Urban Public Economics Review
Revista de Economía Pública Urbana

Urban Public Economics Review
Universidade de Santiago de Compostela
info@uper.org
ISSN (Versión impresa): 1697-6223
ESPAÑA

2006
Aki Kangasharju / Antti Moisio / Emmanuelle Reulier / Yvon Rocaboy
TAX COMPETITION AMONG MUNICIPALITIES IN FINLAND
Urban Public Economics Review, número 005
Universidade de Santiago de Compostela
Santiago de Compostela, España
pp. 12-23

Tax competition among municipalities in Finland[1]

Aki Kangasharju, Antti Moisio*, Emmanuelle Reulier** and Yvon Rocaboy***

Regional and local public sectors are often characterized by revenue equalization systems that even out tax base differentials between rich and poor jurisdictions. In such a context, the question arises about the existence of strategic interaction among local governments. This paper uses Finnish municipality data to test for local tax competition. We show that despite a strong revenue equalization system, Finnish municipalities still behave strategically in terms of tax setting.

Los sectores públicos locales y regionales se caracterizan, a menudo, por contar con sistemas de nivelación de rentas, que incluso diferencian las bases entre jurisdicciones "ricas" y "pobres". En este contexto, la cuestión radica en estudiar la existencia de estrategias de interacción entre los distintos gobiernos locales. Así, nuestro trabajo utiliza los datos de los municipios finlandeses para testar la existencia de competencia fiscal a nivel local. Se demuestra que, a pesar de la existencia de un importante sistema redistributivo, los municipios de Finlandia se comportan estratégicamente a la hora de establecer sus tipos impositivos.

Key words: local government, tax competition, strategic interaction
JEL classification: H72, H73, D72, D78, H24, H25

1. Introduction

Since the late nineties a few studies have found the existence of correlation between tax rates of neighbouring jurisdictions at the decentralized level of government. This result is often considered as empirical evidence suggesting the existence of local tax competition. It is, for example, the case in Germany (Buettner, 2001), Belgium (Heyndels and Vuchelen, 1998), Spain

[1] We would like to thank participants in the 2nd PEARLE seminar at the Government Institute for Economic Research (VATT-Helsinki) for helpful comments.

* VATT, Government Institute for Economic Research, Helsinki.

** University of Rennes 1, CREM-CNRS.

(Sole Olle, 2004), Italy (Bordignon, Cerniglia and Revelli, 2003), Switzerland (Feld and Kirchgässner, 2001), France (Feld, Josselin and Rocaboy, 2003), Canada (Brett and Pinkse, 2000). No such studies have been conducted in the case of the Finnish municipalities. Yet they play an important role in the Finnish economy in general and in the public sector in particular. Municipalities are, for example, responsible for the provision of social welfare, health services, basic schools and secondary education as well as local infrastructure. The economic importance of municipalities can be described by noting that their share of spending out of GDP is 18% and that they employ roughly 20% of the total Finnish workforce.

Finnish municipalities have the constitutional right of self-government. Specifically, they have independent taxation rights and decide their own budgets. They have full autonomy in determining their tax rates. The bulk of municipal revenues are raised through own source revenues and only 15% comes from grants. Tax revenues cover over half of the total municipal revenues. Municipal taxation concentrates on taxing earned income. Nearly 90% of total municipal tax revenues are raised from income taxation. Municipalities are the sole receivers of the property taxes but the importance of property taxes as revenue source is small.

One interesting feature of the Finish local public sector is that there exists a strong revenue equalization system that evens out tax base differentials between rich and poor municipalities. In addition, the central government equalizes the income differences between citizens through progressive central government income tax and by regulating income based fees for local public services. As a result, one may argue that the consequence of the so-called Nordic model, which tries heavily to even out the differences, would be a low degree of strategic interaction between the municipalities in their tax setting. This proposition that revenue sharing among local jurisdictions can reduce tax competition is for instance discussed by Brennan and Buchanan (1980). In this paper we investigate this question from an empirical point of view by testing for the existence of such a tax competition in the case of the municipal income tax.

The following section (Section 2) briefly summarizes the local tax competition theory. Section 3 describes the data used for our econometric analysis. Section 4 presents the estimation method and analyses the econometric results. Our tests corroborate the existence of strategic interaction at the local level of government suggesting that despite the presence of a strong revenue equalization system, Finnish municipalities are still involved in a tax competition. Section 5 concludes the paper.

