Yardstick competition and fiscal disparities: an experimental study

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Abstract

Recent theoretical research suggest that yardstick competition may be biased by the presence of fiscal disparities between local governments and that fiscal equalization may help in correcting this bias. This paper provides an empirical test of these theoretical predictions by means of a laboratory experiment.

JEL Classifications: H71, H76, C91.
Keywords: yardstick competition, fiscal equalization, experiment.

1. Introduction

The existing research on yardstick competition, that is, the use of comparisons between administrators of adjacent jurisdictions as a benchmark for the local incumbent administrator, usually bases its assumption on the existence of identical or "similar" jurisdictions to be compared.

This idea has been formalized by the seminal paper of Besley and Case (1995), that presents a model of the political economy of tax-setting in a multi-jurisdictional world, where voters compare local administrators to overcome political agency problems. This forces incumbents into a competition in which they care about what other incumbents are doing in order to maximize the probability of re-election.

Similarly, Besley and Smart (2007) study political competition between domestic and foreign administrators of jurisdictions affected by shocks in the cost of provision of local public goods.

If yardstick competition correctly works, that is, if citizens makes comparative performance evaluation across governments in order to understand the quality (or the honesty) of their politicians, then it would be useful to organize the allocation of functions and resources to local governments so as to maximize this behaviour (Bordignon et al., 2003).

A number of empirical papers provide evidence about the existence of tax-mimicking behaviour among local governments. Among others, Besley and Case (1995) successfully tested the existence of this phenomenon using U.S. state data from 1960 to 1988. Bordignon et al. (2003), using data on 143 adjacent Italian

municipalities, found positive spatial auto-correlation in local property tax rates of jurisdictions where the mayors run for re-election in uncertain contests, while interaction is absent where mayors either face a term limit or are backed by large majorities. More recently, Buettner and von Schwerin (2016), using data about German states and local governments, have provided empirical evidence of the existence of yardstick competition between subnational jurisdictions in the setting of local business tax rates.

Despite the large amount of empirical research on the topic, the effect of fiscal disparities between local jurisdiction on yardstick competition has received little attention.

From a theoretical point of view, this problem has been recently treated by Allers (2012) who underlines that when fiscal disparities exist, that is, when local jurisdictions differ in revenue capacities and/or spending need, yardstick competition is likely to be biased. In fact, the key to yardstick competition is transparency and, if administrators' performance cannot be derived from subnational government output and tax rates in a straight-forward manner, its correct functioning could be undermined and administrators of richest (in terms of fiscal capacity/expenditure needs ratio) jurisdictions have a strategical advantage. As a consequence, they could extract higher rents than their counterparts take, and still keep a good reputation or re-election probability, simply because their counterparts manage fewer resources and can offer services with lower quality (Di Liddo and Giuranno, 2016). For this reason, fiscal equalization is likely to increase the efficacy of yardstick competition and remove the yardstick bias, providing all administrators the same amount of revenues (Allers, 2012).

To the best of our knowledge, there is still a lack of empirical research aimed to test the existence of the yardstick bias caused by fiscal disparities. The aim of the paper is to fill the gap in the literature studying - by means of a laboratory experiment - yardstick competition (Besley and Case, 1995) and the effect of equalizing grants on the yardstick bias (Allers, 2012). To be more precise, we will address the two following research questions:

RQ1 - might fiscal disparity among jurisdiction bias yardstick competition?

RQ2 - might central government (CG) transfers improve yardstick competition among local jurisdictions?

The rest of the paper is organized as follows. In Section 2 we report the experimental design, in Section 3 the empirical analysis and its results are presented. Finally, Section 4 concludes. Descriptive statistics on data used in our regressions are reported in Appendix.

2. Experimental design

We recruited students from the University of Bari via a mailing-list system. They were presented with a set of pairwise choice questions; each pairwise choice is composed of two scenarios, labelled "Jurisdiction A" and "Jurisdiction B", of the kind depicted in Table 1. Each subject has to report his/her vote/preference between the two administrators of A and B on the bases of the ratio between benefits from local expenditure (LE) and taxation in each jurisdiction.

The experiment was conducted at the *ESSE* laboratory of experimental economics at the University of Bari and programmed in *z-Tree* (Fischbacher, 2007).

An overall number of 40 students attended two separate sessions composed by 20 subjects each.

Participants were presented with the same 20 pairwise choices corresponding to the 20 scenarios reported in Table 4 in Appendix. The time taken to complete the experiment varied between sessions, treatments, and also across subjects, since participants were explicitly encouraged to proceed at their own pace.

On average, the experiment lasted 15 minutes. The incentive mechanism was that the chosen scenario would be played for real. Specifically, in each section subjects are characterized by an individual tax base and, at the end of each session, for each subject, one question was randomly selected and played out for real. Subjects' pay-off (benefit) was calculated applying equation (1) to the subjects' individual tax base. In this way, participants to the experiment have incentive to detect the less rent-seeker administrator independently to the amount of benefit reported in the various scenarios.

