Reassessment of the Tiebout Model

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Abstract

The Tiebout model has been the staple reference point for the classical approach to fiscal federalism. Its emphasis on mobility, benefit taxation, and the advantages of fiscal competition have informed fiscal federalism since the seminal contributions of Musgrave and Oates. This paper reviews the influence that the Tiebout model has had on fiscal federalism, and argues that although some of its insights remain relevant, it is far from compelling as a positive description or a normative prescription for the design of a federal system. Some aspects of alternative approaches are presented, which lead to quite different perspectives than Tiebout-inspired ones.

1 Introduction

The classical approach to fiscal federalism associated with the seminal works of Musgrave (1959) and Oates (1972) owes much to Tiebout's (1956) 'pure theory of local expenditures'. Tiebout's model originated as a response to the agnostic views expressed by Samuelson (1954) about the inability of a market economy to resolve the free-rider problem of public goods. Tiebout proposed, anticipating the taxonomy of Hirschman (1970), a model whereby consumer-voters' preferences for public goods were revealed through exit rather than voice. Mobile consumers, faced with a large choice of communities offering different mixes of local public goods or services, would choose their most preferred. In so doing, they would reveal their preferences. Local governments, via their 'city managers', would compete for households by their choice of fiscal packages. The whole process would lead to an optimal allocation of households among communities, with each household paying a tax commensurate with the benefit of public services provided.

The focus of this paper is on the impact and relevance of the Tiebout approach for modern fiscal federalism. While Tiebout's extremely stylized view of the world embedded many strong assumptions and was meant to apply mainly to local public goods provision, it nonetheless had a number of elements that were adopted by the early fiscal federalism literature and that have had a lasting influence. Among the most important were the emphasis on household mobility, the fiscal heterogeneity of different communities, the beneficial effects of fiscal competition, and benefit taxation as both the consequence and the ideal of local government finance. Our task includes an assessment of the continuing importance of these features for fiscal federalism.

Some important institutional differences between fiscal federalism models and the Tiebout model should be emphasized at the outset. Fiscal federalism is concerned with public-sector outcomes in models with more than one level of legislatively responsible and autonomous government. We shall restrict attention to federal and state governments, or their equivalent in federations other than the USA. Where useful, we subsume state and local governments into a single level of government.[1] This differs from Tiebout in

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[1] Berglas and Pines (1981), Epple and Zelenitz (1981), Rubenfeld (1987) and Mieszkowski and Zodrow (1989) have amply discussed the legacy of the Tiebout model for local government

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several regards. There is no upper level of government in Tiebout's setting, nor is there any particular role for one since local managers apparently do what they do efficiently and need no interference from above. The number of states in federations is fixed, at least for the time horizon usually studied in fiscal federalism. In Tiebout, there is the implicit requirement that the number of communities be endogenous since in equilibrium all must have optimal populations. The convention in much of the fiscal federalism literature is to suppress local government as a separate level of government, and to focus on the federal and state levels. This is not because local governments are unimportant, but because in most federations, they have both limited autonomy and limited fiscal responsibilities. They are typically 'creatures' of the government of the state in which they are located, and their fiscal powers are to some extent circumscribed by the state. All these differences have some consequences for the applicability of the Tiebout model to fiscal federalism.

The stylized facts of federations also differ considerably from the world of local governments envisaged by Tiebout. Households are far from perfectly mobile among states, especially in federations with a relatively small number of large states. This no doubt dilutes the competition for households that motivated Tiebout's analysis, and replaces it with competition for capital and businesses. There are probably more similarities than differences in the mix of public goods and services provided by different state governments and their municipalities. In particular, in most federations, state are responsible for such big-ticket items as education, health and welfare services, and provide comparable levels of such services. Not only are these unlike the state and local public goods that the traditional literature assumes are provided by sub-national governments, they are also expenditures that have important redistributive consequences, largely by intent, and that are probably more like publicly provided private goods than Tiebout's local public goods.[2] This, combined with the very heterogeneous populations found within states, implies that state tax systems cannot easily be characterized as benefit taxation. Modern federations also

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fiscal outcomes.

[2] There is some empirical evidence for Tiebout's characterization of local public expenditures as congested public goods. See, for example, Borcherding and Deacon (1972) and Bergstrom and Goodman (1973).

exhibit varying degrees of vertical fiscal gaps whereby the federal government raises more revenue than it needs and transfers the excess to states as grants. Why such grants exist and what form they should take is a major pre-occupation of modern fiscal federalism. Given all these things, what is arguably the major feature of the Tiebout model, that of the role of competition among jurisdictions, needs to be reassessed. To what extent does fiscal competition exists, and is it necessarily beneficial as in Tiebout's setting?

More generally, what insights from Tiebout's original contribution still inform our understanding of fiscal federalism? The following sections of this paper aim to address that question. We begin in the next section by reviewing the key features of the Tiebout model, discussing some problems with it as a model of local government, and outlining the elements of the model that have gone on to influence the standard fiscal federalism literature. Then, some Tiebout-inspired approaches to fiscal federalism are considered. Next, some alternative visions of fiscal federalism that have evolved more recently are discussed. Finally, some remaining challenges for ongoing research are considered.

2 Summary of the Tiebout Model and its Lessons

The key features of the original Tiebout model have been succinctly presented by Mieskowski-Zodrow (1989). There is a population of households with different incomes and preferences who are perfectly mobile among communities, and who take their fixed incomes with them. A large number of communities exist, apparently with free entry and exit. Each community provides some mix of congested local public goods and head taxes. Given the level of public goods provided, there is a population level that minimizes per capita public good costs, and that defines the optimal population for the locality. Local managers compete for households to achieve optimal populations by offering a public good and tax mix that will attract the optimal population. (Tiebout talks of local managers trying to attract or repel households if their population is not optimal, though it is unclear how this is done other than by offering attractive fiscal packages. Mechanisms such as zoning should not be necessary in his setting.) Households ('consumer-voters') choose the locality that they most prefer, and an equilibrium is imagined in which households sort across communities according to their most preferred tax-expenditure mix. Preferences

can presumably differ both because of differences in incomes and because of differences in preference orderings for public and private goods. City managers are assumed to be competitive, which in this context implies they are utility-takers. Externalities across community borders are assumed away. The outcome of this competition for households is supposed to be an efficient allocation of households across localities, with an optimal number of households and an optimal size of local public goods in each. One can characterize the equilibrium as a benefit-pricing one in the sense that the head tax that all residents pay corresponds with the benefits they receive from the local public goods.

Tiebout clearly recognized that his model was very much a caricature of reality, though he argued that it was no more a caricature than the model of perfect competition was for private goods. Like all good models, it was designed to make a conceptual point and clearly succeeded. Nonetheless, even as a model of local government behavior, there are some problems worth pointing out. As mentioned, Tiebout meant his model to be a response to the challenge of the free-rider problem that prevented markets from achieving optimality. Other pseudo-market mechanisms have been proposed, such as by Lindahl (1917), Clarke (1971), Drèze and de la Vallee Poussin (1971), and Groves and Loeb (1975), but without the potential applicability of Tiebout. How precisely local politicians succeed in overcoming the preference revelation problem is never really spelled out, although there is a presumption that the city manager 'follows the preferences of older members of the community'. In other words, the mix of services somehow reflects the voice of existing residents, despite the fact that the model is an attempt to substitute exit for voice. Apart from the choice of persons to locate in the community most suited to their preferences, there is little discussion of the motivation or decision-making of other actors in the model, particularly the local governments who are deciding on quantities of local public goods and their financing. This is rather odd given that the paper purports to be about how local governments respond to mobility to provide a mix of goods that exactly corresponds to the preferences of those who end up living in their locality. What is discussed as the consequence of perfect mobility is a final equilibrium that is presumed to be consistent with the assumptions made. The process by which that final equilibrium occurs is not provided. Given the free-riding problem that motivates Tiebout's emphasis on exit as the

key to information revelation, presumably there is some costly trial-and-error procedure that eventually informs all local governments about citizen preferences.

The exogeneity of incomes is also a well-known limitation. Effectively, the model presented by Tiebout is a model of competitive provision of club goods. As we now know, notably with the work of Berglas (1976), perfect competition does lead to optimality in the provision of such goods with an endogenous number of utility-taking private firms providing the optimal number and size of clubs among which the population sorts. Adding a production sector in which incomes are dependent on location complicates matters considerably, and in some models Tiebout efficiency survives. For example, it may lead to heterogeneous communities if different types of labor are complementary in production, but still leads to efficient sorting, as in Berglas and Pines (1981). On the other hand, an influential series of multi-jurisdictional models with local public goods and mobile labor do lead to inefficient labor allocation among jurisdictions, as we discuss in more detail below.

As mentioned, a variable number of communities is critical for optimality in the Tiebout model. This allows there to be enough communities such that, given the total population, all communities are optimally populated. Of course, the meaning of optimal population is somewhat ambiguous when there are many public goods, each one of which supports a different optimal population. Moreover, if communities are heterogeneous in their populations, the meaning of benefit-related head taxes becomes ambiguous, as well as suspect.

More generally, in somewhat more realistic local public goods settings, stability, existence and efficiency of Tiebout-type competition among local governments are not guaranteed. As Bewley (1981) shows, migration equilibria may be inefficient since there is no market mechanism to coordinate the location decisions of individuals. As a result, nothing guarantees that the potential gains from the joint consumption of public goods will be fully realized. Likewise, nothing guarantees that households with similar preferences will locate in the same communities. Hence, the benefits of community sorting may not be realized. Wheaton (1975) and Bewley (1981) considered different settings in which an equilibrium may not exist at all. For example, if households have different incomes, the instrument used to finance local public goods will be critical for the existence of an equilibrium. Un-

der income taxes or benefit taxes, there may not be any allocation of households across communities in which no one has an incentive to move to a different community.

Despite these shortcomings of the Tiebout model and its seeming lack of realism, including absence of an upper layer of government, some key elements of the approach have been adopted by subsequent models of fiscal federalism. One is the mobility of households. This has featured prominently in the literature on fiscal federalism and more recently in that of economic unions (Sinn 2003). Another is the emphasis on state and local public goods as the core form of public expenditures of sub-national governments. Another is the importance of fiscal competition for generating efficient outcomes. Together with household mobility, this leads to important arguments for decentralizing the provision of state and local public goods so that the correct mixes of public goods and taxes are provided in each state according to residents' preferences. This, in turn, leads to an emphasis on benefit taxation as the ideal revenue principle for state governments. How these features have been incorporated into the fiscal federalism literature is what we turn to next.

3 Tiebout-Inspired Approaches to Fiscal Federalism

Traditional models of fiscal federalism have adopted one or more assumptions from Tiebout with respect to state-level governments, while adding a federal government with its own assigned tasks. We begin with a discussion of the assignment problem, that is, how a constitution should assign functions between levels of government. Though this was not an issue for Tiebout, given the absence of a federal government, nonetheless, the way in which Tiebout characterized state government functions heavily influenced subsequent contributions to fiscal federalism and has had a lasting legacy.

