Fiscal Federalism : (a) The Tiebout Model

Why are some types of public expenditure (for example, national defense, anti–trust policy, public pensions, employment insurance) undertaken at the federal level, while others (such as major highways, universities, hospitals) are run at the provincial level, or (police protection, garbage collection, public transit) at the local level?

To begin to answer that question, what are the advantages of having public expenditure undertaken by the lowest level of government, local government? One explanation, put forward by an economist named Charles Tiebout, in a 1956 article, is that local provision may be a way to reduce the free rider problem, by inducing people to reveal their preferences for public expenditure.

In the Tiebout model, people reveal the strength of their taste for some publicly provided goods through their choice of jurisdiction in which to live. That is, people with a strong taste for good primary education will choose to live in a city which spends a lot on primary education. This mechanism is sometimes described as **voting with your feet**.

The key features of Tiebout's model are the assumptions that people do differ in their tastes for publicly provided goods, and that they are **mobile**. The advantages of having low–level jurisdictions (local governments) provide the public goods is that there are many more towns and cities than there are provinces or countries, and that it is much less costly to move among towns and cities than it is to move among provinces or countries. At the time he wrote this article, Tiebout lived and worked in the Chicago area. Like many other large American cities, the Chicago area contains a large number of jurisdictions. In addition to the city of Chicago, there are more than 50 different suburbs, each with their own local government. That is a much larger number of different jurisdictions than exists in the GTA.

Recall the free rider problem, from the beginning of the course : it is inefficient to exclude people from consuming a pure public good, and if people are not excluded, then it is difficult to learn people's demand curves for the public good. This is information which is necessary in order to calculate which allocation is consistent with the Samuelson condition for efficiency.

What are being provided in Tiebout's model are **not** pure public goods, as defined early in the term (as being both non–rival and non–excludable). The "publicly provided goods" which Tiebout analyzed are somewhat different. He referred to them as **local public goods**. A "local public good" is different from a pure public good (or a pure private good).

Tiebout's local public goods are non–excludable, but only for **residents of the jurisdiction**. That is, if some town is providing some local public good, all the residents of that town get to consume the full benefits : they cannot be excluded. But residents of other towns are completely excluded from any benefits of the first town's local public sector. So local public goods are (completely) non–excludable within the jurisdiction, and (completely) excludable outside the jurisdiction.

A pure public good was also defined as being non–rivalrous. The total cost of providing a given quality of a pure public good does not increase with the number of people consuming it. In

contrast, Tiebout assumed that the total cost of a local public good is proportional to the number of people consuming it. Double the population served (holding constant the underlying quality of the public output being provided) and the total cost of the local public good doubles. Expressed otherwise, the cost **per person** of a local public good is **constant**, as a function of the number of people consuming the local public good.[1]

This assumption about the cost of the local public good seems a reasonable one in describing most of the goods provided by local governments. Primary education, police protection, snow removal, and garbage collection do not appear to be anything like non–rivalrous. The more people there are in the jurisdiction, the higher the costs of a given quality of primary education, police protection, snow removal, or garbage collection will be. And a lot of empirical work indicates that these costs are roughly proportional to the population being served : there are no significant economies or diseconomies of scale in population associated with these publicly provided services. That is, small jurisdictions seem to have neither a cost advantage, nor a cost disadvantage in providing these services, compared with larger jurisdictions.

So central to Tiebout's model is this definition, that the local governments are providing local public goods (not pure public goods, and not pure private goods).

Tiebout's model also rests on several other assumptions, some reasonably realistic, others less so. He assumed that people's incomes were given, and did not vary with the jurisdiction in which they chose to live. This is consistent with a large metropolitan area, in which people commute to work. In this case, people could move from one suburb to another, without having to change their job. He assumed that there were no costs to moving. Of course that is not literally true, but the costs of moving within a metropolitan area are relatively small. He assumed that people were well–informed about the local public sector in each jurisdiction, and so could make a location choice based on the local public goods provided in different jurisdictions (and on the costs of those local public goods).

He also assumed that there was a large number of jurisdictions in the metropolitan area. As mentioned above, this certainly is consistent with the organization of many large American urban areas.

As far as the local governments were concerned, Tiebout assumed that the local politicians (or local government employees, or local land owners) wanted to attract new residents. That is, the local public sector is chosen, in his model, to try and induce people to choose to move to the jurisdiction.

Finally, how is the local public sector financed? In Tiebout's model, the cost of the local public sector, in each jurisdiction, is **divided equally** among all residents of the jurisdiction. This of course is not exactly how our local public sector is financed in Canada (or in the United States), and this assumption is crucial for the result that Tiebout obtained.

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[1] Actually, in his article, Tiebout allowed for a slightly more general technology, in which the cost per person of the local public good was U–shaped as a function of the population served.

