Are we getting value for our tax money? Improving the transparency of subnational government performance

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Abstract

Citizens pay taxes in order to enjoy public services. But because they do not know the public production function, it is hard for them to assess whether they are getting value for money. Political yardstick competition, based on a comparison of public services and tax rates with those in nearby jurisdictions, can provide voters with a useful instrument to help solve this asymmetric information problem. However, is has been shown that fiscal disparities bias this yardstick. A politician in a fiscally advantaged jurisdiction can perform badly and still compare favorably, even if his neighbors perform well. An incumbent in a fiscally disadvantaged jurisdiction may be unable to avoid a bad reputation, even when performing well. This paper derives the characteristics of a fiscal equalization scheme that removes this yardstick bias. It turns out that currently used fiscal equalization systems do not remove the yardstick bias except under restrictive assumptions.

Keywords: rent-seeking, yardstick competition, fiscal disparities, equalization, transparency

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1 Introduction

With some exceptions (e.g., national security), the provision of public services is best left to subnational governments. An important reason for this is that these can tailor public services to local needs (Oates, 1999). In every jurisdiction, local citizens can then decide how much tax money they are willing to pay to receive public services. Another advantage is that subnational voters can compare their own jurisdiction's tax rates and public service levels with those of nearby jurisdictions (yardstick competition). By comparing their incumbent's performance with the performance of administrators in similar jurisdictions, voters can re-elect good politicians and send non-performers packing. This in turn gives administrators an incentive to perform better.

Decentralization of government, however, creates the problem of fiscal disparities. In order to provide a certain service level, some subnational governments must, for reasons outside their control, spend more money per inhabitant than others. The first reason for this is that the demand for certain services may differ. In some communities, e.g., the proportion of schoolchildren is higher than elsewhere. The second reason is that, because of adverse geography, geology, climate, etcetera, some services are more costly to produce in some regions than in others. Public transport, e.g., will be more costly in mountainous areas. For both these reasons, spending needs of subnational governments may differ significantly. On the other hand, the ability to raise revenues may differ as well. Some jurisdictions have an affluent population and many successful businesses. In this case, low tax rates suffice to generate substantial revenues.[1] Jurisdictions with a lower revenue capacity need higher tax rates in order to keep up.

It has been shown that fiscal disparities make it difficult to compare the performance of local governments (Allers, 2012). Politicians in disadvantaged jurisdictions seem to perform worse than they actually do, while the performance of politicians in jurisdictions with low costs or a high revenue capacity is overestimated. This makes yardstick competition biased.

[1] Revenue capacity may include other income sources besides taxation, which will be ignored in this paper.

In many countries, fiscal disparities are equalized to some extent through a system of intergovernmental grants. Traditionally, equalization is advocated on the grounds that it improves locational efficiency, as it removes an incentive to move to jurisdictions with favorable fiscal conditions (Buchanan, 1950, 1952; Buchanan and Goetz, 1972; Boadway and Flatters, 1982); on equity grounds (Le Grand, 1975; Bramley, 1990; Cappelen and Tungodden, 2007); or as an insurance against regional shocks (Bucovetsky, 1998; Von Hagen, 2006; Konrad and Seitz, 2003).[2] Allers (2012) argues that a case can be made for equalization in order to improve the decision-making process of subnational governments. If fiscal disparities are equalized to the extent that every jurisdiction is able to provide the same service level at the same tax sacrifice, subnational government output levels, combined with tax rates, provide an unbiased indicator of subnational government performance. Note that fiscal equalization does not mean that all subnational governments will have identical service levels. Equalization applies to the *capacity* of subnational jurisdictions to provide an attractive combination of services and taxes. It is up to local administrators to use the available means efficiently and effectively. Voters can compare performance in different jurisdictions in order to assess their elected administrators (yardstick competition). In the presence of fiscal disparities, yardstick competition is hampered by the fact that rent-taking politicians in jurisdictions with a large revenue capacity relative to spending needs are less likely to be found out, whereas administrators who do not take rent may still compare unfavorably if their jurisdiction suffers from adverse circumstances.