3.1 The Assignment Problem

The classical view of what should be the assigned tasks of the federal and state governments was part of the original statement of the fiscal federalism problem by Musgrave (1959) and Oates (1972). The traditional view of the assignment of both expenditure and revenue-raising were implicitly inspired by Tiebout. With respect to expenditure responsibilities, states should be assigned the provision of state public goods — those whose benefits accrued mainly within state borders — although perfect assignment on these grounds was

not possible (Breton 1965). In principle, the federal government could provide state public goods, but for political and informational reasons it would provide a common level across states. State governments would provide appropriate levels of state public goods to satisfy the needs and preferences of state residents, which are presumed to differ across states in the Tiebout model. This is the so-called Decentralization Theorem of Oates (1972), a precursor of the principle of subsidiarity adopted by the European Union. As Oates (1999) has emphasized, it applies whether households are mobile or not, since in either case, there is still a presumption that preferences will differ across states.

The Decentralization Theorem and the model underlying it have had surprising staying power, given its rather simplistic underlying view of the assignment of expenditures in a federation. Analytical models of fiscal federalism typically take it for granted that state governments provide state public goods, albeit sometimes congested ones. These include, among others, models of labor mobility (Buchanan and Goetz 1972; Flatters, Henderson and Mieszkowski 1973; Gordon 1983; Albouy 2009b), models of fiscal competition (Wilson, 1986; Zodrow and Mieszkowski 1986; Keen and Marchand 1997), models of vertical interaction (Boadway and Keen 1996; Keen 1998; Keen and Kotsogiannis 2002; Boadway and Tremblay 2006), and models of interregional insurance (Persson and Tabellini 1996a,b; Lockwood 1999; Bordignon, Manasse and Tabellini 2001). More recently, the Decentralization Theorem has been re-visited using political economy approaches (Besley and Coate 2003; Lockwood 2002, 2006, 2008). In this approach, the federal government provides different levels of public goods across states, but the allocations are determined by political economy considerations rather than normative principles.

The point is simply that the assumption that state governments provide a state public good has been the dominant approach to the assignment problem and to fiscal federalism modeling more generally. It relies on differences in preferences among state residents as the main argument for the decentralization of spending responsibilities. As we mentioned, this way of conceptualizing the assignment problem is not entirely compelling. The bulk of state public expenditures in most federations are on quasi-private goods and services and on targeted transfers rather than on state public goods. This leads to somewhat different arguments for decentralization, as we discuss later.

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The traditional approach, which owes much to Musgrave's well-known distinction between the Allocation, Distribution and Stabilization branches of government, also assigns redistribution and stabilization to the federal government. Stabilization is relatively non-controversial, although state government budgets do have macroeconomic consequences, sometimes intentionally and sometimes pro-cyclically (Poterba 1994). The case for assigning redistribution to the federal level is less clearcut, and rests on a couple of arguments. One is that in a world with mobile households, redistribution will be competed down by state governments (Oates 1999; Wildasin 1991). Another, more normative, argument is that individuals ought to be treated the same for redistributive purposes no matter where they live, so that a common national standard of equity should apply. This is an argument that has played an important role in the equalization literature as will be seen later. A consequence of this view is that state taxes should use the benefit principle, or equivalently that benefit taxes should be assigned to state (and local) governments (McLure 1983, 2001). For example, residence-based taxes are preferable to source-based taxes on these grounds, and property taxation on residents is a particularly attractive state and local tax base. As well, user fees are like benefit taxes. This argument for benefit taxation has particular force in a Tiebout setting in which households are highly mobile and sort among communities by preference.

However, the notion that state governments should play no redistributive role and should use benefit taxes is not compelling on various grounds. For one thing, benefit taxation is not feasible, as the literature on the Lindahl equilibrium has taught us. State populations are typically quite heterogeneous, given the imperfect mobility that exists in the real world. Benefit taxation would require taxes on persons appropriately conditioned on the benefits they receive from public goods and services. More important and as mentioned, a substantial proportion of state spending is on quasi-private goods (what Bewley 1981 refers to as public services) that are inherently redistributive, such as education, health care and social services. It would defeat the purposes of these programs if they were financed using benefit taxation. Of course, one might then wonder why these services are decentralized to state governments. That raises issues about the principles of assignment in a federation to which we return in the next section. Furthermore, given the

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size of expenditures at the state level of government, significant sources of revenue must be obtained to finance them. If one presumes that states should raise a substantial part of their own revenues, this requires that they have access to at least one broad-based revenue source, such as income taxation, general sales taxation or payroll taxation. It would be exceedingly difficult to design those taxes according to the benefit principle.[3]

There have also been theoretical arguments for decentralizing some redistribution to the state level. Pauly (1973) has argued that income redistribution is in part like a local public good. To the extent that altruism applies with more force to those living nearby, efficiency can be best achieved by some local redistribution, which serves to internalize the externalities associated with local altruism. More recently, the optimal income tax literature, specifically the tagging sub-component of that literature, has suggested that redistribution can be more effectively achieved if the population can be disaggregated into identifiable groups with different distributions of incomes in each (Immonen, Kanbur, Keen and Tuomala 1998; Banks and Diamond 2008). One's state of residence might be one such characteristic. Given that, redistribution might be improved if redistribution were decentralized to the state level, possibly accompanied by interstate transfers (Raff and Wilson 1997; Hamilton and Pestieau 2005; Boadway and Pestieau 2006).

To the extent that state governments do not use benefit taxation for whatever reason, there are potentially strong implications for the system of federal-state transfers. Most federations, the USA being an exception, deploy systems of equalization transfers among states with differing fiscal capacities. As discussed below, one rationale for these equalization transfers relies on the redistributive features of state fiscal systems.

3.2 Labor Mobility in Fiscal Federalism

One of the most important aspects of Tiebout's model from the point of view of the development of the literature on fiscal federalism has been the role of labor mobility. In Tiebout (1956), households took their given incomes with them when they moved. Optimal community sizes applied when the benefits of having more residents to share the costs of

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[3] Anderson and McGuire (2009) examine in detail the extent to which US states have practiced benefit taxation, using revenue and expenditure data over a five-decade period.

public goods just offset the congestion costs imposed by adding more users to the local public good. This, combined with an endogenous number of communities ensured that households were allocated efficiently among communities, and this would be so regardless of whether household preferences for public goods differed. Models of fiscal federalism with mobility change these assumptions in two important and realistic ways. First, incomes are endogenously determined by a production technology that exhibits decreasing returns to labor in each state, say, because of a fixed factor like land. Second, the number of states is fixed. In this setting, even if all households are identical, mobility among states will generally lead to an inefficient allocation of population.

The original insight that mobility is inefficient in a federation was due to Buchanan (1952) and Buchanan and Goetz (1972), and was elaborated in various ways by, among others, Flatters, Henderson and Miezskowski (1973), Stiglitz (1977), Boadway and Flatters (1982), and Gordon (1983), and more recently by Albouy (2009b). The exact form of the argument depends on the assumptions being made. Consider first the simple case studied by Flatters, Henderson and Mieszkowski. There are two states, $i = 1, 2$, with strictly concave and increasing production functions $F_i(L_i)$, where L_i is the population in state i. Total population L moves freely across states, so $L = L_1 + L_2$. State production can be divided between a pure state public good, G_i, and a private good, X_i, such that $F_i(L_i) = G_i + L_i X_i$. All households have the same utility function $U(X, G)$ and, given state fiscal decisions, allocate themselves between states such that, assuming an interior solution, $U(X_1, G_1) = U(X_2, G_2)$. (Corner solutions in which all households choose to live in one state or the other are of course possible.)

In this setting, population has two conflicting effects on per capita utility. An increase in population reduces per capita output because of diminishing returns to labor. At the same time, higher population enables more sharing of the costs of providing the public good. The optimal allocation of resources in the federation must satisfy two conditions. One is the Samuelson condition, $L_i U_G(X_i, G_i)/U_X(X_i, G_i) = 1$, which determines the optimal division of output between private and public goods in each state. The second is the condition for the optimal allocation of population between the two states (assuming an interior optimum), $F_1'(L_1) - X_1 = F_2'(L_2) - X_2$. Intuitively, an additional resident

contributes to output their marginal product and uses resources equal to their per capita consumption of the private good. No cost is associated with their consumption of the public good. (Note that generally $X_1 \neq X_2$ since the state with larger population will have higher G and thus lower X.) If population is optimal in the federation as a whole, $F_i'(L_i) - X_i = 0$, and per capita utility is maximized across the federation.[4] Otherwise, the federation will be under-populated if $F_i'(L_i) > X_i$, and vice versa.

At stake is whether a federation with decentralized state decision-making results in an efficient resource allocation. Consider the case where state governments obtain all the rents produced in their states, and use those rents along with a head tax on their residents, T_i, to finance G_i. Assuming households earn the marginal product for their labor, their budget constraint is $F_i'(L_i) - X_i = T_i$. Then, labor will be allocated efficiently across states only if $T_1 = T_2$, and this will generally not be the case.[5] Intuitively, T_i is the fiscal externality that a migrant contributes to other citizens when moving to state i.

This result can be generalized slightly by allowing G to be a congested public good. Let $g_i = G_i/L_i^\alpha$ be the services obtained from G_i, so utility can be written $U(X_i, g_i)$. Then, $\alpha G_i/L_i$ can be interpreted as the marginal congestion cost an additional resident imposes on existing residents. It is the change in resources required to keep g_i constant when L_i increases.[6] The condition for the optimal allocation of population can then be written $F_1'(L_1) - X_1 - \alpha G_1/L_1 = F_2'(L_2) - X_2 - \alpha G_2/L_2$, or under the assumptions made above, $T_1 - \alpha G_1/L_1 = T_2 - \alpha G_2/L_2$. This is the result reported by Buchanan and Goetz (1972), and it has an obvious interpretation.

Further insight can be obtained by using the budget constraint $G_i = T_i + R_i(L_i)$, where we still assume that the state governments obtain the rents from state production.

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[4] Some have emphasized the so-called Henry George Rule when population is optimal (Mieskowski and Zodrow 1989). Rents in state i are $R_i = F_i - L_i F_i'$. Using $F_i = G_i + L_i X$ and $F_i'(L_i) = X_i$, we obtain $R_i = G_i$. That is, public goods can just be financed by fully taxing rents, reminiscent of the extreme version of a tax proposed by George (1914). In a federation without optimal population, sole reliance on rent taxation will be inefficient, as we shall see, so we do not emphasize this rule.

[5] Flatters, Henderson and Mieszkowski (1973) argue that $T_1 = T_2$ if the compensated price elasticity of demand for the public good is unity. Note that $T_i \gtrless 0$ as the federation is under- or over-populated.

[6] Since $G_i = L_i^\alpha g_i$, $\partial G/\partial L_i = \alpha G_i/L_i$.

