



Strategic fiscal interactions among local Governments in Colombia

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Abstract

Using spatial panel data from most municipalities in Colombia for the period 2000-09, this paper provides empirical evidence of the existence of strategic fiscal interactions in property and business taxation. However, there is little evidence of cut-throat tax competition that leads to a «race to the bottom.» Also, this paper shows that differences in property tax rates affect local election results and the popularity of the main political parties in the local councils, signaling the presence of yardstick competition in this source. The results suggest that country does not seem to require policy measures aimed at attenuating municipal tax competition.

Key words: Decentralization, strategic fiscal interaction, tax competition, yardstick.

JEL Classification: H71, H73, H77.

1. Introduction

Strategic fiscal interaction is at the core of decentralized fiscal systems, and its consequences affect the performance of local governments and the effectiveness of decentralization¹. When setting local fiscal policies, policymakers take into account the fiscal policies of neighboring jurisdictions. This strategic behavior stems from the drive of the local administrations to attract and preserve a mobile tax base, deter poor migrants from moving into the jurisdiction, free-ride on public service provision when other jurisdictions provide benefits to theirs, and gain votes during elections. Depending on its nature, this behavior may lead to inefficiently low taxes and the under-provision of public goods and services, affect the spatial distribution of economic activity and urban growth, shape government accountability, and alter horizontal tax equity.

While public finance economists and political scientists have long studied strategic fiscal interaction among local governments in North America and Western Europe (see, for example, Wilson, 1999, and Brueckner, 2003, for a review of empirical studies), they have paid

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little attention to investigating its presence in developing countries (see Madies and De-thier, 2010, for a survey of studies). There does not seem to be a clear understanding among policymakers and analysts about whether spatial fiscal interdependence exists and how significant it is, despite the massive implementation of decentralization reforms throughout the developing world during the past three decades.

This knowledge gap can undermine local autonomy and decentralization processes. For instance, based on anecdotal accountings of fierce municipal tax competition, especially for the Bogotá metropolitan area (El Tiempo, August 13, 2010; El Espectador, August 23, 2010), many politicians, policy analysts, and scholars in Colombia have called for policy measures such as tax harmonization (Castro, 2006) and mutual agreements by competing municipalities on maximum levels for tax exemptions (Durán and Zapata, 2011; Rubiano, 2010). Other proposals include passing a national law that raises the minimum tax rates and reduces the rate bands for both property and Industry and Commerce (ICA) tax, and reforms that make the application of ICA tax territoriality uniform (Secretaría de Hacienda Distrital 2011; Rodríguez *et al.*, 2012).

This paper contributes to fill these gaps by providing empirical evidence of the existence, significance and nature of spatial fiscal competition among municipalities in Colombia. This study of spatial fiscal interaction is the first of its kind to focus on local governments in Latin America, and one in only a handful of empirical studies concerned with this topic in the context of developing countries. This contribution to existing studies involves the empirical testing of fiscal competition over the two primary municipal tax sources in Colombia: property and business tax. I first test for the presence of strategic tax setting and, in particular, for the theoretical prediction that municipalities engage in tax competition that can lead to a «race to the bottom.»² Subsequently, using a comparative framework between the local taxes, I attempt to identify the nature of such interactions. I also test for the yardstick competition hypothesis estimating the electoral effects of strategic tax setting.

The empirical results suggest that, when setting property and ICA tax rates, the municipal governments in Colombia take into account the tax rate levels of neighboring municipalities. More importantly, I do not find evidence of a downward spiral of either tax rate that would signal a race to the bottom competition. Moreover, I find that local politics and electoral accountability may be fostering property tax rate mimicking among municipalities; such dynamics are not present in ICA taxation. These results suggest that ruinous tax competition is not a general concern in Colombia.

The rest of this paper is organized as follows. In section 2 I lay out the theory of strategic fiscal interaction and discuss the existing empirical evidence. In section 3 I present the spatial panel model used to estimate tax reaction functions for both the property and ICA taxes, based on a spatial contiguity weights matrix and the instrumental variables (IV) and Maximum Likelihood (ML) approaches. Also, I describe the estimation of a popularity equation using IV and GMM techniques. Next, I provide a general characterization of the institutional framework governing local public finance and local elections in Colombia, describe the database used, and present some descriptive statistics. In section 5 I present the results,

and in the final section I state the conclusions and call for further research on the causes and mechanisms underlying fiscal competition in Colombia.

2. Theoretical Framework and Empirical Evidence

Brueckner (2003) and Revelli (2005) have classified strategic fiscal interaction into three distinct categories: tax competition, expenditure spillovers, and yardstick competition³. Tax competition, or mobility-led interaction, refers to the exit strategies of individuals and businesses revealing their preferences for a bundle of taxes and expenditures. Tax competition among subnational governments arises due to the variation in tax rates of mobile factors across jurisdictions. The theory suggests that when a local government levies a tax on a mobile factor (*i.e.*, business capital), it does so in a strategic, non-cooperative fashion by comparing the rates of neighboring jurisdictions. The behavior stems for the administration's desire to attract foreign mobile resources (Wilson, 1986; Zodrow and Mieszkowski, 1986; Bucovetsky, 1991; Wildasin, 1991; Wilson, 1999; Wilson and Wildasin, 2004; Oates, 2002; Brueckner, 2003). Strategic tax rate setting thus influences the allocation and size of the tax base available from one neighboring jurisdiction to the other (Revelli, 2005). Tax competition ultimately leads to suboptimal levels of tax rates and public expenditures in a race-to-the-bottom process⁴.

A second form of strategic fiscal interaction is yardstick competition, or information-led interaction, which relates to the voice and accountability exerted by local constituencies. Yardstick competition arises from a spillover of information among neighboring jurisdictions (Revelli, 2005). This becomes an issue when an electorate has access to information about the fiscal policies and performance of neighboring jurisdictions, and uses it to measure the performance and honesty of its own government (Salmon, 1987; Besley and Case, 1995). Based on a comparative evaluation, if the public has a negative opinion about the performance of their own governments, they may punish their leaders by voting them out during election time (Case *et al.*, 1993; Revelli, 2002; Bordignon, Cerniglia and Revelli, 2004; Revelli, 2006). Moreover, outside of election time, politicians pay attention to, and may be disciplined by, public opinion (for instance, if they are using their current position as a platform for a future political career at the state or national level) (Breton, 1996; Salmon, 2006). In both situations, politicians tend to imitate the fiscal policies in neighboring jurisdictions⁵.

