

SUMMARY OF THE PREVIOUS METHODOLOGY FOR ESTIMATING TOTAL TAXABLE RESOURCES

The 1983 legislation reauthorizing the Revenue Sharing Program (P.L. 98-185) directed the Secretary of the Treasury to undertake a series of studies of Federal-state-local fiscal relations. A specific concern of the Congress was the validity of the measures of revenue-raising capacity used in the grant allocation formulas of Revenue Sharing and other Federal grant programs. One of the outcomes of Treasury's response to this concern was the development of Total Taxable Resources (TTR), an entirely new measure of the capacity of states to raise public revenues.¹ Subsequently, the Congress introduced TTR into the allocation formula for the Alcohol, Drug Abuse, and Mental Health Block Grant and the General Accounting Office has recommended its inclusion in the grant allocation formulas of Medicaid and the Maternal and Child Health Block Grant.

TTR provides a more comprehensive assessment of revenue-raising capacity than resident personal income, the measure of this capacity employed in many federal grant allocation formulas. TTR not only takes into account the personal income of the residents of a state, but also income produced in a state but received by non-residents. These notes review the rationale for TTR and describe the method for its calculation.² This is followed by a discussion of TTR estimates for 1982 through 1989.

Rational for TTR

Measures of revenue-raising capacity allow Federal policies and programs to systematically take into account the relative capacity of states to pay for public services. These "ability-to-pay" measures provide quantitative means-test criteria for allocating Federal grants among the states and yardsticks to assess state fiscal conditions.

From the perspective of an individual or household, ability-to-pay would be best measured by what economists refer to as income comprehensively defined or economic income.³ This measure takes into account all flows of income received by households in terms of total consumption of all goods and services plus changes in net worth. The closest proxy to this

¹The concept was initially articulated by Max B. Sawicky and introduced in the Office of State and Local Finance, U.S. Department of the Treasury, Federal-State-Local Fiscal Relations: A Report to the President and the Congress (September 30, 1985). For more detailed discussions, see Max B. Sawicky, "The 'Total Taxable Resources' Definition of State Revenue-Raising Ability" and John T. Carnevale, "Experimental Estimates of Total Taxable Resources, 1981-84," Federal-State-Local Fiscal Relations: Technical Papers, Volume I (September 1986), pp. 63-94 and pp. 119-32, respectively.

²This method differs from the method employed by the Treasury in developing experimental TTR estimates in 1985. See Carnevale, ibid.

³Richard Musgrave and Peggy Musgrave, Public Finance in Theory and Practice, (New York: McGraw-Hill, 1973), pp. 225-237.

theoretical construct is personal income (PI) as defined and estimated on a regular basis by the Department of Commerce.

With the implicit assumption that the revenue-raising capacity of states is the same as the sum of the abilities of the residents of states to bear economic burdens, PI has been introduced in many federal grant formulas and widely used as a yardstick to assess the fiscal conditions of states. This key assumption is quite reasonable if it can also be assumed that states have closed economies; that is, all the income produced in a state is received by its residents. Unfortunately, this latter assumption is not tenable. States have open economies characterized by extensive cross boundary income flows. It is noteworthy that a major criticism of the use of PI as an indicator of revenue-raising capacity is that it fails to account for important flows of income produced in a state, the proceeds of which may accrue to non-residents--commuter earnings or distributions of profits to non-residents from in-state firms, for example. Since PI fails to take such income flows into account, it is argued that it significantly underestimates the revenue-raising capacity of several states.

Given these concerns, it has been suggested that a comprehensive measure of income produced in a state, gross state product (GSP), be used as a measure of the revenue-raising capacity of states.⁴ It takes into account all income produced in a state whether it accrues to residents or non-residents. In closed economies, GSP or income produced in a state would just about equal PI or the income received by its residents and therefor PI and GSP are reasonable substitutes for each other. Closed economy assumptions, however, are not tenable. Consequently, GSP suffers from limitations analogous to those that affect PI. Specifically, GSP fails to take into account income flows to state residents from out-of-state sources. As a result, it underestimates the revenue-raising capacities of states whose residents are recipients of significant amounts of income from out-of-state sources--flows of dividend and transfer income from out-of state to in-state retirees, for example.