The impact of fiscal disparities on accountability has not yet attracted much analysis. Kotsogiannis and Schwager (2008) argue that yardstick competition is more effective if differences in revenue capacities are equalized. However, this is not because equalization helps voters to improve their estimate of incumbents' rent-taking. On the contrary, in their model, voters are not interested in rent-taking: because there are only two periods, every administrator they choose after the first period will take maximum rent in the second.

This paper studies possible remedies for the yardstick bias, in particular equalization of revenue capacity and spending need. The paper is organized as follows. In section 2, we discuss the theoretical background and related literature.

[2] For a review of the arguments for equalization, see Boadway (2004; 2006).

We proceed by deriving an equalizing grant that would entirely eliminate the yardstick bias (section 3). We demonstrate that equalization systems existing in practice do not remove the bias in the yardstick, except under restrictive assumptions (section 4). Section 5 argues that the problems attached to a transparency-improving equalization system make it difficult and costly to implement in real-world circumstances. As an alternative, we suggest that information on fiscal disparities could be made available to the public, in order to allow voters to form a true picture of their administrators' performance. Section 6 summarizes and concludes.

2 Background

The traditional arguments for equalization implicitly assume a benevolent government, which aims to maximize the electorate's welfare. The political economy literature challenges this assumption, and stresses that politicians and bureaucrats maximize their own welfare instead. Here, decentralization is often seen as a strategy to reduce the monopolistic character of government and therefore to improve accountability (e.g., Brennan and Buchanan, 1985). Accountability can be defined as the extent to which voters can hold incumbents responsible for their performance. Decentralization may introduce two forms of competition between subnational governments. The first one works through mobility: competition for mobile tax bases (fiscal competition) or to avoid high cost citizens (welfare competition). The second form involves politics: competition for comparative performance (yardstick competition).

Voters have two options when they are dissatisfied: voice or exit (Hirschman, 1970; Tiebout, 1956). The most powerful way to voice disapproval is through the vote. People can either move away, or send the incumbents packing. Competition based on the exit option may limit incumbents' freedom to collect rents (e.g., Edwards and Keen, 1996). The exit option is characterized by high transaction costs, as people have to find a new home, move house, and perhaps find a new job. Therefore, this option only becomes attractive if differences between jurisdictions' performance are substantial. With only the exit option, politicians would have

considerable leeway.[3] Vote, on the other hand, is relatively cheap. However, to be effective, this instrument requires that voters are able to identify 'good' politicians, that is, politicians who give them value for their tax money. If voters are able to identify good politicians from bad ones, they can re-elect good ones and dismiss the bad ones. Besley and Smart (2007) call this the selection effect. Moreover, politicians will have an incentive to perform well in order to be re-elected (incentive effect).

Because of asymmetric information, voters are usually unable, at reasonable cost, to determine how much service an efficient government is able to supply at a given tax rate (Bradford et al., 1969). Only the bureaucrats themselves know the governments' production function. Because promises cannot be trusted in this setting, past performance is the best indicator of future performance (Downs, 1957). Retrospective voting can remove politicians who do not perform well from power. The problem, however, is to assess performance. As Salmon (1987) points out, in a world with only one government, the only way to do this is to compare government output and tax rates over time. In a stationary world, this could be sufficient. Of course, the world is in fact far from stationary. As a result of the frequent occurrence of exogenous shocks, output is an imperfect indicator of performance. The retrospective vote is a blunt instrument.

This changes fundamentally if government is decentralized. If there are comparable jurisdictions, subject to the same exogenous shocks, voters can use tax rates and service levels in other jurisdictions to create a yardstick for assessing the performance of their administrators. Thus, decentralization may work as an incentive scheme. If incumbents try to compare favorably to administrators in other jurisdictions, they engage in policy competition. This political yardstick competition may discipline politicians. Although this has been recognized by earlier writers (e.g., Parks and Ostrom, 1981), Salmon (1987) is the first to systematically describe this mechanism. Several theoretical papers study the effectiveness of yardstick competition to improve accountability (e.g., Wrede, 2001; Bordignon et al., 2004; Belleflamme and Hindriks, 2005; Besley and Smart,

[3] Epple and Zelenitz (1981) show that, even with costless migration, exit without vote is insufficient to prevent jurisdictions from exercising monopoly power if jurisdictional boundaries are fixed. Because land is immobile, bureaucrats can share in the rents accruing to land.

