



The political economy of fixed regional public expenditure shares with an illustration for Belgian railway investments[☆]



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ABSTRACT

Many local public goods are allocated by federal governments using fixed regional shares: every region is entitled a fixed share of the total budget for a particular type of public good. This paper explores two characteristics of this type of allocation. First, it shows that this type of allocation is relatively efficient as it puts a strict budget constraint on the decisive region. Second, we show that these fixed shares can be an equilibrium of different legislative bargaining processes. The working of the fixed sharing rules is illustrated for the allocation of railway investments in Belgium.

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1. Introduction

In this paper we analyze the allocation of public expenditures over regions in a federal state. In particular, we are interested in the role of the fixed sharing rule. By fixed sharing rule we mean that each region in a federation gets a fixed share of the total budget for a particular regional public good. A regional public good is a good that mainly benefits the region where it is supplied and the quantity supplied can differ among regions. The fixed sharing rule seems to be present in many federations. It is often based on a combination of population, GDP etc. Sometimes it is explicitly stated in a ruling or law, sometimes it is more like a tacit agreement. In the EU, the rule is often used to allocate investment money over member countries. It has been used explicitly in the UK to allocate public funds to the different regions – this was the so called Barnett formula introduced in 1978 (Bristow, 2001). It also appears in the international river agreements where the most common sharing rule is a “percentage” rule which assigns fixed shares of water flow to the participating countries (Beach et al., 2000). It is used in Belgium to allocate federal investment funds to railway projects. It

was the latter example that draw our attention and this example will be used to illustrate our theory. But there are many more examples where the allocation of public expenditures is approved after having made reference to one or another rule that is not based on an explicit benefit–cost analysis of the public expenditure.

Economists often consider such an allocation a very inefficient and senseless allocation as there is no explicit optimization of resources over regions. These considerations lead us to the three questions we address in this paper. First, we analyze under what conditions the fixed sharing rule allocation does not depart too far from the first-best, and how it differs from the uncoordinated common-pool allocation. Second, we discuss what mechanism determines the precise fixed sharing rules that are used in a federation. Third, we assess the working of fixed regional shares numerically for one case study: regional rail investments in Belgium.

To provide an answer to the first question, in Sections (3) and (4) we present a political economy model with the regions as the main players, and consider the investments or expenditures as local public goods. We define three different allocation mechanisms for regional investments. The first-best will serve as a benchmark. The second allocation mechanism is the common-pool allocation, where every region can decide on its own investment level and where all investments have to be financed by federal tax revenues. The third alternative is the allocation of the total investment budget over the regions according to a fixed sharing rule. We show that, in general, the fixed sharing rule performs better than the common pool allocation, and we provide conditions

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under which the fixed sharing rule approximates the first best allocation. The main benefit of the fixed sharing rule equilibrium is that it imposes a strong budget constraint on the region that is decisive at the federal level: it can spend more in its own region but the fixed sharing rule implies it will have to spend (and pay) more in the other regions.

In Section 5, we use two variants of a legislative bargaining model to study the determination of the fixed regional shares. In the first variant the share of each region is determined in a constitutional type of agreement approved unanimously or by a qualified majority. One of the main implications of this bargaining model is that, the stronger the region in terms of proposal power, the bigger is its share in the federal budget. In the second variant we show that the fixed shares can be an equilibrium in trigger strategies. This can be more considered as an implicit rule. We introduce the possibility to deter cheating on agreed shares, and show that under rather general conditions, reasonable fixed shares can be supported as an equilibrium. Both variants of the bargaining model give rise to the regional shares proportional to the bargaining power of the regions. Bargaining power of the regions is reflected by the probabilities of being selected as an agenda setter, and those are often proportional to the population size.

In Section 6, we illustrate the results and the welfare effects of the alternative regional allocations for rail investments in Belgium. Currently rail investment expenditures in Belgium are decided and paid by the federal government in agreement with the regions. It seems that no political agreement is possible if the rail investment expenditures do not follow a historical sharing rule of 60% for Flanders and 40% for the Walloon region. One of our main findings for this example is that, as such, the fixed 60/40 sharing rule for federal funds in Belgium does not necessarily generate large efficiency losses.

