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Tax competition for commuters

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ABSTRACT

The paper presents a tax competition model in which local governments can use a wage tax or a land tax to finance public expenditure and compete for commuters. In this model the governments provide public capital goods that are considered a factor of production. Thus, an optimal combination of the two taxes must be chosen, to maximize each jurisdiction's residents' consumption. It is argued that, in symmetric competition, the governments will employ only a land tax. However, in asymmetric competition, the signs of the wage taxes depend on jurisdiction sizes and the specific form of the production function.

1. Introduction

According to the data reported in Braid (1996), only 5.5% of U.S. local government tax revenue comes from wage or income taxes, and 75.7% comes from property taxes (24% or more of this from business property taxes). In contrast, 37.2% of state government tax revenue comes from income taxes, and only 3.9% from property taxes.[1] Also, 88.6% of national government tax revenue comes from income taxes, and only 1.7% from property taxes. Other tax revenue comes from sales and excise taxes, for the most part. It is quite obvious that wage taxes and business property taxes, which are considered distortionary and thus responsible for the underprovision of public goods, do have a role to play in the taxation policies of local governments. It can be argued (see Braid (1996)) that commuting represents at least one of the causes of the local governments' reliance on property taxes, since most people commute between jurisdictions within big metropolitan areas rather than across states.

One of the earliest papers to discuss tax competition was Zodrow and Mieszkowski (1986). The basic model of that paper considers a system of many regions. Within each region, competitive firms use two factors: mobile "capital" and immobile "labor", to produce one single output. The main result of the model is that if a region's government raises the tax rate on capital, then a capital outflow will be generated and, therefore, a positive externality is created, for which the region's government fails to account (see also, Wildasin (1989)). Consequently, governments will abandon capital taxes if head taxes are available and public good levels are inefficiently low.

Since individuals change their residences from time to time, labor mobility can be added to the basic tax competition model. The model developed by Wilson (1995) offers similar conclusions to those of the basic model, in the absence of scale economies. There are a large number of identical jurisdictions, each possessing a fixed land supply. Each region competes for both mobile capital and mobile labor. A property tax and a head tax are available for financing public expenditures. Capital and land are taxed through the use of a "property tax" at the same ad valorem rate. As in the basic tax competition model, a rise in the property tax drives capital away to other regions, and creates a positive externality.

If a head tax is added to Wilson's (1995) model, then, in the absence of scale economies, the result would be exactly the same as in the basic tax competition model: governments would abandon the distortionary property tax and use only the head tax. However, when scale economies do exist, the property tax is needed to balance the budget, and the Samuelson rule is satisfied — although the head tax no longer satisfies the marginal-cost-pricing rule. In other words, the presence of scale economies introduces a need for other taxes, since the per capita cost of the public good provision then exceeds the marginal cost. Governments' optimal policy is to employ the property tax and manipulate the head tax to offset the distortionary effects of the property tax. But, they do not deviate from efficient public good provision. Thus, Wilson's interesting result is that the taxation of

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[1] Less than a third of U.S. states allow local governments to use wage or income taxes, and in some of these states (most notably Kentucky, Ohio, Pennsylvania and Maryland) a much higher percentage of local government tax revenue comes from wage or income taxes. Data for other countries are also mentioned in Braid (2005).

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mobile capital need not imply that public goods are underprovided in equilibrium.

Yet, there is another kind of labor mobility to consider. While, in Wilson's model, individuals choose the region in which to reside and work, in contrast, Braid (1996) presents a model in which consumers who live in one jurisdiction can commute to work in another jurisdiction in the same metropolitan area. Braid's model contains three jurisdictional levels: the world economy consists of many metropolitan areas, each containing a fixed number of identical local jurisdictions with a fixed numbers of residents. The model has three factors of production. Business capital is mobile throughout the world economy; labor is partially mobile because individuals can commute costlessly to other jurisdictions within a metropolitan area; and, land is completely immobile. The public good in this model is assumed to benefit local residents only. Two residence-based taxes (a lump-sum tax and a business land tax) and two source-based taxes (a business capital tax and a wage tax) are considered. Finally, the model considers a business property tax that is uniformly levied on business land and business capital. The model ties the level of taxation to the degree of competition for commuters. As the number of jurisdictions in each metropolitan area rises, the wage tax declines, the property tax rises, and the public good provision declines. Therefore, Braid's paper shows that competition for commuters exacerbates the underprovision of public goods, while causing greater reliance on the property tax.

The main reason why results differ so between Wilson's model and Braid's model is that Wilson assumes scale economies in public good provision, but Braid does not. Braid assumes that only residents consume the public good, and that their number is fixed in each jurisdiction. This is why Wilson finds no positive relation between public good underprovision and reliance on the property tax, while Braid, however, shows that labor mobility (commuting) exacerbates the underprovision problem.

This paper extends the existing literature by investigating the tax competition for labor from a new perspective. By considering the public good provided by local governments as a factor of production and including asymmetric tax competition[2] in the analysis, this paper builds a bridge between Wilson (1995) and Braid (1996), and shows that public goods can be efficiently provided in certain cases.

