



# Tax competition among local governments: Evidence from a property tax reform in Finland

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## ABSTRACT

This paper uses a Finnish policy intervention to study tax competition among local governments. Changes in the statutory lower limits to the property tax rates are used as a source of exogenous variation to estimate the responses of municipalities to tax rates in their neighboring municipalities. I do not find evidence of interdependence in property tax rates among Finnish municipalities. The results are in contrast to the earlier empirical literature, using data from other countries, that has mainly found positive interdependence in tax rates. I compare the causal estimates based on the policy change to the commonly used Spatial Lag estimates and Spatial Instrumental Variables estimates, which are based on highly restrictive assumptions. The comparisons suggest that the standard spatial econometrics methods may have a tendency to overestimate the degree of interdependence in tax rates.

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## 1. Introduction

The theoretical literature on fiscal interaction among local governments is fairly well developed and has identified several potential sources for interdependence in taxation and spending decisions. The implications of fiscal interaction for the efficiency of public service provision and the allocation of resources across jurisdictions have been studied in various settings (see [Wilson, 1999](#), and [Wilson and Wildasin, 2004](#), for reviews). By contrast, empirical research on fiscal interaction among jurisdictions is still relatively scarce and the identification strategies used do not generally meet the standard required for the results to have a causal interpretation.

The estimation of the responses of jurisdictions to taxes and spending in other jurisdictions is fraught with endogeneity issues. Firstly, the interdependence of taxation and spending decisions among neighboring jurisdictions leads to two-way causality, which renders Ordinary Least Squares (OLS) estimates of the reaction functions inconsistent. Secondly, tax rates in neighboring municipalities may be driven by spatially correlated unobserved factors that lead to spurious correlation in tax rates. This paper studies municipal property taxes in Finland and utilizes a Finnish policy change as a source of exogenous variation in

tax rates to overcome these identification problems. The purpose of the paper is to estimate the responses of Finnish municipalities to property tax rates in neighboring municipalities. In addition, the causal estimates based on the policy change are compared with standard spatial econometrics methods that have been commonly used in the literature.

In Finland, municipalities choose property tax rates within limits set by the central government. In the year 2000, the lower limits to the general property tax rate and the residential building tax rate were raised. The reform caused imposed increases in tax rates that can be used to estimate the effect of tax rates in nearby municipalities on the tax rate choices of municipalities. Changes in property tax rates are regressed on changes in the average property tax rate of neighboring municipalities by Two-Stage Least Squares (2SLS) regression. Imposed increases in neighbors' tax rates are used as an instrument for the actual change in neighbors' tax rates.

Earlier empirical studies fall into two main categories based on how they have tried to address the issue of simultaneous determination of policy choices (see [Brueckner, 2003](#), for a review). The first group uses the so called *Spatial Lag* (SL) models that estimate reaction functions using non-linear regression and maximum likelihood methods.<sup>1</sup> The estimation of neighborhood effects by SL models hinges on the assumption that the determinants of tax rates, apart

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<sup>1</sup> For example [Allers and Elhorst \(2005\)](#), [Bordignon et al. \(2003\)](#), [Brueckner and Saavedra \(2001\)](#) and [Revell \(2001\)](#) estimate tax rate reaction functions with the SL model.

from neighbors' tax rates, are exogenous. Moreover, the SL method imposes restrictive distributional and functional form assumptions. The second group, termed *Spatial Instrumental Variables* (SIV) models in this paper, estimates the reaction functions by Instrumental Variables regression using neighbors' attributes, such as age structure and income, as instruments for their tax rates.<sup>2</sup> Like the SL method, the SIV method also assumes that the jurisdiction attributes used as the determinants of tax rates are exogenous. For example endogenous sorting of individuals to communities with different combinations of taxes and services will bias the standard SIV estimates as well as the SL estimates (Brueckner, 2003).

Gibbons and Overman (2010) analyze identification issues in spatial econometrics models and argue that reliable estimation of causal spatial interaction parameters requires quasi-experimental settings that provide exogenous variation in the variable of interest. This paper is, along with Eugster and Parchet (2011),<sup>3</sup> the first study using a quasi-experimental design to estimate tax competition reaction functions.<sup>4</sup>

The empirical results of this study suggest that there is no significant interaction in property tax rate choices among Finnish municipalities. While this finding is consistent with the theoretical literature discussed in Section 2, it is in contrast with the previous empirical literature that has mainly found the dependence of tax rates in neighboring jurisdictions to be positive. Allers and Elhorst (2005) provide a table of nearly twenty empirical studies on local tax competition including studies using the SL and SIV methods. In their list, the median estimate for the response to a percentage point increase in tax rates in neighboring jurisdictions is 0.4 percentage points and most estimates fall between 0.2 and 0.6. I compare the estimates based on the policy change to SL and SIV estimates with Finnish data. The comparisons suggest that the SL and SIV models may have a tendency to give upward biased estimates of the degree of fiscal interaction.