Then, since $R(L_i) = F_i(L_i) - L_i F_i'(L_i)$, the optimal migration condition can be written:

$$\frac{(1-\alpha)G_1}{N_1} - \frac{R_1(L_1)}{N_1} = \frac{(1-\alpha)G_2}{N_2} - \frac{R_2(L_2)}{N_2} \tag{1}$$

This offers a few insights. If $\alpha = 1$, so $G_i = g_i/L_i$ and G_i is a private good provided by the public sector, optimal migration only applies if per capita rents are the same in both states. Differences in per capita rents induce inefficient migration, referred to as fiscally induced migration. If the rents are owned by absentee landlords whose utility does not count, an efficient labor allocation will occur when $\alpha = 1$. On the other hand, if $\alpha = 0$ so G_i is a pure state public good, the absence of rent taxation again implies that $G_i/L_i = T_i$ be equalized across states for optimality, which will not generally be the case.

The failure of free migration to ensure that population is efficiently allocated across states forms the classic argument for unconditional equalization transfers. A transfer from one state to the other will induce a change in the allocation of labor, so can be used to correct the migration inefficiency. In the case just considered, the optimal transfer from state 1 to state 2, denoted $S_2(= -S_1)$ is given by (Boadway and Flatters 1982):[7]

$$S_2 = \frac{L_1 L_2}{L_1 + L_2}\left[\left(\frac{(1-\alpha)G_2}{L_2} - \frac{(1-\alpha)G_1}{L_1}\right) + \left(\frac{R_1(L_1)}{L_1} - \frac{R_2(L_2)}{L_2}\right)\right] \gtreqless 0 \tag{2}$$

According to the second term in square brackets, equalization grants should equalize per capita rents accruing to state governments. This term disappears to the extent that rents are not taxed. For the first term, suppose $\alpha = 0$ so G_i is a pure public good. Then, per capita shares of financing the public good should be equalized, and this term disappears as α goes to unity. Albouy (2009b) has generalized this analysis to allow for individuals of different skills who migrate freely among states, but whose skills are imperfect substitutes in production. State government taxes include proportional income taxes as well as possibly source-based taxes including taxes on capital income and rents. In this case, migration is generally inefficient. Source-based taxes generate fiscally-induced migration,

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[7] In this simple model, it is not necessary that there be a federal government implementing an equalization scheme. As Myers (1990) has shown, states would voluntarily make the necessary transfers, since doing so would increase per capita utility everywhere.

and the standard fiscal externalities of migration apply. An equalization formula that is qualitatively similar to (2) but equalizes all source-based tax differences applies.[8]

The inefficiency of migration does not stop there. As Stiglitz (1977) and Atkinson and Stiglitz (1980) showed, migration equilibrium may not be unique. Moreover, if the federation is under-populated, it may be the case that the only stable equilibrium is a corner solution with all households going to a given state. In this case, an interior migration equilibrium is unstable, so out of that equilibrium, population goes entirely to one state. This is not surprising, given the unexploited agglomeration economies when the population is low. The state in which population agglomerates might be the wrong one, in the sense that per capita utility would be higher if population were in the other state. Moreover, per capita utility might be lower than if population were at the interior, unstable equilibrium.

These results on the inefficiency of migration in models with free migration are pessimistic. Fortunately, the Tiebout assumption of free migration is not realistic. Models with costly migration can avoid some of the above problems, especially instability. However, they do not avoid the general inefficiency of migration. And in addition, once migration costs apply, households will end up with different levels of utility, and equity issues arise. We return to that below.

An efficient allocation of labor is only one condition required for optimality in our simple federation. As we have mentioned, the Samuelson condition characterizing the optimal division of output between public and private goods in each state must also be satisfied. Here, the message of the literature is more optimistic. Suppose state governments behave non-cooperatively and act as 'utility-takers' with respect to migration. This is the analog of price-taking behavior in this context and corresponds with what has been assumed in the competitive provision of club goods, though here without entry and exit. If local governments finance public goods by a head tax, they will choose G_i so that the Samuelson condition is satisfied (Boadway 1982). The equal-utility condition of free migration means that states interested in maximizing the per capita utility of their residents will

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[8] Albouy (2009b) shows that there is no need to equalize residence-based taxes in this world with perfect migration, contrary to what has been suggested by Boadway and Flatters (1982). That need may arise in a world without free migration, as discussed further below.

also maximize per capita utility nationwide, referred to as 'incentive equivalence' (Myers and Papageorgiou 1993; Wellisch 2000). This is so regardless of whether the federation is under- or over-populated.

This has some relevant implications. When states use a head tax to finance the state public good, the benefit pricing solution applies as in Tiebout. This implies that states do not compete inefficiently for labor, even if the federation is under-populated in which case per capita incomes of their residents would rise with an inflow of labor. In that sense, tax competition does not apply with mobile labor the way it does with capital or commodity trade. Still, the allocation of labor will generally be inefficient, as mentioned above.[9] These results also generalize to the case where state public goods are subject to congestion, so a modified Samuelson condition applies of the form $L_i^{1-\alpha} U_G(X_i, G_i)/U_X(X_i, G_i) = 1$.

If states have access to other tax instruments, non-optimal state choices might be made. For example, if the non-labor production resources (natural resources, capital, land) in a state are owned by non-residents, taxing them using source-based taxes seems to lead to tax exporting since non-resident owners are being made to pay for the financing of state expenditures. To the extent that such tax exporting does occur, states will have a tendency to provide excessive levels of public goods, as the traditional result has it (McLure 1967). However, this assumes that source-based taxes are not shifted back to residents. In the case of capital, if it is mobile, taxes on it will only be borne by non-residents to the extent that the tax is unanticipated. Otherwise, it is simply shifted back to domestic factors of production.[10] Similarly, in the case of land or natural resources, taxes that are anticipated will be capitalized into their price and ultimately will be borne by the original owners, who themselves may be residents (Feldstein 1977).

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[9] Note that the inefficiency of migration disappears if population is optimal for the federation and states have access to rent taxes. In this case, the Henry George Rule applies so $T_1 = T_2 = 0$ and the migration externality disappears. This is clearly not the Tiebout result since benefit taxes are not used.

[10] Berry Cullen and Gordon (2009) analyze the impact on wages of different types of state taxes in a setting where both firms and households are mobile across states. See also Albouy (2009a), who argues that federal taxes cause workers to reallocate inefficiently away from high productivity, low quality of life areas in the USA.

3.3 Fiscal Competition

One of the main properties of the Tiebout model was the presumed beneficial effect of fiscal competition. Competition among communities for mobile households led to an efficient supply of public goods and an efficient allocation of population. In contrast, and partly in response to Tiebout's analysis, there has been much literature focusing on how fiscal competition can distort government decisions as well as the allocation of production factors across states. Most of this literature has been concerned with the mobility of capital and firms rather than households.[11]

The basic capital tax competition models were first proposed by Wilson (1986) and Zodrow and Mieszkowski (1986). In these models, capital is perfectly mobile and states provide public goods to their residents financed by a source-based tax on the capital used within their jurisdictions. The stock of capital is assumed to be fixed and states behave competitively in the sense that they take the net return to capital as given. In this context, an increase in the tax rate of one state leads to an outflow of capital which raises the tax base and the tax revenues in other states. These fiscal externalities are the source of inefficient decision-making. Since states do not take into account the positive effect of an increase in their tax rate on the revenues of other states, they tend to set inefficiently low tax rates. Equivalently, in order to attract capital to their state and increase their own tax base, they tend to under-tax capital. In symmetric models where states are identical initially, they set the same tax rates in equilibrium, which implies that the equilibrium allocation of capital is not distorted. However, all tax rates, and thus public goods' levels, are inefficiently low. As a result, tax competition reduces welfare in all states. Tax coordination, or some corrective policies from the federal government, can be welfare-improving.

When states differ, either in terms of sizes, endowments, preferences or production technologies, equilibrium tax policies will differ across states leading to an inefficient allocation of capital (e.g. Bucovetsky 1991; Wilson 1991; DePater and Myers 1994; Burbidge and Cuff 2005; Slemrod and Wilson 2006). In particular, Bucovetsky (1991) and Wilson

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[11] Wilson (1999) and Wilson and Wildasin (2004) survey the tax competition literature.

(1991) characterize tax competition equilibria when states differ in population sizes and find that the smaller states tend to set lower tax rates and attract more capital per unit of labor. With large differences in the sizes of states, small states may actually have higher welfare in the presence of tax competition.

Keen and Marchand (1997) have extended the basic tax competition model to examine how states may also distort the composition of public expenditures in order to attract mobile capital. They considered a model where governments provide two types of public goods: consumption public goods and production public goods. If production public goods and capital are complements in the production process, the mobility of capital will induce governments to over-provide production public goods relative to consumption public goods. In effect, while taxes on capital discourage capital from locating in the state, this is mitigated if the revenues are used for production public goods which enhance the productivity of capital. In this case, both tax coordination and expenditure coordination can potentially be welfare-improving.

Fiscal competition can also arise when governments use commodity taxes and consumers have the possibility to engage in cross-border shopping (Mintz and Tulkens 1986; Kanbur and Keen 1993; Lockwood 1993). Two forms of fiscal externalities can occur in this case. An increase in the commodity tax rate in a state whose residents cross-border shop in neighboring states will induce an increase in cross-border shopping, reducing tax revenues in the taxing state and increasing them elsewhere. This tax-competition effect will cause tax rates to be too low. For states in which residents from another state cross-border shop, an increase in the tax rate will increase tax payments by non-residents, even though it reduces cross-border purchases. This tax exporting will provide an incentive to set tax rates too high. The net effect depends on the specific circumstances. In Kanbur and Keen (1993), there are two neighboring states of different sizes. In a Nash equilibrium, the tax rate in the smaller state will undercut that in the larger state, causing cross-border shopping to go from the larger to the smaller state. As with capital tax competition and expenditure competition, this form of fiscal competition is generally welfare-reducing. However, if the small state is small enough relative to the large one, it can be made better off at the expense of the larger state.

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The standard analysis assumes that state governments are benevolent, in which case tax competition tends to reduce social welfare. However, if they are not benevolent, tax competition can be beneficial by constraining the self-interested behavior of political decision-makers. Edwards and Keen (1996) and Rauscher (1998) studied the extreme case of state governments behaving as revenue-maximizing Leviathans, following Brennan and Buchanan (1980). In this case, competition for mobile capital mitigates the tendency of governments to set inefficiently high taxes. On balance, tax competition can make households better-off. A similar phenomenon occurs where governments, even if benevolent, cannot commit to future tax policies. In particular, even benevolent state governments will set capital tax rates too high in an attempt to tax the quasi-rents of accumulated capital (Fischer 1980). In these circumstances, tax competition can mitigate the time-inconsistency problem and improve welfare (Kehoe 1989).

There are also circumstances in which competition between governments for mobile capital can lead to fully efficient outcomes. Oates and Schwab (1988) consider a setting where the allocation of capital among jurisdictions depend on the level of environmental standards. Setting high environmental standards provides benefits in the form of a cleaner environment but reduces the supply of capital within the jurisdiction. They find that, in the absence of capital taxation, governments choose to set the efficient environmental standard, which is such that the marginal willingness-to-pay for lower pollution emissions is equal to the reduction in wages resulting from a lower capital stock. However, if governments need to raise revenues using capital taxation, the fiscal implications of a lower capital stock will induce them to set an inefficiently low environmental standard. In a similar setting where local governments provide public inputs that increase the marginal product of capital, Oates and Schwab (1991) show that competition for mobile capital will lead to an efficient outcome as long as governments impose benefit taxes. If the taxes on capital are equal to the benefits derived from the public inputs, capital and public inputs will be used efficiently and the marginal product of capital will be equalized across jurisdictions.