Several scholars stress the need to empirically discern among the competing theories underlying spatial competition (Bordignon, Cerniglia and Revelli, 2004; Revelli, 2005; Reulier and Rocaboy, 2009). This distinction is fundamental, because alternative models and the reaction functions used to test for tax interactions can generate similar patterns of spatial dependence (Brueckner, 2003; Revelli, 2005; Revelli and Tovmo, 2007). In fact, the main theoretical prediction of both tax and yardstick competition models is that tax rates tend to be spatially autocorrelated among neighboring jurisdictions, because local governments mimic each other's fiscal policies. To identify the source of tax interdependence, scholars have estimated the structural equations that generate the reaction function, set up natural experiments, and/or used vote functions to relate election results to tax rates of both their

home and neighboring jurisdictions (Besley and Case, 1995; Brett and Pinkse, 2000; Revelli, 2002; Brueckner, 2003; Buettner, 2003; Bordignon, Cerniglia and Revelli, 2004; Revelli, 2005 and 2006; Bosch and Solé-Ollé, 2007).

There is some, albeit very little, empirical evidence on spatial fiscal interaction in the context of developing countries. Recently, researchers found evidence of the presence of fiscal competition in Benin (Rota-Graziosi and Foucault, 2010), Brazil (De Mello, 2008), China (Zhang and Chen, 2007; Yao and Zhang, 2008; Agostini, Brown and Zhang, 2010), Indonesia (Arze del Granado, Martínez-Vázquez and Simatupang, 2008), and the Philippines (Capuno *et al.*, 2012). However, these studies face a number of limitations, including data constraints (*i.e.* cross-section data) and challenging institutional settings in the country of research (*i.e.* little tax autonomy), all of which undermine the generalizability, relevance, and validity of their findings.

One major constraint is that none of the above-mentioned studies, with the exception of Arze *et al.* (2008), have distinguished between tax and yardstick competition as the underlying source of the observed spatial interaction. Identifying the most likely source of fiscal competition is critical in the case of developing countries since, in a context with limited factor mobility (Madies and Dethier, 2010), accountability and electoral objectives underlying yardstick competition may account for the observed fiscal interdependence (Arze *et al.*, 2008).

3. Empirical Strategy

3.1. Tax-Setting Equation

For the empirical estimation of strategic fiscal competition, I use the conventional tax reaction function (Brett and Pinske, 2000; Brueckner and Saavedra, 2001; Buettner, 2001), in its reduced form, which for multiple time periods can be expressed as a spatial panel (lag) model:

$$\tau_{it} = \rho \sum_{j=1}^n W_{ij}\tau_{jt} + X_{it}B + \mu_i + \lambda_t + e_{it} \quad (1)$$

where τ_{it} is the (property or business) tax rate set in year t by jurisdiction i ; τ_{jt} is the tax rates of neighboring jurisdictions; X_{it} is a vector of exogenous characteristics of jurisdiction i , including intergovernmental fiscal transfers, total expenditures, population size, and poverty; μ_i are spatial specific effects that control for all space-specific time-invariant variables; λ_t represent time fixed effects that control for all time-specific effects; and e_{it} is a random term.

In equation (1), ρ is the slope of the tax reaction function—the tax competition variable—which indicates whether municipality i responds to changes in neighboring municipalities' tax rates j . The statistical significance of ρ indicates the presence of strategic tax interaction among municipalities⁶.

The fiscal competition model implies that municipal tax policies vary due to fiscal, demographic, economic, and fiscal characteristics. I use population size and hypothesize that the larger the population, the higher the tax rates needed to satisfy the demand for public goods. Also, to control for differences in the economic conditions of municipalities, I use the poverty rate⁷, expecting that municipalities with higher-income residents can satisfy the demands for public goods with relatively lower tax rates (Brueckner and Saavedra, 2001). In addition, I employ fiscal transfers per capita received from the central government (shared revenues, royalties, co-financing, and grants), and expect that the larger the amount of fiscal resources transferred, the greater the resources available to a municipality, and thus the lower the incentives for municipalities to raise own revenues. These conditions allow for a reduction in tax rates. Finally, to capture the cost of providing public goods and services in a municipality, I use total expenditures per capita, expecting that the higher the public spending, the greater the need of the municipality for additional resources, and thus the higher the tax rate.

It is possible that municipal governments, in trying to balance their budgets, set own rates strategically taking into consideration the level of each tax handle they have at their disposal. In such a context, there is a possible contemporaneous correlation of the errors across the property and ICA tax setting equations. To test for this hypothesis, and to confirm the convenience of running separate tax reaction functions, I estimate Seemingly Unrelated Regression (SUR) models based on a set of simultaneous equations of the strategic tax rate setting, allowing the error terms in the property and ICA tax reactions functions to correlate. For robustness, I also estimate an IV-3SLS (three-stage least squares) model that combines SUR and 2SLS estimations considering the endogenous tax competition variables.

To ascertain whether tax competition is the source of the potential strategic interaction, I analyze comparatively the results from the property and ICA tax reaction estimations, in particular the size and significance of the estimated slope (the standardized coefficients). Based on their theoretical framework of exit and voice competition, Hendrick, Wu, and Jacob (2007) suggest that if mobility (exit) is the primary driver of the observed fiscal competition, then one might find tax competition among municipal governments for taxes levied on highly mobile tax bases (like the ICA business tax in Colombia). Conversely, if the accountability (voice) mechanism is the primary driver, then competition should be greater among municipal governments for the taxes that are more visible and salient to voters and other taxpayers than other types of revenue sources, such as, at the local level, property taxes (Bahl and Linn, 1998; Bird and Slack, 2004; Bahl, Martínez-Vázquez, and Youngman, 2010).

Likewise, Chirinko and Wilson (2011) suggest that highly mobile resources should be more sensitive to taxation than less mobile ones. Property tax bases are less mobile, due to «the combined effects of the high costs of migration and the capitalization of property taxes» (Hendrick *et al.*, 2007: 230). Accordingly, a tax levied on business capital, such as ICA, should produce a larger elasticity than that of a tax levied on property.

3.2. Popularity Equation

To test for the presence of yardstick competition, I use popularity functions relating election results to tax rates present in both the home and neighboring jurisdictions (Revelli, 2005). I estimate the following model:

$$V_{it} = \beta_1 V_{it-1} + \beta_2 \tau_{it} + \beta_3 \tau_{jt} + \beta_4 X_{it} + \beta_5 Y_{jt} + \mu_i + \lambda_t + e_i \quad (2)$$

where V_{it} is the current vote share for the main political party in the municipal council that won the most votes in the previous election (hereafter called “the incumbent party”); V_{it-1} is the lagged vote share for the incumbent party in the municipal council from the previous election, indicating an incumbency advantage or vote inertia (Bosch and Solé-Ollé, 2007; Dubois and Paty, 2010); τ_{it} is the tax rate set by the home jurisdiction i in year t ; τ_{jt} is the weighted average of tax rates of adjacent jurisdictions set in year t ; X_{it} is a vector of exogenous socio-economic and fiscal characteristics of the home municipality i , including population density, the poverty rate, intergovernmental fiscal transfers, and cadastral reappraisals (the latter only for the property tax); Y_{jt} is a vector of exogenous political characteristics of the home municipality, including the party alignment between the elected mayor, as well as the elected governor in the department, and the incumbent party in the municipal council, and the number of terms the incumbent party has been in office as the main political party; and e_{it} is a random term. The model is estimated using IV and GMM methods.