2007). A steadily increasing number of empirical studies confirm the occurrence of yardstick competition (e.g., Besley and Case, 1995; Bordignon et al., 2003; Allers and Elhorst, 2005; Revelli, 2006).

This paper is concerned with an aspect of yardstick competition that has received little attention. Yardstick competition needs the existence of comparable jurisdictions. However, jurisdictions, even if they operate in the same institutional setting, have the same service responsibilities, and are susceptible to common exogenous shocks, differ with respect to fiscal capacity and spending need. In order for political yardstick competition to work optimally, differences in subnational government output and tax rates should reflect only differences in policies, not fiscal disparities. It would be sub-optimal to punish or to credit incumbents for factors outside their control (Allers, 2012).

We investigate what kind of equalization system would remove the transparency loss resulting from fiscal disparities. As it turns out, such a system does exist, but it is not normally used for equalization purposes. Therefore, we analyze the effects of two different equalization schemes which are actually used in various countries.

3 Equalization and transparency

Yardstick bias

To model the way fiscal disparities bias yardstick competition, we build on Allers (2012). There is a central government and there are two subnational jurisdictions[4]. Subnational jurisdictions provide public services and finance this through tax revenues and, in the case of fiscal equalization, equalization transfers. Public service levels are chosen at the subnational level.[5] The central government decides whether equalization is applied, and how.

Each jurisdiction must balance its budget. The jurisdiction's budget constraint is

$$E_i = \theta_i \beta_i B + G_i \tag{1}$$

where E_i is jurisdiction i's per capita expenditures; G_i its per capita equalization grant; B the average per capita tax base; β_i the relative per capita tax base, defined

[4] This is for ease of exposition only. It is straightforward to extend the analysis to a greater number of jurisdictions.

[5] In practice, the central government usually delegates some (or many) tasks to subnational governments. Here, we abstract from that.

as $\frac{B_i}{B}$, where B_i is the per capita tax base of jurisdiction i; and θ_i the tax rate, defined as the share of the tax base that the jurisdiction collects ($0 < \theta_i < 1$). Thus, $\beta_i B$ is jurisdiction i's per capita tax base, and $\theta_i \beta_i B$ is its tax revenue. The administrator in i knows β_i and B; voters do not. We assume that relative tax bases are not affected by rent levels.[6]

Box 1. Assumptions

In order to keep the analysis simple, a number of assumptions have been made. Here is a list of the most important ones.

1) Subnational government spending is financed from own tax revenues and equalization grants (no borrowing).
2) Subnational taxes are borne by the jurisdictions' own residents (no tax exporting).
3) Benefits of subnational public services are enjoyed by residents only (no spillovers).
4) Subnational governments choose local service levels (no mandated tasks).
5) Politicians strive for re-election (no term limits).
6) Subnational jurisdictions face identical exogenous shocks.
7) Administrators in jurisdiction i observe B, β_i, γ_i and ρ_i, voters do not. Everyone observes S_i, S_j, θ_i and θ_j.

Each jurisdiction is governed by an elected politician. After being elected, he or she chooses a tax rate (and thus an expenditure level, see equation 1), in a way that is exogenous to our model, and then a fraction ρ_i of public expenditures that is extracted as rent ($0 \leq \rho_i < 1$).

Administrators are assumed to strive for re-election. Thus, we abstract from term limits. This can be motivated by the fact that politicians are often organized in parties, which can compete in election after election. Moreover, politicians often try for a different office when a term limit prevents them from being re-elected. E.g., mayors may want to run for governor later in their career. Like re-election, this requires a good reputation with voters and support from their party.

