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Fiscal Capacity: An Overview of Concepts and Measurement Issues and Their Applicability in the Russian Federation

Jorge Martinez-Vazquez
L.F. Jameson Boex

Georgia State University
ANDREW YOUNG SCHOOL OF POLICY STUDIES

FISCAL CAPACITY: AN OVERVIEW OF CONCEPTS AND MEASUREMENT ISSUES AND THEIR APPLICABILITY IN THE RUSSIAN FEDERATION

Policy Research Center, School of Policy Studies
Georgia State University*

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I. INTRODUCTION

Intergovernmental fiscal relations in the Russian Federation have evolved significantly since the onset of economic reforms in 1991. Since then, the Russian government has set out to replace the old Soviet system of expenditure norms and negotiated transfers with a more stable and transparent system of fiscal federalism that is compatible with a free market economy.

In a system of fiscal federalism, there are three reasons why a federal government may wish to support subnational government expenditures in general, or subnational spending on specific public goods and services. First, in the absence of federal government grants, regions could underprovide public goods for which significant externalities are present. An example of this is pollution control. A second reason for intergovernmental grants is the pursuit of macroeconomic stability. A third reason for intergovernmental transfers is the goal of explicit equalization of resources between regions.

Fundamental to the development of a system of intergovernmental transfers is an understanding of the concepts of fiscal capacity and fiscal effort. These concepts are presented in Section II. In Section III, this note will discuss a variety of ways in which fiscal capacity and effort can be measured; benefits and

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shortcomings of each of these measures will be discussed in detail. Section IV will provide a summary and make some concluding remarks. The next technical note on fiscal capacity will conduct an analysis of the measures available to the Government of the Russian Federation based on currently available data and techniques.

II. FISCAL CAPACITY AND FISCAL EFFORT

One of the most important reasons for the existence of intergovernmental transfers in the Russian Federation is the explicit goal of equalization of fiscal resources between subjects of the Federation. Equalization of resources between regions comprises two dimensions: the equalization of expenditure needs and the equalization of fiscal capacity. Equalization of expenditure needs occurs when subnational governments or regions receive transfers from the central government in order to compensate them for differences in the cost of providing a similar level of public services. This is briefly discussed in Box 1. While equalization of expenditure needs should be an important element of any equalization program, the focus of the current note will be the equalization of fiscal capacity.

Fiscal Capacity

The fiscal capacity of a region can be defined as the potential ability of the governments in the region to raise revenues from their own sources in order to pay for a standardized basket of public goods and services. A measure of fiscal capacity should be an important factor in determining the allocation of intergovernmental grants in order to equalize the amount of resources available to each of the regions.

Yet while there is a need for a good measure of fiscal capacity, the fiscal capacity of a region can not be easily quantified. While the level of revenue collection in a region may intuitively be considered as a good proxy for fiscal capacity, the amount of revenues collected is not a good measure of fiscal capacity in actuality. This is further explained below. It is generally hard to come up with a single number that represents the potential ability or capacity of a region to raise revenues. As will be discussed in the next section, all measures of fiscal capacity have some disadvantage associated with them. In the case of Russia, the lack of good data makes matters worse. The data that are necessary to compute measures of fiscal capacity are often low quality or may not be available at all in Russia.

BOX 1: Equalization of Expenditure Needs

Differences in social, economic and demographic characteristics could make it more costly for some regions to provide a certain level of public goods and services. For example, consider regions A and B. Both regions are equal in terms of population and economic characteristics, but Region B has a larger number of school-aged children.

	Region A	Region B
Cost per pupil (in $ 1000)	5	5
Number of pupils ('000)	100	200
Total Cost (in $ mn)	500	1000

In order for both regions to provide a similar level of school quality, Region B will obviously have to spend more. This region thus has a higher expenditure need. Other examples of characteristics that influence regional expenditure needs are input cost differentials, the unemployment level, etcetera.

An excellent discussion of how to measure the expenditure needs of regions is presented by ACIR (1990).

Before we proceed, let us explain the problems associated with measuring fiscal capacity by the actual amount of revenue collections in a region. There are several elements that create a gap between the amount of revenue raised by a region and the *potential ability* of a region to raise revenue. First, two

regions with the same fiscal capacity may collect different amounts of revenue as a result of applying different tax rates. Second, two regions with the same fiscal capacity may collect different amounts of revenue due to variances in the enforcement effort with which revenues are collected. Third, two regions with the same fiscal capacity may collect different amounts of revenue as a result of different levels of taxpayer compliance. Thus, while tax rates, enforcement effort and taxpayer compliance all affect the level of revenue collections, they do not affect the *potential ability* of regions to collect revenues.