To control for the size of agglomeration economies present in municipalities, I use population density. The economic condition of municipalities is also relevant, since increases in poverty levels in a given municipality are likely to reduce the popularity of incumbent parties. In addition, keeping the cadaster updated likely reduces the vote share of incumbent parties in the council, because doing so likely increases property valuations and, thereby, tax burdens—especially if those increases are not translated into better services. Moreover, greater fiscal transfers possibly lead to increased popularity, because they increase income flows and investment in the municipality.

Finally, to capture popularity shocks, I include several political variables. First, to account for the likely incumbency advantage or the persistency of voting for the same parties by the electorate in the short term, I incorporate the (lagged) vote share for the incumbent’s party in the municipal council in the previous election. Second, I control for whether it is the first term for the incumbent party in the council, hypothesizing that constituencies sanction less forcefully those governing parties during their first term (*i.e.*, the honeymoon effect). Furthermore, to control for local and regional politics, I use the party alignment between the incumbent party in the council and the mayor, as well as that with the department’s elected governor. These two dummy variables are interacted with the mayors’ and governor’s popularity levels. It is expected that if the mayor and the governor belong to the same party as that of the incumbent in the council, popularity levels will increase.

Differences in tax rates across jurisdictions should influence election results. So I would expect that if yardstick competition is the source of the observed spatial fiscal interaction in tax setting, then an increase in the home tax rate negatively affects the popularity of the main party in the local council, while an increase in the tax rates of neighboring municipalities have a favorable impact on its popularity. Yardstick competition is likely to occur in Colombia because local politicians and parties can be reelected to the municipal council. Also, in the case of mayors, even though they cannot be reelected, political parties endorsing incumbents want to stay in power and thus may copy the tax policies of their neighbors to do so.

3.3. Weights Matrix

I use the contiguity criterion to construct the spatial weights matrix required to identify neighbors for each municipality. In doing this, τ_{it} is the weighted average of tax rates of geographically adjacent municipalities (Revelli, 2005):

$$\tau_{it} = \sum_{j=1}^n W_{ij} \tau_{jt}$$

Where $W_{ij} = 1/n_i$ if municipality j shares a border with municipality i , and $W_{ij} = 0$ otherwise (Anselin, 1988; Revelli, 2005). I employ row standardization as a weighting scheme; that is, the elements of the weights matrix add up to one, which implies giving the same weight to all neighboring municipalities so that the effect of each on the local tax rate is the same.

Although there are other weighting schemes that could be used (such as the inverse distance between the central points of two jurisdictions or a population-based scheme), I choose the common boundary approach for a number of reasons. In Colombia, there are not parameters to set relevant distances between municipalities as city extensions vary considerably (Rodríguez, García, Sánchez and Maldonado, 2012). Similarly, there is a great variance in population sizes, making very hard to establish connections relevant for fiscal competition. In addition, demographic migration and industrial mobility have primarily taken place within metropolitan areas, much more than across them (Martínez and Ciro, 2006). This dynamic has been driven by the suburbanization of people and industries in contiguous municipalities around the main urban centers (Alfonso, 2010). Also, the spatial distribution of industrial activity has remained fairly constant over time, with marked structural differences and distinct agglomeration forces across metropolitan areas (Cuervo and González, 1997; Gouesset 1998; Toro, 2004; Fernández *et al.*, 1998). Finally, in the context of yardstick competition, since adjacent municipalities presumably experience similar cost shocks in terms of public services, their tax rates are more informative for making comparative evaluations than those of municipalities located far from the home municipalities. Also, that information is likely to spill over more easily among closer neighboring municipalities (Revelli, 2002).

Despite these arguments, given the wide variety of sizes, municipalities across the country have a different number of neighbors. This issue is likely to limit our ability to capture the real spatial processes underlying fiscal interactions at the municipal level. While the use of only this spatial weight matrix constitutes a limitation of the study, as shown in the literature it is not expected to obtain very different results when using other approaches (see Delgado and Mayor, 2010 and 2015, for a survey of studies).

3.4. Econometric Issues

For the tax reaction functions, I first use IV-2SLS to address the spatial autocorrelation and endogeneity of the local tax rates (Revelli, 2005; Liu and Martínez-Vázquez, 2014). This approach implies using as instruments variables that, while correlated with the tax rates of neighboring municipalities, are not correlated with the error term. As suggested by Kelejian and Robinson (1993) and Kelejian and Prucha (1998), I use a subset of the neighboring municipalities' exogenous (spatial lags of control) variables as instruments. Transfers in Colombia are likely to be exogenous as they are allocated by a transparent formula based mostly on poverty and equity criteria. While population and expenditures could be affected by common local shocks that would also be likely to affect tax rates, the variable poverty should control for the presence of those shocks. As a robustness test, I also use the spatial Maximum Likelihood (ML) estimator.

In like manner, in yardstick competition theory there is also a potential estimation problem related to the simultaneous determination of the tax rates and popularity levels (Revelli, 2002 and 2005). While tax rates influence the incumbent party's vote share, it is also possible that incumbents, given their popularity levels and initial election results, adjust their tax policy to maintain or gain political support from the local electorate. Exogenous, predetermined components of municipal budgets can serve as suitable instruments to address these endogeneity problems.

I employ as instruments the municipal debt—measured as total debt as percentage of own revenues—and the wages and salaries of the municipal civil service. For local policymakers, both debt levels and salaries often constitute a rigid and inertial spending that is hard to manipulate in the short term. At the same time, these variables are critical for the determination of tax rates expectations (as higher levels of debt and salaries may require future increases in taxes), while increases in tax burdens are also important in determining election results.

4. Data

4.1. Local Public Finance and Electoral System in Colombia

Colombia provides an appropriate setting for the study of strategic fiscal interaction. Its institutional, political, and legal framework, as well as the underlying decentralization,

grants relatively high autonomy to municipal governments to raise and administer local tax revenues, in general, and to set tax rates, in particular⁹. Such fiscal autonomy is one key assumption of strategic fiscal interaction models. Also, in contrast to the lack of data in most developing countries, Colombia offers rich and detailed fiscal, socioeconomic, political, and cadastral data at the municipal level, which make it possible to measure property tax rates more accurately and examine strategic fiscal interaction over several years.

The property tax in Colombia is levied on the assessed value of land and property (buildings and improvements). Municipal governments, through municipal councils, are autonomous to set the tax rates within a wide range determined by the central government. Property tax rates must range between 1x1,000 and 16x1,000, with vacant urban land being taxed at 33x1,000¹⁰. In addition to nominal tax rates, the municipal council also defines exemptions, exclusions, and discounts, and approves the updating of the cadastre. Typically, the executive branch and the council jointly set the tax rates; in turn, the executive branch is responsible for revenue administration, from billing to collection and enforcement.

