State and local tax competition in a spatial model with sales taxes and residential property taxes

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ABSTRACT

This paper presents a theoretical model with a uniformly populated line that is divided into local jurisdictions (and/or states). If one level of government imposes sales and residential property taxes, and if the spatial extent of each taxing jurisdiction is positive and finite, then (in Nash equilibrium) the sales tax rate is less than residential property tax rate, housing consumption is suboptimal, and the public good is underprovided in each jurisdiction. If a very large state (or country) is divided into local jurisdictions, and if both levels of government choose tax rates endogenously, then under some assumptions there is an efficient outcome.

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1. Introduction

This paper presents a spatial model in which there are many local jurisdictions along a uniformly populated line. It derives a Nash equilibrium in tax rates when local governments (or both state and local governments) choose sales-tax and residential-property-tax rates, and it compares the equilibrium and socially optimal amounts of local public goods and housing.

Sales and property taxes are commonly used in the United States. A general sales tax is used by 45 of the 50 states.[1] Sales taxes form 54% of state tax revenues (income taxes form 42%). Local general sales taxes are used in 34 states, and sales taxes make up 22% of local tax revenues in the United States as a whole. Although property taxes are unimportant at the state level, local property taxes (residential and business) make up 72% of local tax revenues.

Several branches of the theoretical literature are relevant to national, state or local taxation choices, usually with only one level of government, but sometimes with more than one level of government, choosing tax rates. In most of the papers, a benevolent government of each jurisdiction chooses the tax rates that maximize the well-being of its own residents, and there is a Nash equilibrium in the tax rates chosen by different jurisdictions.

One branch of the theoretical literature consists of "business-tax-competition" models.[2] A number of regions produce output using labor and capital. Regions compete for mobile business capital. This creates a "horizontal taxation externality" (see Wildasin, 1989), since if one region increases its tax on business capital, it has a capital outflow, but all other regions benefit from capital inflows. Consequently, if only a (source-based) business capital tax can be used, then it is underused and the local public good is underprovided in each region. A business capital tax is the same as a business property tax in most models (since land is usually absent).

Business-tax-competition papers such as Bucovetsky and Wilson (1991), Gordon (1986), part of Wilson (1991), and Braid (1996, 2000, 2005) consider the choice by jurisdictions among more than one distortionary tax. The first three have source-based business capital taxes and residence-based wage taxes that are

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[1] See Chapter 15 of Fisher (2007, p. 373) for the numbers 45 and 34 in this paragraph, and International Monetary Fund (2002) for most other information. Nechyba (1997) points out that in the US, 97% of tax revenues for school districts come from the property tax. Fisher (2007, Table 13.2) points out the percentages for various types of local (and state) governments: school districts, 96%; townships, 92%; special districts, 70%; counties, 69%; municipalities, 49%; overall for local governments, 73%; but only 2% for states. See also footnote 30.

[2] See Beck (1983), Brueckner (2000, 2004), Bucovetsky (1991), Bucovetsky et al. (1998), Wildasin (1988, 1989), Wilson (1986, 1991, 1999), Wilson and Wildasin (2004), Zodrow and Mieszkowski (1986), and the references of the next paragraph. Sometimes "tax competition" refers to situations in which a local public good is underprovided.

distortionary because of labor-leisure choice. The last three consider the tax choices of sub-metropolitan jurisdictions between business property taxes and source-based wage taxes that are distortionary because of interjurisdictional commuting.[3]

Some business-tax-competition papers, such as Keen and Kotsogiannis (2002, 2004), have business capital taxation by both a national government and state governments. In addition to horizontal taxation externalities due to capital flow, there are vertical taxation externalities due to double taxation (by national and state governments) of the same tax base.

Another branch of the literature consists of "residential-tax-competition" models. There is a horizontal taxation externality due to interjurisdictional migration of consumers. Some authors consider the choice between different taxes. For example, Hoyt (1991) and Krelove (1993) show that under some conditions a residential property tax may dominate a land tax.

One residential tax competition model, by Nechyba (1997), considers tax choices made by both state and local governments. Based on a calibrated computable general equilibrium model, local governments (particularly school districts) will choose to use property taxes, while states will tend to use income taxes, if these are the two taxes that are available.

A third branch of the literature consists of "sales-tax-competition" models, including the Leviathan models (in which governments maximize tax revenues) of Kanbur and Keen (1993), Ohsawa (1999, 2003) and Nielsen (2001), and the benevolent-government models (in which governments maximize the utilities of their residents) of Arnott and Grieson (1981), Mintz and Tulkens (1986), Braid (1993) and Trandel (1994).[4] These models have a horizontal taxation externality due to the cross-border shopping that may occur if there is a differential in sales or commodity tax rates between adjacent jurisdictions.[5] Most of these models are explicitly spatial, unlike the papers mentioned in previous paragraphs (except Braid, 2000). Only a single type of distortionary tax and a single level of government are considered.[6]

Lucas (2004) presents a sales-tax-competition model that has a federal structure, with one country that has two regions. There are two commodities, one of which is taxed by both national and regional governments. There is a horizontal taxation externality due to cross-border shopping for this commodity, and also a vertical taxation externality due to taxation by both national and regional governments. The other commodity is untaxed. There are federal and regional public goods. Efficiency results from federal government use of matching grants.[7]

Hoyt (2001) does not fit into any of the categories above. A country has a number of states. Leisure is untaxed, and labor is used to produce two taxed commodities. There are national and state public goods. There is a vertical taxation externality due to taxation of both commodities by national and state governments, or of both commodities by the national government and one by states, but no horizontal taxation externality (there is no capital flow, migration of residents, or cross-border shopping in the model).

