Identifying local tax mimicking with administrative borders and a policy reform

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ABSTRACT

This paper exploits an exogenous reform of the local fiscal equalization scheme in the German State of North Rhine-Westphalia (NRW) in 2003 to identify tax mimicking by municipalities in the neighboring state of Lower Saxony (NDS). The reform caused municipalities in NRW to increase their business and property tax rates. I study within the difference in difference (DD) and the spatial lag (SL) frameworks whether municipalities in NDS bordering NRW did react to the exogenous tax increases by NRW municipalities. The DD and SL results suggest that there are no interactions in tax rates. In contrast, traditional SL regressions that rely on variation in neighbors' demographic and political characteristics for identification provide strong evidence for immediate strategic interactions. These results indicate that most of the existing literature overestimates the importance of local tax mimicking.

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1. Introduction

Tax policies of local governments could be interdependent for several reasons. First, the tax competition literature argues that municipalities set tax rates to attract mobile tax bases. According to this literature, a change in tax rates by other jurisdictions provides incentives for a given jurisdiction to adjust its rates as well (Wilson, 1986; Zodrow and Mieszkowski, 1986).[1] The second reason for local tax mimicking is yardstick competition: voters observe taxes and expenditures in other jurisdictions and evaluate the performance of their local officials accordingly (Besley and Case, 1995). Officials, therefore, have an incentive to adjust their tax policies in view of those in other jurisdictions. A third reason for interdependencies is benefit spillovers. If public goods provided by a given jurisdiction have benefits in other jurisdictions, the benefiting jurisdictions have to provide fewer public goods themselves. Such spillovers can lead to negative interactions in tax rates (Case et al., 1993).[2]

Following these theoretical arguments, a large empirical literature has attempted to identify interactions in local taxation. The common methodology is to estimate reaction functions using the spatial lag (SL) framework (Anselin, 1988).[3] The argument underlying this framework is that if there are tax policy interactions, tax rates in "other" municipalities should have a causal effect on the tax rate chosen by a given municipality (Brueckner, 2003).

Evidence for strategic interactions in the SL framework has been found in many different settings: the metropolitan areas surrounding Boston (Brueckner and Saavedra, 2001) and Barcelona (Sollé Ollé, 2003); Swiss cantons (Feld and Reulier, 2009; Schaltegger and Küttel, 2002); and Dutch (Allers and Elhorst, 2005), French (Leprince et al., 2007), Italian (Bordignon et al., 2003), Belgian (Heyndels and Vuchelen, 1998), and German municipalities (Büttner, 2001; Hauptmeier et al., 2012).[4]

The main methodological difficulty when estimating strategic interactions in local taxation within the SL framework is that tax rates in other jurisdictions are by construction an endogenous variable. To address this endogeneity problem, many authors rely on an instrumental

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[1] However, the literature following the seminal contributions of Wilson (1986) and Zodrow and Mieszkowski (1986) has established various exceptions and qualifications to this basic result; see e.g. Wilson (1991),Wildasin (1998), Keen and Kotsogiannis (2002), Wilson and Wildasin (2004), and Wilson and Janeba (2005). See also Wilson (1999) for a survey.

[2] There are several preceding albeit informal treatments of local fiscal interactions, notably Tiebout (1956), Bradford and Oates (1971), Oates (1972), Brennan and Buchanan (1980), and Salmon (1987).

[3] Different terminologies are used to refer to spatial models of reaction functions. Following Allers and Elhorst (2005), I refer to the generic model that relates neighbors' tax rates to the tax rate of a given municipality as a spatial lag model.

[4] See Brueckner (2003) and Revelli (2005) for a survey of the literature.

variable (IV) approach, e.g. Büttner (2001), Feld and Reulier (2009), and Sollé Ollé (2003).[5] Gibbons and Overman (2012), however, argue that most of the extant empirical evidence on local fiscal interactions using the IV methodology is unreliable. The crucial assumption in the typical IV model estimated in the literature is that the characteristics of other municipalities – e.g. local demographics, politics, or incomes – are exogenous and can be excluded from the second stage in which the tax rate of a given municipality is explained, and therefore used as instruments for other municipalities' tax rates. However, this assumption most likely does not hold in reality. First, neighbors' characteristics might have a direct effect on a given municipality's tax rates. Second, it is plausible that the neighbors' tax policies have a direct effect on their own demographic structure, income levels, and other characteristics. Third, spatially correlated omitted variables might influence both neighbors' characteristics and the tax rate in a given municipality.

To identify strategic interactions, it is necessary to rely on credibly exogenous variation in the tax rates of other jurisdictions. One source of exogenous variation that is increasingly used in the public finance literature is natural experiments. Yet, few studies have hitherto exploited natural experiments to study interactions in local fiscal policy. Lyytikäinen (2012) relies on a policy-induced change in minimum tax rates set by the Finnish central government for municipal property taxes and finds that Finnish municipalities do not interact in their tax policies. Isen (2014) obtains similar results for local governments in Ohio by implementing a regression discontinuity design with close referenda on tax ceilings. Parchet (2012) relies on Swiss cantonal borders and interactions between cantonal and municipal income tax rates for identification. His results suggest that tax interactions exist.[6]

In this paper, I add to this small literature by employing an identification strategy that relies both on policy induced exogenous variation in tax rates and on administrative borders to study interactions in local taxation of German municipalities.[7] The policy reform in question is changes to the local fiscal equalization scheme in the state of North Rhine-Westphalia (*Nordrhein-Westfalen*, NRW) imposed by the state government in 2003. I demonstrate that these changes caused NRW municipalities to significantly increase their local business and property tax rates. I then exploit this significant increase in the tax rates of NRW municipalities to study tax mimicking in a sample consisting of municipalities located in the neighboring state of Lower Saxony (*Niedersachsen*, NDS).

