONATHAN KLICK

jklick@law.fsu.edu

Florida State University College of Law, 425 West Jefferson Street, Tallahassee, FL 32306, USA

FRANCESCO PARISI

George Mason University School of Law, Arlington, VA 22201, USA

Abstract. While much has been written about inter-jurisdictional competition for tax revenues, especially concerning the choice between harmonization and competition, the literature has largely ignored intra-jurisdiction issues. The few articles examining this issue focus on how lower level governmental entities react to the tax decisions of a national government. However, in some instances, multiple co-equal taxing authorities might share the same base. These bodies face a dilemma over whether to harmonize their policies or to compete. We present a simple model of revenue maximizing tax authorities and derive the conditions under which harmonization dominates competition.

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1. Introduction

Tax competition holds an increasingly large place in the public finance literature. Most of the research in this area focuses on inter-jurisdictional competition. Scholars have analyzed how tax authorities set rates when individuals can move across jurisdictions and have raised the possibility that tax harmonization among the jurisdictions can generate increases in tax revenues (Wilson 1999).

Recently, researchers have turned to the questions arising in tax systems in which there are multiple tax authorities within the same jurisdiction. This work, however, focuses exclusively on vertical arrangements in which a hierarchy of taxing authorities exists (Goodspeed 2000; Flochel and Madies 2002). In these models, the higher-level government is assumed to move first, with lower-level governments making their decisions taking the higher-level policy choice as given. In effect, these models resemble a sequential move or Stackelberg game. Another type of intra-jurisdictional tax competition exists in which effectively co-equal taxing authorities relate to each other in a horizontal arrangement. This situation, in which tax authorities will make policy decisions simultaneously, has been ignored in the literature.

Although this horizontal intra-jurisdictional tax competition might be relatively less frequent than vertical arrangements or inter-jurisdictional competition, many existing and recently proposed tax arrangements can be analyzed in this framework. In many areas, for instance, cities and counties in the U.S. share tax bases, and there is no reason that such relationships will be exclusively vertical since tax decisions are

made and revised independently and not necessarily in a sequential fashion. Also, though counties are larger geographically, cities will often be more important politically. Recently proposed restructuring of fiscal autonomy in some EU countries contain features of horizontal tax competition, inasmuch as several entities would be given coexisting authority to tax the same pool of goods and services. Other examples include the case of autonomous school districts that share taxing authority with municipalities without any kind of hierarchical structure. A relatively new example might be provided by those cities (e.g., Philadelphia) whose elected officials have decided to tax the income of individuals who work in the city but who live in cities in the surrounding suburbs where, presumably, their incomes are also taxed.

This article attempts to fill this analytical gap in the tax competition literature. In Section 2, we present a general model of horizontal intra-jurisdictional tax competition. Section 3 discusses the implications of the model for the issue of tax harmonization and Section 4 provides some illustrations of the model. Section 5 concludes.

2. A Model of Horizontal Intra-Jurisdictional Tax Competition

Parisi et al. (forthcoming) describe a situation where multiple regulators share competence over a given activity. They demonstrate how this overlapping competence induces a situation where the actions of one regulator generate externalities affecting the other regulators' abilities to extract rents. In this paper, we expand on that idea to describe situations in which multiple tax authorities share the same tax base.

In this context, there are two relevant externalities according to the public finance literature. The first is the standard deadweight loss due to taxation (Gruber and Saez 2002). That is, if taxation decreases the equilibrium quantity of the activity giving rise to the tax base, an increase in the tax rate levied by one authority will necessarily exert a negative externality on the other authorities. Since higher tax rates shrink the tax base, a higher rate charged by one entity lowers the revenues collected by the other entities.

