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Jorge Martinez-Vazquez
Cristian Sepulveda

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Georgia State University | Andrew Young School of Policy Studies

Tel: 404-413-0233
Fax: 404-413-0244

Website:
pfrc.gsu.edu

Address:
55 Park Place NE
7th Floor
Atlanta, GA 30303

Mail:
Public Finance Research Cluster
P.O. Box 3992
Atlanta, GA 30302-3992

International Center for Public Policy
Andrew Young School of Policy Studies

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On the Nature and Measurement of Vertical Fiscal Imbalances

Jorge Martinez-Vazquez and Cristian Sepulveda*

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Abstract

Despite a vast literature on the financial structure of fiscally decentralized governments, there remains a great deal of confusion about the concept vertical fiscal imbalance (VFI) and how it relates to the amounts of intergovernmental transfers that flow between levels of government. This paper attempts to clarify the concept of VFI in fiscally decentralized countries. We distinguish between the "optimal VFI" and the "actual VFI". The optimal VFI, defined for any level of government as the difference between the expenditure needs (associated with the optimal decentralization of expenditure responsibilities) and the fiscal capacity (associated with the optimal decentralization of revenue assignments), is generally not zero. Further, the actual VFI (based on actual levels of decentralization) typically exceeds the optimal VFI because of insufficient revenue assignments. The actual VFI equals the amount of unconditional intergovernmental transfers that "should" be distributed across levels of government to ensure that all government units are able to provide a standard level of services for the responsibilities that have been assigned. We argue that such transfer amounts need not be equal, and might not even be correlated, to the amount of intergovernmental transfers actually distributed across levels of governments to close the VFI. This is an important distinction because it suggests that the negative effects of transfer found in the empirical literature do not necessarily imply, as commonly presumed, that those are the negative effects of VFI, and therefore do not necessarily reflect how the VFI should be adjusted.

Keywords: decentralization, vertical fiscal imbalance, intergovernmental transfers

* Martinez-Vazquez: International Center for Public Policy, Georgia State University; e-mail: jorgemartinez@gsu.edu. Sepulveda: Department of Economics, Farmingdale State College, State University of New York; e-mail: sepulvc@farmingdale.edu.

Introduction

Vertical fiscal imbalance (VFI) is one of the most relevant, yet misunderstood, concepts in the fiscal decentralization literature. The VFI informs about the fiscal interdependency between levels of government, and it is based on the difference between the cost of carrying out the assigned expenditure responsibilities and the revenue potential from the assigned revenue sources of each level of government. Assuming a balanced budget for the general government, the revenue potential of the national or central government typically exceeds the cost of the assigned central governments' responsibilities, and the resultant surplus must be equal to the aggregate imbalance (deficit) or excess of costs responsibilities over revenue potential at the subnational level. The VFI is equal to that imbalance or excess amount, and ideally, the government level(s) with a surplus should provide unconditional intergovernmental transfers to the level(s) with deficit to "close" the VFI.

The literature on VFI is vast and mostly applied, as the topic itself focuses on the fiscal structure of the general government. Unfortunately, even though several authors have made insightful contributions to the discussion, empirical estimates of VFI remain difficult to produce and evaluate because there is still no broadly accepted definition of the concept. The discussion has been complicated by a very inconsistent use of the relevant terms. For instance, the terms 'imbalance' and 'gap' have been used interchangeably to represent the same concepts, and each of them have also been given alternative meanings by different authors. [1] Part of the problem seems to be semantic, as any imbalance between two amounts can also be described as a gap between them; but arguably, the reason for the confusion could be the lack of clarity about the main concepts and the absence of a widely accepted theoretical framework. Without pretending to have solved this problem, but recognizing the need to use these terms consistently, here 'fiscal gap' is used to refer to the difference between expenditure needs and fiscal capacity in any government unit, and 'fiscal imbalance' is used to refer to the amount of money necessary to eliminate the differences in 'fiscal gaps' among government units. Fiscal imbalances can be 'vertical' if they are associated with differences in fiscal gaps between governments of different levels (e.g., central and subnational), or 'horizontal' if they are associated with differences in fiscal gaps between governments of the same level.

[1] Sharma (2012) provides a detailed account of the use of the terms and the meanings given by different authors.

The main goals of this paper are to contribute to clarifying the concept of VFI, and to draw a clearer distinction between intergovernmental transfers and the concept of VFI. We do this by expanding the theoretical framework introduced by Martinez-Vazquez and Sepulveda (2020), which is based on the fiscal-gap model used to determine the optimal amounts of intergovernmental equalization transfers. The presence of a VFI can be justified from an economic perspective when social welfare maximization requires to decentralize more expenditure responsibilities than revenue responsibilities. In that case a positive VFI is part of the optimal decentralization system. We use this expanded framework to explain why VFIs are such a prevalent characteristic of fiscally decentralized systems of government, and how poorly designed intergovernmental transfer programs add unnecessary costs to the system.

We distinguish the optimal VFI, associated with an optimally decentralized system of government, from the *actual* VFI, resulting from the prevailing expenditure or revenue responsibilities. Assuming for convenience that a country properly allocates expenditure responsibilities among government levels based on its own social organization and preferences, the actual VFI will deviate from the optimal VFI due to suboptimal revenue assignments. The difference between actual and optimal VFI, called here *excess* VFI, increases if subnational governments are not given sufficient powers to collect their own revenue. This situation, which we will explain is likely of common occurrence in fiscally decentralized countries, creates the need for additional intergovernmental transfers that by themselves have negative effects on the accountability of subnational authorities. The relevant concern for fiscal decentralization design and empirical analysis is not the *presence* of a VFI, or even its size, but instead the size of the excess VFI.