As a result of common exogenous shocks ω to the economy, the service level corresponding to a certain amount of spending varies. As a result, past performance is a weak indicator of future performance, which limits the usefulness of

[6] This is probably a simplification. There is some evidence (Hilber et al., 2011, Allers and Vermeulen, 2013), that service levels and tax rates are capitalized into property values.

retrospective voting. Following the literature (e.g., Besley and Case, 1995), we assume that both jurisdictions experience identical shocks. Apart from ω, the per capita service level S_i depends on per capita spending on the public service $(1-\rho_i)E_i$, and on spending need, which may be expressed as the jurisdiction's need index γ_i:

$$S_i = \omega \frac{(1-\rho_i)E_i}{\gamma_i}. \qquad (2)$$

γ_i reflects both demographic and other factors outside the control of the subnational government that determine the amount of spending on the public service needed to supply a certain service level in jurisdiction i. Like β_i, γ_i is expressed in relative terms; $\gamma_i > 0$, with average value one. The incumbent knows γ_i; voters do not. The existing yardstick competition literature generally assumes γ_i to be the same for all jurisdictions (e.g., Besley and Case, 1995). That is clearly unrealistic.

Table 1. Explanation of symbols

β_i	Jurisdiction i's relative per capita tax base
γ_i	Jurisdiction i's need index
λ_i	Relative fiscal advantage of jurisdiction i
π_i	Relative performance yardstick used by voters to judge the incumbent of i
ρ_i	Rent as fraction of jurisdiction i's spending
θ	Nationwide standard tax rate
θ_i	Jurisdiction i's tax rate
ω	Common exogenous shock
B	Average per capita tax base
B_i	Jurisdiction i's per capita tax base
E_i	Jurisdiction i's per capita expenditures
G_i	Jurisdiction i's per capita equalization grant
S	Nationwide standard service level
S_i	Jurisdiction i's per capita service level
t	Equalization rate

Voters do not observe ρ_i. Instead, they observe service levels and tax rates. Voters value high service levels and low tax rates. They maximize value for money: the ratio of services provided to tax sacrifice $\frac{S_i}{\theta_i}$. Regularly, voters choose a politician to govern their jurisdiction. They either re-elect the incumbent, or elect a challenger. Voters use a relative performance yardstick π_i to judge the incumbent. If $\pi_i > 1$, jurisdiction i's incumbent's performance is considered superior to that of his or her counterpart in the other jurisdiction. If $\pi_i < 1$, i's incumbent is considered

inferior. Voters base their judgment on an incumbents performance in the entire period since the previous elections.[7]

Given voters' preferences, the benchmark for jurisdiction *i*'s incumbent's relative performance π_i is $\frac{S_i}{\theta_i}$, value for money, relative to the corresponding ratio in the other jurisdiction:

$$\pi_i = \frac{\frac{S_i}{\theta_i}}{\frac{S_j}{\theta_j}} \tag{3}$$

where $i \neq j$. Substituting (2) in (3), the performance benchmark becomes

$$\pi_i = \frac{(1-\rho_i)\frac{E_i}{\gamma_i \theta_i}}{(1-\rho_j)\frac{E_j}{\gamma_j \theta_j}}. \tag{4}$$

Note that ω is cancelled out of the equation. That is because we have made the assumption that jurisdictions *i* and *j* experience identical shocks.

It is convenient to define $\lambda_i = \frac{\frac{\beta_i}{\gamma_i}}{\frac{\beta_j}{\gamma_j}}$. This is the relative fiscal advantage of jurisdiction *i*, compared with that of jurisdiction *j*. Substituting (1) in (4), setting G_i to zero as there is as yet no equalization, yields

$$\pi_i = \frac{(1-\rho_i)}{(1-\rho_j)}\lambda_i. \tag{5}$$

Equation 5 demonstrates that the relative fiscal advantage of a jurisdiction, λ_i, affects the voters' judgment of his or her performance.

Now consider the case without fiscal disparities: λ_i =1. The performance yardstick (5) reduces to

[7] If voters only take the situation into account as it is during election time, a political business cycle may result.

$$\pi_i^* = \frac{(1-\rho_i)}{(1-\rho_j)}, \tag{6}$$

where π^*_i is the yardstick without fiscal disparities. Voters approve of incumbent *i* if $\pi_i^* > 1$. It follows from (6) that this requires $\rho_i < \rho_j$. Thus, the yardstick π_i^* gives a true picture of the incumbent's relative performance. Politicians can improve their chances to be re-elected by taking less rent.