2. The local tax competition theory

There are two different ways to explain fiscal interaction at the local level of government. The first one comes from the pioneer work of Wildasin (1988). Local public decision-makers are supposed to maximise a welfare function positively related to the local public good level. Voters are assumed to be immobile and to consume both a private good and a local public good. The latter is financed by a tax on capital. Since capital is assumed to be perfectly mobile across local jurisdictions, when a given government raises its tax rate, net return on capital located there falls and then capital chooses to relocate. Symmetrically, a jurisdiction may be induced to lower taxation in order to attract capital and then to increase local public expenditures. As a result, under the assumption of perfect mobility of capital, a strategic change in tax rate in one jurisdiction systematically alters the location of capital and yields a change in tax rates in the other jurisdictions. This is the mobility-based tax competition hypothesis.

The second way to explain local tax competition is due to Salmon (1987), and more recently to Besley and Case (1995). These authors have dropped the concept of mobility as a vector for fiscal interaction. In their framework fiscal interactions are mainly based on information asymmetries between voters and their representatives. In a world of imperfect and asymmetric information, voters have restricted possibilities to evaluate the performance of their representatives. Selfish representatives aim at gathering political rents and hence have incentives to withhold information about their opportunistic behavior from voters. However, voters can draw inferences on politicians' behavior, by comparing it to the performance of governments and parliaments in neighboring jurisdictions. Other things being equal, these neighbors serve as yardsticks for the voters' evaluation. A bad performance in their own jurisdiction compared to other jurisdictions will penalize representatives, and their chance of being re-elected drops. Under this theory, public choice would not only be driven by information gathering from neighboring jurisdictions, but also by fiscal strategic interaction. Because representatives anticipate the yardstick mechanism, they are able to stay in power by adapting to the policies of their neighbors. This second channel leads to what we can refer to as information-based tax competition.

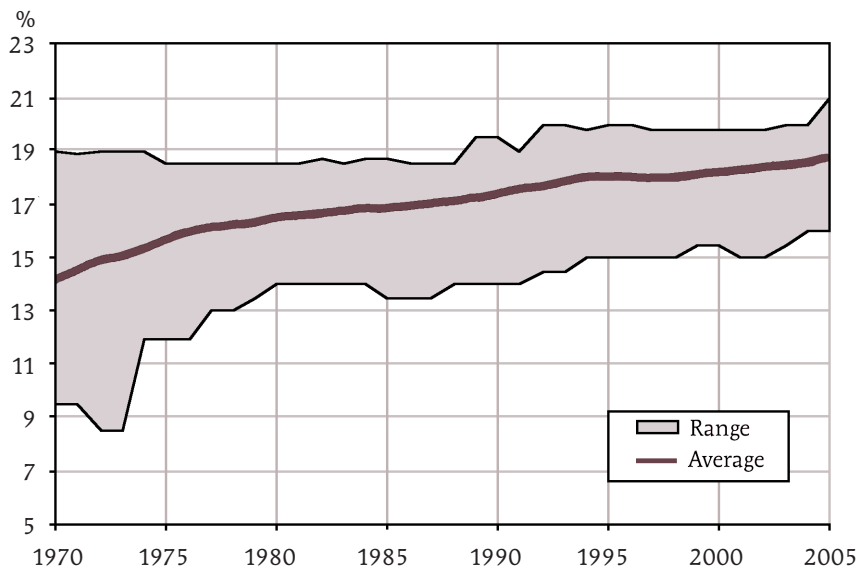
In both cases, we can establish a theoretical correlation between the tax rates of neighboring jurisdictions. Indeed, in order not to suffer a tax base shrinking, or not to be considered as bad politicians, decision-makers ratio-

nally adopt mimicking behaviors. In what follows we test for the existence of such a local tax competition in the case of the Finnish municipalities.

3. Data

In this study we analyse the income tax rates of all Finnish municipalities over the period 1988-2002[1]. In 1988, the average income tax rate was 17.1. By 2002, the average had risen to 18.3, the lowest tax rate being 15 and the highest 19.75. In the longer perspective, the income tax rate growth has been even more dramatic. At the same time, the variance of municipal tax rates has diminished (Figure 1).

Figure 1: The development of income tax rate in Finnish municipalities 1970-2005



Over time, most municipalities have raised their tax rates. However, during most years there have also been municipalities that decided to lower their income tax rate (see Table 1).

[1] The municipalities in the autonomous area of Åland islands are excluded. Due to mergers of municipalities, the number of municipalities in the data set gradually diminishes from 461 in 1988 to 448 in 2002.

