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The Distribution of Tax Burdens and Government Expenditure Benefits in Metro and Nonmetro Arizona

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The distribution of household income among classes is often perceived as an important policy issue by political decision makers and their constituency. Data from the U.S. Bureau of the Census for Arizona and eleven Western States¹ indicate the extent and nature of their income distribution problem. More than one-third of all families in Arizona and one-fourth in the Western states had incomes of less than \$7,000 in 1969. Over 11% of Arizona's families were in poverty compared with approximately 9% for the eleven Western states. The incidence of poverty in non-metro Arizona in both 1959 and 1969 was nearly double the metro rate, while the proportion of families with incomes over \$15,000 in 1969 was only half that of metro Arizona [U.S. Bureau of the Census].

The changing importance of government fiscal policy in determining a person's real disposable income is suggested by data on taxes paid by Arizonans. Taxes paid to all levels of government increased from 17% of personal income in 1950 to 27% in 1974 [Valley National Bank].

No estimates are available which suggest the distributional impact, among income classes of Arizona households, of tax burdens and expenditure benefits. This is the first study to make these estimates for metropolitan and nonmetropolitan Arizona and, so far as we know, for any single Western state. The study uses primary data for 1974. A relatively new theoretical and empirical

technique is employed to estimate an important part of fiscal impacts—the distribution of public goods benefits among income classes. Policy suggestions are given.

Methodology

Three basic sets of computations were performed in estimating the distributional impacts of government fiscal policy. Each set of computations was based on primary data gathered from a stratified random sample of Arizona's urban and rural households and upon theoretical and accounting procedures described in this section. The first computations determined the initial (pre-tax, pre-benefit) income of each household. The second set of computations estimated the amount of tax burden and expenditure benefits occurring to each income group. Finally, tax burdens and expenditure benefits of each income class were compared to the initial (pre-fiscal) income so that the progressiveness of the fiscal policy could be determined.

To estimate the distribution of government expenditure benefits, government expenditures must be divided between those for public and those for specific goods. A public good is non-excludable; the consumption of it by one person does not exclude the consumption by another. Thus, public goods enter every household's utility function in equal amounts, but are valued differently by different households. Specific goods, by contrast, are consumed entirely by an individual and are valued at the market price of the good. National defense is a common example of a public good, while food stamps are government provided specific goods.

Government expenditures for public goods are defined by the Tax Foundation as those for national defense, international affairs, general government (excluding interest), postal service, civilian safety,

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¹The eleven Western states include: Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington and Wyoming.

transportation (excluding highways), commerce and finance, health and sanitation, natural resources, public utilities, and other miscellaneous expenditures. All other government expenditures are treated as specific goods. Aaron and McGuire and Maital use this definition of public goods, labeled Alternative A, for "low total quantity of public goods" plus a second definition which consists of the above items plus portions of expenditures on elementary and secondary education (.7), public assistance and welfare (.3), veterans' benefits and services (.3), highways (.5), and agriculture (.3). The second category, Alternative B, is termed "high total quantity of public goods." Their definitions are used in the research reported here.

Because public goods are non-excludable, they are commonly not provided through the market place, and accordingly an assessment of their worth to different income classes is difficult. McGuire and Aaron, and Maital have, however, built on earlier theory of public expenditure developed by Samuelson, and made rational estimates of the distribution of public goods possible. These developments were made in 1969 and 1970, and to the best of our knowledge, only one other study [Plath and Ayer] has employed the methodology, and that used 1961 secondary data.

Benefits from government expenditures for public goods were allocated among income classes by the method outlined by Aaron and McGuire and Maital. The value of public goods to an income class (j) equals:

$$AB_j = OG [(Y_j^d + Y_j^s)^{-\phi} / \sum_i (Y_i^d + Y_i^s)^{-\phi}]$$

where: AB_j = the dollar value to income class j of public goods.

OG = total expenditures on all public goods provided by the government

Y_j^d = the disposable income of income class j

Y_j^s = the value of specific goods benefits to j provided by the government

ϕ = the inverse of the elasticity of substitution between public and private goods

i = the ith individual

The complete derivation of AB_j is given in Plath and Ayer. Aaron and McGuire estimated the value of AB to different family income groups by arbitrarily choosing values of ϕ of -1 and -2. Maital, however, reviewed three independent studies [Fellner, Mera, and Powell; Van Hoa; and Wilson], each of which estimated ϕ to be -1.5, or close to it. Maital used this value of ϕ in his computation

of the distribution of public goods among income classes, and it is the value used in the research reported here.