Many authors acknowledge the distinctive economic nature of intergovernmental transfers and the VFI, but mostly because "it is in reality inherently difficult to measure it [the VFI] accurately" (Jia et al. 2021, p.7), empirical and applied economists frequently use actual transfer amounts as proxies for the (presumably actual) VFIs. This practice, however, can potentially lead to two misspecification problems. One is that the VFI should consider only the resources required to cover expenditure needs in excess to subnational revenue collection capacity, and therefore should exclude the funding required, for example, for delegated (as opposed to devolved) expenditure responsibilities. The typical proxies of the actual VFI used in the empirical literature do not exclude the transfers provided for delegated responsibilities and therefore overestimate the

size of the actual VFI. Moreover, since the amount and design of those transfers vary from place to place, total transfers might not even be correlated with the actual VFI. This means that even when the excess VFI is very large, total transfers might be a poor proxy for the actual VFI. The other problem is that in the absence of a clear distinction between optimal and actual VFIs –and the related notion of excess VFI, both the meaning and the relevance of empirical findings on the effects of the VFI are questionable. For instance, the negative effects on budget discipline and accountability attributed in the literature to the presence of VFI would be totally misplaced if expenditure and revenue responsibilities were actually assigned optimally. Indeed, that situation would mean that even when the negative effects from intergovernmental transfers are identified, the net gains in efficiency associated with the optimal VFI are being maximized.

The rest of the paper is structured as follows. Section 2 provides an intuitive explanation of the concept of VFI. Section 3 focuses on the origin of VFIs and explains how they can be the result of the optimization of revenue and expenditure assignments. Section 4 provides some reasons for intergovernmental transfers to differ from the VFI and suggests that subnational authorities might have political incentives to push for fewer revenue assignments and more transfers. Section 5 focuses on the effects of intergovernmental transfers, with an emphasis on those results labeled (we claim misleadingly) as effects of VFIs. Section 6 briefly discusses how a sound system of incentives should be balanced in a fiscally decentralized country. Section 7 concludes by calling for a clearer distinction between VFI and intergovernmental transfers in the fiscal federalism literature.

What is Vertical Fiscal Imbalance (VFI)?

A long tradition in the literature that includes, among many others, contributions by Dahlby and Wilson (1994), Boadway and Tremblay (2006), Dahlby (2005), and Sharma (2012), recognizes that the VFI cannot be defined simply as the difference between expenditure and revenue, or by the amounts of transfers actually provided by the central to the subnational governments. The VFI is not an amount that can be directly measured and found in published subnational government budget data. Instead, it is an economic estimation of the amount of intergovernmental transfers that *should* be disbursed between levels of government based on a given set of expenditure and revenue assignments in order to ensure that all government units are able to fulfill their expenditure responsibilities. Since in practice the actual amounts of intergovernmental transfers need not be

equal to the VFI, assuming that they are can misleadingly lead to erroneous conclusions on the size and effects of the VFI.

Obtaining a definition of the VFI requires to make several considerations that have not been widely agreed upon or adopted in the literature. The first is about what a fiscal imbalance is intended to mean. Fiscal in this case refers to the two sides of the government budget, expenditure and revenue, and imbalance means that these two amounts are not equal, or that the budget is not balanced. The underlying normative objective is to ensure that all government units receive the revenue they need to meet their spending responsibilities, neither more nor less, and for this purpose the amounts of transfers required to correct the imbalance are set equal to (or at least are based upon) the difference between what they need and what they can collect on their own. The idea is very simple; however, there is a key complication: we cannot rely on factual accounting records or on what government officials say they need to spend or can collect. Generally, government officials would prefer to have more money at their disposal and to have to collect less of their own revenue; this makes local constituents better off and helps politicians get reelected. Even honest government officials could overestimate costs and underestimate how much revenue they can collect, while even accurate accounting records depend on discretional decisions that may deviate from what can be justified as "necessary" or "possible" at the national level.

A second consideration, therefore, is the need of well defined "standards" to ensure a consistent (and arguably fair) estimation of transfer requirements for all government units. These standards do not need to be complex and could also be understood as a set of common rules used to estimate the transfer requirements. Expenditure standards are meant to represent the quantities and qualities of public services that governments should be *able* to (not what they want to) provide in accordance with their expenditure assignments, and revenue standards are similarly meant to determine the amount of revenue that governments should be *able* to collect in accordance with their revenue assignments.

The emphasis in *ability* is linked to a third important consideration: the expected benefits from fiscal decentralization crucially depend on subnational governments enjoying some degree of decision-making autonomy to better fit their fiscal policies to the needs and capacities of their communities. The standards are only suggestive, not compulsory. Government authorities must retain their ability to deviate from those standards for the decentralized system of government to work properly. It follows that the transfer requirements computed based on those standards do not

need to be equal, similar, or even correlated with the difference between actual expenditure and actual revenue.

After these three considerations have been acknowledged, it is easy to introduce the concepts that are necessary to define the VFI. We first define *expenditure needs* (EN) as the cost of providing the standard level of public services in a jurisdiction, *fiscal capacity* (FC) as the amount of revenue that can be collected in a jurisdiction with a standard level of "effort" by the local authorities, and *fiscal gap* (FG) as the transfer funds required to fully finance the expenditure needs:

$$FG = EN - FC \ .$$

This definition allows for negative fiscal gaps, which are obtained when a government (e.g., the central government; an affluent jurisdiction) can collect more than its needs in accordance with the prevailing fiscal assignments. Based on this definition, and assuming there is one single tier of subnational governments with J subnational jurisdictions, each identified with a subscript $j = 1, \dots, J$, the VFI can be defined simply as:

$$VFI = \sum_{j=1}^{J} FG_j \ .$$

The VFI for any given level of government corresponds to the sum of the fiscal gaps of all government units at that level. Note that if only two levels of government exist in a country, central and subnational, a balanced budget for the general government requires the VFIs at the two levels to be equal in amount but with opposite signs.