The potential ability of a region to collect revenues, or fiscal capacity, is influenced by the economic structure of the region and by the availability of taxable resources, or tax bases. For example, the tax base of the enterprise profit tax (EPT) is the amount of taxable profit earned by an enterprise headquartered in the region. Other examples of tax bases are household income (tax base for the personal income tax), value added in the production process (value added tax), the value of taxable property holdings (property tax) and so on. It is obvious that regions with a smaller tax base will have a more limited potential ability to raise revenues.

Fiscal Effort

Fiscal effort can be defined as the degree to which a government or subnational region utilizes the revenue bases available to it. As such, the level of fiscal effort is affected by the level of the tax rates applied (if subnational governments have discretion over rate), by the level of exemptions granted (again if subnational governments have discretion over the structure of the tax), and by the tax enforcement effort exerted by the tax administration authorities. The level of fiscal effort is typically measured as the ratio of the actual amount of revenues collected to some measure of fiscal capacity. There are several reasons why

it is important to include a discussion of fiscal effort in concert with this treatment of fiscal capacity.

First, the degree of fiscal effort determines the gap between actual collections in a region and the region's fiscal capacity. The acknowledgment that different regions may exert different levels of fiscal effort emphasizes the fact that the revenues raised in a region and the revenue-raising ability of a region are two distinctly different concepts.

Second, fiscal effort itself may become a factor in the allocation of equalization grants. The idea is that grants could be allocated as the basis of the relative level of fiscal effort that regions exert. Regions that try harder to raise revenues but are still unable to finance a certain level of public services may be more worthy of receiving grant money. On the other hand, simply rewarding regions that exert higher levels of fiscal effort could result in the use of federal resources on regional projects that lack any merit. Higher levels of fiscal effort in some regions may simply be the result of higher levels of demand for government goods and services in those regions. Thus, even though a case can be made for encouragement of tax effort, the case is theoretically weak. There is no reason to give more federal moneys to regions that prefer to spend more of their gross incomes in the public sector rather than in the private sector. In theoretical terms, the best policy may be neither to discourage nor encourage tax effort. Federal policies should be neutral with respect to the tax effort of subnational governments. In countries with a short subnational government tradition in raising their own taxes, as in the case of Russia, it may be justified to have temporary policies that encourage tax effort.

Third, a thorough understanding of the concept of fiscal effort is crucial in the selection of a measure of fiscal capacity. Imagine for a moment that the central government would inadvisably select current revenue collections as their measure of fiscal capacity, to be used in the allocation of equalization grants.

This would give regions an incentive to collect less revenue from their own sources. This would be the case because reductions in the level of taxation would please voters, while the revenue shortfall would be offset (in part at least) by an increased level of transfers from the central government. The use of revenue collections as a measure of fiscal capacity would thus give subnational governments an incentive to lower tax rates and exert a lower degree of fiscal effort. For each measure of fiscal capacity considered in this note, we will discuss whether this measure is "incentive compatible" or not, meaning whether the measure of fiscal capacity is neutral or provides perverse incentives to subnational governments to collect their own taxes.

III. MEASURING FISCAL CAPACITY

Measures of fiscal capacity and fiscal effort are essential to the implementation of a national program of equalizing grants from the federal government to subnational governments. Since the level of fiscal effort is simply defined as the ratio of actual revenues collections divided by the region's fiscal capacity, we will forego any further discussion of the measurement of fiscal effort and solely focus on the measurement of fiscal capacity.

A variety of methods with which to measure a region's fiscal capacity are available.[2] First, we will discuss the use of revenue collections as a measure of fiscal capacity. Currently the Russian Federation uses revenue collections from a base year as its measure of fiscal capacity. Second, we will discuss per capita income, which is without doubt the most basic measure of fiscal capacity. Per capita income has

[2] This section draw heavily upon two reports by the U.S. Advisory Commission on Intergovernmental Relations (ACIR 1986; 1988).

extensively been used around the world as a proxy for fiscal capacity, including in the United States. Third, we will consider gross regional product (GRP) as a measure of fiscal capacity. A fourth measure of fiscal capacity that will be discussed is the level of total taxable resources (TTR). Fifth, we will discuss a measure of fiscal capacity called the Representative Tax System (RTS). Finally, we suggest a sixth method to measure fiscal capacity which uses regression analysis to arrive at a representative tax system. In the discussion of these alternative measures, we bear in mind the current context of intergovernmental fiscal relations in the Russian Federation.