Equalization to remove the yardstick bias

In order to remove the bias in the comparative performance yardstick, we need an equalization grant that ensures that the yardstick used by voters (Equation 4) equals the optimal yardstick (Equation 6). This requires

$$\frac{E_i}{\gamma_i \theta_i} = \frac{E_j}{\gamma_j \theta_j}. \tag{7}$$

The equalization grant is by definition equal to expenditures minus tax revenue (see Equation 1). Combining this with the expenditure level derived from (7) yields $G_i = \frac{\gamma_i \theta_i}{\gamma_j \theta_j} E_j - \theta_i \beta_i B$. However, in such an equalization system, a grant would depend on tax and spending levels chosen in the other jurisdiction. This may be avoided by setting both elements of Equation 7 equal to a common value:

$$\frac{E_i}{\gamma_i \theta_i} = \frac{E_j}{\gamma_j \theta_j} = C. \tag{8}$$

Here, *C* can have any positive value, provided it is the same for all jurisdictions. Condition (8) ensures the yardstick bias is zero. Combining (8) and the budget constraint (1), the optimal equalization grant becomes

$$G_i^* = \theta_i(\gamma_i C - \beta_i B) \tag{9}$$

It is easy to demonstrate how grants according to (9) affect the relative performance yardstick. The budget constraint (1) can now be written as

$$E_i = \theta_i \beta_i B + \theta_i(\gamma_i C - \beta_i B). \tag{10}$$

Substituting (10) in (4) yields

$$\pi_i = \frac{(1-\rho_i)C}{(1-\rho_j)C} = \pi_i^*. \tag{11}$$

Thus, equalization according to (9) completely removes the yardstick bias caused by fiscal disparities.

A special case of the grant in (9), which has been used in practice (Ladd and Yinger, 1994), is derived by setting $C = B$:

$$G_i^{PEG} = t\theta_i B(\gamma_i - \beta_i) = t\frac{E_i}{\gamma_i}(\gamma_i - \beta_i). \qquad (12)$$

where t ($0 \leq t \leq 1$) is the program's equalization rate: the extent to which fiscal disparities are equalized. Complete equalization is characterized by t=1, but, in practice, t might be lower.

The grant in (12) is called a power equalization grant. Essentially, these are matching grants, where the match rate depends on the jurisdiction's relative needs and on its relative tax capacity. If the need index matches the tax base index ($\gamma_i = \beta_i$), the grant is zero. For jurisdictions with high needs relative to tax capacity ($\gamma_i > \beta_i$), the grant is positive, and higher expenditures translate into higher grants in order to offset the negative effect of high needs relative to tax base. For jurisdictions where $\gamma_i < \beta_i$, the grant is negative, and more spending leads to bigger negative grants.[8] Thus, recipients can influence their power equalization grant by changing spending behavior. In practice, power equalization grants are not used to equalize fiscal disparities, although they are used sometimes to finance specific services.[9]

4 Existing equalization systems

We now analyze the effect on the relative performance yardstick of two equalization approaches which underpin many existing equalization systems.[10] We will see that these generally do not remove the yardstick bias caused by fiscal disparities.

[8] This is the case where grants are transfers between subnational governments: $G_i = -G_j$ (horizontal equalization). Grants may instead be financed through tax revenues collected by the central government. In that case, for jurisdictions where $\gamma_i < \beta_i$, the grant is lower than for jurisdictions where $\gamma_i > \beta_i$.

[9] Ladd and Yinger (1994) report the use by several American states to help finance local education.

[10] Other equalization schemes are conceivable. See Musgrave (1961) for a useful taxonomy.