Intuitively, the VFI represents the amount of money that a level of government (typically, the central government) should transfer to another level (typically subnational) to close all its fiscal gaps, or to make all its expenditure needs affordable after taking into account their self-financing capacity. [2]

In practice, it is very difficult to ensure that the amount of money actually available for the intergovernmental transfers aimed at closing the fiscal gaps is equal to the size of the VFI. This can be a major issue in political discussions about public budgets and the role of governments.

[2] When negative fiscal gaps exist in some subnational government units (for instance, in some affluent jurisdictions), this interpretation requires all government units with negative fiscal gaps to transfer their surplus to governments with positive fiscal gaps. This is possible, and there actually exist so-called "Robin Hood" (equalization) transfer systems in which part of the revenue collected by relatively rich jurisdictions is transferred to relatively poor jurisdictions, but those systems are sometimes difficult to implement due to political reasons. When that is the case, then the definition of VFI can be modified to include *only positive* fiscal gaps.

There are at least two possible solutions to this conundrum, one structural and one practical. The *structural solution* is to revise the expenditure and revenue assignments, as well as the standards defined for their measurements, and ensure that the total fiscal capacity of the general government is in fact equal (or close enough) to its total expenditure needs. This is of course a costly and difficult process, as it might require long-term efforts to update the legal and institutional frameworks. The *practical solution*, which might be unavoidable in the short term, is to reduce (based on a certain criterion) the amounts of transfers given to each jurisdiction with a positive fiscal gap, such that the total amount of transfers is made equal to what the country can afford. This is equivalent to an implicit modification of the expenditure and revenue standards, and it can be considered innocuous when the mismatch is relatively small.

The final consideration, more formal in theory, is that we need to distinguish between the *optimal* VFI, associated with the maximum attainable level of welfare, and the *actual* VFI, associated with the prevailing (not necessarily optimal) expenditure and revenue assignments. This latter has not been always properly recognized in the previous literature.

The presence of a VFI is normally characterized by a greater devolution of expenditure than revenue powers to subnational governments, and this imbalance is associated with costs, which are typically well recognized, but also with some benefits, which are typically less well recognized. Starting with the latter, some of the benefits are captured in what is known today as the fiscal decentralization theorem (Oates 1972), which states that devolving decision-making powers to subnational authorities would increase social welfare because they are better able to fit fiscal policies to the distinctive needs and wants of their communities. Other benefits of a VFI are associated with central government advantages in terms of economies of scale, technical capacities and access to broader tax bases, which make the collection of some taxes more efficient, with reduced marginal costs of public funds, at the central level. There are also important costs associated with the presence of a VFI. The transfers meant to close the VFI reduce accountability and government responsiveness to the preferences of their communities and therefore have negative effects on efficiency and overall social welfare. Of course, finding the optimal vertical structure of the government requires identifying the set of fiscal assignments and standards that maximize the difference between all benefits and all costs, and that solution will implicitly define an optimal VFI.

In practice, however, there are technical limitations and political economy forces that can impede the optimal assignment of expenditure and revenue responsibilities –or their implementation, and for that reason we need to acknowledge that the actual VFI can be very different from the optimal VFI.

Here we define the difference between actual and optimal VFIs as *excess* VFI, which can take a positive value if a country assigns "too many" expenditure responsibilities or "too few" revenue powers to subnational governments with respect to the optimal solution, or negative if the opposite situations are true. Since the optimal VFI is associated with a welfare maximizing solution, then it is only the excess VFI what causes the *unnecessary* welfare costs that countries should try to avoid.

A practical approach to simplify the discussion about the excess VFI, which is in line with a common position adopted in the literature, is to assume that each country knows what expenditure responsibilities should be assigned to each level of government. Since countries have their own cultural, demographic and economic characteristics, as well as different institutional arrangements to make decisions and implement their policies, the "optimal" assignment of expenditure responsibilities –this position claims– can only be determined by the country itself. In this context, expenditure responsibilities can be assumed to be given and both the optimal and the actual VFI are fully explained by the revenue assignments. This approach allows us to focus on determining whether revenue assignments are enough to ensure that subnational government can afford the provision of standard public services or not. Generally, the *optimal* VFI computed under this assumption will still not be zero because central tax collections tend to be more efficient in terms of the marginal costs of public funds and therefore result in insufficient (but still optimal) subnational revenue assignments. In addition, there are several political-economy reasons, further discussed below, for why decentralized systems end up with subnational revenue assignments that are significantly smaller than the optimal revenue assignments. This results in the *actual* VFI generally being larger than the *optimal* VFI. [3]

[3] Conceptually, although very unlikely in practice, the *actual* VFI could also be smaller than the *optimal* VFI, such that the excess VFI would be negative.

'Standard-Optimal' Degrees of Revenue and Expenditure Decentralization

In this section we discuss the benefits and costs of devolving expenditure and revenue responsibilities to subnational governments and explain how the optimal levels of expenditure and revenue assignments give rise to the optimal VFI. The analysis informs about the origin of the VFI, as it explains why a positive VFI can be *expected* in most fiscally decentralized systems of government.