Revenue Collections

As already noted earlier in this report, the level of current revenue collections is a poor proxy for tax capacity. First of all, this measure fails to recognize that the amount of collections is affected both by a region's fiscal capacity as well as its fiscal effort. Second, use of revenue collections as a proxy for fiscal capacity in the allocation of equalizing grants provides a perverse incentive to regions to lower their fiscal effort.

The Russian Federation currently uses the level of revenue collection for a base year as its measure of fiscal capacity, which is then adjusted for legislative changes. The use of data for a base year minimizes the perverse incentive for regions to reduce current revenue, because current transfer levels regions are no longer based on current revenue collections. However, the adjustment process is imperfect and subject to negotiation, resulting in an opaque system for the determination of intergovernmental transfers. The use of a base year may also not be incentive compatible over time. Regions that exert a low effort at present may benefit in the future years, if the base year is moved forward.

In addition, the accuracy of measures of fiscal capacity that are based on base year data are bound to deteriorate over time. This is especially true in light of the sweeping changes of the Russian economy that occurred since 1991. As a result, we believe that there are better measures available for the fiscal capacity of the regions of the Russian Federation than lagged revenue collections. Five alternative measures of fiscal capacity are discussed below. All of these alternative measures are incentive compatible for the regions and all of these measures are based on current (i.e., not base year or lagged) data.

Per Capita Personal Income

The most obvious source of revenue for a regional government is the income of its taxpaying residents. As a result, the most obvious measure (and one of the most widely used measures) of fiscal capacity has become the per capita level of personal income.

The main advantage of using per capita personal income as a measure of fiscal capacity is that its wide availability and its simplicity. The Russian statistical bureau, GOSKOMSTAT, annually publishes data on the income of the population of the subjects of the federation. In theory, the clarity and transparency of this measure is an important advantage. Even those not trained in economics have an intuitive understanding how per capita income is measured and why it is a good proxy for fiscal capacity.

While simplicity is the main advantage of per capita income, it is also its main disadvantage. First, there is the problem of measurement. In Russia, per capita income statistics may not necessarily reflect true per capita income because of different incidence across regions of the underground economy. But even without actual measurement problems per capita income is incomplete as a measure of the ability of regions

to raise revenues. In particular, this measure fails to account for the ability of subnational governments to tax economic resources or economic rents owned by residents outside their jurisdictions. Imagine, for example, that a region is heavily oriented towards tourism. While the region could collect significant amounts of revenues from the monies spent by tourists (through sales taxes, hotel taxes, etcetera), this increase in its ability to collect revenues is not (or only marginally) reflected in the per capita income of the region. In more general terms, the problem with per capita income as a measure of fiscal capacity is that it does not necessarily measure the tax bases available to each region well.

The most serious problem with the per capita income measure in Russia is that while data on the levels of regional per capita income may be available, the accuracy of the data may be questionable. Besides the existence of the underground economy, accurate measurement will be difficult in a country as large and economically diverse as Russia.

Gross Regional Product (GRP)

A third possible measure of fiscal capacity is gross regional product (GRP), the regional equivalent of gross domestic product (GDP). Gross regional product is defined as the total value of goods and services produced by the region's economic resources (land, labor and capital) over a given period of time. Since the total value of goods and services produced in a region is equal to the income received by the owners of the employed economic resources, GRP reflects the total amount of income potentially subject to taxation by the regional government. GRP is a more comprehensive measure of the fiscal capacity than per capita income because GRP includes income generated within a region irrespective of the location of residence of the worker or producer.

In practice, GRP will include a substantial share of the personal income of the residents in a region, since most of the residents of a region also work or own businesses in the same region. In addition, GRP also includes the incomes of nonresidents that a regional government may tax. Continuing the earlier example, unlike per capita income, gross regional product would include the monies spent by tourists on accommodations and purchases within the region.