The second externality comes about through tax evasion (Allingham and Sandmo 1972). If the various tax authorities use the same monitoring mechanisms, or if each entity can gain access to the records used by the others, an individual has the incentive to make sure his evasion is consistent across taxing authorities. For evasion to be successful in such a system, an individual would need to report the same level of activity to all authorities or else his evasion would become apparent to all. The public finance literature has demonstrated that evasion decisions are a function of the tax rate, with individuals exhibiting a higher propensity to evade at higher marginal tax rates (Clotfelter 1983), and also a function of the enforcement level (Beron et al. 1992). For simplicity, we ignore the enforcement issue, taking it as exogenous to our model, so we can focus on the rate induced evasion distortion.¹

We model intra-jurisdictional competition with n tax authorities, where the individuals being taxed are immobile, but the tax base is not inelastic. That is, while individuals cannot leave the jurisdiction, they can substitute away from the activity

being taxed, so the tax base (Y) is a decreasing function of the tax rate.² For simplicity, we assume identical individuals, so that the optimal tax rates generated by a maximization problem over one individual will be identical to those generated over all individuals. Further, we assume that the loss due to evasion increases with the total tax rate applied. That is, the net tax rate collected by each authority is equal to the authority's rate (t_i) minus the loss due to evasion

$$\gamma \left(\sum_{j=1}^n t_j \right)^2$$

Each tax authority then faces the following revenue maximization problem:

$$\text{Max}_{t_i} \left[t_i - \gamma \left(\sum_{j=1}^n t_j \right)^2 \right] Y \left(\sum_{j=1}^n t_j \right) \tag{1}$$

This yields the following Nash/Cournot equilibrium strategy for the representative tax authority:

$$\left[1 - 2\gamma \left(\sum_{j=1}^n t_j \right) \right] Y + \left[t_i - \gamma \left(\sum_{j=1}^n t_j \right)^2 \right] \frac{\partial Y}{\partial t} = 0 \tag{2}$$

Assuming symmetry among the players, this leads to:

$$[1 - 2\gamma n t^*] Y + [t^* - \gamma n^2 t^{*2}] \frac{\partial Y}{\partial t_{n^*}} = 0 \tag{3}$$

Converting the derivative term into the tax elasticity (ϵ_{Yt}) of the base generates:

$$1 - 2\gamma n t^* + \epsilon_{Yt} - \gamma n^2 t^* \epsilon_{Yt} = 0 \tag{4}$$

Solving for t^* :

$$t^* = \frac{1 + \epsilon_{Yt}}{\gamma n (2 + n \epsilon_{Yt})} \tag{5}$$

This solution provides the intuitively attractive implication that the higher the marginal tax-induced propensity to evade, represented by γ , the lower the equilibrium tax rate if there are relatively few tax authorities. However, for any given tax elasticity of income, there exists an n beyond which each tax authority disregards the incremental effect of its tax rate on evasion:

$$\frac{\partial t^*}{\partial \gamma} = - \frac{n(2 + n \epsilon_{Yt})(1 + \epsilon_{Yt})}{[\gamma n (2 + n \epsilon_{Yt})]^2} \tag{6}$$

The point of sign reversal can be represented by $n = -2/\epsilon_{Yt}$, as long as we assume that the economy is operating in a condition where the absolute value of income's

tax elasticity is less than unitary. For the purpose of illustration, taking tax elasticity estimates from Gruber and Saez (2002), who estimated an average elasticity of -0.4 , our model would indicate that governments sharing the same tax base in a horizontal fashion would ignore the effect of increases in their marginal tax rate on an individual's propensity to evade taxes in the case where there are five tax authorities.³ Perhaps counter-intuitively, the equilibrium tax rate increases as the tax elasticity of the base increases (for $n > 2$):

$$\frac{\partial t^*}{\partial \varepsilon_{Y_t}} = \frac{\gamma n(2 - n)}{[\gamma n(2 + n\varepsilon_{Y_t})]^2} \quad (7)$$

Specifically, since the elasticity of income with respect to the tax rate is assumed to be negative, as income grows more sensitive to changes in the tax rate (i.e., decreases, though the elasticity's absolute value increases) the optimal tax rate must increase to satisfy condition 7 whenever $n > 2$ since the denominator on the right-hand side of condition 7 is always positive. This result implies that when there are relatively many tax authorities, each tax authority has the incentive to disregard the effect of its incremental tax rate on the tax base.