We use the framework introduced by Martinez-Vazquez and Sepulveda (2020) to review the theoretical foundation of the VFI. That discussion focused on the design of an *equalization* transfer program aimed at providing all jurisdictions in the country with the same (or similar) ability to meet their expenditure responsibilities. There usually are many other transfer programs in a country, but the equalization transfers program is the only one that needs to be designed together with the overall budgetary structure of a fiscally decentralized system. Similar to the models developed by authors like Dahlby and Wilson (1994) and Boadway and Tremblay (2006), we describe the optimal levels of revenue and expenditure assignments in a fiscally decentralized system of government in terms of the optimal marginal cost of funds (MCF). The MCF is a measure of the marginal welfare costs of collecting one additional monetary unit at the optimal level of government expenditure, and in this context, it consists of a *unique* optimal MCF valid for all government units.

In contrast to other models based on the MCF, however, Martinez-Vazquez and Sepulveda (2020) observed that the autonomy required to fully realize the welfare gains from fiscal decentralization is expected to create *deviations* from that unique optimal MCF. Imposing a unique optimal MCF may be undesirable because it determines a given level of own revenue collections and therefore presumes no revenue autonomy for subnational governments. Moreover, the autonomy exercised locally is based on information that is *not* available to a hypothetical central planner (that is why subnational autonomy can improve welfare). It is simply not possible to centrally determine *ex-ante* the optimal level(s) of the MCF (unique or different across governments) that maximize social welfare.

These difficulties can be overcome by restricting the scope of the welfare maximization problem to the *standard* levels of government services and tax effort. The solution to this model

will describe what we call here the "standard-optimal" degrees of revenue and expenditure decentralization.

The framework considers two levels of government: central and subnational. The preferences of each subnational jurisdiction $j = 1, \dots, J$, are represented by the utility function u^j of its representative individual, who can also be interpreted as the local decision maker. Each utility function is concave and increases with the consumption of a private good X^j, the (non-rival and non-excludable) public good G^C provided by the central government, and the per capita amounts of money spent by jurisdiction j on standard public (goods and) services G^s, common to all jurisdictions, and on discretional public (goods and) services G^{dj}. Standard public services can be understood as the number and/or quality of public services that all jurisdictions *should be able* to provide, regardless of whether they are provided or not. Discretional public services can be understood as deviations from the standard quantities or qualities, and so their value can be positive or negative. [4]

The tax base B^j encompasses all sources of income in jurisdiction j and it is a function of the standard tax rate t^s and the central government tax rate t^c, both assumed to be the same across all jurisdictions. For instance, tax rate increases may reduce labor supply (increase tax avoidance) or make tax evasion efforts more worthwhile, reducing the size of the tax base. After-tax income is fully spent on private goods, such that $X^j = (1 - t^c - t^s)B^j$.

Assuming a utilitarian social welfare function, the standard-optimal degrees of revenue and expenditure decentralization can be found by choosing the values of t^s, G^s, and T^j that solves the following problem: [5]

$$\max_{t^s, G^s, T^j} \sum_{j=1}^{J} u^j\left[X^j, G^s, G^{dj}, G^c\right]$$

subject to: $\sum_{j=1}^{J} G^s = \sum_{j=1}^{J}\left\{t^s B^j - A^s\left[t^s B^j\right]\right\} + \sum_{j=1}^{J} T^j$, and

$$G^c = t^c B - A^c[t^c B] - \sum_{j=1}^{J} T^j \ .$$

[4] Discretional public services are included only to illustrate the more general problem of fiscal decisions in a decentralized system of government. They play only a "residual" or secondary role in the derivation of the VFI, which for simplicity will be disregarded in this section.

[5] The general problem of finding the optimal fiscal structure of the government also requires the optimization of t^c and G^c, but in order to ensure the affordability of the system that needs to be done in a later stage to account for the subnational decisions about the discretional public services G^{dj}, discretional tax rates t^{dj} and the behavioral responses that affect the tax bases. See Martinez-Vazquez and Sepulveda (2020) for a solution to the complete problem.

where the first constraint implies that the subnational budget for standard public services is being balanced in the aggregate, and the second represents a balanced budget at the central level. In particular, A^s is the standard administrative cost function of tax revenue collections, which is assumed to increase with the tax revenue collected; T^j is the amount of transfers provided by the central government to each jurisdiction j; B is simply the national tax base $\sum_{j=1}^{J} B^j$; and A^c is the function representing the tax revenue collection costs faced by the central government.

The optimal solution to the maximization problem is described by the condition:

$$SMB^s = MCF^s \ , \ (1)$$

where SMB^s is the social marginal benefit of standard public services, equal to the social marginal rate of substitution between standard public services and private goods, which at the optimal solution must be equal to the marginal cost of public funds (MCF), here associated with standard public services only.

The benefits and costs of fiscal decentralization, hereafter represented by δ, are shown in Figure 1. For convenience, the total amount of government expenditure is assumed to be constant and equal to 1, such that the values of expenditure decentralization δ_e and revenue decentralization δ_r can be interpreted as shares of general government expenditure. The reference point is a situation with no fiscal decentralization ($\delta_e = \delta_r = 0$) on the vertical axis at MCF_0, which shows the marginal cost of funds faced by a central government that concentrates all revenue and expenditure assignments.

Moving to the right the social marginal benefits from standard expenditures are represented by the function SMB^s, which corresponds to the welfare benefits from expenditure decentralization, δ_e. As subnational governments are assigned greater shares of expenditures responsibilities, we can initially expect increasing welfare gains due to a better fit of local preferences (Oates 1972). This can be represented in equation (1) as greater values for SMB^s as the subnational authorities better spend any given amount of money. Eventually, the inability of subnational governments to take full advantage of economies of scale and to address the problem of externalities would reduce the marginal benefits of expenditure decentralization, and they could even become negative after a certain level.