More specifically, I first use the tax increases in NRW to explore within a difference in difference (DD) framework whether there are either immediate or gradual strategic interactions in NDS municipalities' tax policies. The idea is to compare the development of tax rates in NDS municipalities which border NRW, and therefore had the strongest exposure to the tax increases by NRW municipalities, with developments in NDS municipalities that do not border NRW. The DD evidence indicates that the development of the business and property tax rates in

the "treated" NDS border municipalities and the "untreated" interior[8] municipalities did not differ significantly after the treatment.

Second, I use the tax increases in NRW to induce exogenous variation in neighbors' tax rates for NDS municipalities bordering NRW within the standard SL framework. As the DD results, the SL estimates provide little evidence for contemporaneous strategic interactions in business or property taxation by NDS municipalities. To compare these results with those found in previous studies, I also estimate SL models using other municipalities' demographic and political characteristics as instruments for their tax rates. Consistent with the findings in most of the previous literature, I find in these regressions strong evidence for immediate strategic interactions. This pattern of results suggests that the evidence for local tax competition in the previous literature is due to invalid instruments. These findings are in line with those of Lyytikäinen (2012) and Isen (2014), even though they are obtained with a different natural experiment and in a different institutional setting.

The remainder of this paper is structured as follows. I describe in the next section some institutional details, and in particular the 2003 policy reform in NRW. Section 3 collects the DD results. Section 4 compares SL regression results using traditional instruments with SL results using an instrument that exploits the natural experiment in NDS. Section 5 concludes.

2. Institutional details

2.1. North Rhine-Westphalia and Lower-Saxony

The setting for this paper consists of two German states: North Rhine-Westphalia and Lower-Saxony. NRW is the largest German State in terms of population: in 2011, 17.8 million inhabitants lived within 396 municipalities. NDS, which shares a long border with NRW (583 km), has about 7.9 million inhabitants. The number of municipalities has declined over time in NDS because of municipal amalgamations. In 2011, NDS had 1033 municipalities.[9] Fig. 1 shows municipal boundaries in both NRW and NDS.

2.2. Municipal finance in Germany

Germany's federal constitution guarantees all municipalities a degree of fiscal autonomy. In particular, municipalities can autonomously determine the rates for the business (*Gewerbe-steuer*) and property taxes (*Grundsteuer*). Technically, municipalities do not choose a tax rate but a tax multiplier (*Hebesatz*) for these taxes. The multiplier is multiplied with a tax base that is calculated according to stipulations that are identical throughout the federation. Since the definition of the base is fixed for an individual municipality, the multiplier determines the effective tax rate. Therefore, I use in this paper the terms tax multiplier and tax rate interchangeably.

The business tax is levied by each municipality on all firms located within its boundaries. The tax base is net firm profits, even though some adjustments are made, for example regarding interest payments. Total revenues in the federation from the business tax in 2010 were 32.42 billion Euros.[10] On average, business tax revenues as share of current revenues were about 17% in NRW and about 26% in NDS in 2010.

Two property taxes exist in Germany: First, a tax on agricultural properties (*Grundsteuer A*) and second, a tax on developed properties

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[5] The second popular methodology is Maximum Likelihood (ML). This methodology, too, relies on exogeneity assumptions but additionally requires functional form and distributional assumptions. Studies on fiscal interactions that use the ML methodology are, for example, Case et al. (1993), Brueckner and Saavedra (2001), and Bordignon et al. (2003). Allers and Elhorst (2005) provide a breakdown of the number of studies using either the IV or ML methodology. Of the 19 studies in their list, 3 use ML, 14 use IV, and 2 use both.

[6] Two more studies provide quasi-experimental evidence on tax policy interactions in frameworks different than the traditional spatial lag one. Eugster and Parchet (2011) use language borders between French-speaking and German-speaking Swiss regions to compare discontinuities between fiscal preferences and local income tax rates. Agrawal (2013) uses US state borders to study competition in local sales taxes. These authors find strong evidence for tax mimicking, and in particular for tax competition.

[7] The importance of borders for tax mimicking has been previously studied by Cassete et al. (2012). These authors explore whether there are strategic interactions between municipalities in Germany and France. They find that municipalities on either side of the border compete with other municipalities in the same but not with municipalities in the other country. However, these results rely on spatial lag regressions with instruments that are potentially endogenous.

[8] I call for simplicity the NDS municipalities that border states other than NRW interior municipalities.

[9] For administrative purposes, many municipalities in NDS are organized in "joint communities" (*Samtgemeinden*). However, tax rates are independently chosen by the individual member municipalities.

[10] Source: German Federal Statistical Office. Note that municipalities have to share business tax revenues with higher tiers of government (*Gewerbesteuerumlage*). Nevertheless, most of the revenues accrue to them.