The average payment made to the 40 subjects was 5.50 Euro. Consequently, the average payment was around 22 Euro per hour spent doing the experiments. This is well above the marginal wage rate of the subjects performing the experiment.

Table 1: Representative scenario. In each scenario jurisdictions have three inhabitants.

	Jurisdiction A	**Jurisdiction A**
Total tax base	B_A	B_B
Tax rate	t	t
Transfers from CG	T_A	-
Total benefits from LE	Π_A	Π_B

The payoff in each administration, i.e. the benefits from local expenditure, is calculated by the following function:

$$\Pi = N\,\alpha\,(tB_i - \rho_i + T_i)\,, \qquad i \in \{A, B\} \tag{1}$$

where B_i is the per capita tax base in the administration and N the number of inhabitants ($N = 3$), t is the tax rate, ρ_i is the per capita rent extracted by the administrator, T_i is the eventual vertical equalising transfer to the poorest jurisdiction, and α is the marginal per capital return (MPCR). Subjects are informed that t, α and the number of inhabitants, are constant across administrations.

3. Empirical analysis and results

Our main interest is in the frequencies of votes for administrators who extract lower rent in the different scenarios that involves jurisdictions A and B. To that end, we construct, as dependent variable, a dummy variable that assumes value 1 when the administrator who extracts higher rent is correctly identified and 0 otherwise. Descriptive statistics on the results of the experiment are presented in Table 5 in Appendix.

The regressors included in the model are: the difference in the tax bases expressed in percentage; the tax rate of the local tax, that differs in various scenarios, remaining the same for both jurisdictions in all cases; the difference

in benefits from local expenditure in percentage and the degree of equalization that can assume value 0% or 100%. That is, no equalization or full revenue equalization.

We used a random-effects binary probit estimator in order to compute the marginal effects of the regressors, comparing cases characterized by differences in the tax base to cases characterized by identical tax bases, in order to estimate how much the (conditional) probability of the outcome variable changes in the two cases, holding all other regressors constant at mean. Table 2 reports the coefficient point estimates of 5 specification of the model, the full specification corresponds to column 5 of the table. The computed standard errors are robust to all kind of intragroup correlation, relaxing the usual requirement that the observations be independent. That is to say, we assume that our observations are independent across individuals (clusters) but not necessarily within individuals.

Table 2: Coefficient point estimates. Panel probit - random effect - std. errors robust to intra-group correlation. Dependent variable: vote for the less rent-seeker administrator (binary).

VARIABLES	1	2	3	4	5
Difference in tax base (%)	-0.0179***				-0.0239***
	(0.00312)				(0.00413)
Tax rate (%) A=B		0.00188			0.0111**
		(0.00362)			(0.00452)
Difference in benefits (%)			0.000972		0.00703***
			(0.00132)		(0.00241)
Equalization degree (%)				0.00131	0.00910***
				(0.000939)	(0.00188)
Constant	0.284*	-0.454***	-0.451***	-0.470***	-0.336
	(0.159)	(0.111)	(0.0836)	(0.0735)	(0.282)
Observations	800	800	800	800	800
Number of Subject	40	40	40	40	40
Log pseudolikelihood	-480.6	-510.9	-510.8	-510.0	-462.5

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

In the full specification, the estimated coefficient associated to difference in tax base and equalization are statistically different from zero, the former is negative, and the latter is positive. These gives us our two results:

R1 - fiscal disparity biases yardstick competition;

R2 - transfers from central government help subjects to correctly evaluate administrators' capacity.

Furthermore, the estimated coefficient associated to the difference in benefit an the tax rate are positive and statistically different from zero. This suggest that for higher amounts of resources managed by administrators (higher tax rate = higher revenues) there is higher probability of detection of the worst administrators since the difference in available resources are better perceived by voters. Similar intuition also hold for benefits, the higher the difference in benefit

(higher MPCR) is, the higher the perceived difference between administrators is.

We used the coefficents point estimates in Table 2, column 5, in order to estimate the probability that subjects' preference is given to the administrators that extract less rent than their counterparts. The first column of Table 3 reports the predicted probability that the less rent-seeker (best) administrator is detected in the absence of disparities in the tax base. The second column reports the predicted probability that the best administrator is detected in the presence of disparities in the tax base without revenue equalization. Finally, the third column reports the predicted probability that the best administrator is voted in the presence of disparities and full revenue equalization.

We can observe that the highest probability of voting for the best administrator is reached in the absence of fiscal disparities (55.2%), this probability falls dramatically when there are differences in tax bases among administrations (15.6%), finally equalizing grants seems to partially correct the yardstick bias (probability of 44.3%).

Table 3: Predicted probabilities.

Variables	Predicted probabilities		
	No fisc. Disp. - No eq.	Fisc. Disp. - No eq.	Fisc. Disp. - Full eq.
Constant	0.552***	0.156***	0.443***
	(0.0665)	(0.0279)	(0.0392)
Observations	800	800	800

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
NOTE: All other predictors at their mean value.