In models where there is both household mobility and capital mobility, there are benefits from Tiebout sorting and distortions generated by capital tax competition. Overall, fiscal competition may be increase or decrease welfare. Brueckner (2000) considers a

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model of capital tax competition where households sort themselves across communities on the basis of preferences for public goods, and he examines whether the welfare benefits of Tiebout competition dominate the welfare cost of capital tax competition. He finds that communities with high demand for public goods set high tax rates and high public good supply, but have low capital stocks and wages. As a result, high-demand communities are made worse-off by capital tax competition, as opposed to the case where governments use only head taxes, whereas communities with low demand for public goods may be better-off or worse-off. In a similar setting and using numerical simulations, Brueckner (2004) finds that the welfare benefits of Tiebout competition will dominate the welfare loss generated by capital tax competition if there is sufficient dispersion in preferences for public goods, so that the benefits of community sorting are relatively large, and if the curvature of the production function is high, so that the elasticity of capital supply in any given region and the intensity of tax competition are relatively low.

3.4 Intergovernmental Grants

In the classical approach to fiscal federalism of the sort discussed above, intergovernmental grants were taken to serve three main purposes. First, grants can be Pigouvian-type subsidies to internalize interstate spillovers (Thurow 1966; Oates 1972; Gordon 1983; Dahlby 1996; Inman and Rubenfeld 1996). The form of these would, in principle, be open-ended matching grants, with the matching rate reflecting the size of the externality. This view of conditional transfers is on the one hand relatively ambitious, and on the other does not do justice to the type of conditional grants that are common in many federations. It is ambitious because it presumes that the magnitude of spillovers could be known with enough precision to inform the size of the matching rate. In fact, the matching rates that one observes in practice — often as much as one-for-one — seem to be very high relative to the presumed size of interstate spillovers. As well, federal-state grants are often either closed ended or bloc conditional grants that have no matching component. Although this form of grant is hard to justify on spillover grounds, there are other rationales for conditional grants that might support them to which we return below.

A second traditional argument for federal-state transfers is to close a vertical fiscal gap

that is somehow taken to reflect differences in the desired levels of state expenditure and revenue-raising responsibilities. This would call for unconditional transfers, which make up a significant proportion of transfers in most federations. The possibility of a vertical fiscal gap being desirable (over and above that required to deal with spillovers) belies the Tiebout model where taxes reflect the benefits of public services so should be sufficient for meeting all revenue needs. The standard argument is that the case for decentralizing expenditures is greater than for decentralizing revenues. There is considerable agreement across federations about the sorts of expenditure programs that can best be delivered by the states, and in most cases this results in comparable levels of spending to the federal government. For states to be self-sufficient in revenues would involve them having access to substantial shares of major revenue sources. Given the potential for non-harmonized taxes, as well as the efficiency and equity consequences of significant decentralization of revenue-raising, most federations have opted for relatively more centralized revenues than expenditures. In fact, the fiscal gap varies considerably across federations, with most of the differences due to differences in revenue decentralization.

This fiscal gap argument for federal transfers is not completely convincing. It is just as likely that the argument goes in the other direction, that is, that the size of the fiscal gap is primarily determined by federal-state transfers having a role to play in their own right. One such role is to influence the behavior of the states — for example, to induce them to initiate certain expenditure programs — a role that has become prominent in more recent literature on fiscal federalism. Another role is equalization. Almost all federations have formal systems of equalizing transfers whose allocation is based on some measure of state fiscal capacity. Indeed, some have formal institutions for advising the federal government on allocating equalization transfers (Australia, India, South Africa). We saw above that in a world with mobile labor, equalization transfers can in principle negate fiscal externalities of migration. Given the limited extent of migration in practice, this is an unlikely explanation for the size of equalization transfers we see in practice. Alternative approaches to fiscal federalism to which we now turn provide a different rationale for both equalization transfers and bloc (and closed-end) conditional transfers.

4 Alternative Approaches to Fiscal Federalism

The study of fiscal federalism has taken on renewed urgency. Many countries have been, or are, decentralizing legislative and fiscal responsibilities to sub-national governments. These include developing countries, like Indonesia, Iraq, Kenya, Nepal and South Africa; transitional economies, like Russia; and OECD countries, like Spain, Belgium and the UK. As well, existing federations are going through varying degrees of reform of their federal systems to improve public service delivery, make tax systems more efficient, improve accountability and governance, and simply react to new circumstances. This has been the case in Australia, Canada, China, Germany and to some extent the USA and Latin American federations. The issue of intergovernmental fiscal relations remains an ongoing concern in established federations, like India, Nigeria and Pakistan. Even in many unitary states like Japan, the Scandinavian countries and the UK, fiscal relations between the central government and local governments have undergone some streamlining. The principles and practices of fiscal federalism have also informed the design of fiscal relations in economic unions, such as the European Union, the Gulf Cooperation Council and Mercosur.

There are a number of issues of common emphasis and concern to modern federations. First and foremost is the extent and form of decentralization. Typically, the fallback or status quo position is a relatively centralized situation, so the issue of concern is how much to decentralize. On some occasions, the approach is more bottom-up, as in the case of economic unions. And, at the other extreme, there are concerns about the break-up of existing nations, such as the former nations of Czechoslovakia, the original Pakistan, the USSR, and Yugoslavia, as well as nations where break-up has threatened, such as Belgium, Canada, Nigeria, Spain and Sri Lanka. There are even cases where separate regions contemplate joining to become a federation, such as Cyprus and, more succcessfully, Germany. Second is the issue of the form of federal-state fiscal relations, including especially the system of grants. These have undergone significant reform in many countries. A third issue is the coordination and harmonization of policies among states, including tax structures, internal trade and investment, cross-border spillovers and procurement. Finally, there is the issue of fiscal stabilization, both the response to idiosyncratic regional shocks and the response to aggregate shocks facing the nation as a whole.

The literature that complements these developments draws some elements and lessons from the Tiebout tradition. But, the emphasis is generally quite different and in some ways contradictory to the Tiebout approach. What follows is a summary of some of the key elements of the alternative approach, some of which we have hinted at above already.[12] The discussion does not follow any particular order of importance.

4.1 Limited Mobility

Mobility of households plays a limited role in modern analyses of fiscal federalism. This in large part because migration is a costly decision, both in terms of material costs, such as the cost of changing houses and employment, and in terms of non-pecuniary costs, such as the loss of social capital and circles of friendship. These costs are obviously less for some persons, such as younger and more skilled persons, than for others. It is also in part, though, to the fact that migration is a long-term decision and not one that responds to year-to-year policy changes. Fiscal federalism approaches often make the simplifying assumption that labor is immobile, thereby eliminating one of the key elements of Tiebout competition. Alternatively, the very long-run nature of migration can be taken to imply a change in the order in which events occur. Instead of migration responding to state policies as in Tiebout-type models, migration can be thought of as occurring before state policies are implemented. To the extent that potential migrants anticipate future policies, as one would assume when sub-game perfection is being used as an equilibrium concept, outcomes can be quite different than those in the standard approaches. Consider the consequences of these two approaches in turn.

Fiscal Federalism with Immmobile Households

If households are completely immobile, the mechanism for sorting by preferences no longer applies. Instead, emphasis has been put on the fact that utilities for persons of a given earnings capacity are no longer equalized. This implies that persons of similar types who are resident in different states will generally be treated differently in terms of the taxes and public services they face. Following the seminal treatment by Buchanan (1950), this can be thought of as violating horizontal equity in the sense that otherwise identical persons

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[12] A detailed, non-technical treatment of some of these elements is in Boadway and Shah (2009).

are treated differently by the full public sector, state and federal governments combined. To the extent that horizontal equity, or fiscal equity as Buchanan called it, is a societal objective, it can to some extent be addressed by a system of federal-state equalization transfers. There is a sizable literature on the design of equalization transfers for this purpose, and we can provide only a brief summary here.[13]

Start with a simple benchmark case that draws on Buchanan (1950). (See also Mieszkowski and Musgrave 1999.) Suppose that two states, 1 and 2, contain populations with given incomes, and average incomes, $\overline{Y}_1, \overline{Y}_2$, differ across the two states. The state governments provide a quasi-private good in equal per capita amounts to all residents, and finance it with a proportional income tax at the rates t_1, t_2. Define the *net fiscal benefit* (NFB) as the difference between the dollar amount of the quasi-private good and tax payments by each person. If the tax rate is the same in both states, there is a common level of NFBs for all persons in a given state, while NFBs differ across states by the difference in per capita tax payments, $t(\overline{Y}_2 - \overline{Y}_1)$, or equivalently the difference in the level of the quasi-private good, $g_2 - g_1$. Moreover, an equalization transfer based on differences in per capita tax collections would undo NFB differences. The transfer to state 2 would take a form analogous to (2):

$$S_2 = \frac{L_1 L_2}{L_1 + L_2} t (\overline{Y}_1 - \overline{Y}_2)$$

If the states had the same objective function, in the post-equalization outcome they would choose the same tax rates and provide the same levels of the quasi-private good.

This example is obviously very special, and before we generalize it, it is worth emphasizing how it differs from the Tiebout outcome. For one thing, differences in preferences play no role in determining outcomes. On the contrary, the presumption is that if the states had the same fiscal capacity they would provide comparable levels of public services

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[13] See, for example, Ahmad and Brosio (2006); Boadway (2004); and Boadway and Shah (2007). There have been many country-specific studies of equalization, some recent examples including Financial and Fiscal Commission (2000) for South Africa; Expert Panel on Equalization and Territorial Formula Financing (2006) on Canada; Bosch and Durán (2008) on Spain, Germany and Canada; and the Commission on Scottish Devolution (2009) on the UK. The ongoing work of the Commonwealth Grants Commission in Australia is also relevant.

to their residents. For another, the equalization remedy being proposed is that differences in residence-based taxes should be fully equalized. In a model with free migration, the case for equalizing residence-based taxes disappears, as Albouy (2009b) has shown: free migration undoes differences in average incomes across states. Put differently, horizontal equity is not a concern under free migration, since households of a given type can migrate until they are equally well-off wherever they reside. As well, the case for equalization of residence-based taxes would disappear if benefit (head) taxes were used instead of income taxes, even if there were no mobility of households and differences in average income prevailed.

The above example serves only to illustrate the intuition of the argument for equalizing residence-based taxes. The logic can be applied to more realistic settings. Other residence-based taxes also give rise to NFB differences, such as state sales and payroll taxes. To the extent that they are proportional, the same argument as in the example applies. The argument can be extended to apply to proportional income taxes. If the rate structure is piecewise linear, equalization transfers could be based on differences in per capita incomes within each tax bracket, as is done in Canada. Source-based taxes also give rise to NFBs, and these can be eliminated by fully equalizing per capita differences in source-based state tax revenues, as in the full migration case. State public goods and services may not accrue equally to all residents: education serves school-age children, social services applies to the needy, health care applies to the ill, and so on. In general, different states will have different needs for public services based on their demographic make-ups. Equalization systems can readily take account of differences in need across states similar to the way in which per capita income differences are dealt with, as is done in Australia and South Africa, for example. Differences in the costs of provision of public services will also differ across states because of differences in population density, the urban-rural mix, climate and so on. This is conceptually more difficult to deal with since it will generally not be optimal to provide the same level of public services when costs of provision differ. The method used is to base equalization on the standard pattern of services that states tend to provide to residents in different geographic circumstances and compensate states according to the share of their populations that resides in high- versus low-cost regions.