Function MCF^s in Figure 1 represents the welfare costs of revenue decentralization, δ_r. The MCF^s can in turn be decomposed into the marginal *efficiency* cost of funds, $MECF^s$, times the Feldstein's (1972) 'distributional characteristic' DC^s. For simplicity, we will assume that DC^s

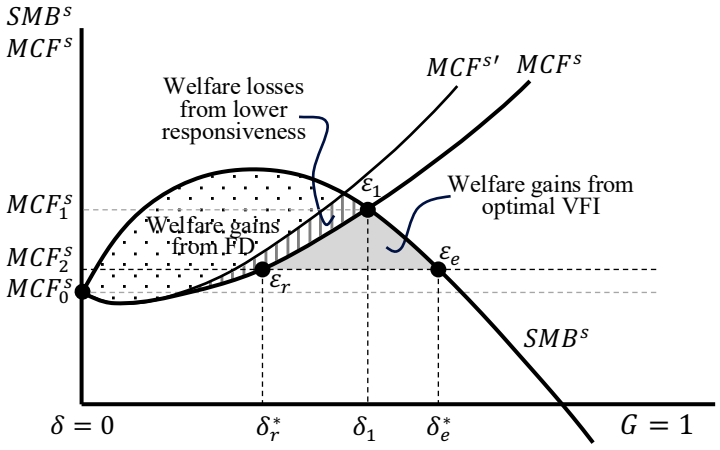
is equal to one, such that $MCF^s = MECF^s$, which means that standard public services have a neutral effect on distribution based on the utilitarian welfare function, and that

$$MCF^s = \frac{-\sum_{j=1}^{J} \partial X^j / \partial t^s}{\sum_{j=1}^{J}\left(B^j + t^s \frac{\partial B^j}{\partial t^s} - \frac{\partial A^{sj}}{\partial t^s}\right) + t^c \frac{\partial B}{\partial t^s} - \frac{\partial A^c}{\partial t^s}}, \qquad (2)$$

where ∂ is used to represent partial derivatives.

As revenue sources are initially assigned to subnational governments, they could possibly start collecting revenue with tax instruments that are more easily administered locally. Local authorities, for instance, can often collect the property tax more efficiently than the central government, which means that the cost of collecting an additional unit of revenue is reduced as they are given more autonomy to collect this tax. [6] This is represented by an initial (slight) reduction of the MCF^s as the level of revenue decentralization increases from the vertical axis to the right. Eventually, however, smaller gains from scale economies and less developed tax collection agencies imply that greater shares of revenue decentralization are expected to increase the MCF^s of the system. In equation (2), this can be represented by the greater value that $\partial A^{sj}/\partial t^s$ (and possibly $\partial A^c/\partial t^s$) would take as t^s increases, making MCF^s higher than the marginal cost that the central government would face if using t^c instead to collect the same level of revenue. [7]

Figure 1. Standard-Optimal Levels of Expenditure and Revenue Decentralization



[6] See, for instance, Bird and Slack (2005) and Sepulveda and Martinez-Vazquez (2012).
[7] In this line, for instance, Vincent (2023) finds that increasing the assignment of tax revenue sources to subnational governments (increasing revenue decentralization) has a negative effect on tax compliance, which would lead to increasing MCF.

Considering the two functions, SMB^s and MCF^s, the intersection at ε_1 shows a situation with vertical fiscal *balance*, where expenditure and revenue decentralization are equal at $\delta_1 = \delta_e = \delta_r$, and all subnational governments are financially autonomous or self-sufficient. In this case the optimal VFI would be zero. It is important to acknowledge that this scenario could be unfeasible, because poorer jurisdictions might not be able to collect the amount of taxes necessary to fund the standard provision of public services. Assuming for simplicity that all jurisdictions are able to comply with the standards, at ε_1 the net welfare gains from fiscal decentralization are given by the area below SMB^s and above MCF^s, between $\delta = 0$ and δ_1 (the sum of the dotted and striped areas). Note that it is worth accepting a higher marginal cost MCF_1 for the government as a whole because it is associated with a higher social welfare level reached with (in this case balanced) fiscal decentralization.

However, a situation with vertical fiscal *balance* (VFI $= 0$) cannot be expected to generally maximize social welfare. If tax collection becomes too costly for subnational governments compared to the central government, then keeping relatively more tax assignments at the central level can help reduce the marginal costs of the system from MCF_1^s to MCF_2^s, while initially producing net welfare gains for the country equal to the gray area in Figure 1. These additional gains require reducing the standard revenue collections share of subnational governments from δ_1 to δ_r^*, and the central government to provide them with transfers in the amount necessary to increase the share of subnational expenditure from δ_1 to δ_e^*.

The standard-optimal levels of revenue decentralization δ_r^* and expenditure decentralization δ_e^* are sustained by the standard-optimal amount of intergovernmental transfers equal to the (welfare maximizing) *optimal* VFI. Note, again, that the marginal cost can be greater than the marginal cost faced by the central government alone, as in this case $MCF_2^s > MCF_0^s$, but this cost increase could be justified with greater benefits obtained by realizing better expenditure decisions.