Despite the more comprehensive nature of GRP, this measure still suffers from a certain one-dimensionality as a measure of fiscal capacity. While in reality different tax bases may be subject to different levels of taxation, GRP simply aggregates the value added by all economic resources. At the same time, computation of gross regional product is data intensive and is currently only available for the regions of the Russian Federation for certain time periods.

Other problems with the use of GRP as a measure of fiscal capacity are specific to the structure of Russia's taxes. For example, the collections of the Enterprise Profit Tax (EPT) at present is based on the location of corporate headquarters, not on the location of economic activity of the company. This drives a wedge between the definition of fiscal capacity and the definition of GRP. In other countries, the income of enterprises is apportioned among regions where these firms are activethrough the use of formulas that include factors such as location of property, workers, and sales.

In summary, while GRP is a more complete measure of fiscal capacity than per capita income, there still exists some mismatch between the true taxable resources available to a region and GRP. An attempt to adjust for some of this mismatch is made for a measure referred to as Total Taxable Resource.

Total Taxable Resources (TTR)

Total Taxable Resources (TTR) is a measure of fiscal capacity that is closely related to gross regional product (GRP). The federal government of the United States started using TTR as a measure of fiscal capacity in 1987.

Total Taxable Resources recognizes that while dGRP is a good measure of the total amount of economic activity that takes place in a region, GRP does not include the effect of certain federal taxes and transfers on the fiscal capacity of subnational regions. As such, several adjustment are made to GRP to arrive at TTR. First, certain federal taxes are subtracted from gross regional product, because these funds are unavailable to regional and local government as a source of revenue. In the United States, the federal indirect taxes that are subtracted from GRP include social security taxes and federal pension funds. Next, to arrive at TTR, each region's GRP has to be augmented with the amount of direct federal transfers to firms and individuals, including federal pensions and unemployment benefits. After all, these transfers increase the wealth of a region's producers and households, which in turn increases the ability of the region to raise revenues. In addition, in the case of the Russian Federation adjustments would have to be made to correct for the wedge between GRP and the total amount of taxable resources erected by the structure of the Enterprise Profit Tax. A summary of the adjustments necessary to arrive at TTR is provided in Box 2.

BOX 2: TOTAL TAXABLE RESOURCES

Total Taxable Resources (TTR) is a measure of the all the taxable resources that are available to a region. The basis for this measure of fiscal capacity is gross regional product (GRP). However, several adjustment need to be made to GRP to arrive at a true measure of a region's total taxable resources. An numerical example will illustrate the procedure.

The first set of adjustments that needs to be made to GRP in order to arrive at TTR is the correction for federal indirect business taxes and federal transfers (subsidies) to firms and households. The rationale for this adjustment is that federal indirect business taxes reduce the ability of regions to raise revenues, while subsidies to firms or households in the region will enhance the region's ability to raise revenues. These adjustments can be quite significant, as federal social security taxes and pension funds are major components of the indirect taxes under consideration.

The adjustments for federal taxes and subsidies are reflected in the numerical example below. The gross regional product of Region A equals 5000 units. The firms in the region pay a total of 600 units in indirect federal business taxes to the central government, such as payroll taxes for social security taxes. However, firms and households in the region receive a total of 100 units of federal subsidies. The intermediate balance based on the adjustments made so far is 4500 units.

The second set of adjustments that needs to be made pertains to the structure of the Enterprise Profit Tax (EPT) in the Russian Federation. Rather than taxing profits where they are made, the EPT taxes the profit at the location of the corporate headquarters. If regions were to have discretion over the tax rates, this would provide an incentive to firms to locate their headquarters in low-taxing jurisdictions. In addition, it creates a wedge between the taxable resources of a region and the GRP, because GRP allocates profits regardless of the location of a firm's headquarters (HQ). Therefore, the intermediate balance needs to be adjusted by subtracting any profit generated in the region by firms that are headquartered outside the region. However, we must add any profits generated outside the region by firms that are headquartered inside the region. The resulting amount indicates the total amount of taxable resources of a region.

Continuing the numerical example for Region A, let us assume that a number of firms that are not headquartered in Region A do engage in economic activities there. As a result of these activities, the firms earn an additional profit of 1300 units. This amount is to be subtracted from the subtotal. However, at the same time there are firms that are headquartered in Region A but that are involved in business in other regions as well. These activities outside the region earn these firms an addition profit of 1400 units. These are additions to TTR. As a result, the Total Taxable Resources of Region A equal 4600 units.