While equalization based on compensating states for differences in the NFBs their residents receive from state fiscal programs might be rationalized based on horizontal equity considerations, there are some overriding conceptual issues involved. The first is the standing of horizontal equity of state treatment as a national policy objective. This obviously involves a value judgment that must reflect a national consensus. In some nations, equal treatment of equals is a matter of social citizenship, or national solidarity as the Europeans put it. The idea is often enshrined in the constitution, as in the cases of Canada, Germany and South Africa. In other cases, it seems to be a matter of societal consensus. The Commission on Scottish Devolution in the UK took it for granted that the financial arrangements for devolution should respect the principle of comparable access to public services in all regions, a principle that is meant to guide fiscal transfers from the UK Parliament to devolved governments, and one taken for granted by the more recent Independent Commission on Funding and Finance for Wales. However, the extent of social consensus for equal access to public services can be strained in countries where there are large inequalities among states or differences in language, culture or religious affiliation across states (Belgium, Canada, Spain). Despite this, horizontal equalization is a feature of most federations, the USA being a notable exception (except within states). As well, arguments against decentralization of revenue-raising often include the adverse consequences that decentralization can have on fiscal equity.

The second conceptual issue concerns the incentive effects that equalization transfers can have. Obviously, simply equalizing actual NFBs would have strong disincentive effects, as states would lose little by reducing their revenue intake in expectation of being compensated through equalization transfers. To avoid this, equalization systems are typically designed to minimize the ability of states to influence their own transfers. This is done by basing transfers on representative fiscal systems that reflect average state policies. On the revenue side, equalization entitlements are calculated by applying average state tax rates to each state's tax base, or to a commonly defined representative state tax base. As long as states have relatively limited influence over their tax bases, incentive problems are minimized. A similar approach is applied on the expenditure side: one calculates the per capita costs of providing standard public services. As long as state tax structures and

public services do not vary much, applying these approaches is feasible.[14].

When states can influence the size of their tax bases, more subtle incentive effects can arise. Smart (1998) and Bucovetsky and Smart (2006) emphasize that equalization causes states to underestimate the marginal cost of public funds from raising state tax revenues. When state tax rates are increased, to the extent that this induces a fall in the tax base, that will be compensated by the equalization system. Thus, states will have an incentive to over-expand. However, there is little evidence that such effects influence state government fiscal choices. In some circumstances, states may have more direct effects on their tax bases, as when they have access to natural resource revenues within their borders. They can influence the rate at which natural resources are exploited by controlling licenses for exploration and extraction.

A third conceptual issue brings us back to the Tiebout model. Although states provide comparable sorts of public services and have access to similar types of taxes, they do not adopt identical fiscal structures, and they would be unlikely to do so even if equalization enabled them to do so. This may be because of the differences in preferences that Tiebout emphasized. Notwithstanding that, given the complexity of political decision-making, it would be highly unlikely that two states did choose the same policies unless they were consciously imitating one another. That being the case, achieving full horizontal equity in a federation is not feasible. Moreover, it is not desirable since it would undo the independent choices made by state governments, and violate one of the purposes of federalism, which is to allow states the discretion to make their own decisions on matters affecting their residents. This does not negate the need for equalization, but it calls for a compromise between the objective of equalization, which is to foster the equal treatment of equals, and the purpose of federalism. The compromise that is typically made is to take the objective of equalization to be that of equalizing the potential for different states to provide comparable

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[14] It is sometimes advocated that equalization could be simplified considerably by basing entitlements on a simple macro-indicator, like state GDP of disposable income (Barro 2002). In principle, this confuses the role of equalization as a device for equalizing the provision of public services across states with that of equalizing individual incomes, which is the job of the personal tax-transfer system. On the other hand, where severe data limitations exist, a macro approach may be the only feasible one.

levels of public services at comparable rates of tax, but to allow states the discretion to exercise that potential as they see fit (subject to some caveats concerning the existence of other national objectives discussed in the next sub-section). The implementation of this compromise is bound to be ambiguous, but that is the nature of federalism.

Migration as a Long-Run Decision

As mentioned, migration may be a much longer decision than the fiscal decisions taken by governments. In these circumstances, it might be reasonable to think of households choosing their state of residence before policies are chosen. If we adopt standard multi-stage game-theoretic equilibrium concepts, it is as if the government cannot commit ex ante to policies before households migrate. It turns out that reversing the timing of decisions in this way turns the results from earlier mobility models on their head and can lead to significantly adverse outcomes.

To see the consequences of migration being a long-run decision, consider the framework studied by Mitsui and Sato (2001), which is admittedly extreme, but serves to highlight the forces at work. Ex ante identical households move first and are assumed to be able to choose freely and costlessly their state of residence. Governments move next, and we assume that the federal government moves before the states. (Below we consider some important consequences of the states choosing policies before the federal government.) The technology is the same as earlier. Each state has a strictly concave production function in labor. The states choose the level of state public goods to be financed from local rents, a head tax and an equalization transfer (positive or negative) they receive from the federal government. Given their populations, they satisfy the Samuelson condition. The federal government, also taking population as given, chooses an equalization system, which consists of a set of transfers to all states that are purely redistributive. For simplicity, there are no national public goods, though that would make no difference to the results. The households choose their state of residence anticipating subsequent government policies. Of course, they have no individual effect on those policies.

Consider the federal government's choice of equalization transfers. Anticipating state behavior, the federal government foresees the effect its equalization transfers will have on per capita utility in each state, where the latter may be denoted $V^i(L_i, S_i)$ for state

$i = 1, \cdots, h$. The federal government chooses transfers to maximize a social welfare function $W(V^1, \cdots, V^i, \cdots, V^h)$, which exhibits finite and non-negative aversion to inequality. Given the allocation of population $L_1, \cdots, L_h$, optimal federal equalization transfers will result in utilities that are increasing in population. For example, in the utilitarian case, marginal utilities of private consumption will be equalized across states. Given that more populous states will have higher levels of the state public good by the Samuelson condition, those in more populous states will be better off. This will generally be the case for a government with non-negative aversion to inequality, unless the government adopts a maxi-min social welfare function and equalizes utilities everywhere (so removes any benefit from ex ante migration).

Given that utilities will be higher in more populous states, the only stable equilibrium will be where the population all migrates to the same state. This is obviously a non-optimal outcome. In effect, equalization is a welfare-reducing policy in this case. The equilibrium outcome exaggerates the benefits of agglomeration, and equalization's supposed benefits are negated.

4.2 Expenditure Assignment and Decentralization

In the Tiebout-Musgrave-Oates tradition, expenditure assignment was based on the principle that state governments should be responsible for state public goods, that is, those whose benefits largely accrued to state residents, and revenue assignment was based on the benefit principle. This was in keeping with the idea that redistribution was a federal responsibility, and that state governments could best provide the mix of state public goods that reflected the preferences of residents in the state. As Oates (1999) argued, these principles remained intact regardless of whether households were mobile across states.

When we observe the reality of state fiscal structures — and local ones in unitary nations as well — these ideals are far from observed. While state governments do provide what might be called state public goods, by far their most important programs in most federations consist of quasi-private goods, social insurance and targeted transfers, including things like education, care for the elderly and children, health care, welfare and social services, and sometimes unemployment insurance. These programs are largely redistribu-

tive in nature. Similarly, while some state revenues, like property taxes and user fees, are benefit-related, they are typically more income- or consumption-related and have redistributive consequences. Moreover, unlike the world envisioned by Tiebout, Musgrave and Oates, systematic differences in preferences for state fiscal programs seems not to be their characterizing feature. Though there are significant differences in the details of program design, different states do provide comparable mixes of the main public services.

The current fiscal federalism literature focuses on a different set of arguments for decentralizing fiscal responsibilities to state governments. Some of them are as follows.

Information about Local Needs

As in Oates' (1972) Decentralization Theorem, local knowledge still plays an important role, but a more general one. Where public services are targeted to particular groups who need them, state and local policy-makers are better able to identify those needs and design state programs accordingly. For example, the location of schools and hospitals, the mix of services provided by them, and the choice of hiring priorities require some knowledge of local needs. The targeting of local needs makes public service provision inherently complex and must be set against scale economies from more central provision. Almost all federations resolve this trade-off by assigning delivery responsibilities to the state level. A more difficult trade-off involves setting off the efficiency of decentralized provision against the fact that many services provided by states have equity consequences of one sort or another, including distributive effects, social insurance and equality of opportunity. This suggests that the federal government, acting on behalf of the nation, has an interest in program design. We return to the resolution of that trade-off below.

Agency Problems

Related to the above, the delivery of public services and targeted transfers to citizen-clients faces classical agency problems. Some of these involve hidden information, such as ascertaining the true costs of building and operating local schools, hospitals and welfare delivery agencies (Boadway, Horiba and Jha 1999; Lockwood 1999). Others involve hidden action by local managers and social workers responsible for delivering public services to those who are being targeted, such as the case studied by Seabright (1996) where

decentralization increases the electoral accountability of governments in a setting where the governments' policy choices are not verifiable. The presumption is that agency problems can be alleviated by reducing the number of layers of administrative bureaucracy, which decentralization serves to do. On the other hand, decentralization itself may raise agency problems between the federal and state governments. For example, this may arise if the federal government is implementing interstate redistribution under asymmetric information about state tax bases, although such agency problems can be mitigated by an appropriate design of interstate transfers (Bordignon, Manasse and Tabellini 2001).

Innovation

A further benefit of decentralizing the provision of public services to the states is that it allows not only for diverse choices of program design, but also experimentation and innovation, what Oates (1999) refers to as laboratory federalism. Assuming that state governments are motivated by providing public services in the most cost-effective way, the fact that several states are simultaneously pursuing cost-reducing innovations increases the chance of good innovations occurring. Innovative methods of delivering public services can then be imitated by other states, also as a way of reducing costs. This problem of cost-effective service delivery is particularly important in the public sector given its labor-intensity and the fact that productivity growth tends to be less than in the private sector, as Baumol (1967) noted long ago. Innovation in the rest of the economy increases the cost of labor and therefore increases the relative cost of public services. This motivates responsible governments to seek ways of improving productivity.

The benefits of decentralized innovation have been celebrated in the Canadian case. In particular, many of the innovations of health care provision by the public sector can be attributable to programs originally introduced by the province of Saskatchewan in the early 1960's. These were subsequently imitated by other provinces and became the model for nationwide health insurance subsequently adopted with federal government financial assistance and incentives.[15] One can point to other, less transformative, innovations by

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[15] It is ironic, given the recent debate in the USA about the role of the public sector in health care financing, that in a recent nationwide poll by the Canadian Broadcasting Corporation, the person voted the Greatest Canadian was Tommy Douglas, Premier of Saskatchewan when

some provinces that spread to others in university policy, welfare policy, tax policy and regulation. Of course, not all such innovations are welfare-improving: some might interfere with cross-border trade and labor mobility, and others may constitute beggar-thy-neighbor policies that divert resources from other jurisdictions.