A point that has already been made repeatedly in the literature but not clearly placed in the theoretical literature on optimal fiscal decentralization, is that the intergovernmental transfers required to close the VFI can have negative effects on subnational fiscal decisions, and that the resultant welfare costs reduce the net benefits from fiscal decentralization. These effects, which will be discussed in the next section, are related to the fact that transfers are perceived as costless by the local residents, such that they become less concerned about the way those revenues are

spent. The result is lower accountability and responsiveness of subnational authorities to the needs and wants of their communities, leading possibly to wasteful spending, corruption, and other types of inefficiencies. The costs of intergovernmental transfers can lead either to a reduction in the social welfare benefits of decentralization, or to an increase in the marginal cost of funds, or to both. In Figure 1 they are represented by an increase in the marginal cost of funds function from MCF^s to $MCF^{s\prime}$. The additional welfare costs from lower responsiveness are represented by the area with vertical strips between the two marginal cost functions.

There has been a longstanding agreement in the fiscal decentralization literature about the importance of assigning significant revenue autonomy to allow for an effective accountability mechanism (Martinez-Vazquez 2015, McLure 2000). While complete revenue autonomy (as under vertical fiscal *balance* at ε_1) could be too costly or simply impossible, the dependance on transfers is also associated with costs. The right balance should be somewhere in between, and an optimal fiscal decentralization design must ensure that the difference between the welfare gains from the presence of a VFI (the gray area in Figure 1) and the welfare losses from lower responsiveness (the striped area) is maximized. [8]

The conclusion of this section is that the VFI should be seen as a possible *structural* feature of fiscal decentralization systems even when they are optimally designed. In general, the optimal VFI is associated with benefits from the efficiencies obtained by assigning subnational governments expenditure responsibilities that exceed their revenue powers, but also with costs from lower accountability of subnational authorities. In practice, however, it is unlikely that the optimal VFI will be implemented. The reason is that beyond benefits from the efficiency gains and costs from lower accountability, there are powerful political-economy considerations to make the actual VFI larger than the optimal VFI. What follows in these common situations is that the larger amount of transfers needed to close the *excess* VFI adds to the costs from lower accountability of subnational authorities.

[8] It follows that the VFI can be "too big", in the sense that it requires amounts of intergovernmental transfers that lead to welfare losses greater than the gains from VFI. See Smith and Revell (2016) for a case study analysis of the decentralization systems in Mexico and Argentina, where the significant size of the VFIs is said to be associated with several inefficiencies and high welfare costs.

On the Relation and Differences Between Intergovernmental Transfers and the VFI

In the previous section we derived the *optimal* VFI and explained the need for intergovernmental transfers to close that VFI. We used a model focused on the determination of the optimal equalization transfers because this program is part of the optimal fiscal decentralization system. When instead of optimal VFI we focus on actual VFI, the need for transfers to close the VFI and the role of equalization transfers are equally valid.

In practice, there are different types of intergovernmental transfers—other than equalization—that can be justified in varied ways, and many of them can be considered to be either reducing or even closing the VFI. For instance, revenue sharing arrangements whereby subnational governments are entitled to a portion of the taxes collected by the central government in their jurisdictions, are usually unconditional and are therefore available to "fill" the fiscal gaps and help *close* the VFI. Some conditional transfers can also be used to close the VFI. This is the case of conditional block grants aimed at financing certain devolved functions. These functions should be partially financed with own revenue, otherwise the conditional block grants would be imposing a minimum level of expenditure and therefore rendering the function as delegated (instead of devolved); but if own revenue is being used the block grants are effectively closing the VFI. Matching grants are conditional transfers that *reduce* the VFI. Since matching grants require the receiving government to spend money in order to receive a predetermined share of the amount spent, then even if conditional, matching grants do not affect the devolved nature of the expenditure function. Moreover, since the effect of the matching share is to reduce the price of the public service, then it can be understood as a reduction in expenditure needs and therefore the VFI.

Other transfers are less related or simply unrelated to the VFI. For instance, some conditional transfers are allocated with the purpose of financing *delegated* responsibilities, which are ultimately responsibilities of the central government. Common examples are transfer programs aimed at investment and development, poverty alleviation and other specific objectives. If the responsibilities over these objectives have *not* been assigned to the subnational governments, and instead remain at the central level, then those transfers are not effectively financing subnational expenditure needs and are not affecting the VFI.

It follows that one important reason for the total amount of intergovernmental transfers to differ from the actual VFI is the presence of centrally funded mandates. When the central