2. Related literature

One of the main concerns of public and political economists is the inefficiency of local public goods provision by a central legislature. Starting with Tullock (1959) and Weingast et al. (1981), economists have modelled fiscal policy in democratic regimes as a common pool problem and addressed the question of fiscal inefficiency in the form of excessive spending. The reason for this inefficiency is that the benefits are concentrated in specific jurisdictions while the costs are spread across all the jurisdictions.

More recent theoretical studies readdress this problem. For instance, Besley and Coate (2003) incorporate cross-regional spillovers in the model to study which level of government, central or local, should decide on the provision of the local public good.

The empirical issue of the common pool problem also has been tackled in a variety of studies. Among others, Knight (2004) proves existence of the common pool incentives by analyzing 1988 Congressional votes over transportation project funding. It is shown that the probability to gain support for a project by a legislator is increasing in the local spending and decreasing in contributions to the federal tax revenues. This result implies aggregate overspending, especially in politically powerful localities, as well as large deadweight losses.

As an alternative to a common pool allocation, federal governments can entitle each region to a fixed share of the total budget. Sometimes these fixed shares come from a proportional scheme: the public good is allocated in proportion to a single numerical criterion, such as population.

In order to explain the determinants of regional shares as an outcome of a political process, we employ the theoretical legislative bargaining model of Baron and Ferejohn (1989) with a modification: the probabilities of becoming an agenda-setter (or recognition probabilities) vary across the legislators. The most closely related paper in this sense is that of Knight (2005). However, in his work there are only two types of legislators with respect to the recognition probability: members vs. non-members of a transportation committee. Another difference with his paper is that we consider not only a standard infinite

version of Baron–Ferejohn model but also an alternative variant, in which we introduce the possibility of punishment to deter deviations from the specified sharing rule.

It is worth to mention studies that, using an axiomatic perspective, provide conclusions similar to ours. Thus, Young et al. (1982) compare behavior of different allocation methods¹ in practice on the basis of principles, which include simplicity and reasonable information requirements, in addition to certain “fairness” principles. One of the conclusions is that the simple scheme based on allocating costs in proportion to population may be preferable to more equitable approaches that are rather complicated and require detailed information, which is not always available.

To the best of our knowledge none of the studies addresses either the question of efficiency of fixed sharing rule or has considered such a rule as an alternative to the inefficient common pool allocation.

3. The model and assumptions

In this section we describe the setup and the main ingredients of the model. Following Persson (1998) we consider a federal state with $n \geq 2$ regions. Each region has a homogeneous population. The federal government uses federal tax revenue to provide a local public good in those regions.

The federal government uses a labor tax t to finance the provision of the public good g_i in region $i = 1..n$. We denote by L_i the total labor supply in region i and assume that it is fixed. The total pool of tax revenues is then equal to $t \sum_{i=1}^n L_i$. Since labor supply is fixed, the labor tax does not cause any distortions in the labor market. We assume that the cost c_i of providing one unit of the public good differs among the regions because of geographical characteristics, for instance.

The federal government budget constraint is:

$$t \sum_{i=1}^n L_i = \sum_{i=1}^n c_i g_i, \tag{1}$$

from which we can easily express t as:

$$t = \frac{\sum_{i=1}^n c_i g_i}{\sum_{i=1}^n L_i}. \tag{2}$$

The preferences for each region i with respect to the local public good g_i and private consumption q_i are represented by a quasi linear utility function:

$$u_i = q_i + H_i(g_i), \quad i = 1..n.$$

In line with the standard assumptions the function $H_i(g_i)$ is an increasing and concave benefit function that corresponds to the utility derived by region i from expenditure g_i on the public good:

$$H_i(0) = 0, \quad H'_i(g_i) > 0 \quad \text{and} \quad H''_i(g_i) < 0, \quad i = 1..n.$$

We use Persson's approach as a starting point but assume specific benefit functions H_i for each region, because it is possible that the local public good is used more intensively in some regions.

4. Comparing different allocation rules

In this section we consider the properties of three alternative allocations. First, we consider the first-best situation where the federal government allocates the public good expenditures to the regions in order to

¹ The general cost/surplus sharing problem has been extensively studied from an axiomatic perspective. A comprehensive survey of this strand of the literature is provided in Young (1994) and Moulin (2002) among others.

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