Municipalities are also responsible for setting the rates for the ICA tax, a business tax levied annually on the gross income obtained by firms from the industrial, commercial, and services activities performed in the municipality. ICA tax rates must range from 2x1,000 to 7x1,000 for industrial activities, and from 2x1,000 to 10x1,000 for commercial and services activities¹¹.

The property and ICA taxes are the most significant sources of revenue for municipalities in Colombia. Between 2000 and 2009, the combined revenue collected from both taxes represented, on average, 82 percent of total tax revenue collections. Given their preponderance, it is more likely that municipalities engage in tax competition using these instruments to attract foreign resources and/or preserve their tax bases^{12, 13}.

With regards to the local electoral process, since 1986 and 1989, respectively, mayors in municipalities and governors in departments have been elected democratically (for three-year periods until 2003, and now for four years). All local elections, whether for mayoralty, gubernatorial, or local legislative, are held simultaneously at the end of October, and there is only one round¹⁴. Only residents in the municipality or the department can vote in the local election.

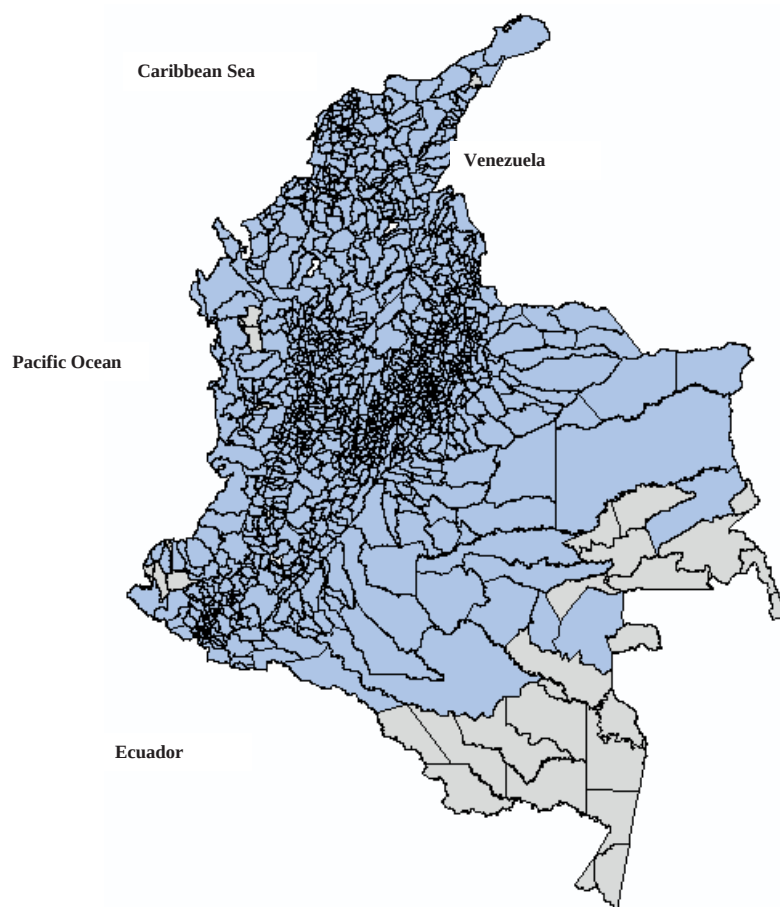
While mayors and governors cannot run for immediate reelection, councilmen can run immediately, and indeed do so often. Mayors and governors are elected according to who obtains the most votes, while councilmen are elected from lists presented by their political parties, and the assignment of seats in the council is done through a mathematical formula known as *cifra repartidora*¹⁵. Local constituencies can vote for their preferred candidates, if the political parties define their lists as «preferential», or for the political party and its proposed order of candidates, if they define their lists as «closed». As noted, the councilmen often have a strong influence on local fiscal policy, as they are responsible for approving the

municipal budget as well as the changes proposed by the executive branch in tax, expenditure, and debt policies (in particular, in tax rates, tax incentives, and cadastral executions).

4.2. Sample and Database

I use a unique panel dataset of over 1,000 municipalities in Colombia—about 95 percent of the total number of municipalities—for the period 2000–09¹⁶. Map 1 shows the municipalities included in the sample and the excluded ones depicted in the grey areas¹⁷. Tables 1 and 2 show some descriptive statistics.

Map 1
SAMPLE MUNICIPALITIES
N = 1084, T = 10 (2000-2009)



Source: Authors' calculations based on data from DANE and DNP.

Table 1
DESCRIPTIVE STATISTICS – STRATEGIC PROPERTY AND ICA TAX
COMPETITION MODELS

Variable	Obs.	Mean	Std. Dev.	Min	Max	CV
PT effective rate (x 1,000)	10,840	6.191	6.349	0.000	190.310	1.026
ICA Effective Rate (x 1,000)	10,240	2.24	5.716	0	141.555	2.552
Poverty (%)	10,920	43.92	19.13	4.47	100	0.435
Transfers per capita	10,840	219,164	148,091	3,399	3,242,438	0.676
Population size	10,840	39,067	235,161	764	7,259,597	6.019
Total Expenditure per capita	10,840	365,339	304,499	52	7,607,191	0.833

* Panel data for the period 2000–2009. Colombian Pesos figures in prices of 2000.

Source: Authors' calculations based on data from DANE and DNP.

Table 2
DESCRIPTIVE STATISTICS – YARDSTICK COMPETITION—PROPERTY AND ICA TAX

Variable	Obs	Mean	Std. Dev.	Min	Max	CV
Incumbent's Vote Share	1,392	0.092	0.115	0.000	0.780	1.253
Lagged Vote Share	1,392	0.300	0.158	0.000	0.935	0.527
Cadastral Update	1,392	0.557	0.497	0	1	0.893
Population Density (log)	1,392	3.959	1.252	-0.876	10.009	0.316
Poverty	1,392	0.432	0.190	0.067	0.976	0.441
Fiscal Transfers (log)	1,392	5.161	0.504	3.746	7.166	0.098
First Term	1,392	0.731	0.444	0	1	0.607
Party Alignment Governor	1,392	0.087	0.202	0.000	0.811	2.304
Party Alignment Mayor	1,392	0.105	0.216	0	1	2.056
PT Rates (log)	1,392	1.608	0.675	-4.185	5.093	0.420
Neighbors' PT Rates (log)	1,392	1.732	0.457	-1.230	3.849	0.264
ICA Tax Rates (log)	1,309	-0.242	1.344	-6.499	4.240	-5.547
Neighbors' ICA Tax Rates (log)	1,309	0.261	1.026	-2.582	3.131	3.935

* Pooled data for the period 2000–2007 including three election years (2000, 2003 and 2007).

Source: Authors' calculations based on data from DANE and DNP.

In Colombia, there are no data available on statutory rates and market values; thus, I use the effective tax rates instead, as is typically used in the empirical literature on strategic fiscal interaction—even that of developed countries. These measures better capture the changes in statutory rates, as well as the deductions, exclusions, tax expenditures, and other tax incentives.