For the most part, the income flows ignored by PI are captured by GSP and *vice versa*.⁵ It should not be surprising, therefore, that there have been suggestions that measures of income produced and income received be combined in order to provide a comprehensive indicator of a state's revenue-raising capacity. In principle, a combined measure would provide a complete accounting of all income flows a state would potentially be able to tap in order to finance its

⁴A persuasive case for the use of GSP as a measure of the revenue-raising capacity of states is made in Robert H. Aten, "Gross State Product: a Measure of Fiscal Capacity," Reeves, J. Clyde, Ed., Measuring Fiscal Capacity, (Boston: Oelgeschlager, Gunn and Hain, 1986), pp. 97-140.

⁵For a variety of reasons, the actual dollar measures of PI and GSP would not equal each other in a closed economy. For example, PI measures flows of current income received by the residents of a state and therefore does not take into account retained corporate earnings included in GSP.

public sector. Suggestions for such a combined measure date to the early 1940's.⁶ Until recently, there were two major problems with the idea. While estimates of state personal income have been published for decades, no estimates of income produced of comparable quality were available. Even if such measures had been available, it was not entirely clear how they might have been combined to form a comprehensive indicator of a state's revenue-raising capacity. The publication of experimental GSP estimates in 1985 by BEA combined with a commitment to produce annual GSP data resolved the former problem.⁷ The development of TTR is a response to the latter problem.

In broad conceptual terms, TTR attempts to provide a comprehensive measure of the overall economic well-being of a state by providing a full accounting of the aggregate flows of income available for public or private purposes. This ensures that all income streams potentially available for public financing are taken into account.

Treatment of Interstate Income Flows

The central analytic issue in the development of measures of TTR is how to handle interstate flows of income. Options for treating these flows are usefully addressed in terms of a hypothetical three-state example (see Table 1). All three states produce \$100 of income and their residents receive \$100 in income, but they differ in terms of interstate income flows.

TABLE 1
AN HYPOTHETICAL EXAMPLE

	States	Income Produced in			Total
		A	B	C	
Income Received by Residents of:	A	\$100	-	-	\$100
	B	-	\$ 80	\$ 20	100
	C	-	20	80	100
	Total	\$100	\$100	\$100	

⁶See Paul Studenski, "Measurement of Variations in State Economic and Fiscal Capacity" Bureau Memorandum No. 50, Social Security Board (March 1943). A subsequent discussion of the idea is provided by Robert D. Reischauer, Rich Governments--Poor Governments, Chapter III, "Measuring Fiscal Capacity," unpublished Brookings staff paper (1978).

⁷Bureau of Economic Analyses, U.S. Department of Commerce, Experimental Estimates of Gross State Product by Industry (May 1985).

State A has a closed economy in which all the income produced in the state is received by its residents. Eighty percent of income produced in State B is received by its residents, while 20 percent is received by the residents of State C. A similar situation exists for State C whose residents receive 80 percent the income produced there, while 20 percent is received by the residents of State B.

The 1985 experimental TTR estimates adopted the following approach for calculating TTR--income received by a state's residents from out-of-state sources was added to estimates of total income produced in the state (see Table 2).

TABLE 2
TTR: 1985 EXPERIMENTAL METHOD

	States		
	A	B	C
Income Produced	\$100	\$100	\$100
Out-of-State Income Received	-	20	20
TTR	\$100	\$120	\$120

Given this method, states B and C are assigned TTR measures 20 percent larger than State A, despite the fact that all three states are equal in terms of total income produced and received. Such a result is due to the fact that interstate income flows are counted twice--they are fully credited to the revenue-raising capacities of both the states where the income is produced and to where it is received.

Upon some consideration, it was concluded that this approach to the treatment of interstate income flows is not entirely appropriate. The logic of the experimental method suggests that income just produced or just received by a state is as important to a state's revenue-raising capacity as income both produced and received in a state. In other words, there is an implicit assumption that both producing and receiving states can, with impunity, tax interstate income flows at the same rate as flows that remain entirely within their boundaries. Even casual observation of the fiscal behavior of states suggest that this is simply not the case. For example, widespread provisions for the deductibility of out-of-state taxes on commuter earnings reflect an appreciation that higher effective rates on these interstate flows could elicit behavioral responses that would significantly reduce the contribution of these flows to a state economy.

Another perspective on the limitations of the experimental method is provided if one assumes that states B and C in the hypothetical example were combined to form a single state. In these circumstances the combined revenue-raising capacity of the amalgamated state would be

reduced 20 percent--total income both produced and received in the state would equal \$200 with no flows of income from out-of-state sources. Thus, given the experimental method, TTR is to a significant degree an artifact of how political boundaries are drawn. Clearly, the influence of political boundaries should not be allowed to distort the measurement of the underlying economic activities within those boundaries.