Table 1: Number of municipalities grouped by tax rate change decisions 1988-2002

Year	No tax rate change	Tax rate lowered	Tax rate increased	Total number of municipalities
1989	358	1	101	460
1990	372	0	88	460
1991	359	1	100	460
1992	354	0	106	460
1993	341	0	114	455
1994	328	2	125	455
1995	438	8	9	455
1996	415	35	5	455
1997	395	44	13	452
1998	356	19	77	452
1999	355	10	87	452
2000	354	15	83	452
2001	401	6	41	448
2002	337	3	108	448

Our main data source is the Regional Statistical Database of Statistics Finland (ALTIKA). This database contains information on municipal finances, and regional statistics derived from the Population Census. The variables used in the study are listed in Table 2 and statistical summary of the variables is presented in Table 3.

Table 2: The variables used in the study

Variable	Abbreviation
Tax rate of the municipality	Taxr
Mean tax rate in the neighbouring municipalities	NTaxr
Grants received by the municipality, euros per capita	Grant
Taxable income of the municipality, euros per capita	Inc
Unemployment rate in the municipality	Un
Population of the municipality	Pop
The share of 0-15 year old population in the municipality	young
The share of 75 years and older population in the municipality	old
Population density	Density

Table 3: Statistical summary of the variables

Variable	Mean	Std. Dev.	Std. Dev. (within)	Min	Max
Taxr	17,79	0,78	0,49	14,00	20,00
NTaxr	17,77	0,61	0,41	15,42	19,38
Grant	8.603,13	2.757,58	1.198,94	171,89	19.698,98
Inc	8.389,04	2.226,92	1.577,99	3.734,26	31.649,90
Un	13,46	6,59	5,38	0,60	33,90
Pop	11.729,40	31.906,42	1.673,86	220,00	559.718,00
young	20,78	3,23	0,95	9,92	37,55
old	7,23	2,26	0,76	1,55	14,62
Density	56,25	190,36	8,72	0,22	3.025,50

In the analysis all variables except variables that are in percentage form are transformed into logarithmic form. The neighbour matrix used is constructed so that the neighbouring municipalities are those sharing a geographical border.

4. Empirical model and the results

As Hayashi and Boadway (2001), Feld, Josselin and Rocaboy (2003), and Feld and Reulier (2005), our empirical analysis is based on a model where the income tax rate in municipality i depends on tax rates in the neighbouring municipalities ($NTaxr_{i,t-1}$) lagged one period. Moreover, in our econometric model the income tax rate in municipality i depends on per capita grants received by the municipality ($Grants_{i,t-1}$) lagged one period, previous period per capita income ($Inc_{i,t-1}$), and some demographic factors in the municipality ($X_{i,t-1}$) lagged one period.

By using lagged values of all explanatory variables we assume that the municipal councils make their tax rate decisions mainly using the information on previous year factors. We think that this is a realistic assumption even though it is well known that in practice the budget proposals brought forward by the municipal management are based both in past development and in predicted future development. The future development predictions, however, are usually used to make decisions on long term investments such as building new schools, health centres or starting new housing projects. The tax rate may nevertheless be more affected by the development in near past, such as cuts on grants, shrinking tax base or unexpected service needs. It is also nearly impossible to

model expectations in any reliable way using the data we have at our disposal. Moreover, strategic interactions are introduced in this model by the neighbouring municipalities tax rate ($NTaxr_{i,t-1}$). We have supposed like most studies on this question that two jurisdictions are going to compete if they are geographically closed. In consequence, the neighbouring tax rate is the average of the income tax rate set in bordering jurisdictions. In short, we model the tax rate as:

$$Taxr_i = f\left(NTaxr_{i,t-1}, Grant_{i,t-1}, Inc_{i,t-1}, X_{i,t-1}\right) \quad [1]$$

We test two econometric models for [1], the simple OLS and the fixed effects model. As we are using the lagged neighbouring tax rates, we do not need to deal with the endogeneity problem of the tax rates between neighbouring municipalities[2]. Nevertheless, using panel data structure leads us to check for two possibilities. The first one is serial correlation and the second one is heteroskedasticity. Suitable econometric tests revealed that it is not possible to reject the autocorrelation hypothesis[3] neither the heteroskedasticity one[4]. In order to deal with autocorrelation and heteroskedasticity we have introduced time dummies and corrected Least squared and fixed effects estimations by robust and cluster options. The results of the estimations are presented in Table 4. The estimated coefficients are presented after each variable and the t-statistics are in parentheses. The results for

[2] The endogeneity problem is discussed at length by Kelejian and Prucha (1998, 1999) and Kelejian and Robinson (1993).