Need-capacity equalization

A relatively ambitious equalization system aims at closing or narrowing the gap between spending need and revenue capacity, both defined in absolute per capita terms (Bradbury et al., 1984). This objective is at the root of the equalization schemes in, e.g., the UK, the Netherlands, and Australia. These countries have made considerable efforts to estimate both revenue capacities and spending needs of subnational governments. Possibly the most ambitious program exists in the Netherlands (Huigsloot, 2007), where equalization grants to municipalities are allocated using no less than sixty different local characteristics. Moreover, the equalization system is assessed annually, and changes are made regularly.[11]

Although fiscal disparities are estimated and used to base the equalization grant on, they are not common knowledge. The allocation system of the equalization grant is complicated, and grants received by local governments include non-equalizing parts. It would take a considerable effort to derive the relative fiscal position of a particular jurisdiction. Therefore, we maintain our assumption that voters do not know β_i or γ_i, even in the case of equalization.[12]

Here, spending need is the spending necessary for a jurisdiction to provide standard-quality services S, and equals $S\gamma_i$, where γ_i is the jurisdiction's need index, as before. S can be defined as the average per capita service level. Revenue capacity is now defined as the tax revenue given a standard or average tax rate, θ, and equals $\theta\beta_i B$. A jurisdiction's need-capacity grant G_i^{NCG} is then given as (a fraction of) the difference between spending need and revenue capacity:[13]

$$G_i^{NCG} = t(S\gamma_i - \theta\beta_i B)\,. \tag{13}$$

[11] In Belgium, Switzerland and elsewhere, much simpler versions are used, based on a few demographic or geographic characteristics which are not derived from an extensive study of spending needs.

[12] Even if voters would know β_i or γ_i, this would not be enough to remove the yardstick bias, for they now would have to take the equalization grant into account as well. The difference between the actual equalization grant and the ideal one from a transparency point of view is what determines the yardstick bias now. We can safely assume that voters would generally not know this. Empirical evidence supports this. Recall from section 3 that Allers and Elhorst (2005) found that voters in the Netherlands seem to use raw tax and expenditure levels to compare local government performance, without taking fiscal disparities into account.

[13] In the literature, such grants are also known as foundation grants.

Jurisdictions with favorable fiscal conditions (revenue capacity exceeding spending need) would "receive" a negative grant, less favored jurisdictions a positive grant.[14]

Note that a jurisdiction's need-capacity grant depends neither on its expenditure level nor on its tax rate, but only on γ_i, β_i and on national standards.[15] With full equalization (t=1), jurisdictions wishing to supply a standard service level can do so by levying the standard tax rate.[16] However, they are free to choose a different service level, and higher or lower taxes to match. Thus, subnational government autonomy is preserved. Stated differently, service *capacities*, not service *levels*, are equalized. Note, however, that if jurisdictions choose to differ from the standard tax rate, fiscal disparities will not be completely equalized, because the service level increase that can be financed by raising the tax rate depends on β_i/γ_i. Need-capacity equalization ensures every jurisdiction can have standard service levels at the standard tax rate. This is an important difference with power equalization, which ensures equal service levels at equal tax rates (see Cappelen and Tungodden (2007) for a comparison of both grants).

From (1) and (13) we obtain the budget restriction with NCG-grants

$$E_i = tS\gamma_i + \beta_i B(\theta_i - t\theta) \tag{14}$$

To derive π_i, we substitute (14) in (4). After rearranging, this yields

$$\pi_i = \frac{(1-\rho_i)\left[\frac{tS}{\theta_i B} + \frac{\beta_i}{\gamma_i}\frac{\theta_i - t\theta}{\theta_i}\right]}{(1-\rho_j)\left[\frac{tS}{\theta_j B} + \frac{\beta_j}{\gamma_j}\frac{\theta_j - t\theta}{\theta_j}\right]}. \tag{15}$$

Now, the yardstick bias, the quotient of the bracketed terms in (15), may or may not decrease with increasing t, depending on S, B, θ_i and θ_j. Consider the case where t=1. If tax rates are similar, both $\frac{\theta_i - \theta}{\theta_i}$ and $\frac{\theta_j - \theta}{\theta_j}$ will be small, neutralizing the bias caused by $\frac{\beta_i}{\gamma_i}$ and $\frac{\beta_j}{\gamma_j}$. In addition, $\frac{S}{\theta_i B}$ in the numerator will tend to cancel