For the property tax competition model, the dependent variable is the effective property tax rate, defined as the property tax revenue divided by the assessed values of all properties in the municipality. For the ICA model, the effective ICA tax rate is measured as the ICA tax revenue divided by the industrial and commercial GDP at the municipal level. Unfortunately, Colombian authorities do not produce data on GDP at the municipal level, but rather only at the department (intermediate government) level. To overcome this shortcoming, following Sánchez (2012), I calculate the industrial and commercial GDP as a ratio of the number of industrial, commercial, and service firms located in a municipality to the total number of industrial, commercial, and service firms existing in their respective Departments, multiplied by the departmental GDP. The number of firms is fixed and obtained from the National Census of 2005. This industrial GDP variable may also overestimate the industrial and commercial activity of smaller municipalities where businesses are likely to be small. It may also generate significant measurement errors that likely affect the estimation results.

For the yardstick competition analysis, I use data for about 70 percent of municipalities in the country and three election years (2000, 2003, and 2007). In these models, the variables are the average values of the three and four years preceding the 2003 and 2007 elections, respectively (*i.e.*, periods 2000-03 and 2004-07). As a dependent variable, the election result for the incumbent party is defined as the vote share for the main party in the municipal councils during the previous four years. In the cases where incumbent parties do not run again for council seats, it is also possible that they form coalitions with other parties. Nonetheless, it is impossible to identify such political strategy with the current data, and thus a significant proportion of incumbent parties in the subsequent elections have been given a zero value in this variable.

Cadastral data on assessed values, valuations reappraisals and the number of properties were obtained from the IGAC and the Cadastral Offices of Bogotá, Cali, Medellín and Antioquia. Budgetary data for property tax and ICA tax collection, fiscal transfers, municipal debt, civil service salaries, comes from the DNP. Data on elections and political parties were obtained from the Colombian National Registry of the Civil State. Demographic and economic data for population size and density, the proportion of young and old population, and departmental GDP were collected from the National Administrative Department of Statistics (Departamento Administrativo Nacional Estadística, or DANE). Table 3 presents statistics on the local tax rates. While the municipalities in Colombia have considerable autonomy in setting local tax rates, very few have set them at the highest possible levels (Leibovich and Núñez 2002; Iregui, *et al.*, 2004; Uribe 2006). The disparities in tax rates measured among the municipalities in the sample during the period 2000-09 were considerable, although these disparities have decreased for both taxes throughout the period.

Table 3
DESCRIPTIVE STATISTICS – PROPERTY AND ICA TAX RATES

Variable	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
1. Mean										
ICA Effective Rate	1.70	1.88	2.11	2.05	2.02	2.13	2.45	2.55	2.57	2.88
PT Effective Rate	4.87	5.64	5.41	5.75	7.25	7.17	6.76	6.26	6.41	6.78
2. S. D										
ICA Effective Rate	4.42	5.23	6.60	5.72	5.02	5.11	5.72	5.67	6.24	6.46
PT Effective Rate	4.51	8.54	6.77	5.22	7.01	7.49	7.96	6.27	5.89	6.99
3. CV										
ICA Effective Rate	2.60	2.79	3.12	2.79	2.48	2.39	2.34	2.23	2.43	2.25
PT Effective Rate	0.93	1.51	1.25	0.91	0.97	1.05	1.18	1.00	0.92	1.03

Source: Authors' calculations based on data from DANE and DNP.

5. Results

5.1. The Property and ICA Tax Competition

Table 4 displays results from several specifications of the tax setting equation (1) for the effective property tax rate. The first stage of the IV model (the spatially lagged tax variable regressed on the instruments and on the control variables) in Column 1 shows that both instruments are statistically significant. As expected, the level of fiscal transfers received from the central government is negatively associated with property tax rate levels, signaling the presence of fiscal laziness across neighboring municipalities. In turn, increases in population are associated with decreases in property tax rates in adjacent municipalities. Perhaps, as local governments and residents are highly sensitive to property taxation, municipalities may no longer desire to exert greater fiscal efforts once they are able to finance services with a given population level.

Column 2 contains the IV second stage estimators which show the results from regressing the home municipality's property tax rate on own characteristics and on the contemporaneous spatially weighted average of neighboring municipalities' tax rates. This latter tax competition variable is positive and highly significant, which suggests that tax rates are set strategically and synchronously, taking into consideration the tax rates of neighboring municipalities. Results indicate that, on average, an increase/decrease of 1x1,000 in the tax rates of neighboring municipalities would lead to a movement in the same direction of about 0.5x1,000 in the home municipality¹⁸.

Table 4

PROPERTY AND ICA TAX COMPETITION INSTRUMENTAL VARIABLES AND MAXIMUM
LIKELIHOOD ESTIMATES, FIXED EFFECTS

Variable	PT		ICA		PT	ICA
	I 2SLS (1)	IV (2)	I 2SLS (3)	IV (4)	ML (5)	ML (6)
Neighbors' tax rates ρ		0.518** (0.262)		0.237* (0.148)	0.078*** (0.015)	0.081*** (0.015)
Population _{<i>t</i>}	0.173 (0.681)	0.744 (1.147)	1.123*** (0.449)	4.043*** (1.040)	0.427 (0.879)	1.860*** (0.608)
Total Expenditure p.c. _{<i>t</i>}	0.076 (0.098)	0.395*** (0.148)	0.029 (0.066)	0.866*** (0.161)	0.602*** (0.152)	-0.008 (0.104)
Poverty _{<i>t</i>}	0.960 (3.899)	-7.298* (3.899)	1.042 (2.200)	-4.154 (3.176)	-8.114*** (1.847)	-0.767 (1.476)
Transfers p.c. _{<i>t</i>}	-0.101 (0.110)	-0.426*** (0.172)	-0.284*** (0.080)	-0.245 (0.209)	-0.703*** (0.209)	-0.071 (0.142)
<i>Instruments (Neighbors' Variables)</i>						
Population _{<i>t</i>}	-2.198* (1.303)		6.516*** (1.012)			
Total Expenditure p.c. _{<i>t</i>}			0.436*** (0.137)			
Transfers p.c. _{<i>t</i>}	-1.199*** (0.216)					
Municipal FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Anderson		44.29 (0.00)		178.4 (0.00)		
Cragg-Donald F		22.16 (11.59)		89.96 (11.59)		
Hansen J Test (overid.)		0.430 (0.512)		0.114 (0.736)		
Observations	10,840	10,840	10,390	10,390	10,840	10,390

*** Significant at the 1% level; ** significant at the 5% level; * significant at the 10% level. All Specifications include time- and municipal -specific fixed effect and use effective tax rates.

Robust standard errors in parenthesis.

Source: Authors' calculations based on data from DANE and DNP.