The critical problem is how to attribute interstate income flows to the revenue-raising capacities of producing and receiving states. This would involve allocating some portion of contributions of commuter earnings and interstate flows of dividend, rent, interest, and transfer payments to both where these flows are produced and to where they are received. Unfortunately, there is no readily apparent method for undertaking such allocation based on either theory or empirical findings. Since it is clear that the interstate income flows contribute to the revenue-raising capacities of both producing and receiving states, a reasonable expedient is to assume that such flows contribute equally to both producing and receiving states. However, these contributions only should be counted once in aggregate from the perspective of the nation. This would require that one-half income just produced and one-half income just received be combined with income that is both produced and received in a state (see Table 3).

TABLE 3

TTR: PROPOSED METHOD

	States		
	A	B	C
Income produced and received	\$100	\$ 80	\$ 80
(.5) Income just produced	-	10	10
(.5) Income just received	-	10	10
TTR	\$100	\$100	\$100

Given this method, the TTR measures of all three states in the hypothetical example would be identical--a result far more plausible than that generated by the method employed in preparing the experimental estimates.

It should be pointed out that TTR can be estimated if, as is the case, data on interstate income flows are incomplete. All that is required are reasonable indices of total income produced in a state and total income received by a state's residents. This can be seen by the following simple algebra.

Let

a = income both produced and received in a state

b = income just received in a state

c = income just produced in a state

then:

a + b = total income received in a state

a + c = total income produced in a state

Then the proposed method for making the calculation is

$$\text{TTR} = a + .5b + .5c$$

which also can be expressed as

$$\begin{aligned} \text{TTR} &= \frac{2a + b + c}{2} \\ &= \frac{(a + b) + (a + c)}{2} \end{aligned}$$

In other words, TTR can be estimated by averaging indices of income produced and income received.

A Calculus Specified

The above suggests two possible approaches for calculating TTR (1) adding to income flows both produced and received in state one-half the flows just produced and one-half the flows just received or (2) allocating aggregate flows of income according to an average of indices of income produced and income received in a state. Given the limitations of the available data sets, the former method is not readily feasible. As indicated above, comprehensive indicators of income produced and income received are available from the Bureau of Economic Analysis (BEA) for implementing the latter approach.

Indicators of income produced are provided by BEA estimates of gross state product (GSP) which represent an allocation to the state level of the national aggregate of gross domestic product (GDP).⁸ There are several available indicators of income received at the state level, the

⁸For a discussions of BEA estimates of GSP, see Vernon Renshaw, Edward A. Trott, Jr. and Howard L. Friedenberg, "Gross State Product by Industry, 1963-86" Survey of Current Business, Vol. 68, No. 5 (May 1988), pp. 30-46 and Edward A. Trott, Jr., Ann Dunbar, and Howard L. Friedenberg, "Gross State Product by Industry, 1977-89" Survey of Current Business, Vol. 71, No. 12 (December 1991), pp. 43-59.

most comprehensive of which is state personal income also provided by BEA.⁹

For the purposes of calculating TTR, GDP is used rather than the sum of GSP. While conceptually equivalent, total GSP is slightly smaller than GDP (less than 0.4 percent difference) largely because it excludes the wages and salaries of federal civilians and military personnel stationed abroad that can not be disaggregated among the states.¹⁰

Operationally then, estimating TTR involves allocating total GDP in proportion to an average of indices of income produced and income received. GDP represents a comprehensive measure of total income produced within the nation's boundaries and, by inference, it also measures total income received by the residents of the U.S. Calculation of TTR involves allocating this aggregate among the states in proportion to state PI and to GSP. TTR for each state is the average of these allocations, with the measure calculated as follows:

$$\text{TTR} = 0.5(\text{PI}_s/\text{PI}_n + \text{GSP}_s/\text{GSP}_n)\text{GSP}_n$$

where PI_n = U.S. personal income
 PI_s = state personal income
 GSP_s = gross state product
 GDP = gross domestic product

It should be noted that PI is a somewhat less comprehensive measure than GSP. For example, it does not reflect changes in the value of assets that are affected by the level of retained corporate earnings included in GSP. Therefore, implicit in this procedure for calculating TTR is that the income flows not accounted for by PI are distributed among the states in proportion to the components that are measured.

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⁹Various indicators of income received are evaluated by Stephen M. Barro, State Fiscal Capacity: An Assessment of Measurement Methods, report prepared for the U.S. Department of Housing and Urban Development (Washington, D.C., SMB Economic Research, Inc., 1984).

¹⁰A detailed crosswalk between GDP and total GSP is provided in Table A in Renshaw, et al, op. cit., p. 31.