[3] For the simple OLS model (resp. fixed effect model), the autocorrelation coefficient is equal to 0.88 (resp. 0.61). Those two coefficients are significantly different from zero at the 1% level. As for the fixed effects model we tested the autocorrelation using the procedures proposed by Drukker (2003) and Wooldridge (2002). The tests suggest that there is autocorrelation also in case of time demeaned variables. However, we need emphasize the fact that our dataset consists of very short panels i.e. the time span of our dataset is clearly smaller than the number of cross-section units (we have 15 years for each 448 municipalities). In case where T (number of years) is small relative to N (number of cross section units) Wooldridge (2002, pp. 274-276) suggests that one should deal with autocorrelation by adjusting the variance matrix estimator and test statistics. This can be done by using a robust variance matrix estimator that is valid in the presence of any heteroscedasticity or serial correlation. Here, we have followed this procedure using the routines that are available in STATA-program.

[4] The Pagan-Hall general test indicates that we reject the hypothesis that disturbance is homoskedastic at the one percent level both for the simple OLS model.

the time dummies are not reported in Table 4 however, as they served only to control for macroeconomic changes common to all municipalities. The results for the time effects are presented in Table 5.

Table 4: The estimation results

	(1)	(2)
	OLS	Fixed effects
$NTaxr_{t-1}$	0.562	0.303
	(13.03)**	(5.66)**
$logGrant_{t-1}$	0.571	-0.084
	(5.25)**	(1.20)
$logInc_{t-1}$	-0.536	-0.956
	(2.33)*	(6.08)**
Un_{t-1}	0.003	0.005
	(0.42)	(1.08)
$logPop_{t-1}$	-0.038	
	(0.99)	
$Young_{t-1}$	-0.003	-0.010
	(0.30)	(0.73)
Old_{t-1}	0.013	-0.010
	(0.72)	(0.44)
$logDensity_{t-1}$	0.067	0.484
	(2.32)*	(1.63)
Constant	8.599	20.607
	(3.17)**	(10.53)**
Observations	6048	6048
R-squared	0.55	0.85

Notes: Robust t-statistics in parenthesis. * Significant at 5% ** Significant at 1%

According to our results there exists a clear relationship between neighbouring municipalities' tax rates. The coefficient in the OLS model is larger than that of the fixed effects coefficient. The OLS coefficient is less interesting when analysing the neighbour effect however, as we should be mainly interested in the effect of change in neighbouring tax rate on the tax rate of municipality i. As the simple OLS model measures the static differences between municipalities, the result in column 1 of Table 4 only indicates that there are statistically significant differences between municipal tax rates. The fixed effects model result is more

relevant because it measures the effect of change in the neighbouring tax rate on municipality i's tax rate change. Using the model specified above, we find that as the average neighbouring tax rate is raised by 1 point, municipality i will raise its tax rate by 0.303 point. The magnitude of this statistically significant effect is actually not lower than that

Table 5: The coefficients for the year dummies

	(1)	(2)
	taxr	taxr
_Iyear_1989	-0.246	-0.741
	(1.96)	(8.84)**
_Iyear_1990	-0.227	-0.560
	(2.12)*	(7.22)**
_Iyear_1991	-0.190	-0.378
	(2.02)*	(5.22)**
_Iyear_1992	-0.105	-0.182
	(1.65)	(3.50)**
_Iyear_1993	-0.055	-0.099
	(1.76)	(3.81)**
_Iyear_1994	0.000	0.000
	(.)	(.)
_Iyear_1995	-0.111	-0.123
	(5.38)**	(8.16)**
_Iyear_1996	-0.076	-0.031
	(5.06)**	(1.81)
_Iyear_1997	0.055	0.032
	(1.71)	(0.90)
_Iyear_1998	0.249	0.181
	(5.56)**	(3.44)**
_Iyear_1999	0.361	0.355
	(5.71)**	(4.97)**
_Iyear_2000	0.405	0.458
	(5.40)**	(5.59)**
_Iyear_2001	0.391	0.544
	(4.24)**	(5.61)**
_Iyear_2002	0.351	0.530
	(5.03)**	(6.61)**

which is found in other studies on this question[5]. For instance in the case of a set of Spanish municipalities, Solé Ollé (2003) shows that a 1 point change in the neighbours' tax rates leads to a 0.389 change in municipality i' tax rate in the case of the property tax, and to a 0.333 change in the case of the motor vehicle tax.