Columns 3 and 4 present the results of estimating the fiscal competition model for the effective ICA tax rate. The first stage in Column 3 reveals that, as expected, both population and total expenditures of neighboring municipalities are positively and significantly associated with ICA tax rates. For population, perhaps the size of the population reflects the presence of industrial and economic bases and thus since ICA does not tax residents but rather business, local politicians are more willing to increase tax rates. Column 4 shows that the slope of the tax reaction function is positive and highly significant, signaling the presence of tax interactions. In Columns 5 and 6 displays results of the same models estimated through ML techniques, showing the significance of the tax competition variable—although the sizes of coefficients are smaller in this case.

Table 5 shows the results of jointly estimating Seemingly Unrelated Regression models (SUR) and IV-3SLS (three-stage least squares) to check for the possible correlation of the errors across the property and ICA equations. For both the property and ICA taxes, the coefficients of the neighbors' tax rates are always positive and statistically significant, further confirming the presence of strategic fiscal interaction. The Breusch-Pagan Lagrange Multiplier Diagonal Covariance Matrix Test indicates that the correlations of errors across equations are not significantly different from zero—therefore supporting the estimation of the property and ICA tax reaction functions separately. The IV-3SLS shows fairly equal results. These findings are in line with the fact that the majority of municipalities in Colombia rely mostly on the property tax to finance services, given the limited existence of robust ICA tax bases and ICA revenues. In this context, it seems unlikely for most municipalities that, in balancing budgets, they set both home rates strategically taking into consideration the level of each tax.

Table 5
SIMULTANEOUS EQUATIONS PROPERTY AND ICA TAX RATES FIXED EFFECTS (FE)²

Variable	SUR		3 SLS	
	PT	ICA	PT	ICA
Neighbors' tax rates ρ PT	0.201*** (0.017)	--	0.467** (0.235)	--
Neighbors' tax rates ρ ICA _{<i>t</i>}	--	0.128*** (0.019)	--	0.326*** (0.115)
Population _{<i>t</i>}	-0.348 (0.735)	4.418 (0.622)	-0.189 (0.765)	3.680*** (0.757)
Total Expenditure p.c. _{<i>t</i>}	0.350***	0.867***	0.325***	0.850***

² The SUR and 3 SLS models are estimated using the STATA command `reg3 sure`. SUR implies OLS estimations with homoskedastic errors and 3 SLS implies IV estimations with homoskedastic errors.

Variable	SUR		3 SLS	
	PT	ICA	PT	ICA
	(0.123)	(0.104)	(0.127)	(0.105)
Poverty _{<i>t</i>}	-7.18***	-4.074***	-7.910***	-4.210***
	(1.633)	(1.372)	(1.768)	(1.381)
Transfers p.c. _{<i>t</i>}	-0.470***	-0.276*	-0.416**	-0.213
	(0.188)	(0.158)	(0.196)	(0.163)
Intercept	15.357	-53.744***	10.237	-44.274***
	(10.865)	(9.171)	(11.866)	(10.727)
Municipal FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Breusch Pagan LM Test	0.45 (0.499)		0.15 (0.689)	
Observations	10,390		10,390	

*** Significant at the 1% level; ** significant at the 5% level; * significant at the 10% level.

Source: Authors' calculations based on data from DANE and DNP.

5.2. The Nature of the Observed Strategic Tax Interactions

With regards to identifying the source of the tax interaction, Table 6 presents the different test results to determine whether tax competition is its main driver. The comparative analysis of the standardized coefficients across the property and ICA tax equations under IV-2SLS, SUR and IV-3SLS in Table 6 show that the slope of the property tax is consistently larger than the slope of the ICA tax. While the standardized coefficients under the ML approach are equal, to support the tax competition hypothesis the ICA elasticity should be greater than that of the property tax. Overall, these results can also be interpreted as evidence against the race to the bottom theory.

Table 6
STRATEGIC PROPERTY AND ICA TAX SETTING—STANDARDIZED COEFFICIENTS

	IV		SUR		3 SLS		ML	
	Property Tax	ICA Tax	Property Tax	ICA Tax	Property Tax	ICA Tax	Property Tax	ICA Tax
Neighbors' tax rates	0.302**	0.135*	0.117***	0.073***	0.273**	0.185***	0.045***	0.046***

*** Significant at the 1% level; ** significant at the 5% level; * significant at the 10% level.

Source: Authors' calculations based on data from DANE and DNP.

In addition, Table 7 displays the results from several specifications with regards to the effect of property tax rate setting on local election results. The results from the first stage show that for both home and neighboring municipalities, their debt burdens and the size of the wage bill are positively and significantly associated with higher property tax rates. Column 2 shows that, while increases in own tax rates do not seem to have adverse effects on the vote shares for the main parties in the municipal council, increases in the tax rates of neighboring municipalities have a favorable impact on them. These results are partially in line with tax mimicking underlying the yardstick competition theory.

Table 7
YARDSTICK COMPETITION—PROPERTY AND ICA TAX SETTING
INSTRUMENTAL VARIABLES AND GMM

Property Tax					ICA				
Variable	I 2SLS (1)		IV (2)	GMM (3)	I 2SLS (4)		IV (5)	GMM (6)	
Home Tax Rate			-0.044 (0.028)	-0.083* (0.045)**			-0.010 (0.006)	-0.012 (0.010)	
Neighbors' Tax Rates			0.052* (0.031)	0.098** (0.049)			0.013* (0.007)	0.016 (0.011)	
Lagged Vote share	-0.181** (0.101)	-0.127** (0.072)	0.097*** (0.016)	0.154 (0.097)	-0.888*** (0.231)	-0.608*** (0.172)	0.107*** (0.016)	0.371*** (0.149)	
Cadastral Update	-0.039 (0.035)	-0.028 (0.022)	-0.014*** (0.005)	-0.020*** (0.007)					
Pop. Density	-0.075*** (0.017)	-0.072*** (0.010)	0.001 (0.002)	-0.002 (0.003)	-0.017 (0.040)	-0.107*** (0.027)	0.001 (0.002)	0.006* (0.003)	
Poverty	-1.025*** (0.166)	-0.580*** (0.096)	-0.040 (0.028)	-0.062 (0.042)	-0.625** (0.297)	-0.348* (0.213)	-0.016 (0.017)	-0.029 (0.023)	
Transfers p.c.	-0.048 (0.047)	-0.030 (0.031)	0.031*** (0.005)	0.027*** (0.008)	-0.990*** (0.112)	-0.726*** (0.079)	0.030*** (0.006)	0.015*** (0.008)	
First Term	-0.135*** (0.050)	-0.147*** (0.032)	-0.148*** (0.007)	-0.134*** (0.009)	-0.096 (0.086)	0.111* (0.066)	-0.152*** (0.007)	-0.133*** (0.009)	
Party Alignment Mayor-Governor	-0.162** (0.091)	-0.156*** (0.058)	0.043*** (0.014)	0.037** (0.018)	-0.045 (0.160)	-0.259** (0.120)	0.044*** (0.013)	0.024 (0.019)	
Party Alignment Mayor-Council	-0.033 (0.101)	-0.025 (0.060)	0.108*** (0.017)	0.094*** (0.021)	-0.228 (0.186)	-0.084 (0.133)	0.106*** (0.016)	0.087*** (0.020)	
Constant	4.693*** (0.392)	4.134*** (0.248)	0.009 (0.048)	-0.016 (0.074)	8.590*** (0.904)	7.576*** (0.631)	0.004 (0.039)	0.033 (0.057)	
<i>Instruments</i>									
Home Debt burden	0.031** (0.016)				0.112*** (0.029)				
Home spending (salaries)	0.228*** (0.049)				1.035*** (0.107)				