Specific goods benefits were allocated on the basis of each income classes' relative share of expenditure for or receipts of the specific good in question. Thus, benefits from government expenditure for higher education were allocated to income classes on the basis of each classes' relative share of total expenditures for higher education. Similarly, tax burdens were allocated on the basis of each income classes' share of the total tax for each type of tax. For example, the state income tax burden was estimated by multiplying each classes' relative share of total state income tax payments (determined from the survey) by the actual total revenue collected by the state income tax.

Primary data for 1974 from Arizona families were collected for the study. A detailed, seven page questionnaire was sent to a stratified, random sample of 1516 Arizona households. Information was requested on family size, sources of income, expenditures of various types, and amounts and types of taxes paid. Considerable effort went into questionnaire design and administration, including personalized letters, repeat mailings, and a certified mailing. These tried (and proven?) techniques, as described by Buse, Dillman, and Dillman, et al., were employed to elicit a high response rate. The response rate was 40%, less than anticipated based upon Buse, Dillman, and Dillman, et al. We suspect that the population from which our sample was drawn was more heterogeneous than that of the Buse study, and the subject matter was of a considerably more confidential, complex nature than the subject matter of the other two studies. The low response rate resulted in an inadequate sample size for the two lowest income classes of nonmetro households. The confidence intervals of the statistics computed from the questionnaire were inspected. In most cases, the computed statistics appeared acceptable, but where questionable, secondary information from other sources was used to complement the primary data. However, data for the two lowest income classes of nonmetro households should be regarded as rough estimates.

Results and Policy Implications

The distributional impact of government taxing and spending is said to be progressive, regressive, or neutral. Here, progressive means that the policy, either taxing or spending, favors the low income

groups. Accordingly, if a tax were progressive, the proportion of a family's income paid out in taxes would become greater as its income rose. Or, if government spending for specific or public goods was progressive, government spending benefits as a proportion of family income would become less as family income rose. Corresponding definitions apply for regressive and neutral fiscal impacts.

The data indicate that the state-local tax structure in both metro and nonmetro Arizona is very regressive, due to their heavy reliance on sales and property taxes for revenues (table 1). The federal tax burden is "U" shaped, being regressive to lower income households, neutral to middle income households and progressive to the highest income groups. The regressiveness is primarily due to social security contributions while the progressiveness at higher income levels is due to the graduated income tax. Overall, the total tax burdens for all levels of government are regressively distributed.

Mitigating this regressiveness, federal and state-

local specific goods expenditures are very progressively distributed (table 2). Progressivity occurs because of public assistance, social security and other welfare type transfer payments which make up a large share of total income for households in the low income category.

Public goods benefits are "U" shaped for both metro and nonmetro areas. The regressiveness in the highest income households appears to result from the large share of total income which is claimed by that class. These benefits are allocated on the basis of relative disposable income, albeit modified by the inverse of the marginal rate of substitution between public and private goods. Using disposable income rather than initial income for allocation also appears to cause the progressivity to the lower income households. This is because disposable income is much greater than initial income in these households due to the magnitude of government transfer payments which are not included in initial income.

Table 1. Tax burdens among income classes, metro and nonmetro households, Arizona, 1974 (percentage of initial incomes).

Metro Income Class	Property Tax	Sales Tax	FICA Tax	Total Fed. Taxes	Total S-L Taxes	Total Taxes
\$ 0 - 3,499	19.0	23.5	16.3	50.3	61.3	111.6
3,500 - 6,899	9.2	8.2	7.0	19.6	23.7	43.3
6,900 - 10,499	5.0	5.3	5.7	17.8	15.1	32.9
10,500 - 15,199	4.0	4.2	5.1	17.9	12.7	30.6
15,200 +	3.6	3.1	3.8	19.9	11.0	30.9
Nonmetro Income Class						
\$ 0 - 3,499	44.7	21.4	18.3	50.1	87.4	137.5
3,500 - 6,899	17.7	9.2	9.1	30.6	37.2	67.8
6,900 - 10,499	8.7	5.1	5.8	19.5	19.8	39.3
10,500 - 15,199	5.4	3.8	5.0	16.7	14.2	30.9
15,200 +	5.6	3.2	4.3	20.2	12.9	33.1

¹ Property, Sales and FICA taxes were allocated, at least partially, on the basis of total consumption. Total consumption was much greater than initial income in the lower income households. Thus, there is a relatively large tax burden on the lower income households.