Accountability

It is often argued that decentralization enhances accountability, the loose argument being that the closer they are to the citizens, the more responsive will public service providers be to citizens' interests (World Bank 2003).[16] One can identify at least three classes of reasons why this may be the case. The first is that if public services are decentralized, citizen-voters can more closely identify decision-makers who are responsible for services they receive. As well, they can better identify the taxes they pay with the services they receive. This enables them to exercise voice in ensuring that problems with service delivery can be brought to the attention of decision-makers and rectified. Higher-level governments are responsible for providing services to a broader population, and it is more difficult to know who to hold responsible for public services supplied locally, especially where discretion is involved in tailoring the design of public services to local needs and characteristics. Put differently, decision-makers in a more centralized system may be responsible for more public services that affect many states. In contrast, under decentralized provision, decision-makers are responsible for more specialized public services delivered to one state, and this should improve their accountability (Persson and Tabellini 2002). There is some evidence that decentralization makes local service provision more responsive to citizens' needs. See, for example, Faguet (2004) who argues that decentralization in Bolivia improved the targeting of investment in human capital and social services to the most needy localities.

A second and related argument is that public services delivered closer to the citizen-clients allow more participation by the latter in the choice of design and delivery methods.

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public health insurance was introduced in 1961.

[16] As de Tocqueville (1875) put it: 'The Federal government is far removed from its subjects, while the state governments are within the reach of them all and are ready to attend to the smallest appeal'; and 'The government of the Union watches over the general interests of the country; but the general interests of a people have but questionable influence upon individual happiness, while state interests produce an immediate effect upon the welfare of the inhabitants'.

This was particularly emphasized by the World Bank (2003) in addressing services for the poor. They argued that both client choice and participation in service delivery enable them to monitor and discipline service-providers, and this can be facilitated by decentralization. Citizen participation can come in a variety of means, such as serving on local advisory of governing bodies and taking some financial stake through user fees. Opportunities for participation are apparently greater the more decentralized is service delivery. One study that showed how accountability can be enhanced by citizen participation was by Schaltegger and Torgler (2007). They found that Swiss cantons in which voters participate directly in the political process through initiatives and public referenda have lower levels of indebtedness, which they interpret as being more accountable.

The third argument is that decentralization creates the opportunity for comparing public service provision in one state with that in others. As mentioned above, innovations in public service delivery should be facilitated by decentralization and these can be imitated by other states. As well, citizens can use observations from neighboring states as a yardstick for learning information about costs of provision of public services. So-called yardstick competition can be used to discipline state politicians to prevent excessive rent-taking or lax effort. Besley and Case (1995) provide evidence that state politicians' policy choices, particularly with respect to tax rates, are responsive to those in neighboring states, and that voters penalize politicians who deviate from policies of neighboring states.

Yardstick competition is related to fiscal competition in its effect, but its motivation differs. As discussed above, fiscal competition relies on mobility of tax bases, which generally induces states to compete tax (or transfer) rates down and provide some discipline to state governments. An exception is commodity tax-setting under cross-border shopping. States who sell to cross-border shoppers have an incentive to raise taxes since that exports the costs to non-residents (Mintz and Tulkens 1986; Kanbur and Keen 1993; Lockwood 2001). As we have seen, fiscal competition can be either beneficial or detrimental depending on whether government tend to over-spend or not. Yardstick competition, on the other hand, does not rely on mobility. It simply relies on the beneficial effect of information transmission as a discipline device.

Rent-Seeking, Corruption and Governance

Decentralization can affect the extent of corruption or rent-seeking. There are factors working in opposing directions. On the one hand, decentralization reduces the size of rents both because rents are competed away to some extent and because rents are divided among states so there is less at stake for rent-seekers. On the other hand, corruption might be facilitated because interpersonal contacts are higher at the state level. Sato (2003) constructs a model in which rent-seeking is reduced by decentralization because rents are reduced and and lobby groups are diminished in size. He argues that the beneficial effects of reduced rent-seeking resulting from decentralization offsets at least some of the costs of tax competition resulting from decentralization.

Empirical studies have tended to confirm the possibility of decentralization reducing rent-seeking or corruption. Fisman and Gatti (2002a), using data for states in the US for the period 1976-87, estimate that larger federal transfers to a state increase the rate of conviction for abuse of public office. This indicates that more reliance on federal transfers rather than own-source revenues induces corruption. The same authors study the relationship between fiscal decentralization and corruption using international cross-section data (Fisman and Gatti 2002b). They show that fiscal decentralization of government expenditures significantly reduces corruption, measured using the corruption index of the International Country Risk Guide. Fan, Lin and Treisman (2009) use firm-level survey data on bribery experience to study the relation between decentralization and corruption. Their results confirm that decentralization of revenue-raising reduces corruption. However, complexity of government, measured as a more tiers of government or more local public employees, increases it. Thus, decentralization alone does not fully explain corruption.

4.3 Tax Assignment and Federal-State Transfers

There is much at stake in the assignment of revenue-raising responsibilities to state governments. More decentralized revenue-raising can affect the efficiency of markets within the federation, both through the extent of harmonization of the tax system and through the potential for beggar-thy-neighbor tax policies to be deployed. As well, there are equity consequences if states choose different degrees of progressivity in their fiscal systems

from one another and from the federal government. Revenue decentralization also affects the need for federal-state transfers both to make up deficiencies in the ability of states to finance their expenditure programs and possibly to address horizontal imbalances in fiscal capacity across states. These effects are over and above those of accountability referred to above, as well as over and above the possibility of soft-budget constraints discussed below.

In a Tiebout-like world, these issues are muffled. Revenue decentralization is driven by the principle of benefit taxation, and ideally states would be expected to stand on their own fiscal feet. However, in actual federations, the issue of revenue decentralization is a challenging one, as the following discussion illustrates.

Tax Assignment versus Revenue Decentralization

There are two levels on which to discuss state taxation responsibilities. One is the constitutional issue of which tax types states ought to be able to use. The other is how much responsibility states should have for raising the revenue to finance their own expenditures as opposed to relying on federal transfers. The two are related.

Both issues are informed by the fact that in typical federations, expenditures of state governments collectively are of the same order of magnitude as federal expenditures, especially in term of goods and services expenditures. Moreover, the kinds of public services provided by the states include some that have redistributive consequences, so benefit taxation is not a feasible option. This implies that if states are to be responsible for a significant proportion of own-revenue financing, they need access to at least one broad tax base, like income, sales or payrolls, some of which are likely to be co-occupied by the federal government. On economic grounds, there is relatively little to choose among these three bases. All three are different forms of residence-based taxes. On efficiency grounds, the main concern has to do with implications of state taxation for the efficiency of cross-border transactions. Income taxes can in principle lead to issues with respect to the mobility of capital and entrepreneurs across state borders, while sales taxes can lead to cross-border shopping. Payroll taxes may affect the choice of state of residence, especially where that can differ from state of employment. However, given the differentials in state tax rates that are likely to apply, these effects are likely to be limited.

More important are equity and administrative considerations. In the case of the in-

come tax, if tax structures are chosen independently, states are likely to choose different bases as well as different rate structures from each other as well as from the federal government. This may be viewed as compromising national redistributive objectives to the extent that equity is viewed as being defined nationally. As well, compliance and collection costs increase if different tax systems are used at the state and federal levels.

The sales tax poses special problems in a federation. There are solid arguments for adopting a value-added tax (VAT) as the tax of choice for sales taxation, despite the fact that the number of taxpayers is much higher under a VAT than under a single-stage sales tax. A VAT has two main advantages (Crawford, Keen and Smith 2008). First, because of the crediting mechanism, taxes on intermediate inputs are eliminated and production efficiency is achieved (at least for registered traders). Second, a VAT treats domestically produced products on a par with foreign goods since all taxes can be purged from exports, while imports are fully taxed. However, the multi-stage feature of a VAT makes it a difficult tax to impose in a multi-jurisdictional setting in the absence of border controls. Both input tax crediting and taxing of cross-border purchases are difficult to monitor and administer, especially where different tax rates apply in different states and state VATs co-exist with a federal one. Mechanisms can be devised that can in principle resolve these problems, but they have yet to be tested in the real world, neither in federations nor in economic unions.[17]

Some of these problems are addressed by agreements between the federal government and the states. These can take two forms. Revenue-sharing mechanisms enable states to obtain a share of the revenues from a given tax-type while retaining full uniformity of the base and rate structure. This is a feasible option for any broad-based tax. However, revenue-sharing leaves states with virtually no control over the revenues accruing to them. An alternative, which applies more to income and payroll taxation, is a formal tax harmonization arrangement whereby the states somehow piggy-back onto the federal tax system. States may impose a surtax on federal tax liabilities or the federal tax base, or

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[17] See Bird and Gendron (1998), Varsano (1999), Keen and Smith (2000) and McLure (2000). Canada has a VAT that is jointly imposed by the federal government and some of the provinces. However, the provinces do not have discretion to set their own rates, so the system is more like a revenue-sharing one.

they may impose their own rate structures on the federal base (as in Canada and some US states). A significant advantage of harmonized arrangements is that they permit a single tax-collecting authority, which economizes on collection and compliance costs. Of course, this comes at expense of some state autonomy.

Different federations have different constitutional assignments of tax sources. Some, like Canada and the USA, allow state-level governments access to virtually any broad-based tax, including narrower taxes like excises and corporate taxes. Others assign taxes in a much narrower way. Australian states are allowed to use only relatively narrow tax bases. All income taxes and VAT are collected by the Commonwealth government, and states rely relatively heavily on transfers to finance their expenditure programs. Similarly, in Germany, most taxes are assigned centrally, and there is a formal revenue-sharing arrangement by which the Länder obtain most of their revenues. The diversity of revenue arrangements is much more pronounced than expenditure assignments, which tend to be fairly common across federations. Differences in fiscal decentralization arise mainly on the revenue side.

The fact that in many federations, both the federal and state levels of government have access to the same broad tax bases means that the revenue assignment issue is less a matter of constitutional fiat than of how the revenues from each tax base are shared between the levels of government. This is an endogenous process that depends jointly on the tax rates that both levels choose to apply to the same base, as well as the level of federal-state transfers that closes the endogenous fiscal gap. We return to some consequences for fiscal federalism of the interaction between the federal and state governments in the next subsection.

Federal-State Transfers

Regardless of the extent to which state governments have access to broad-based revenue sources, a common feature of federations is a vertical fiscal gap: the federal government raises more revenues than it needs for its own program spending and transfers the excess to the states. In principle, it is possible for decentralize enough revenue-raising responsibility to the states to make them self-sufficient and to eliminate the need for federal transfers, at least in federations where states have the constitutional ability to use broad-based taxes.