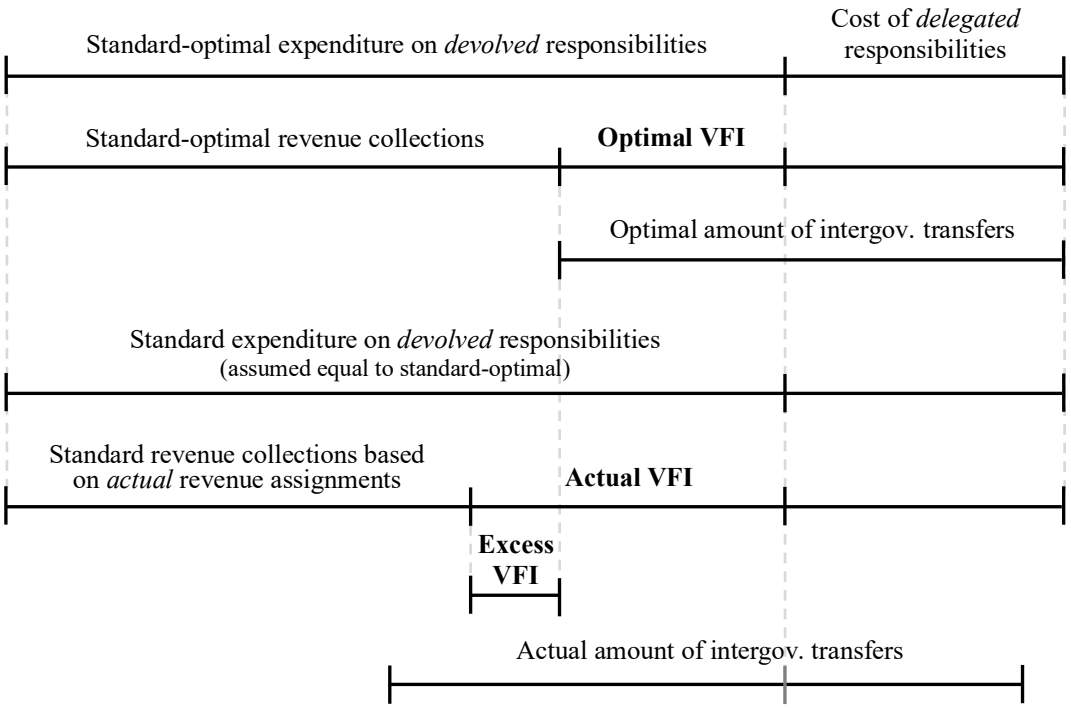
government retains responsibility over certain expenditure assignments and only administrative powers are devolved for their provision to subnational governments, then the conditional transfers provided will increase the total amount of transfers only, not the actual VFI.

In contrast, the incorporation of unfunded expenditure assignments, in which full autonomy is devolved to subnational governments with no additional revenue powers, may have no effect on the amounts of intergovernmental transfers and on subnational fiscal capacity, but it would increase the subnational levels of expenditure needs and thus also the actual VFI.

There is another reason for a wedge to exist between the actual VFI and transfers that has not been given enough attention in the empirical and theoretical literatures. Arguably because of the lack of clarity about the role of transfers in a decentralized system of government, it is common to find *mistakes* embedded in the process of allocating intergovernmental transfers, like ill-conceived equalization formulas that do not properly account for the fiscal capacity and expenditure needs of government units. These mistakes could ensure the presence of systematic differences between VFI and transfers. In the end, we can expect the difference between the two variables to vary, and often broadly, across countries.

Figure 2 shows how the amount of transfers given to subnational governments is related to the concepts of VFI introduced in previous sections. The sum of the optimal VFI and the cost of responsibilities that have been delegated (as opposed to devolved) to subnational governments corresponds to total the optimal amount of intergovernmental transfers that the central government should provide.

Figure 2. Optimal vs. Actual Measures of VFI and Intergovernmental Transfer Amounts



The actual VFI is equal to the difference between the standardized cost of the expenditure responsibilities devolved to subnational authorities—which consistent with previous discussions and as commonly done in the literature is here assumed to be optimal—and the standard revenue collections under the revenue powers devolved to subnational governments. The Figure presents a case in which the excess VFI is positive, a situation consistent with the interest of central government authorities to retain more revenue powers for themselves, and the interest of subnational authorities to reduce the tax burden of their constituents. Finally, the actual amount of intergovernmental transfers is subject to its own political and economic determinants, and as an illustration it is shown here to be different than the actual and optimal VFIs.

Another political-economy issue that has not yet received enough attention in the literature is that there seems to be no drawback to additional transfers from the recipients' perspective. Indeed, even in the presence of poor responsiveness, transfers are less costly for the local communities than their own revenue collections and thus unambiguously benefit both government authorities and potentially their constituents (depending on how resources are used). Since this can be expected to be true across the whole national territory, subnational authorities have strong incentives to push not only for more transfers from upper-level governments, but also for fewer

revenue assignments. Based on this idea, we may expect subnational governments to do little to obtain more revenue powers and unite in pressuring the central government for more transfers regardless of the size of the VFI. To complicate this matter, political interests at the central level could be reinforcing the pressure over the transfer amounts. For instance, Castro and Cisalpino (2025) find that Brazilian jurisdictions that rely more on transfers tend to support the incumbent president's party in presidential and congressional elections, which might create an incentive to influence the amounts of transfers at the central level. Overall, political efforts to modify the transfer amounts can distract from the national discussion about the proper assignment of fiscal responsibilities and the correct measurement of the VFI, and divert it into a poorly informed, less productive and possibly more antagonistic debate about the amounts of intergovernmental transfers.

The Negative Effects of Intergovernmental Transfers

Martinez-Vazquez and Sepulveda (2020) modelled accountability and showed that subnational government authorities can be expected to be less responsive to the needs and wants of their constituents when they receive more transfers. The reduction in responsiveness can happen because transfers give authorities the opportunity to benefit individually without imposing any additional costs on their constituents. In the extreme, they can be corruptly appropriating public funds, or more generally deviating resources to uses that are not properly responding to their community's needs and wants, or just being less careful in using them efficiently. From these simple relations, we can derive several hypotheses that can be explored empirically. For instance, transfers can affect efficiency, the level of corruption, tax revenue collections and composition, and the level and composition of expenditure at different levels of government.