[14] Negative grants would only occur in the case where grants are transfers between subnational governments (horizontal equalization). Negative grants may be avoided by financing grants through tax revenues collected by the central government.
[15] If national standards are based on averages, an individual jurisdiction does exert some influence on them, depending on its share. With few jurisdictions, this share is large.
[16] This is similar to Boadway's (2004) unitary state benchmark.

out $\frac{S}{\theta_j B}$ in the denominator. Indeed, if $\theta_i = \theta_j = \theta$ and t=1, then π_i in Equation (15) is reduced to the optimal yardstick π^*_i in (6).

Thus, need-capacity equalization might improve transparency, but whether it actually does so is far from certain. That depends on (relative) tax rates, and thus on incumbents' choices.[17]

Revenue capacity equalization

A less ambitious equalization scheme aims only at equal revenue capacities, ignoring differences in spending need. This is used in, e.g., Canada. Reasons for not equalizing spending need may be that spending need is hard to estimate correctly, or the wish to avoid perverse incentives of equalization. A common approach to measuring revenue capacity is the representative tax system (RTS) developed by the Advisory Commission on Intergovernmental Relations (ACIR, 1962). Under this approach, full equalization implies that jurisdictions levying the average tax rate have average per capita spending power E:

$$E = \theta B \,. \tag{16}$$

Jurisdictions spending E face the budged restraint

$$E = G_i^{RTS} + \theta \beta_i B \,. \tag{17}$$

Combining (16) and (17), and introducing t as before, yields the equalization grant under RTS:

$$G_i^{RTS} = t\theta B(1-\beta_i) \,. \tag{18}$$

This is similar to the equalization program analyzed by Kotsogiannis and Schwager (2008). There are two differences compared with the power equalization grant in (12). In de first place, G_i^{RTS} depends on θ not θ_i. Like the NCG-grant, the RTS grant cannot be influenced by individual jurisdictions, except in an indirect way by influencing national averages (θ and B). The second difference is that spending need differences are ignored in (18): the need index γ_i does not enter into the equation.

[17] In our model, tax rates are exogenously determined. For future research, it could be interesting to make tax rates endogenous. Eq. (15) shows that the choice of the tax rate would then interact with the choice of the rent level.

Combining (1) and (18) yields the budget restriction with RTS-grants

$$E_i = t\theta B + \beta_i B(\theta_i - t\theta). \tag{19}$$

Substituting (19) in (4) yields the comparative performance yardstick:

$$\pi_i = \frac{(1-\rho_i)\left[\frac{t\theta}{\theta_i\gamma_i} + \frac{\beta_i}{\gamma_i}\frac{(\theta_i - t\theta)}{\theta_i}\right]}{(1-\rho_j)\left[\frac{t\theta}{\theta_j\gamma_j} + \frac{\beta_j}{\gamma_j}\frac{(\theta_j - t\theta)}{\theta_j}\right]}. \tag{20}$$

Comparing (20) with the performance yardstick under need-capacity equalization (Eq. 15), we see that only the first terms between square brackets differ. Consider the case with t=1 (full equalization). Like (15), (20) deviates from the optimal yardstick in (6). The bias in yardstick (20) will be zero only if the terms between square brackets cancel out. This is the case if $\theta_i = \theta_j = \theta$ and $\gamma_i = \gamma_j$. As we have seen, under need-capacity equalization, for the yardstick bias to be zero it suffices to have $\theta_i = \theta_j = \theta$.

The condition $\theta_i = \theta_j = \theta$ and $\gamma_i = \gamma_j$ is unlikely to be met in practice. Like need-capacity equalization, equalization of revenue capacity using the RTS-approach results in a biased yardstick. Whether this bias is smaller than the bias without equalization (Equation 5) depends on (relative) tax rates.

5 Discussion

We have shown that the yardstick bias created by fiscal disparities may, in theory, be removed entirely through equalization. However, equalization may not be the ideal instrument.