Gross Regional Product	5000.00
Federal Indirect Business Taxes (-)	600.00
Payment of Federal Subsidies / Benefits (+)	100.00
Intermediate Balance	4500.00
Profits Generated in Region by Firms with HQ Outside Region (-)	1300.00
Profits Generated Outside Region, by Firms with HQ in Region (+)	1400.00
Total Taxable Resources	4600.00

The advantage of TTR as a measure of fiscal capacity is that it provides a more accurate reflection of a region's actual fiscal capacity. Its disadvantages are similar to those of the use of gross regional product; its computation is actually more data intensive. TTR is a potentially feasible measure of capacity for the Russian Federation, but the data required for its computation may not be available at the present time.

Representative Tax System (RTS)

In order to move away from the one-dimensionality suffered by the measure of fiscal capacity reviewed so far, the U.S. Advisory Commission on Intergovernmental Relations developed the Representative Tax System (RTS). As a measure of fiscal capacity for a region, the fundamental concept underlying the RTS is to calculate the amount of revenue that a region would collect if it were to exert average fiscal effort. This is done by collecting data on revenue collections and (proxies for) tax bases for each of the taxes under consideration for every subnational regions. Based upon information on all tax bases for every region as well as the national average fiscal effort for each of the taxes (which is explained below), we can compute the amount of revenues that each region would collect under average fiscal effort. This amount is then considered to accurately quantify the fiscal capacity of each region. The main benefit of RTS is that computations are made at a disaggregated level and based on detailed knowledge of (proxies for) the statutory tax bases.

The Representative Tax System consists of five elements: (1) determination of revenue coverage, (2) classification of revenues into sources, (3) definition of standard tax bases, (4) determination of average

tax rates, and (5) the estimation of fiscal capacity. The discussion of the mechanism that follows is organized around these five elements.

Revenue Coverage. In order to produce the best measure of fiscal capacity possible, the RTS should take into account all the taxes and quasi-taxes levied by regional and local governments. The revenue sources of the governments considered for the purpose of RTS should include quasi-taxes such as vehicle taxes, license or registration fees, permits, user charges and fines. Since profits from regional government-owned businesses also enhance the fiscal capacity of regions, they should also be included in the revenues covered by the estimation of fiscal capacity.

Classification of Revenues. The next step in the process of computing fiscal capacity in the RTS is to classify each revenue item based on its source. This needs to be done because a government's ability to derive revenues from a source tends to be unique for each type of tax.

For this purpose, all revenue items need to be grouped into tax components. A tax component is a group of tax items which rely on the same source. For instance, a variety of regional excises taxes on distilled alcoholic beverages can be grouped into one tax component. In this manner all revenue items are combined into tax components. For example, the Representative Tax System in Canada consists of 33 components; data for each of these components are available for each of Canada's ten provinces. In the United States, the RTS incorporates 27 state tax components, ranging from more detailed components such as "Selected Sales Taxes on Distilled Spirits" to a component for "General Sales and Gross Receipts Taxes." A complete listing of the tax components of the RTS in the United States is presented in Table 1.

Defining Standard Tax Bases. The next step in computing fiscal capacity is to define a standard tax base for each of the tax components. Sometimes, data on the statutory tax base can function as the

standard tax base . This is possible when the statutory tax base is defined the same across all the regions, and when data on the statutory tax base are available. While in the United States there are large variations in statutory tax bases for state and local taxes, tax bases are more consistently defined in the Russian Federation. This is especially the case for a number of taxes that are shared between the Russian federal government and the regional governments.

Defining standard tax bases for other tax components may not be as simple. For many regional and local taxes and quasi-taxes, the statutory tax bases may vary from region to region, or data on statutory tax bases may simply be unavailable. In those cases, proxies will have to be found for the standard tax bases of these tax components. Requirements for the selection of proxies for the standard tax bases include the following: (1) That they are closely related to the statutory tax base as possible, (2) that they are well-defined, and (3) that consistent data are available for them for all regions. Examples of proxies of tax bases in the U.S. RTS system are the consumption of distilled spirits (in gallons), which functions as a proxy for the tax base of the component "Selected Sales Taxes on Distilled Spirits." The amount of retail sales and receipts of selected service industries services as a proxy for the tax base for the component "General Sales and Gross Receipts Taxes." A complete listing of the standard tax bases from the U.S. representation tax system is presented in Table 1.