There is already a well-developed literature on the effects of transfers on several important variables (see Lago et al. 2024 for a recent survey) and, importantly from the perspective of this paper, some effects of the aggregate amounts of transfers from the central to the subnational governments are being analyzed in the empirical literature under the label of the effects of VFI. Given the general absence of economic measures of the VFI (actual or optimal), these empirical studies use transfers (and sometimes add subnational borrowings) as proxies for the VFI. The result is a wide range of empirical results claiming that VFIs lead to increased government debt (Aldasoro and Seiferling 2014), a reduction in tax collection effort in local taxes (Jia et al. 2021),

or a reduction in the GDP (Eyraud and Lusinyan 2013). Meloni (2016) also concludes that the VFI drives "expansions in expenditures per capita and changes in expenditure composition, favoring current expenditures to the detriment of investment […] in election years". Following a different approach, Mitra and Chymis (2022) do not use a direct measure of VFI and link this variable to overspending, inefficiency, and lower economic growth. But since they do not distinguish VFI from actual transfers, it is not clear that these outputs are related with the VFI or could be attributed instead to intergovernmental transfers. All these findings are consistent with the negative effects that transfers are expected to have on subnational decisions. But a question that remains is whether all these studies are actually estimating the impact of VFI, or just the impact of intergovernmental transfers.

The lack of a clear distinction between intergovernmental transfers and VFI can have a negative (albeit unjustified) influence on our perception of fiscal decentralization reforms, as problems that should be associated with the *implementation* of fiscal decentralization policies, are attributed to the (optimal) *design* of the fiscal decentralization system. In this regard, for instance, Aldasoro and Seiferling (2014) "call for a degree of caution when promoting fiscal decentralization", while Smith and Revell (2016) rightfully call for putting more attention on micro-level behaviors of subnational authorities, but also suggest that the theory of decentralization is flawed. Here we consider the last suggestion unfounded, as it does not seem to be acknowledging that the literature has traditionally advised in favor of sound accountability mechanisms based on own revenues, and against the excessive use of transfers.

Balancing the System of Incentives

Of course, fiscal decentralization systems can be poorly designed and the actual VFI can be excessively big. Knowing this, the fiscal decentralization literature has amply recognized that intergovernmental transfers can have negative effects on subnational fiscal decisions, and that for this reason it must be accompanied by accountability mechanisms and a system of incentives that induce subnational authorities to behave more efficiently.

Fiscal autonomy, in both expenditure and revenue decisions, are considered to be a key element of a sound system of incentives in any fiscal decentralization system (Bird and Smart, 2002; Bahl and Martinez-Vazquez, 2006), as it makes the community more involved and aware of

the local authorities' decisions and therefore more active in holding them responsible for their performance.

Specifically, revenue autonomy and a significant share of own revenue collections, or equivalently the minimization of intergovernmental transfers as a source of subnational financing, has for long been considered a necessary condition for the proper functioning of the fiscal decentralization system (Bird 2000; McLure 2000; Martinez-Vazquez 2015). The empirical literature has largely supported this solution, as own tax revenues have been found to provide incentives to constrain government spending and improve the quality of the public infrastructure (Paler 2013; Gadenne 2017).

In addition to devolving significant expenditure and tax autonomy to subnational governments, there are other ways to introduce adequate incentives into the system. For instance, as usually explained, equalization transfers to subnational jurisdictions should not be determined by their *actual* expenditure and revenue. Instead, they should be calculated based on the expenditure needs and fiscal capacity of the jurisdiction, which in turn depend on the standard provision of public services and the standard level of tax effort defined nationally for the jurisdictions of a certain level of government. The use of these measures prevents the manipulation of (accounting) budgetary variables by subnational authorities that want to receive inefficient or unfair amounts of transfers. Additionally, the same measures of expenditure needs and fiscal capacity can provide a sense of fairness and transparency to the calculation of the VFI and the intergovernmental transfers necessary to close it. This may help to contain unjustified subnational pressures to increase the total amount of transfers from the central government and focus attention on what matters most: a sound assignment of expenditure and revenue responsibilities and their respective standards.

Conclusions

Intergovernmental transfers have been commonly used in the literature to measure the VFI in decentralized countries. Even though this practice is justified by the fact that the presence of a VFI means that transfers in the same amount are necessary for all government units to cover their expenditure needs, there are also good reasons to be more cautious about the relation between the two concepts. One reason is that transfers are not necessarily a good measure of the VFI. As explained, some transfers (e.g., for delegated responsibilities) are not meant to address the VFI,

and therefore considering them would overestimate the VFI. But even when transfers are meant to cover the VFI, their amounts could be based on erroneous estimations of fiscal capacities and expenditure needs. Methodological problems can indeed drive a wedge between the amount of transfers and the actual VFI.

The other reason is that the effects of intergovernmental transfers cannot be said to represent the effects of the VFI. The empirical literature has consistently found that transfers have negative effects on accountability and efficiency. As long as transfers are required under the presence of a VFI, these negative effects are part of the costs of that VFI. However, the same VFI can be justified economically by the presence of greater benefits in the form of efficiency gains. The optimal VFI is associated with the decentralization of government responsibilities that maximizes welfare, and here we have introduced the concept of excess VFI to represent any deviations from that optimal VFI. When the actual VFI is greater than the optimal VFI, the excess VFI is positive and leads to unnecessary costs and inefficiencies of the system. When the excess VFI is negative, then it would be welfare improving to assume higher costs from additional transfers because the associated benefits would be greater. It follows that the negative effects of transfers do not imply that there will be a welfare gain from reducing the size of the actual VFI or the transfer amount.

A constructive debate about the VFI should focus on much more than the negative effects of transfers. Identifying, measuring, and eliminating the excess VFI requires continuous analysis and debate about what revenue and expenditure assignments are best suited for each government level, as well as the use of proper methodologies to estimate the fiscal capacity and the expenditure needs of each government unit. Limiting policy recommendations to the reduction of transfers or the VFI, without addressing the most relevant topic of the optimal assignment of revenue and expenditure responsibilities, is misguided and can result in very counterproductive policy reforms.

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