Such an outcome could be achieve with federal initiative by a unilateral reduction in federal transfers and reducing federal tax rates on co-occupied or other tax bases. In practice, federations are continually adjusting the level of transfers and the division of tax room between the federal and state governments. In some federations (e.g., Belgium, Canada, Spain), there has been a gradual evolution toward greater state self-sufficiency, coincident with the higher rate of growth of state expenditures in areas like health care and education. However, there remains a sizeable fiscal gap in virtually all federations.

There are a number of reasons why vertical fiscal gaps are maintained. A first reason is that different states have different fiscal capacities, and the decentralization of revenue-raising exacerbates those differences. To the extent that the federal government assumes responsibility for equalizing state fiscal capacities, for reasons discussed above, decentralization compromises the ability to do so. Unless the equalization system is purely redistributive among states (as it was in Germany before unification and is in Sweden among local governments), there is a minimum fiscal gap that is compatible with achieving a given degree of equalization. Moreover, the more decentralization there is, the less consensus there will likely be nationwide for achieving equalization.

A second reason is that revenue decentralization reduces the extent of built-in stabilization against regional economic shocks (Von Hagen 2007). The federal tax-transfer system is one of the main mechanisms for insuring against such shocks, along with labor mobility and the federal equalization system. Unless the equalization system fully compensates for revenue decentralization, interregional stabilization will suffer.

Third, there are structural reasons for the federal government to occupy some minimum share of the tax room. A harmonized tax system is facilitated by the federal government having enough dominance in a given tax-type such that a uniform tax base and single tax collecting authority can be maintained. In the case of the VAT, decentralization of discretionary revenue-raising to the states, while possible, is administratively very complex. Few federations attempt to decentralize VAT to the states, Brazil, Canada and India being exceptions, and in the Canadian case decentralization is only partial as the provinces have minimal discretion in setting tax rates. In the case of the income tax, federal dominance also makes harmonization more likely, and allows the federal government to use the rate

structure to achieve redistributive objectives.

Finally, in most federations, the transfer system contains some degree of conditionality. In the traditional fiscal federalism literature, emphasis was put on the role of matching conditional grants as Pigouvian-type devices for internalizing inter-state spillovers. This has been superseded by a much more general view of the grant system as a device for federal influence over state programs. Recall that an important component of state expenditure responsibilities are major public services like education, health and social insurance programs. Given the importance of these programs for equity and equality of opportunity, the federal government has an interest in how they are designed and delivered, and in some federations shares the constitutional obligation for providing such services. The federal government typically exercises its influence by imposing conditions on its transfers. The conditions can be relatively broad and non-intrusive, such as requiring that state programs achieve some minimal national standards (Australia, Canada). In other cases, the federal government might actually legislate program requirements and rely on the states to implement them (Germany). A tension always exists between the efficiency benefits of state provision and the desire of the federal government to influence the design of state programs. The key is to make transfer conditions as non-intrusive as possible consistent with national objectives being achieved. Some dispute settlement mechanism must also exist for interpreting whether states have in fact abided by the required conditions, and if not how they will be sanctioned. In the end, the setting of conditions on federal grants and their enforcement takes on a largely political dimension, and is a source of great tension in many federations.

The political nature of grants has also been emphasized in some of the empirical work on grants. We have already mentioned the relationship between transfers or decentralization and corruption or governance. There is also a literature on the political determinants of grants. Johansson (2003) estimates the determinants of grants to municipalities in Sweden. She finds, following the predictions of Downsian electoral competition models, that grants are allocated disproportionately to swing ridings in an effort to improve the chances of electoral success. (See also Case 2001 for the case of Albania.) Milligan and Smart (2005) find only limited support for the swing-riding hypothesis. They find instead that

grants go disproportionately to ridings of members of the governing party, suggesting a bargaining explanation for parties rewarding their core supporters. Knight (2005) also finds support for a legislative-bargaining explanation for grants. His findings suggest that federal transportation grants in the USA favor the districts of congressional representatives who sit on the transportation committee, so have bargaining or proposal power. More recently, Solé-Ollé and Sorribas-Navarro (2008) find that municipalities in Spain receive more grants if they are politically aligned with upper-level granting governments, which might also be taken as support for the bargaining approach to grants.

Vertical Interaction

The essence of a federal system of government is that the two levels of government have legislative independence. But, the fiscal decisions of individual governments have spillover effects on others. While the traditional focus in the spirit of Tiebout has been on fiscal spillovers among states — horizontal fiscal externalities — recent emphasis has been put on interdependencies between federal and state fiscal decisions. Given the bilateral nature of federal-state interaction, these interdependencies can give rise to strategic behavior. Two main types of federal-state interaction have been studied, one involving the interdependence of tax and expenditure decisions of the two levels of government — so-called vertical fiscal externalities — and the other involving more direct interaction through federal-state transfers. Consider these in turn.

Vertical fiscal externalities arise when the choices of one level of government affect the fiscal options of the other. The seminal contribution seems to have been Johnson (1988), who showed that the cost of redistributing income at the state level is lower than at the central level because higher redistribution within a state reduces total income and therefore federal tax liabilities. As a result, part of the cost of redistribution at the state level is effectively exported to other states. Much recent emphasis has been on vertical tax externalities that arise when the two levels of government share similar tax bases (Boadway and Keen 1996; Dahlby 1996; Keen 1998). Thus, suppose the federal government applies a tax on income. A state government when deciding on its own tax rate will recognize that an increase in the rate will reduce its base and limit the additional revenues it raises. However, it will not take account of how federal revenues will be affected by the same

reduction in base. As a result, state governments will underestimate the true marginal cost of public funds (MCPF) and have an incentive to over-expand relative to the social optimum. The size of this externality will be higher the higher is the federal tax rate.[18] Effectively, federal and state governments over-exploit the common tax base, analogous to the tragedy of the commons.

The federal government might mitigate this externality if it is the first-mover in tax-setting. It can reduce the size of the externality by reducing transfers to the states and forcing them to become more self-sufficient. It can also reduce its own tax rate by containing its own expenditures below the optimal value. The consequence of the vertical fiscal externality can also be mitigated by countervailing horizontal tax competition effects, which tend to cause states to under-spend (Keen and Kotsogiannis 2002). On the other hand, fiscal equalization systems that are based on the size of state tax bases will reinforce vertical tax externalities by encouraging states to raise tax rates without facing any revenue consequences (Bucovetsky and Smart 2006).

The empirical literature tends to support the existence of vertical fiscal externalities. A sample of the many studies of this are as follows. Besley and Rosen (1998) studied excise taxes on cigarettes and alcohol in the USA, and found that state government tax rates were increasing in the federal tax rate. (The federal government was assumed to act as a Stackelberg leader, rather than reacting to state tax rates.) Devereux, Lockwood and Redoano (2007) extended the Besley-Rosen analysis to allow for horizontal tax externalities as well, reflecting cross-border shopping. In the case of cigarettes, states responded negatively to neighboring state tax rates, but not to the federal tax rate, which is consistent with cigarette demand being inelastic. On the other hand, state gasoline taxation responded to federal tax rates but not to those in neighboring states. Esteller-Moré and Solé-Ollé (2001) estimated vertical tax externalities in income taxation in the USA. They found that states tend to increase their rates of personal income taxation and of general sales taxes in response to increases in federal tax rates, consistent with the existence of

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[18] Dahlby and Wilson (2003) have shown that it is possible that the externality goes in the other direction when the tax base is before-tax labor income. Whereas an increase in the tax rate will cause labor supply to fall, it could cause tax-inclusive labor income to rise.

vertical externalities. Similarly, Hayashi and Boadway (2001) found evidence for both vertical and horizontal externalities in the case of business income taxation in Canada. They also looked for evidence that the federal government behaved as a Stackelberg leader, and found only weak empirical support. Finally, a particularly interesting study from the point of view of assessing the continuing importance of the Tiebout approach is that of Brülhart and Jametti (2006). They study the case of local income taxes by Swiss municipalities. By taking advantage of the hierarchy of governments in the Swiss federation — federal, cantonal, municipal — they are able to develop a method for differentiating empirically between vertical and horizontal fiscal externalities in local tax-setting. They find that vertical externalities significantly dominate horizontal ones, lending some support to the view that the horizontal competitive effects that Tiebout emphasized were not the most important form of intergovernmental strategic interaction.

The second form of interdependency between federal and state governments concerns the role of federal-state transfers. These serve to close the gap between expenditure and revenue-raising responsibilities by the states, which we have stressed are very much endogenously determined. An important question that arises is to what extent the fiscal gap determines federal transfers, or the reverse. In game theoretic terms, this is equivalent to the question of who is the first mover, the federal or the state level of government, or do they move at the same time.[19] The normative approach to fiscal federalism, going back to Musgrave (1959) and Oates (1972) typically assumes, if only implicitly, that the federal government is the first-mover. However, much emphasis has been put recently on the consequences of alternative orders of decision-making, and much is at stake for the outcomes (Goodspeed 2002; Rodden, Eskeland and Litvack 2002; Wildasin 2004; Vigneault 2007).

If the federal government is unable to commit to its taxes and transfers before the states set their tax and expenditure policies, state governments may have incentives to choose their policies strategically in order to attract larger federal transfers. State govern-

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[19] The general presumption in the literature is that federal and state governments act non-cooperatively since they each must rely on independent legislatures to make final fiscal decisions. However, it is clear that elements of cooperative decision-making occur, such as when inter-governmental agreements are made. It is clear that in most federations, there is ongoing communication between representatives of all governments.

ments could do so by over-spending and running high budget deficits with the expectation that the federal government would eventually bail them out. This is the well-known soft-budget constraint problem (e.g. Kornai, Maskin and Roland 2003; Vigneault 2007). Although the federal government may announce that it will not provide bailouts in the future, it may be unable to credibly commit not to do so once state governments face serious fiscal problems. In effect, state governments are then able to transfer part of the cost of their own programs to the residents of other states. The federal government may improve its commitment ability over time and induce some fiscal discipline by establishing a reputation of not providing bailouts (Inman 2003), but doing so may be difficult when states face exogenous shocks to their tax bases.

At the other extreme, in highly decentralized federations with a high degree of state fiscal autonomy, the federal government may respond to its own fiscal problems by reducing transfers to state governments. Federal budget deficits are then effectively shifted to state governments, leading to excessively hard state budget constraints (Boadway and Tremblay 2006). An extreme case of this might be the tendency for federal governments to impose unfunded mandates on the states, a peculiarly US phenomenon.

4.4 Efficiency in the Internal Economic Union

The Tiebout model emphasized the benefits of fiscal competition and decentralized decision-making for the efficient functioning of the federation. Recently, emphasis has been put on some of the adverse effects of uncoordinated fiscal choices by state-level governments (or national governments in an economic union context for that matter). Some of these adverse outcomes arise from potentially adverse effects of fiscal competition for the efficiency of state decisions given inter-state spillovers. Others arise from the so-called race to the bottom in state redistribution programs. These approaches focus on intrastate inefficiencies and inequities that arise from non-cooperative (Nash) behavior by state governments.