Lastly, the equilibrium tax rate set by each authority declines as the number of tax authorities increases until a sufficiently large number of tax authorities are present, at which point, the relationship will switch (assuming the base is sufficiently inelastic with respect to the tax rate):

$$\frac{\partial t^*}{\partial n} = -\frac{(2\gamma(1 + n\varepsilon_{Y_t})(1 + \varepsilon_{Y_t}))}{[\gamma n(2 + n\varepsilon_{Y_t})]^2} \quad (8)$$

However, the total tax rate increases in n :

$$\frac{\partial \sum_{j=1}^n t_j}{\partial n} = -\frac{\gamma \varepsilon_{Y_t}(1 + \varepsilon_{Y_t})}{(2\gamma + \gamma n\varepsilon_{Y_t})^2} \quad (9)$$

For convenience, we have chosen to focus on the case of pure rent extraction on the part of the tax authorities. A more complete model would incorporate the expenditure decision as well. In such a model, as long as we retain the assumption that those setting the tax rates are self interested, they would still have the incentive to maximize their revenue subject to some additional institutional constraints such as meeting public demand for particular services, retaining office in public elections, etc. Although these constraints would add realism to the model, the fundamental insight of our rent-seeking model of intra-jurisdictional tax competition would remain. Specifically, in situations where there is some rent extraction through taxation and there are multiple complementary tax authorities, the incentive for any individual tax authority to internalize the deadweight losses of his own policy decisions is attenuated, generating aggregate tax rates that are higher than the revenue maximizing rate that would be chosen by a unified tax authority.

3. Harmonization vs. Competition

A particular focus of the inter-jurisdictional tax competition literature has been the costs and benefits of the harmonization of tax rates among the various authorities relative to competition on tax rates (Goodspeed 1998). In the intra-jurisdictional context, harmonization takes on special importance.

In the case of over-lapping tax authorities, the tax base is effectively a common pool resource, and no single entity fully internalizes the cost of the various distortions. This can be shown by comparing the tax rate set by a monopolist and the aggregate tax rate set by n independently acting authorities:

$$t^M = \frac{1 + \varepsilon_{Yt}}{\gamma(2 + \varepsilon_{Yt})} < \frac{1 + \varepsilon_{Yt}}{\gamma(2 + n\varepsilon_{Yt})} = nt^C \quad (10)$$

It is easy to see that the independently acting authorities set a higher total tax rate than would a tax monopolist. Further, since a monopolist could always duplicate the total tax rate set by the independent authorities, we can infer that the monopolist collects more total revenue than that collected by the independent authorities. Under the conditions presented here, we are left with the proposition that horizontal tax authorities sharing a common base would be better off colluding, assuming the cost of maintaining the tax cartel is sufficiently low.

This insight has implications for situations of mixed horizontal and vertical relationships. For example, in a federal system where one national government shares a tax base with multiple horizontally competing tax authorities, the national government suffers revenue losses due to the excessive tax rates set by the lower level authorities. If those lower level authorities were to collude and set a lower aggregate rate, the national government would see its revenues increase.

However, a potential danger to the national government's interests exists. In a normal federal system, the national government can operate as a Stackelberg competitor, gaining a first mover advantage which effectively induces subsequent movers to set a lower rate than they would if all authorities set rates simultaneously. The lower level tax authorities choose their rates optimally taking the national rate as a function of their chosen rates. However, if lower level authorities collude, at some point, the cartelized lower authorities might be able to transform the Stackelberg game into a Cournot game. Once such a switch occurs, the federal government no longer enjoys its first mover advantage.

Interestingly, in the U.S. system, the "compact clause" of the Constitution provides a mechanism by which the national government could regulate this tension between desiring some, collusion among lower level authorities but not so much collusion so as to flip the game from sequential move to simultaneous move. Specifically, the clause disallows both formal and informal agreements among individual states unless prior approval has been granted by the federal government.⁴ In principle, the U.S. federal government could allow state level collusion up to the point where the state cartel begins to challenge federal supremacy, rejecting any agreements that go beyond that point.

In fact, the limited case law concerning the compacts cause seems to suggest this type of balancing. For example, in *Virginia v. Tennessee*,⁵ the Supreme Court stated that the general prohibition on state collusion only applies to agreements that have a tendency to increase the political powers of the contracting states, encroaching on the supremacy of the national government. Perhaps implicitly recognizing the advantage given to the federal government by virtue of limited state tax collusion, the Supreme Court upheld the validity of the Multistate Tax Compact in *U.S. Steel Corporation v. Multistate Tax Commission*.⁶ In that case, the Court decided that the test of whether a compact violates the compacts clause involves evaluating the power of the organization of states relative to the federal government. As long as federal supremacy is not threatened, the presumption of congressional approval is granted.