² The nonmetro property tax burden appears greater than the metro burden due to the inclusion of taxes paid by large copper mines in nonmetro Arizona. Data were not available to separate these taxes. Thus, while they were allocated to nonmetro households, in reality they were probably "exported" to consumers throughout the United States.

Table 2. Government expenditure benefits to income classes, metro and nonmetro households, Arizona, 1974 (percent of initial income).

Metro Income Class	Specific Goods Alternative A	Specific Goods Alternative B	Public Goods Alternative A	Public Goods Alternative B	Total Benefits A	Total Benefits B
\$ 0 - 3,499	272.6	215.8	16.4	21.1	289.0	236.9
3,500 - 6,899	75.1	61.9	12.7	16.3	87.8	78.2
6,900 - 10,499	25.2	15.5	8.3	10.7	33.5	26.2
10,500 - 15,199	15.5	8.2	9.9	12.9	25.4	21.1
15,200 +	12.0	7.1	17.1	22.1	29.1	29.2
Nonmetro Income Class						
\$ 0 - 3,499	234.1	173.8	22.4	30.2	256.5	204.0
3,500 - 6,899	95.1	61.8	14.0	18.1	109.1	79.9
6,900 - 10,499	32.2	19.2	13.7	18.3	45.9	37.5
10,500 - 15,199	19.1	10.2	14.5	19.6	33.6	29.8
15,200 +	16.2	8.6	22.5	30.4	38.7	39.0

The net impact of all levels of government fiscal action is progressive except in the highest income households (table 3). The progressive-regressive sequence results from the decreasing importance of specific goods benefits and increasing importance of public goods benefits as incomes increase. Thus, the lower two income classes and the highest class receive more benefits, relative to their initial incomes, than the middle income households.

If a more even distribution of income within Arizona is desired, this study indicates that present fiscal policy should be modified.

State and local governments are aggravating income inequities by their heavy reliance on the regressive sales and property taxes for revenues. Increased use of more progressive taxes such as the graduated income tax would reduce this problem.

The federal tax structure contains a heavy regressive element in social security contributions of workers which must be matched by their employers. However, social security payments to the retired, disabled, orphaned, etc. represent the most progressive element of all government benefits. These payments more than offset the regressive impact of social security taxes, due to the relatively large population of retired workers in Arizona.

Due to a large welfare component, specific goods benefits are progressively distributed. Public goods benefits, however, have a "U" shaped distribution which is regressive at higher income levels. If increased income equity is a goal, more specific goods expenditures to help low income households and less public goods expenditures would be in order. However, fewer public goods would hurt the lower as well as the higher income groups. It is the middle income classes that would be helped by decreased expenditures on public goods.

Expenditure benefits from all levels of government fiscal activity are somewhat greater for non-

metro households than for metro households, except in the lowest income class. However, state-local taxes are a relatively larger burden to nonmetro households than to metro households. For greater income equity between regions, this nonmetro tax bias should be reduced.

The results of this study indicate that government fiscal action does redistribute income. However, redistribution sometimes results in less rather than greater income equality. Changes in the state-local tax structure as well as expenditure policies are necessary to bring about a more even distribution of income.

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Table 3. Net government benefits to income classes, metro and nonmetro households, Arizona, 1974 (percent of initial income).

Metro Income Class	Net Govt. Benefits (Alt. A)	Net Govt. Benefits (Alt. B)
\$ 0 - 3,499	177.4	125.3
3,500 - 6,899	44.5	34.9
6,900 - 10,499	.6	-6.7
10,500 - 15,199	-5.2	-9.5
15,200 +	-1.8	-1.7
Nonmetro Income Classes		
\$ 0 - 3,499	119.0	66.5
3,500 - 6,899	41.3	12.1
6,900 - 10,499	6.6	-1.8
10,500 - 15,199	2.7	-1.1
15,200 +	5.6	5.9