What was Tiebout's result? Under the assumptions he made, the outcome under public provision will be efficient. Even though no individual can be excluded from the benefits of her own jurisdiction's public sector, and even though no person is asked to announce her preferences, the outcome is still Pareto optimal. The reason? People reveal their preferences indirectly, through the location choices they make. People with a strong taste for some local public good will choose to locate in a jurisdiction which spends a lot (per capita) on that good. They get to consume a high level of that public good, but they have to pay high taxes, to pay for the cost.

Formally, let z denote the level of quality of some local public good. Let c denote the cost per person of providing that local public good. So, under the assumption that there are no economies or diseconomies of scale in population in provision of the local public good, if a jurisdiction has a population P, then the total cost of its public sector is czP, if it provides a quality level z to each resident. (So here, the quality level z is the frequency of garbage collection or snow removal, or the teacher–to–student ratio on the public schools. A higher z is better, but costs more.) The cost per person is cz, regardless of the population.

So if a person moved to a jurisdiction providing a level z of the local public good, she would pay cz in taxes. (Recall that the cost of the local public sector is assumed here to be divided equally among all residents of the jurisdiction.) Let x denote the person's expenditure on private goods : her after–tax income. If y were the person's total income, then moving to this jurisdiction would give her a level z of local public good consumpion, and a level $x = y - cz$ of after–tax income to spend on private goods. If, instead, she moved to another jurisdiction with a higher level z' of local public good provision, then her local public good provision would be higher, but her after–tax income would fall to $y - cz'$.

[Why do taxes here equal the cost of the local public sector? One of Tiebout's assumptions was that whoever ran the local public sector wanted to attract new residents. If some jurisdiction's public sector was inefficient, or corrupt, so that taxes per person exceeded the cost cz of the local public sector, then some other jurisdiction could "undercut" the first. That is, if taxes exceeded cz in jurisdiction #1, jurisdiction #2 could provide the exact same quality z of the local public sector, but at a lower cost to residents. That would mean that jurisdiction #2 attracted all the residents from jurisdiction #1. So no jurisdiction can survive in this environment, if taxes exceed the cost of the public sector. Just as competition among firms drives profit to zero under perfect competition in the private sector, here competition among jurisdictions eliminates "slack" in the local budget.]

What are the options for a prospective resident? She can choose among a variety of jurisdictions, each distinguished by its public sector. The higher the quality of the local public sector, the more she must pay, and the lower her private consumption. Figure 1 illustrates her options. In that figure, consumption of the local public good z is graphed along the horizontal axis, and after–tax income $x = y - cz$ is graphed along the vertical. Her consumption combinations in the different jurisdictions all lie along a line, with slope $-c$. A jurisdiction which offers a level of local public good provision which is higher by Δz than some other jurisdiction, must charge taxes which

are higher by $c\Delta z$, so that private consumption is lower by $c\Delta z$.

In the figure, the person can choose from many different jurisdictions. All she cares about, in choosing among the different jurisdictions, are the local public goods provided, and the taxes she must pay. So she faces a problem almost exactly to the problem she faces in making private consumption decisions : her alternative (z, x) combinations are lined up along a "budget line" with slope c. It is as if she can "buy" the local public good in some market, at price c. In the figure, the consumption combinations A, B, C and D from living in 4 different jurisdictions are shown. She will choose the combination which gets her to the highest indifference curve on this "budget line" : the point in figure 1 where her indifference curve (between the local public good and private expenditure) is tangent to the line with slope $-c$. In this figure, she chooses to locate in jurisdiction B, since that jurisdiction offers the combination of local public goods and private consumption which she most prefers.

Figure 2 adds a second person, who also lives in this same metropolitan area. Both people face the same alternatives : each can choose to live in any one of the jurisdictions. But person 2, in figure 2, has a stronger taste for the local public good than person 1, and so chooses to live in jurisdiction D rather than jurisdiction B.

So the outcome is very similar to the (efficient) outcome of private competitive markets for private goods. People who have a strong taste for a good choose to buy more of the good. Here people with a strong taste for the local public good choose to "buy" more of it, by locating in a jurisdiction which provides a lot of the good. In private markets, no person has any incentive to hide her preferences, by choosing a consumption bundle which she does not prefer. Similarly, there is no point for anyone disguising her preferences in a metropolitan area in which the local public sector is organized along Tiebout's assumptions. Person 1, in figure 2, could disguise her preferences by choosing a jurisdiction that offers less of the local public good than she really wants, such as jurisdiction A. But she would make herself worse off by doing so. To get more of the local public good, she has to pay a price : here that price equals the per capita cost of the better local public good provision. Her best choice is to find a jurisdiction providing a level of the local public good such that the value to her of a slight increase in z s the cost c of that increase.

Notice that a large number of jurisdictions is needed to make figures 1 and 2 work. For a person to get her preferred (z, x) combination on the line $x = y - cz$, there must be some jurisdiction providing exactly the combination she wants. But as long as there is sufficient variety among the public sector packages offered by the different jurisdictions, the outcome under local public provision will be efficient.