4. Implications

There is a dual set of implications of the idea of tax competition in the different contexts of inter-jurisdictional and intra-jurisdictional taxation. The results of the previous sections suggest that, if the relevant environment is characterized by lack of choice or mobility, the creation of specialized provisions of public goods by means of independent taxation is not necessarily more desirable than the centralized supply of a bundle of public goods via single taxation. This is because the independent supply of public goods, while capable of capturing the benefits from specialization and diversification, could induce cross externalities in tax distortions.

Our results provide a framework for evaluating the effect of alternative allocations of tax authority in different environmental settings.

It is worth noting that the impact of parallel taxes depends on (a) the ability of individuals to avoid the impact of taxation by opting out of the taxed activity, and (b) the relationship of complementarity or substitution of the public goods that are provided via taxation.

In the case of intra-jurisdictional competition where the taxed individuals are faced with a “menu” of choices of alternative public good services (e.g., a tax which entitles an individual to free access to public schools, or a tax which entitles an individual to free access to courts and legal services, etc.), the various taxes would not necessarily have a cumulative effect. These taxes would cumulate only in the case in which the individual would choose to participate in each governmental public good. More generally, in an environment characterized by competition in the supply of governmental goods that are prevalently in a relationship of substitutability with the public goods supplied by other tax authorities, and where parties can opt in (or opt out) of any such good, the intra-jurisdictional tax competition is fundamentally desirable, since it prevents the deadweight losses from the bundling of public goods and allows individuals to optimize in a multi-dimensional policy space.

Conversely, intra-jurisdictional competition leads to suboptimal outcomes in two other sets of situations. First, when the nature of the public goods supplied by the

governmental authority does not allow opting-out (e.g., non excludable public goods with resulting free-riding incentives, etc.), the effect of the independently set parallel taxes affecting the same tax base would lead to excessive taxation, as shown in Section 2. Second, even when individuals have the option of selecting from a menu of governmental goods, each associated with a system of voluntary taxation, the competitive supply of such goods is not desirable when those goods are strictly complementary to one another (e.g., car ownership burdened with car sales tax and car ownership tax, car use burdened with tag tax, gasoline tax, etc.). In such cases, the ability for individuals to opt out of any one of those strictly complementary activities is only virtual. Individuals will choose whether to own a car, taking into account the total tax burden independently set by the various authorities, since the independently taxed items are strictly tied to one another. Thus, for example, sales taxes, property tax and registration tax inherently burden the same activity.

5. Conclusion

In this paper, we considered a model of intra-jurisdictional competition where the individuals being taxed are immobile, but the tax base is not inelastic. Our results reveal that independently acting tax authorities tend to exercise their taxing power in excess of what would be optimal from the point of view of the authorities' joint interests. This suggests that the concentration of the monopolistic tax power in the hands of a central authority is preferable (from the point of view of both the taxing authorities and the aggregate welfare) to the intra-jurisdictional tax competition when mobility and inter-jurisdictional competition are not at work. These results are germane to the results reached by Parisi et al. (forthcoming) in the context of regulatory competition. In such a framework, our case of intra-jurisdictional taxation would constitute an example of alternative and negative regulatory power.

These results call for more general re-conceptualization of the notion of regulatory and tax competition. The general assumption, that inter-jurisdictional tax competition leads to more efficient equilibrium tax rates, relies on the implicit assumption of parties' mobility. In the absence of such mobility, intra-jurisdictional competition is characterized by the appropriation of the tax base with no opportunity for individuals to signal their preference for the optimal bundle of tax rate and public good provisions via their jurisdictional choice. Intra-jurisdictional tax competition creates a commons problem, in which each authority's incentives to appropriate a share of the common base lead to suboptimal Nash outcomes compared to the harmonized tax solution that would be chosen by coordinating tax authorities.