Table 1: Tax Components and Tax Bases of the U.S. Representative Tax System (RTS)

Tax Component	Description on Standard Tax Base
Gross Sales and Gross Receipts Taxes	Retail sales and receipt from selected service industries
Selective Sales Taxes on Paramutual	Paramutual turnover from horse and dog racing and jai alai
Selective Sales Taxes on Motor Fuel	Fuel consumption in gallons
Selective Sales Taxes on Insurance	Insurance premiums: life, health, property and liability
Selective Sales Taxes on Tobacco	Cigarette consumption in packages
Selective Sales Taxes on Amusement	Receipt of amusement and entertainment businesses
Selective Sales Taxes on Public Utilities	Revenues of electric, gas, and telephone companies
Selective Sales Taxes on Distilled Spirits	Consumption of distilled spirits in gallons
Selective Sales Taxes on Beer	Consumption of beer in barrels (31 gallons)
Selective Sales Taxes on Wine	Consumption of wine in gallons
Vehicle Operator License Taxes	Number of motor vehicle operators' licenses
Corporation License Taxes	Number of corporations
Hunting and Fishing License Taxes	Number of hunting and fishing licenses
License Taxes for Alcoholic Beverages	Number of licenses for the sale of distilled spirits
Automobile License Taxes	Number of private automobile registrations
Truck License Taxes	Number of private truck registrations
Personal Income Taxes	Federal income tax liability
Corporate Income Taxes / Net Worth Taxes	Corporate profits
Residential Property Taxes	Market value of residential property
Property Taxes on Farms	Market value of farm real estate
Commercial/Industrial Property Taxes	Net book value of inventories, property, plant and equipment
Property Taxes on Public Utilities	Net book value of fixed assets for elec., gas and phone companies
Estate and Gift Taxes	Federal estate and gift tax collections
Severance Taxes on Oil and Gas	Value of oil and gas production
Severance Taxes on Coal	Value of coal production
Severance Taxes on Nonfuel Minerals	Value of nonfuel mineral production
Other Taxes	Personal Income

An important feature of this methodology is that data used for the purpose of defining the standard tax bases need to be drawn from independent sources that cannot be manipulated by individual regions. The data source and composition of the data will need to be considered critically before selecting each standard tax base. For example, an obvious standard tax base for the general sales taxes in Russia would be the amount of turnover reported by the State Tax Service. However, the amount of turnover reported by the regional offices of the state tax service will greatly depend on the effort and diligence with which the regional tax inspectors scrutinize and audit taxpayers. While the regional offices of the tax service are technically part of the federal bureaucracy, regional offices can be greatly influenced by regional politicians. The introduction of such biases into the measurement of standard tax bases for each of the tax components needs to be avoided.

Determining Average Tax Rates. Once standard tax bases are defined for all the tax components under consideration, we need to determine the representative (or average) tax rate that applies to each of the tax components. For this purpose, we do not rely on statutory tax rates. Instead, determination of the average tax rate involves computing a weighted average of the actual tax rates levied by all the regions.

First, for each tax component we add up the revenue generated across all regions. Then this amount is divided by the standard tax base for this item aggregated across all regions. The resulting ratio is defined as the average or representative tax rate for this tax component. An example using U.S. data may again be illustrative. In 1988, all state and local governments in the United States collected a total of $ 108 billion in general sales taxes, based on roughly $ 1,800 billion in retail sales and receipts for selected

services, which is the standard tax base for this component. This results in a representative or average tax rate of (108/1800=) 6 percent. It should be noted that this rate actually incorporates the average fiscal effort exerted by all subnational governments and not just the average applicable tax rate.

Estimating Fiscal Capacity. The final step in the Representative Tax System is to determine the fiscal capacity for each region. This involves applying the average tax rate (as computed in the previous step for the entire country) for each tax component to the respective standard tax base of the region. The total amount that follows from these computations represents the total amount of revenues that each region would have collected under average fiscal effort. This is the amount considered to represent the fiscal capacity of the region.