As for the rest of the variables, we find strong positive relationship between tax rates and *previous period grants* in OLS model but not in fixed effect model. This may be partly because the year dummies pick up most of the grant change effects.[6] There were rather big changes in grants due to reforms over the period 1993-1998 but apart from that the changes in grants seem to have been rather small. The *previous period per capita taxable income* has a strong negative effect in both models. This result comes as no surprise as it just means that the wealthier the municipality the lower the tax rate. The unemployment rate, population or other demographic variables have no statistically significant effect on tax rate in either of the models, except for population density in OLS model.

5. Conclusion

This article points out the existence of strategic interactions when Finnish municipalities set the income tax rate. On average the magnitude of these fiscal interactions is not lower that the one found in the other studies addressing this question. This result is very interesting because the "Nordic model" implies a strong revenue equalization that should have a large restrictive effect on tax competition. It seems important in future work on this topic to determine what is the origin of those strategic interactions. Are they motivated by the fiscal bases mobility or by political election purpose?

[5] See Madiès, Paty, and Rocaboy (2004) for a survey of these studies.

[6] The OLS results differ from the fixed effects also because in the latter we control for the unobservable fixed effects such as differences in management abilities or political situations that do not change during our data period. Another reason for the different results may be that the variation when we simply pool the data comes mainly from differences between municipalities. When we use the fixed effect model, the variation we analyse comes from the change over time within each municipality. If this so called within-variation is very small for some variable, it may be difficult to get reliable estimates for this variable. From Table 3 above we could see that the within-variation is very small especially in case of the variables based on population information. Hence, we may expect difficulties in getting statistically significant coefficients for these variables in fixed effects model.

References

Besley T., Case A. (1995), "Incumbent behavior: Vote seeking, tax setting and yardstick competition", *American Economic Review*, 85:25-45.

Bordignon M., Cerniglia F., Revelli F. (2003), "In search of yardstick competition: A spatial analysis of Italian municipality property tax setting", *Journal of Urban Economics,* 54:199-217.

Brennan, G., Buchanan J. (1980), "The power to tax: Analytical foundations of fiscal constitution ", Cambridge University Press.

Brett C., Pinkse J. (2000), "The determinants of municipal tax rates in British Columbia", *Canadian Journal of Economics*, 33:695-714.

Buettner T. (2001), "Local capital income taxation and competition for capital: The choice of the tax rate", *Regional Science and Urban Economics*, 31:215-245.

Drukker, D. M. (2003), "Testing for serial correlation in linear panel-data models", *Stata Journal* 2:168-177.

Feld L.P, Kirchgässner G. (2001), "Income tax competition at the state and local level in Switzerland", *Regional Science and Urban Economics*, 31, pp. 181-213.

Feld L.P., Josselin J.M., Rocaboy Y. (2003), "Tax mimicking among regional jurisdictions", in A. Marciano and J.M. Josselin (eds), *From economic to legal competition. New perspectives on law and institutions in Europe*, London: Edward Elgar, 105-119.

Feld L.P., Reulier E. (2005), "Strategic Tax Competition in Switzerland: Evidence from a Panel of the Swiss Cantons", *mimeo Université de Marburg.*

Heyndels B., Vuchelen J. (1998), "Tax mimicking among Belgian municipalities", *National Tax Journal*, 51:89-101.

Hayashi M. et R. Boadway (2001), An Empirical Analysis of Intergovernmental Tax Interaction : the Case of Business Income Taxes in Canada, *Canadian Journal of Economics* 34 : 481-503.

Kelejian H.H., Prucha I.R. (1998), "A generalized spatial two-stage least squares procedure for estimating a spatial autoregressive model with autoregressive disturbances", *Journal of Real Estate Finance and Economics*, 17:99-121.

Kelejian H.H., Prucha I.R. (1999), "A generalized moments estimator for the autoregressive paramter in spatial model", *International Economic Review*, 40:509-533.

Kelejian, H.H., Robinson D.H. (1993), "A suggested estimation for spatial interdependent models with autocorrelated errors, and an application to a county expenditure model", *Papers in Regional Science*, 72:297-312.

Madiès T., Paty S., Rocaboy Y. (2004), "Horizontal and vertical externalities: An overview of theoretical and empirical studies", *Urban Public Economics Review*, 2:63-93.

Salmon P. (1987), "Decentralization as an incentive scheme", *Oxford Review of Economic Policy,* 3:24-43.

Sole Olle A. (2004), "Electoral accountability and tax mimicking: the effects of electoral margins, coalition government, and ideology", *European Journal of Political Economy*, 19:685-713.

Wildasin D.E. (1988), "Nash equilibria in models of fiscal competition", *Journal of Public Economics*, 35:229-240.

Wooldridge, J. M. (2002), *Econometric Analysis of Cross Section and Panel Data*, Cambridge, MA: MIT Press.