From a welfare perspective, our discussion of the distortions introduced by intra-jurisdictional tax competition leads to quite unambiguous results. Intra-jurisdictional tax competition leads to an excessive exploitation of the tax base. Taxation is carried out leading to a total level of taxation that exceeds the level that would be chosen by a rational unitary tax authority. This intuition holds regardless of whether the tax authorities act benevolently, or as rent maximizers. Independently of their

objectives, tax authorities would be faced with a strategic problem when acting in an intra-jurisdictional competition setting. Given the presence of distortion externalities, in equilibrium each authority would choose a tax rate that exceeds the optimal rate of taxation, from the point of view of the joint interest of the tax authorities. In this setting, if the tax authorities act benevolently and have full information, the concentration of tax powers in the hands of a central tax authority would yield the value maximizing tax rate.

Interestingly, this paper reveals that the centralized or harmonized solution is also preferable to intra-jurisdictional tax competition when the tax authorities behave as mere rent maximizers. This result follows from the fact that the competing tax authorities are faced with a strategic problem, given the interdependence of their decisions. The equilibrium tax resulting from the choices of the independent tax authorities leads to an excessive level of taxation from both the point of view of the tax authorities, and the collectivity at large.

The analysis in this paper provides some insight as to what structure may temper or aggravate the use of tax power. Specifically, the analysis in Section 2 reveals that a system of intra-jurisdictional tax competition without mobility tends to exacerbate the inefficiencies of a single regulator. Under such conditions the allocation of unified tax authority, or any other solution aimed at harmonizing tax rates, is preferable to the parallel and independent action of tax regulators.

Notes

1. A richer model that endogenizes enforcement would be interesting as well, since tax authorities could free ride on the enforcement actions of the others if records were commonly available to all. Thus, we would expect to see a sub-optimal level of enforcement.
2. Basically we are assuming pure rent extraction by the tax authorities. That is, tax revenues are not used to provide tax base enhancing public goods and individuals have no incentive to generate additional tax revenues to the governmental bodies. The only effect of tax rates on the base is the generation of deadweight loss.
3. Gruber and Saez (2002) indicate that for high income individuals, the elasticity is -0.57 which would imply an inflection point when there are 3.5 tax authorities, while their estimate for low income individuals (-0.2) suggests that 10 tax authorities are needed to reach the point where a tax authority ignores the effects of increases in its tax rate on evasion.
4. Article 1 Section 10 of the U.S. Constitution states in part "No state shall, without the consent of Congress, lay any duty of tonnage, keep troops, or ships of war in time of peace, enter into any agreement or compact with another state . . ."
5. 148 U.S. 503 (1893).
6. 434 U.S. 452 (1978).

References

- Allingham, M., and Sandmo, A. (1972) "Income Tax Evasion: A Theoretical Analysis." *Journal of Public Economics* 1: 323–38.

- Beron, K., Tauchen, H., and Witte, A. (1992) The Effect of Audits and Socioeconomic Variables on Compliance In: Slemrod, J. (ed.) *Why People Pay Taxes: Tax Compliance and Enforcement*, pp. 67–89. Ann Arbor: University of Michigan Press.
- Clotfelter, C. (1983) “Tax Induced Distortions and the Business-Pleasure Borderline: The Case of Travel and Entertainment.” *American Economic Review* 73: 1053–65.
- Flochel, L., and Madies, T. (2002) “Interjurisdictional Tax Competition in a Federal System of Overlapping Revenue Maximizing Governments.” *International Tax and Public Finance* 9: 121–41.
- Goodspeed, T. (1998) “Tax Competition, Benefit Taxes, and Fiscal Federalism.” *National Tax Journal* 51: 579–86.
- Goodspeed, T. (2000) “Tax Structure in a Federation.” *Journal of Public Economics* 75: 493–506.
- Gruber, J., and Saez, E. (2002) “The Elasticity of Taxable Income: Evidence and Implications.” *Journal of Public Economics* 84: 1–32.
- Parisi, F., Schulz, N., and Klick, J. (forthcoming) “Two Dimensions of Regulatory Competition.” *International Review of Law and Economics*.
- Wilson, J. (1999) “Theories of Tax Competition.” *National Tax Journal* 52: 269–304.