Overall, the Representative Tax System (RTS) is a thorough and complete method to accurately measure the fiscal capacity of a region. It is based on disaggregated data and takes into account variations in tax rates among various taxes components and non-tax revenue sources. As a result, fiscal capacity as measured by the RTS can be considered a more accurate representation of a region's true fiscal capacity. However, by the disaggregated nature of the computations, the measure is extremely data intensive. Thus far, no computations of fiscal capacity using RTS are available for the Russian Federation.

Representative Tax System (RTS) Using Regression Analysis

The main benefit of the Representative Tax System (RTS) as a measure of fiscal capacity is its accuracy. However, the method's intensive data requirements may prevent its implementation in some countries. An alternative solution that would maintain much of the accuracy of the RTS while reducing its

data requirements is by introducing regression analysis to the RTS method.[3]

The use of regression analysis in the Representative Tax System dramatically reduces the data requirements for the measurement process. Rather than collecting data on the actual collections and tax bases for every single tax component, the RTS regression method only requires information on the total amount of revenues collected for each region plus data on a series of proxies for the tax bases for each region. While the integrity of the data still needs to be guarded, the requirements on the proxies for the tax bases are somewhat less strict. Most importantly, there is no need to group revenue items into tax components and to specifically match each tax component with a standard tax base.

Alternatively, the RTS regression method can be expanded to include disaggregated information on the main revenue sources, their proxies, and proxies for the remainder of revenues. Incorporating more explanatory variables in the regression model increases the accuracy of the RTS regression approach, albeit at the cost of more intense data requirements and more intensive data analysis.

Once a variety of tax bases is selected and data on their respective sizes are gathered, we use regression analysis to estimate the fiscal capacity of a region. Regression analysis is a statistical technique that can be used to predict the value of one variable based on one or more other known variables. The regression will estimate the parameters B_o, B_1, B_2, and so forth for an equation in the form:

$$\text{Total Collections} = B_0 + B_1 (\text{Tax Base 1}) + B_2 (\text{Tax Base 2}) + B_3 (\text{Tax Base 3}) + \ldots$$

Once the regression has estimated the equation parameters, we can use these parameters to predict

[3] This approach as a measure of fiscal capacity for the Russian Federation was proposed in the previous technical note, "A Methodological Note on the Reform of Equalization Transfers in the Russian Federation," Policy Research Center, Georgia State University.

the amount of revenue collections for each region. This is done by substituting the actual values for the tax base proxies in the region back in the equation and multiplying each of the proxies by the respective estimated coefficient. The predicted amount of revenue collections for each region that follows from the regression equation represents the amount of revenue collections that each region would collect under average fiscal effort. Similar to the RTS method without regression analysis, this amount can be interpreted as the fiscal capacity for a region. The variations in collections not explained by the regression can be interpreted as arising from variations in fiscal effort among the regions. Thus for a region where actual collections are larger than predicted collections, this difference can be interpreted as a measure of the greater (than average) effort exercised by this region.

The regression method has several benefits over the computational version of the RTS. First of all, use of regression analysis avoids the necessity of having to exactly define tax components, define standard tax bases and compute representative tax rates. The regression equation can provide information on the relationship between revenue collections and the tax bases as part of the statistical procedure. Computationally, the procedure is much simpler. In addition, other than the selection of proxies for the tax bases, little manipulation of the results is possible.

However, even the regression approach has its shortcomings. Computationally, the number of tax bases which can be included in the regression equation is limited by the available number of regions. This is less of a problem for the Russian Federation because of the large number of regions. More importantly, the representative tax system using regression analysis is relatively complex and not as transparent as other measures of fiscal capacity, such as per capita income. The average policymaker is not likely to be familiar with the statistical techniques involved, and therefore he may view them with suspicion. Since transparency

and simplicity are desired features of any measure used in for the purpose of determining public policy, the shortcomings should be taken into account in the decision of what measure of fiscal capacity should be used..

IV. SUMMARY

The purpose of this note was to present an introductory review of the concepts of fiscal capacity and fiscal effort. The note outlines a variety of ways in which fiscal capacity (and thus fiscal effort) could be measured. We discussed the advantages and disadvantages of the following measures of fiscal capacity: (1) revenue collections, (2) per capita income, (3) Gross Regional Product (GRP), (4) Total Taxable Resources (TTR), (5) the Representative Tax System (RTS), and (6) RTS using regression analysis. The next technical note will attempt to illustrate, quantify and compare these six different approaches using data for the Russian Federation.

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