2. The model

There are some significant similarities between this paper and Braid (1996). Both papers assume more than one jurisdiction in a metropolitan area and many metropolitan areas in a world economy. Also, in both papers a resident of one jurisdiction in the metropolitan area can commute costlessly to work in another jurisdiction in the metropolitan area; thus, wages net of wage taxes are equalized throughout the metropolitan area. (Braid assumed an ad valorem wage tax, while this paper assumes a unit wage tax, but this difference is of little consequence.)

However, there are also a number of very significant differences between our two studies. Most notably, in Braid (1996), the utility of each resident of a local jurisdiction is a function of a numeraire good, and of the level of local public goods in the jurisdiction. In this paper, consumer utility is a function only of consumption of a numeraire good, which has an exogenous price that is normalized to 1. Also, the production function of the good in a jurisdiction is $F(G_i, N_i, L_i)$, where G_i is the amount of government spending on infrastructure in jurisdiction i, N_i is the endogenous number of workers who work in jurisdiction i, each supplying one unit of labor, and L_i is land (of which there is a fixed amount in the jurisdiction).

The following mild assumptions are made about the production function:

1. $F(G_i, N_i, L_i)=A(G_i)\ f(N_i, L_i)$, where $A(G_i)=\alpha+G_i^{\beta}$ with $\alpha>0$ and $0<\beta<1$. This implies $A(0)>0$; $A'(G_i)>0$ for $G_i\geq 0$; and $A''(G_i)<0$ for $G_i\geq 0$.
2. Let $f(N_i, L_i)$ be constant returns-to-scale in N and L, also,

$$\partial f(N_i, L_i)/\partial N_i \to 0 \text{ as } N_i\to\infty \text{ for } L_i>0 \text{ and } \partial f(N_i, L_i)/\partial L_i \to 0 \text{ as } L_i\to\infty \text{ for } N_i>0;$$

$$\partial f(N_i, L_i)/\partial N_i \to \infty \text{ as } N_i\to 0 \text{ for } L_i>0 \text{ and } \partial f(N_i, L_i)/\partial L_i \to \infty \text{ as } L_i\to 0 \text{ for } N_i>0.$$

3. The three production factors are complements of each other, namely, $F_{LN}(G_i, N_i, L_i)>0$, $F_{NG}(G_i, N_i, L_i)>0$ and $F_{LG}(G_i, N_i, L_i)>0$.

Indeed, a feature of this study is to treat public good as a public capital good rather than as a public consumption good, as it was considered in the previous tax competition literature, including Braid (1996). The public capital good benefits not only the residents of a jurisdiction but also the commuters, in that it has an impact on the wages paid by the local firms to commuters. Taking all three inputs into consideration (N, L and G) there is, in some sense, increasing returns-to-scale in a jurisdiction. This is another version of the "economies of scale" of a public good, mentioned in Wilson (1995), although it is not about the production of the public good itself.

Just as in Braid (1996), where G is (per-capita) government spending on a local public good, in this paper, G_i as a factor of production is not the per-capita quantity of public capital good, but rather the total amount of local government spending on infrastructure. There has been much research on the productivity effects of public infrastructure.[3] It is obvious that local government spending on the infrastructure of the jurisdiction, namely, the basic facilities, services, and installations — the police, streets, water/energy, etc., benefit not only local residents but also firms located in the jurisdiction. Indeed, many local governments finance business incentive programs specifically aimed at encouraging the growth and retention of homegrown companies in the jurisdiction. Therefore, including local government spending as a factor of production is not only realistic but deserves further study on the issue.

Another important difference between this paper and Braid (1996) is that Braid includes mobile capital as a factor of production, while this paper does not. At the same time, while Braid uses several possible taxes including a capital tax, this model uses two taxes, a residence-based land tax and a source-based wage tax. Including mobile capital as the fourth production factor (and a capital tax) in the model may seem normal, since it is essential for production; and, a capital tax, as another choice variable for the local governments, may provide more insights about the model. However, as the model is about tax competition for labor, adding capital into the model would not change the analysis and the results substantially, but it would complicate the model significantly. Therefore mobile capital is ignored in this paper. Since Braid (1996) considers the combinations of a wage/capital tax and a wage/property tax, respectively, a wage/land tax is used throughout this paper.

The final, major difference between this paper and Braid (1996) is that, whereas Braid (1996) had n local jurisdictions of equal size (in terms of resident population and business land area) in the metropolitan area, where n could be any integer between 1 and infinity, this paper has exactly two jurisdictions in the metropolitan area, which can be either of equal sizes or of unequal sizes (so that tax

[2] Bucovetsky (1991) and Wilson (1991) discuss asymmetric tax competition without labor mobility.

[3] Holtz-Eakin and Lovely (1995) examine the productivity of infrastructure in a general equilibrium context. It is found that infrastructure increases the number of manufacturing establishments, thus raising manufacturing output and productivity. Anwar (2001) considers the impact of a change in government spending on public infrastructure when monopolistic competition prevails in one sector of the economy. Bucovetsky (2005) examines a model similar to tax competition and one related to this model.