In the first place, in the equalization system needed to remove the yardstick bias completely, grants depend, apart from tax capacity and spending need, on recipients' spending. This is often not considered desirable. Equalization systems where grants are independent from local spending are available, e.g., the need-capacity system and the RTS system analyzed above. However, these do not remove the yardstick bias, except in special cases.

Secondly, equalization may create inefficiencies. Equalization of spending need may lead to an inefficiently large population in high-cost area's (e.g., Oakland,

1994). Grants must be financed through national taxation, which is usually distortive, or they may be transfers between subnational governments, in which case they distort tax prices of local public services (Dafflon, 2007). Equalizing tax capacity, on the other hand, may eliminate or greatly reduce jurisdiction's incentives to attract or preserve their tax base (e.g., Büttner, 2006).

Finally, even if an appropriate equalization system without harmful side effects could be found, politicians would not necessarily implement it. Several studies document political influence on existing intergovernmental transfers (Khemani, 2007; Allers and Ishemoi, 2011).

In order to circumvent the disadvantages of equalization, yardstick bias may perhaps be reduced by improving information availability instead. Our analysis shows that, to this end, voters need to know λ_i. If voters augment their relative performance indicator (5) by dividing it by λ_i, they obtain the unbiased yardstick (6). The value of γ_i and β_i must be estimated for each jurisdiction in order to establish an equalization system aimed at reducing disparities in spending need and revenue capacity. However, instead of using them to create an equalization system, they may be used to calculate λ_i for each jurisdiction. In order to avoid political influences, this should be done by independent authorities, or civic organizations which use independent research institutes or universities to do the actual number-crunching.

Whether voters would actually understand, trust and be able to use this kind of information effectively is an open question. In practice, voters may well continue to base their vote on their own perception of service levels and tax rates. The available empirical evidence seems to be limited to Revelli (2006), who finds that the introduction, in the UK, of a national performance indicator of locally provided social services, considerably reduced the degree to which local jurisdictions mimic the social care policies of their neighbors. This suggests that local administrators assume voters will no longer look at neighbors to assess local government performance, but instead use the newly introduced performance indicator.

Both solutions – equalization and making fiscal disparities or relative performance known – suffer from the practical problem that fiscal disparities are hard to measure accurately. Especially spending need is hard to quantify satisfactorily (e.g., Duncan and Smith, 1996).

6 Conclusions

Citizens pay taxes in order to enjoy public services. But because they do not know the public production function, it is hard for them to assess whether they are getting value for money. Increasingly, political yardstick competition is seen as an instrument helping voters get a grip on elected administrators at relatively low cost. By comparing their incumbent's performance with the performance of administrators in similar jurisdictions, voters can derive information helping them to re-elect good politicians and send non-performers packing. This in turn gives administrators an incentive to perform better. The key to yardstick competition is transparency. If administrators' performance cannot be derived from subnational government output and tax rates in a straightforward manner, yardstick competition is likely to be biased.

This is the case when fiscal disparities exist. Then, politicians in jurisdictions with a large revenue capacity relative to spending needs can take more rent than their counterparts in less favored fiscal circumstances, and still keep a good reputation. Administrators of jurisdictions suffering from adverse fiscal circumstances may acquire a bad reputation even if they do not take any rent at all.

We show how fiscal disparities bias the relative performance yardstick available to voters, and how this bias may be reduced or removed through fiscal equalization. We also show, however, that equalization schemes existing in practice are less successful in improving transparency.

Although it is possible, in theory, to remove the yardstick bias entirely through equalization, the problems attached to this remedy make it uncertain that this will ever be accomplished satisfactorily. Moreover, even if this would be feasible, the costs arising from perverse incentives may well exceed the benefits. Such costs have not stopped countries from introducing equalization systems aimed at equity or efficiency, however. When an equalization system is set up or when an existing one is evaluated, the effects on transparency should at least be taken into consideration.

If fiscal disparities can be identified, it may not be necessary to use them to set up an equalization system. They may instead be used to provide voters with a ready-made relative performance measure. In this case, the remaining challenge would be

how to disseminate this information in a way that would lead to actual and effective use by voters.

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