In this paper, I assume a spatial model with two goods (a numeraire good and housing), and two types of taxes (sales taxes and residential property taxes). There is a very large state (or country) on a line that is subdivided into many local jurisdictions. There is a horizontal taxation externality at the local level due to cross-border shopping.

My paper examines the relative sizes of the sales and residential-property-tax rates and the efficiency of equilibrium. I assume benevolent government behavior. Potential cross-border shopping plays an important role in determining Nash equilibrium tax rates and public good levels even though no cross-border shopping actually occurs in the Nash equilibrium.[8]

One reason that my paper is significant is that it differs from existing models of sales-tax competition by considering two taxes, each of which is distortionary on its own.[9] As a result of this difference, my analysis illuminates forces that were not well-understood previously in the important field of tax competition. I establish a number of results which are new to the literature, both when all taxation is by jurisdictions at a single level, and also when taxation is by jurisdictions at two levels. However, the results can be explained intuitively.

There are three additional reasons that my paper is significant. First, in Section 8, I have a sales-tax externality at two levels of government. This contrasts with almost all papers in the literature, which do not have a horizontal taxation externality of any type (capital flow, migration of residents, or cross-border shopping) for the higher-level government.[10] Second, the taxes I examine are commonly used in the United States and other countries, but there are differences between states in the US and between countries (see the second paragraph of this section, and Sections 9 and 10). Third, my model leads to comparative static results that could lead to interesting empirical work (see Section 10), and there are a number of interesting ways in which my paper could be extended theoretically (see Section 10).

Section 2 presents the model and basic equations for cross-border shopping and the (very simple) housing market. Section 3 assumes endogenous local tax rates, exogenous higher-level tax rates, and exogenous higher-government transfers to local governments. It derives a set of equations that must be satisfied in Nash equilibrium. Section 4 derives the socially optimal solution, and the simple equations for the efficient levels of the local public goods and housing.

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[3] Braid (1996, 2005), Lee (2003), and Wilson (1995) have land as a third input into production. Wilson (1995) does not have commuting, but allows migration between regions. In Braid (2005) and Lee (2003), tax exporting due to non-resident ownership of part (or all) of the land in each jurisdiction can lead to overprovision of the local public good by each jurisdiction.

[4] The papers that I cite in previous paragraphs (including footnotes 2 and 3) assume that governments benevolently maximize the utilities of their own residents.

[5] Most assume each consumer has a completely inelastic demand for the taxable good that is subject to cross-border shopping good (retail goods or specific commodities), which considerably simplifies the analysis. My current paper and Lucas (2004) do not assume this.

[6] Braid (1993) does have a lump-sum tax (or subsidy) as well as a sales tax.

[7] Devereux et al. (2007) is somewhat similar to Lucas (2004). Unlike my paper and Lucas (2004), it assumes a Leviathan objective for governments, it incorporates smuggling, and it does a significant amount of empirical work (regarding taxes on cigarettes and gasoline). Higher-level governments usually give grants to lower-level governments. Theoretically, grants do not have to go in this direction (see for example Boadway and Keen, 1996; Dahlby, 1996). Some other papers that I cite incorporate intergovernmental grants too.

[8] This is also true in Lucas (2004). It is similar to what happens in Braid (2000), where potential interjurisdictional commuting is an important determinant of business-property-tax rates and wage-tax rates, even though no interjurisdictional commuting occurs in equilibrium.

[9] My paper also differs from most models of sales-tax competition in the somewhat less important way that its sales tax is a general sales tax, whereas most authors present an analysis that is most applicable to an excise tax on a particular commodity (such as cigarettes, alcohol or gasoline). This is how most authors interpret their models, and their assumptions are usually not very consistent with their tax being a general sales tax (see also fns. 5 and 13).

[10] My paper contrasts with all sales-tax competition papers I am aware of and with all of the papers cited above in this respect. A referee has informed me of a manuscript by Breuillé et al. (2011), which in turn cites Wrede (1997). They have horizontal taxation externalities at two levels, with one mobile factor in Wrede (1997) and two mobile factors in Breuillé et al. (2011), with each factor in fixed supply at a national (or multi-national) level, and with taxation by both state and local (or by both national and state) governments. They can be interpreted as capital-tax-competition papers (with two types of capital in the latter). Breuillé et al. (2011) considers cases where states and municipalities can tax both factors, where both can tax one factor and only one can tax the other, and where each can tax one factor. It thus combines aspects of Hoyt (2001), which does not have horizontal taxation externalities, and Wrede (1997).