Variable	Property Tax			ICA		
	I 2SLS (1)	IV (2)	GMM (3)	I 2SLS (4)	IV (5)	GMM (6)
Neighbors' Debt burden	0.072*** (0.016)			0.348*** (0.040)		
Neighbors' spending (salaries)	0.436*** (0.041)			0.694*** (0.092)		
Anderson (underid.)		15.54 *** (0.001)			33.978*** (0.000)	
Cragg-Donald F		5.491 (7.56)			22.790 (7.56)	
Sargan test			3.63 (0.604)			0.24 (0.626)
Hansen J test (overid.)		1.824 (0.401)	1.50 (0.913)		2.041 (0.360)	0.11 (0.741)
Observations	1,288	1,288	1,247	1,250	1,250	1,250

All specifications report robust standard errors in parenthesis. *** Significant at the 1% level; ** significant at the 5% level; * significant at the 10% level.

Source: Authors' calculations based on data from DANE and DNP.

In addition, the vote share for the incumbent party in the council in the previous election is positive and statistically significant, signaling some incumbency advantage or the persistency of voting the same way by the electorate in the short term. Similarly, the indicator variable of whether the incumbent party is in its first term is unexpectedly negative and significant, suggesting that the local electorate punish the incumbent parties much more strongly if they are in their first term. Also, local and regional shocks to incumbents' popularity have a favorable effect, as in both instances the party alignment between the governing party in the council and the mayor and governor are positive and statistically significant. Having an updated cadaster is associated with lower popularity levels, while receiving greater fiscal transfers from the central government has a positive effect on them.

While the set of instruments used seem to be valid as a group, they are weak. In addition, the results are likely to suffer from omitted variable bias as, due to a lack of data, many political and institutional factors have not accounted for and the regression model does not include individual and time fixed effects¹⁹. More importantly, in the context of IV estimation, the inclusion of the lagged dependent variable is likely to bias the estimated coefficients.

To address some of these issues, Column 3 shows estimates of a GMM dynamic panel model regressing popularity levels on the election results from the previous electoral cycle and on the property tax rates and characteristics of the home municipalities²⁰. By using a lagged dependent variable as an independent variable, the GMM dynamic models may best capture the persistency and ideology effects of voting equally by voters in the short term. Also, while the IV method may be more effective to address endogeneity, the GMM approach is a more efficient estimation strategy in the presence of heteroskedasticity, weak

instruments, and correlation of time-invariant municipal characteristics and the explanatory variables and the error term (Baum, Schaffer, and Stillman, 2003; Roodman, 2009). Results show that, while increases in own tax rates have adverse effects on the vote shares for the main parties in the municipal council, increases in the tax rates of neighboring municipalities have a favorable impact on them.

Columns 4 through 6 repeat this exercise for ICA tax setting. As in the case of property taxation, the instruments are significant and have the expected signs. While in Column 5 the IV estimation would suggest the presence of some yardstick competition dynamics (increases in the tax rates of neighboring municipalities have a favorable impact on the vote shares for the main parties in the home municipal council), the GMM results however reject that hypothesis. Indeed, Column 6 shows that, albeit having the expected signs, neither the home tax rate nor the neighboring tax rates are statistically significant. These results indicate that tax policies associated with ICA taxation may not have an impact on election results. The GMM results shown herein for the yardstick competition may be taken with some caution as the estimation employed uses only two periods.

6. Conclusions

This paper provides evidence of the presence of strategic fiscal interaction in tax rate setting among municipal governments in Colombia. Using a large sample of municipalities from 2000 to 2009 and spatial panel regressions with two-way fixed effects for property and ICA taxes, I show that, when setting their own tax rates, municipal governments take into account the tax rates of the adjacent municipalities. However, property taxation across municipalities seems to be more sensitive to changes in tax rates than ICA taxation, which is counterintuitive and casts doubt on the tax competition theory. Finally, I find that local politics and electoral accountability may be fostering property tax rate mimicking among municipalities. Such patterns do not seem to be present in ICA taxation.

All in all, the findings suggest that tax competition is not a general concern in Colombia. In line with Arze *et al.* (2008) and Capuno *et al.* (2012) in their study of fiscal competition in Indonesia and the Philippines, respectively, tax mimicking via yardstick competition may be a closer explanation for the observed interdependence of property tax rates.

Limited factor mobility across municipalities and the agglomeration of residents and firms in only a handful of main cities could explain the absence of tax competition. In Colombia, as in other developing countries, the set of location choices are limited, as few cities offer a public services bundle capable of attracting business and people (Smoke, 2001; Cohen, 2006). Also, tax competition seems unlikely in a context where most municipalities are primarily small and poor, have limited tax bases and low revenue levels, especially from ICA, and depend heavily from central government fiscal transfers.

Local politicians may be adopting similar tax policies implemented by their neighbors in order to achieve some political gains. As constituencies and residents are also burdened by the property tax, as opposed to the ICA tax that levies only businesses, they would be much more sensible to the relative level of property tax rates, which would ultimately affect their preferences toward the type of government that would provide the bundle of taxes and services in their jurisdictions. Also likely, given its visibility and salience, lower property tax burdens, or similar levels vis-a-vis peer municipalities, are almost always seen more favorably by local constituencies (Bahl, Martínez-Vázquez, and Youngman, 2010). This negative perspective on the property tax is likely to be reinforced in a context of comparative performance evaluations, such as the ones that underlie yardstick competition.

Other factors such as central government enforcement and shared learning processes (Shipan and Volden, 2008) may also explain the spatial tax interdependence evidenced here. Based on consultations with central government officials, the fiscal responsibility laws implemented in early 2000 have, in turn, created incentives to generate revenue, and thus convergence in tax rates may be the result of this upwards enforcement²¹. Unfortunately, it is impossible to test this hypothesis as there are not available data from the cadastre and industrial tax bases from before the introduction of this legislation. In addition, municipal officials and policymakers may have learned from their neighbors' experiences through interactions in social networks (*i.e.* The Colombian Federation of Municipalities), and prompted some of them to imitate policies implemented in other municipalities.

The results contradict the conventional arguments against decentralization stemming from the detrimental effects of interjurisdictional competition. For Colombia, there is little support for offsetting actions, such as tax harmonization, tax coordination through mutual agreements and/or through the close supervision of the central government, centralized tax collection using uniform systems, and the establishment of metropolitan governments, or *mancomunidades*, to decrease mobility, among others.