4. Final remarks

Traditionally, fiscal equalisation is considered an instrument to improve equity, efficiency and stability of public finance. In fact, the primary objective of fiscal equalisation is horizontal equity among the residents of different jurisdictions. Furthermore, fiscal equalization may also correct for inefficiencies that might arise if households or firms choose their location basing on net fiscal benefit and may help support macroeconomic stabilization and insure local jurisdictions against asymmetric shocks they may not be able to cope with if left alone (Blöchliger and Charbit, 2008).

The results of our experiment suggest that the presence of fiscal disparities decreases the probability of detection while equalizing grants seems to correct the yardstick bias, as suggested by Allers (2012). However, the correction seems to be only partial. Our results provides new insights on fiscal equalization, suggesting that it may also improve the voting decisions in subnational governments. In fact, the presence of equalizing grants may work as a signal that, combined with tax rates and subnational governments' output levels, provide a better indicator of subnational government performance.

It is important to notice that in our experiment we used vertical, discretionary non-earmarked grants. Further experiments are necessary in order to test the effectiveness of different kind of grants (such as, vertical and horizontal

equalization; discretionary and formula based grants; full and partial equalization, earmarked and non-earmarked grants) in order to test possible different effects of various form of equalization on the correction of the yardstick bias.

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Appendix

Table 4: Pairwise choice scenarios. In each scenario jurisdictions have three inhabitants.

Scenario	Jurisdiction A						Jurisdiction B					
	B	**t**	**T**	$\boldsymbol{\rho}$	$\boldsymbol{\alpha}$	$\boldsymbol{\Pi}$	**B**	**t**	**T**	$\boldsymbol{\rho}$	$\boldsymbol{\alpha}$	$\boldsymbol{\Pi}$
1	30	30%	0	*1*	*0.5*	12	30	30%	0	*2*	*0.5*	10.5
2	30	10%	0	*1*	*0.5*	3	30	10%	0	*2*	*0.5*	1.5
3	30	30%	0	*1*	*0.1*	2.4	30	30%	0	*2*	*0.1*	2.1
4	30	10%	0	*1*	*0.1*	0.6	30	10%	0	*2*	*0.1*	0.3
5	15	30%	0	*0.5*	*0.5*	6	30	30%	0	*0.5*	*0.5*	12.75
6	15	10%	0	*0.5*	*0.5*	1.5	30	10%	0	*0.5*	*0.5*	3.75
7	15	30%	0	*0.5*	*0.1*	1.2	30	30%	0	*0.5*	*0.1*	2.55
8	15	10%	0	*0.5*	*0.1*	0.3	30	10%	0	*0.5*	*0.1*	0.75
9	15	30%	4.5	*0.5*	*0.5*	12.75	30	30%	0	*0.5*	*0.5*	12.75
10	15	10%	1.5	*0.5*	*0.5*	3.75	30	10%	0	*0.5*	*0.5*	3.75
11	15	30%	4.5	*0.5*	*0.1*	2.55	30	30%	0	*0.5*	*0.1*	2.55
12	15	10%	1.5	*0.5*	*0.1*	0.75	30	10%	0	*0.5*	*0.1*	0.75
13	15	30%	0	*0.5*	*0.5*	6	30	30%	0	*1*	*0.5*	12
14	15	10%	0	*0.5*	*0.5*	1.5	30	10%	0	*1*	*0.5*	3
15	15	30%	0	*0.5*	*0.1*	1.2	30	30%	0	*1*	*0.1*	2.4
16	15	10%	0	*0.5*	*0.1*	0.3	30	10%	0	*1*	*0.1*	0.6
17	15	30%	4.5	*0.5*	*0.5*	12.75	30	30%	0	*1*	*0.5*	12
18	15	10%	1.5	*0.5*	*0.5*	3.75	30	10%	0	*1*	*0.5*	3
19	15	30%	4.5	*0.5*	*0.1*	2.55	30	30%	0	*1*	*0.1*	2.4
20	15	10%	1.5	*0.5*	*0.1*	0.75	30	10%	0	*1*	*0.1*	0.6

$\mathbf{B}$ = total tax base, $\mathbf{t}$ = tax rate, $\mathbf{T}$ = transfers from CG,
$\boldsymbol{\rho}$ = administrator's rent (implicit), $\boldsymbol{\alpha}$ = MPCR (implicit), $\boldsymbol{\Pi}$ = total benefits from LE.

Table 5: Regression sample: descriptive statistics.

Variable	N	Mean	SD	P1	Median	P99	Min	Max
Correct answer	800	0.34	0.48	0.00	0.00	1.00	0.00	1.00
Tax base A	800	18.00	6.00	15.00	15.00	30.00	15.00	30.00
Tax base B	800	30.00	0.00	30.00	30.00	30.00	30.00	30.00
Benefit A	800	3.78	4.00	0.30	2.48	12.75	0.30	12.75
Benefit B	800	4.50	4.46	0.30	2.55	12.75	0.30	12.75
Tax rate A=B	800	20.00	10.01	10.00	20.00	30.00	10.00	30.00
MPCR A=B	800	0.30	0.20	0.10	0.30	0.50	0.10	0.50
Equalising grants	800	1.20	1.75	0.00	0.00	4.50	0.00	4.50