At the same time, there is the potential for decentralized decision-making to distort cross-border flows of products and factors of production. This can occur as an incidental consequence of different states choosing different fiscal systems, so that cross-border

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transactions are either distorted or are cumbersome because of the need to comply with more than one state's policies, including tax-transfer systems, regulations, investment rules and procurement policies. It can also occur because states consciously adopt beggar-thy-neighbor policies designed to attract favorable factors of production and businesses from others. These lapses in the efficiency with which cross-border transactions occur is a concern in federations.

Different federations address inefficiency in their internal economic unions in different ways. A useful distinction may be made between negative and positive integration measures. Negative integration measures include those that are intended to preclude state governments from undertaking policies that interfere with the efficient functioning of the economic union. Positive integration measures are those that encourage state governments to coordinate permissible policies so as to facilitate unfettered cross-border transactions. Measures that can be taken to address negative and positive integration can differ. What follows is a hierarchy of measures that might be found in various federations.

Constitutional Provisions

Many constitutions include statements that rule out state policies that interfere with interstate transactions. The Commerce Clause in the US Constitution is an example of such a negative integration measure.[20] Different federation enforce prohibitions against state legislation that interferes with interstate transactions. The courts may be responsible for ruling state laws unconstitutional for such violations. The federal government itself may be able to strike down state laws that are deemed to be in violation.

Naturally, imposing such restrictions on states is controversial. This is especially so since in many cases, state laws that seemingly restrict interstate transactions may have other beneficial features. For example, state laws intended to protect the environment, the safety of workers, or the language and customs of state residents may be viewed by some as legitimate measures even if they cause a restraint of trade. Some of these issues may be avoided by assigning functions that are bound to be distortionary to the federal

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[20] Article I, Section 8, Clause 3 states that the United States Congress shall have power 'To regulate Commerce with foreign Nations, and among the several States, and with the Indian Tribes'. It is the interstate component that is relevant here.

government, such as the regulation of labor markets and professions, or the regulation of competition.

In any case, it would be difficult to induce measures of positive integration by constitutional means.

Cooperative Agreements

Measures of positive integration are typically negotiated among the federal and state governments. Tax harmonization agreements are an example of this, but others might include environmental agreements, harmonization of professional standards and harmonization of state pensions and health insurance systems to ensure that mobility is not impeded. The difficulty is that agreements must be voluntarily agreed to by all participants. In practice, this can be circumvented by limited agreements between the federal government and a subset of states, so-called asymmetric federalism arrangements common in Canada, Malaysia and Spain. Enhanced cooperation agreements in the European Union exemplify this approach (Bordignon and Brusco 2006).

In some cases, broad agreements have been negotiated by the federal government and the states. The Agreement on Internal Trade in Canada is an example of this. It is an agreement between the federal government and all provinces that includes both negative and positive integration measures, and that encompasses a broad spectrum of transactions including trade, investment, public procurement and labor mobility. It is analogous to international free trade agreements in spirit, though it has been ineffective because of the absence of a binding dispute settlement mechanism.

Conditional Grants

Conditional grants can also be used to encourage states to refrain from interfering with interstate transactions. Bloc conditional grants with general conditions can be used for this purpose (as in Australia and Canada). Conditions might include portability of benefits of state programs and other measures to ensure labor mobility and no-discrimination clauses affecting state procurement, regulation and tax policies.

As with the use of conditional grants to induce national standards in state social programs, conditions imposed for achieving efficiency in the internal economic union are

controversial. There is bound to be some judgment in interpreting the conditions, and some discretion in penalizing states for non-compliance. There is also the danger of the federal government imposing conditions that are too intrusive and interfere with state legislative responsibility in their areas of responsibility.[21] At the same time, the threat of punishment might be sufficient to allow the federal government to use moral suasion to induce states to behave cooperatively.

5 Some Challenges for Future Research

There are many unresolved issues and new research and policy challenges in fiscal federalism. These will sometimes draw on elements of the Tiebout model, particularly the merits of fiscal competition and the importance of mobility of some tax bases. The combination of ongoing international competitiveness and increasing fiscal tightness due to demographic and macroeconomic factors will put pressure on the manner in which states deliver public services. Advances in our understanding of political economy will no doubt contribute in unforeseen ways to the way in which fiscal decisions are divided between levels of government and coordinated. What follows is a brief review of a selected number of issues that will challenge approaches to fiscal federalism.

Environmental Federalism

Environmental policy has a federalism dimension for a number of reasons. Some environmental issues are regional or local in nature, but with cross-border spillover effects (air quality, water). State regulatory policies with environmental objectives have the potential to conflict with efficiency in interstate trade. Environmental policies are inevitably faced with informational and enforcement issues, leading to arguments for state implementation. Even where environmental externalities are national or global in nature, policy initiatives may involve the states, either individually or collectively. This is particularly true where environmental policies can implicitly reallocate rents among states. Energy-consuming states have some incentive to tax energy use; automobile-importing states are more likely

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[21] In Canada, the issue of the extent of use of conditional grants to influence provincial spending programs in areas of their exclusive jurisdiction has been controversial. Despite the fact that the courts have generally ruled in favor of the federal government pursuing these policies, they are nonetheless resented by many provinces.

to regulate automobile emissions, and so on.

State environmental policies give rise to harmonization issues analogous to those of income or sales taxes. For example, if pollution taxation is imposed on a destination basis, arrangements need to be made to tax the energy component of imports across state borders and credit that of exports. Given the absence of border controls, this is administratively challenging. Basing taxes on production seemingly avoids that problem, but unless other states are also taxing emissions of their producers, the competitive position of state producers is adversely affected. Some authors have actually suggested applying carbon taxes on a value-added basis using a credit-invoice method (Courchene and Allan 2008), and this would complicate things further if such taxes were levied at the state level.

Agglomeration

In the Tiebout tradition, the spatial allocation of resources reflects the trade-off between diminishing returns to labor and economies of scale in financing and consuming state public goods. The latter is a form of agglomeration economy, and not surprisingly, multiple equilibria and corner solutions are possible. As the economic geography literature suggests, there are other sources of agglomeration that are likely to be much more important than the joint consumption of public goods. Infrastructure itself is a source of agglomeration, which can generate wasteful competition in public spending (Bucovetsky 2005; Zissimos and Wooders 2008). Others include external economies of scale in production arising from inter-firm trade, benefits from a large and diversified local labor market (Boadway, Cuff and Marceau 2004), and knowledge spillovers. Evidence that production agglomeration effects are important influences on firm location decisions is presented in Devereux, Griffith and Simpson (2007).

The existence of agglomeration economies calls into question the conventional rationale for equalization, which tends to be based on marginal fiscal externalities or fiscal equity in the existing equilibrium. Even in the simple full mobility models discussed in Section 3, the possibility of multiple equilibria, especially in under-populated federations, means that global considerations must be taken into account. Equalization may simply serve to perpetuate globally inefficient equilibria by discouraging migration to high-income areas to take advantage of agglomeration economies.

Other policy dimensions besides federal-state transfers become important for the strategic development of the federation. Infrastructure investment in transportation and communications projects is an important federal policy instrument for affecting regional development. As well, attention to the growth of cities becomes important.

Natural Resources

Another driver of regional development that has been of particular relevance in federal setting concerns natural resources. Non-renewable natural resource wealth can be a mixed blessing in any nation because of the effect it can have on non-resource sectors, which are often the most innovative ones, on quality of governance, on internal conflict and on macro-economic management, especially due to the volatile nature of such revenues (Gelb 1988; Sachs and Warner 1999). The problem can be especially difficult in resource-rich federations where the natural resources accrue disproportionately in a small number of states. In these cases, at least some of the natural resource revenues typically remain in the resource-rich states, either by constitutional assignment or because political pressures are irresistible.

The decentralization of natural resource revenues to state governments can cause a number of problems. For one, horizontal imbalances in fiscal capacity encourage fiscally-induced migration that can be of significant size (Day and Winer 2006). If migration is limited, fiscal inequity results. Equalization transfers can address this issue, but equalization of resource revenues can be both costly for the federal government — especially if it does not have access to these revenues — and politically difficult since the states will regard the natural resources as part of their property rights. As well, decentralization of resource revenues can leave resource-producing states with a volatile source of revenue that cannot be set against other revenues as well as at the federal level. The state governments may also be less able or willing to establish a resource fund to save the revenues for the future, and that will exacerbate the resource curse. Related to that, resource-rich states have a strong temptation to use the revenues for state-building purpose, by investing in infrastructure and diversification that in part diverts economic activity from other states. The result can be a rather arbitrary regional development policy in which industry is fostered in regions that happen to be endowed with natural resources rather than in those

that might make more sense from an economic geography perspective.

Timing and Commitment

As we have mentioned earlier, the timing of decisions in a federal economy, or the ability of governments to commit to announced policies, can have enormous effects on outcomes, especially if all decision-makers can foresee the consequences of the inability to commit. The issue of commitment is relevant in many fiscal federalism contexts. It influences the size and form of federal grant systems, especially their size and the extent to which they are formula-based. It is important in influencing the manner in which federations respond and adjust to regional shocks as well as aggregate shocks. It is also important for deciding on fiscal rules for state behavior, such as balanced-budget requirements or borrowing limitations.

Federal-State Institutions

In the end, federal fiscal policies and outcomes are the result of political decision-making. While political economy has made some progress in understanding some basic driving forces on government decision-making, things are complicated in federal settings by the existence of several independent and interdependent governments. Standard models of non-cooperative decision-making by federal and state governments does not capture the reality or complexity of actual federal processes. Institutions do exist for federal-state interaction. In most federations, there is continual discussion and negotiation by inter-governmental committees that influences outcomes. Federal influence on state decisions can occur through many means, from financial incentives to moral suasion to simply co-ordinating policies. In some federations, quasi-independent bodies exist for advising on federal-state fiscal arrangements, and these can be very influential. There are also instances of negotiated federal-state or state-state agreements to coordinate outcomes. These are a long way from the small competitive community managers in Tiebout's story, especially in federations where there are relatively few states, which includes most federations outside the USA.

As all this discussion shows, the fiscal federalism literature has moved well beyond the Tiebout model and its subsequent incarnations in classical fiscal federalism theory. Some

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elements adopted from the Tiebout model have become dated, such as the ideal of benefit taxation at the state level of government and the characterization of expenditure assignment in terms of state public goods. The fact is that in most federations, state governments expenditure-tax systems are an important part of the redistributive and social insurance fabric of the public sector, and this has implications for federal-state fiscal arrangements. The mobility assumption of the Tiebout model plays a much more limited role than in the standard models of fiscal federalism and local government, although mobility of factors other than labor is important. The Tiebout insight about the potentially beneficial effects of interstate competition have probably been the most lasting legacy of the Tiebout model, although it is recognized that fiscal competition can have both positive and negative consequences. Perhaps above all, the way in which fiscal federalism has departed most from Tiebout is in the appreciation that fiscal decision-making in a federation is much more complicated than the community manager view in Tiebout (1956). Government decision-making is inherently complex, involving political, historical and institutional factors. Moreover, the way in which governments interact in a federation is much more complicated than simple Nash or sequential theories would suggest. This means that the field of fiscal federalism remains rich in research potential.

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