Section 2 of this paper summarizes theoretical literature on the sources of tax competition and discusses the relevance of different theories for the Finnish setting. Section 3 provides a description of the Finnish property tax system and discusses the reform of 2000 which will be utilized in the empirical analysis. Section 4 presents the empirical strategy. Section 5 reports the empirical results. Section 6 concludes.

## 2. Theoretical background

### 2.1. Sources of tax competition

Wilson (1999) surveys theoretical literature on tax competition and divides tax competition models into two main categories. As a benchmark category he uses Tiebout (1956) type models of public service provision that assume that there are many small jurisdictions providing public services funded by non-distorting taxes so as to maximize land value in the jurisdiction. Households are mobile and choose jurisdictions that provide their preferred bundle of taxes and services. Intergovernmental competition benefits consumers by creating a variety of tax-service bundles for consumers to choose. The sorting of different households into different communities leads to an efficient level of public services and improves efficiency compared with the situation where taxation and service provision are centralized. Accordingly, these models are often referred to as models of efficient tax competition. Subsequent work has generalized these

models to apply to firms (see Richter and Wellisch, 1996). In the efficient tax competition models there is no strategic interaction at a localized level since each jurisdiction is small relative to the economy. Households or firms are fully mobile and there are no externalities or distortions related to local taxation and the provision of local public goods. The second category of tax competition models includes models that depart from the idealized setting of the Tiebout type models in one way or another that may lead to strategic interaction among jurisdictions. Three main sources of strategic fiscal interaction identified in the literature are 1) benefit spillovers 2) distorting taxes on mobile tax base 3) political economy considerations and information asymmetries.

Benefit spillovers arise if residents of a jurisdiction can benefit from services provided by other jurisdictions. Benefit spillovers will lead to negative dependence in tax rates since higher spending in a jurisdiction reduces the need to spend in other jurisdictions (see Case et al., 1993). The level of services will be inefficiently low since municipalities do not take into account the positive fiscal externality for others. Benefit spillovers can arise if for instance access to parks and other amenities cannot be restricted to the residents of the jurisdiction providing the amenity. Negative spending spillovers are naturally possible and will lead to positive tax rate interaction. For example, higher police spending in one jurisdiction may give rise to a negative externality if criminals respond by moving their activity to other jurisdictions where committing crimes is less risky.

The second class of tax competition models departs from the efficient tax competition setting by assuming that lump sum taxes are not available and services are funded by distorting taxes. Typically, these models study capital taxes or property taxes that fall at least partly on capital which is mobile across jurisdictions. Mobility of capital leads to downward pressure on tax rates since a lower tax rate in one jurisdiction attracts tax base from other jurisdictions and forces them to lower their tax rate. Competition for mobile tax base leads to an inefficiently low level of public services since jurisdictions have to take into account the negative effect of higher taxes on their tax base. In other words, higher taxes in one jurisdiction cause a positive fiscal externality for others. In the competitive versions of tax competition models there are many relatively small jurisdictions that take the net return of capital as given, and hence, strategic behavior is absent (e.g. Zodorow and Mieszkowski, 1986). If jurisdictions are sufficiently large to affect the net rate of return, tax rates are set strategically taking into account tax rates in other jurisdictions (e.g. Wildasin, 1988).

For the purposes of empirical work on local taxes it is important to note that strategic tax competition among jurisdictions in the same region requires that capital is not fully mobile but to some extent fixed to the region (Brueckner and Saavedra, 2001).<sup>5</sup> Another issue with important implications for empirical work concerns the heterogeneity of preferences for local public services. With identical households, a tax cut in one jurisdiction causes other jurisdictions to bid down their tax rates as they compete for the tax base. However, heterogeneous preferences and the sorting of high and low demand residents into different municipalities may give rise to negative interdependence in tax rates. A tax decrease in a low demand jurisdiction may induce high demand jurisdictions to increase their tax rates even further in an attempt to retain high service levels. Drawing on Brueckner (2000), Brueckner and Saavedra (2001) combine heterogeneous preferences and locally fixed tax base and show that in a model with two jurisdictions competing for a fixed amount of capital, the relationship between capital tax rates in the jurisdictions may be positive or negative (or flat).

The third type of tax competition takes place if voters use tax rates in their jurisdiction relative to other jurisdictions as a yard-stick to evaluate

<sup>2</sup> Papers estimating tax-reaction functions with the Spatial IV model include Besley and Case (1995), Buettner (2001), Revelli (2002) and Edmark and Ågren (2008).

<sup>3</sup> Eugster and Parchet (2011) use a regression discontinuity approach to study tax competition in Swiss municipalities around the French/German language border.

<sup>4</sup> Dahlberg and Edmark (2008) use a Swedish policy intervention as a source of exogenous variation in welfare benefit levels to study "race-to-the-bottom" in welfare benefits.

<sup>5</sup> Brueckner and Saavedra (2001) argue that some industries are likely tied to specific regions, and that part of a region's capital stock is oriented towards serving the local population (e.g. retail establishments).

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