Although I find little evidence supporting the race to the bottom theory in Colombia, it is likely that such dynamic could be going on in particular regions of the country, especially those with larger property and ICA tax bases. Future research efforts should analyze, for instance, tax competition among municipalities in specific metropolitan areas or, alternatively to account for the existing differences in population sizes and economic bases across municipalities, create additional weights matrices to analyze tax interactions between larger metropolitan areas. The use of spatial Durbin models is another avenue for continuing the study of subnational tax interactions in the country. Further, future studies must improve the testing of yardstick competition and disentangle competition and imitation from factors such as central government legislation and social networks. Finally, I do not address the likely competition through input provision, which involves instruments such as expenditures, infrastructure provision, and land use policy, yet this constitutes an important subject for future research in the context of Colombia.

Notes

1. Strategic or spatial fiscal interaction, fiscal competition, and fiscal or tax interdependence are used interchangeably.
2. Race to the bottom refers to the process by which two jurisdictions compete with each other for mobile resources (*i.e.* capital) by lowering their tax rates (Wilson, 1999; Brueckner, 2003).
3. The empirical testing of the theory of expenditure competition is left out of the scope of this paper, due to a lack of data on expenditures. Therefore relevant studies in this area are not reviewed in this section.
4. There is evidence of the presence of tax competition in Belgium (Heyndels and Vuchelen, 1998; Gérard, Jayet, and Paty, 2010), Canada (Brett and Pinsky, 2000; Hayashi and Boadway, 2001), France (Reulier and Rocaboy, 2009), Germany (Buettner, 2001), Switzerland (Feld and Kirchgassner, 2001), the United Kingdom (Revelli, 2001), and the United States (Ladd, 1992; Brueckner and Saavedra, 2001).
5. Evidence of yardstick competition has been found in Belgium (Heyndels and Vuchelen, 1998), England (Revelli, 2002 and 2006), France (Dubois and Paty, 2010), Italy (Bordignon, et al., 2003), Norway (Revelli and Tovmo, 2007), Spain (Solé Ollé, 2003), Switzerland (Schaltegger and Kuttel, 2002), and the United States (Besley and Case, 1995).
6. This parameter could be positive or negative (Brueckner and Saavedra, 2001) and, if the spatial weight matrix is row-standardized, a coefficient smaller than one is expected to ensure that the spatial model is dynamically stable.
7. Poverty rate is defined as the number of people suffering from unmet basic needs divided by the total population in municipality i in year t . Unmet basic needs refers to a household that is affected by one of the following factors: overcrowded housing, housing units lacking of basic services, 4 people depending economically from a household head that has only achieved two years of primary education, and one school age child not receiving formal education (Fresneda, 2007).
8. Transfers and population in the case of property taxation and total expenditures and population in the case of ICA taxation. This estimation strategy is also pursued by Ladd (1992), Heyndels and Vuchelen (1998), Figlio, Kolpin and Reid (1999), Brett and Pinsky (2000), Buettner (2001), Revelli (2003), Solé Ollé (2003) and Dubois and Paty (2010), among others.
9. Law 14 of 1983 and the 1991 Constitution.
10. Law 44 of 1990. Nonetheless, Law 1450 of 2011 modified the tax rate bands; now, municipal council must set tax rates between 5x1,000 and 16x1,000 for properties in the richest socioeconomic strata, and between 1x1,000 to 16x1,000 for properties in the poorest strata.
11. Law 14 of 1983 and Decree 1333 of 1986.
12. There are 18 other available income sources, including taxes and fees. From these sources, the gas surcharge, which represented 11 percent of municipal tax revenues in 2009, is the only one with similar relevance.
13. Municipalities have other instruments at their disposal to compete for mobile resources, such as expenditures, infrastructure, and land. However, I do not examine these instruments because of limited data availability. The inability to examine expenditures could affect the internal validity of this study, as possibly the autocorrelation of tax rates among municipalities could be just the reflection of input competition (*i.e.* the over-provision of goods and services may lead jurisdictions to require increases in tax rates), rather than strategic tax setting behavior.
14. "Atypical" elections are held at different times if the mayor or governor has been removed from office due to the declaration of an invalid election or due to corruption charges.
15. The formula converts the number of votes obtained into seats. The seats in the municipal council are assigned in order from those candidates in the party lists obtaining the largest share of votes to those with smaller shares, until depleting the number of seats available. The number of seats in the council range from 7 to 21, and their exact number depends on the number of inhabitants in the municipality.

16. For the property tax analysis, it includes data for the Department of Antioquia. This set of municipalities has been typically absent from empirical studies on property taxation in Colombia. See Leibovich and Núñez (2002), Sánchez (2012), Uribe (2006), Iregui *et al.* (2004 and 2005), among others.
17. Due to a lack of data on the number and assessed values of properties, as well as on the number of firms and ICA tax revenues, I exclude from the sample 16 municipalities in the case of property tax and 46 in the case of ICA tax. Most of the municipalities excluded are less dense, significantly larger than average in terms of geographical extension, and fundamentally poor and rural, so tax competition among them is less likely.
18. While the size of the coefficient for the tax competition variable varies in the literature depending on the type of measurement used (effective or per capita rates) and on the specific taxes and level of government analyzed, Blochliger and Pinero (2011), in their review of the literature for the OECD, show that the estimated elasticity ranges from 0.3 to 0.7.
19. IV models using fixed effects drop the strength and significance of the instruments.
20. As noted, the GMM estimation uses the time lags of the endogenous variables—in this case the lagged popularity rate and the local tax rates—and the exogenous variables in the model as instruments. The set of instruments also include the instruments civil service salaries and municipal debt.
21. The adoption of very stringent subnational fiscal responsibility legislation enhanced this institutional framework, such that municipalities were forced to cover current spending with own resources, control debt, and balance budgets, among other fiscally responsible actions. See Laws 358 of 1997, 795 of 2003, and 819 of 2003 for subnational debt; and Laws 617 of 2000 and 819 of 2003 for fiscal discipline and transparency.

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Resumen

A partir de una base de datos espaciales de panel de una mayoría de municipios colombianos para el periodo 2000-09, este trabajo ofrece evidencia empírica acerca de la existencia de interacciones fiscales estratégicas en relación con el Impuesto sobre Bienes Inmuebles y el Impuesto de Actividades Económicas. Con todo, se halla escasa evidencia de una encarnizada competencia fiscal a la baja. Además, el trabajo muestra que la diferencia en el tipo impositivo del Impuesto sobre Bienes Inmuebles influye los resultados electorales y el nivel de popularidad de los principales partidos políticos con representación en el ámbito local, de lo que se deriva la presencia de un entorno competitivo. Los resultados sugieren que el país no parece requerir medidas políticas destinadas a atenuar la competencia fiscal municipal.

Palabras clave: Decentralización, interacción fiscal estratégica, competencia fiscal, criterio.

Clasificación JEL: H71, H73, H77.

