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FISCAL INCIDENCE IN
EMPIRICAL STUDIES OF INCOME
DISTRIBUTION IN POOR COUNTRIES

Jacob Meerman

A.I.D. Discussion Papers are circulated for the information of the addressees and their staffs. These papers are intended to serve several functions: to improve knowledge of analytical studies, research results and assistance policies among Agency personnel, to encourage the careful recording and analysis of Agency experience and problems by persons currently engaged in them; and to share such experience and ideas with interested persons outside the Agency. These papers are designed to stimulate and serve as background for discussion. They represent the view of the authors and are not intended as statements of Agency policy.

December, 1972

NOTE

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Introduction

Recent concern with income distribution results from increasing awareness that economic development has been very uneven and of little benefit to a very large part of the poor in developing countries. As Robert McNamara stated:^{1/}

A recent study of income distribution patterns in more than 40 developing countries estimates that at the beginning of the First Development Decade the average share in the national income of the richest 20 percent of the people was 56 percent - but the share of the poorest 60 percent of the people was only 26 percent. Preliminary indications are that this severely distorted income distribution is not only continuing, but in many countries may be growing worse.

Such developments have contributed to the demise of the faith that development per se would automatically absorb into the modern sector the impoverished millions. Huge traditional sectors characterized by malnutrition, disease, illiteracy, and early death are now expected to persist unless very radical changes occur in public policy.

The issue can be seen in terms of low levels of output per head and extremely skewed distribution of that output. If increasing output per head is not a short run solution, the question following hard thereon is, can current output be distributed more equally? Government as an engine to redistribute wealth is an ancient notion. In many advanced countries it is a reality and governments are effective in this regard. But what is feasible in the poor countries? The first step in answering this question is to determine the actual current

^{1/}Robert S. McNamara, President of the World Bank, speech at the Third UNCTAD in Santiago, Chile on 4/14/72.

impact of government on income distribution in the developing world. This paper largely addresses this question. Its vehicle is examination of recent studies of income distribution in poor countries to determine how fiscal effects are considered

For the busy reader, a brief summary of the paper's findings and recommendations follow the introduction. The paper itself breaks into five parts: (1) Summary of findings and recommendations; (2) Overall treatment of the public sector in individual studies; (3) the techniques for allocating tax-burden; (4) the treatment of public expenditures; (5) an appendix on the calculation of the Gini coefficients. To enhance interest and understanding the results of these studies are compared with results of similar studies of the USA.

I. Findings and Recommendations

Purpose of Paper

Taxes and public expenditures have been traditionally regarded as effective means toward attaining a more egalitarian distribution of income. The paper is basically concerned with assessing these burdens and benefits from this perspective. To do this the author reviewed all available LDC country studies of income distribution to determine how they treat fiscal incidence.

Findings

(1) From a general perspective, fiscal incidence involves all variables which affect the distribution of income and which governments can

manipulate e.g., taxes, public expenditures, foreign exchange rates, interest rates, treatment of business, wage and migration policy, rate of inflation and others. The review found no study, completed by 1971, which offered a quantitative assessment of fiscal impact on income distribution from a general overall approach.

(2) Of over 4 dozen country size-distributions of income reviewed, only 9 in any way considered fiscal effects. The majority of such studies use a concept which is close to paid out money income.^{2/} Most studies ignored tax-effects. Benefits of government expenditures which are quantifiable in financial terms, e.g., health, education, are also nearly always ignored. In short the typical income concept in such studies comes close to that of factor payments before taxes, but not completely. This failure to consider fiscal incidence is a serious shortcoming, since typically 15 to 20 percent of national income is channeled through the public sector. Moreover in recent years, total public expenditures exceeded 25 percent of national income in at least Algeria, Brazil, Chile, Guyana, Liberia, Yugoslavia and Zambia.*/ These data suggest that in poor countries the public sector has the potential for redistributing anywhere from an eighth to over a quarter of national income. Such would occur if all taxes were paid by the rich, and all public benefits accrued to the poor.

^{2/} Income before payment of direct and indirect taxes, excluding corporate taxes and retained earnings and frequently after payment and receipts for social security.

*/Short form references are listed in full in the bibliography.

Obviously such an "ideal" is far from feasible, but it does indicate the overriding need to assess public sector impact when estimating the size-distribution of income.

(3) Of the nine studies considering aspects of fiscal impact, all considered the effects of taxation, either partially or completely. All of these studies showed tax-burden as distributed nearly proportionately, up and down the income distribution. This conclusion is probably valid not only for the nine countries, but in general. It is reinforced by data from an IMF Study measuring indirect taxes, which are usually regressive, as over three-fifths of total taxes. The combined impact of this material permits a strong conclusion: The tax systems of developing countries have not substantially redistributed income from the rich to the poor. There is a corollary to this: Where expenditure is neutral, without basic tax reform in developing countries, in general increasing total taxation cannot be expected to improve income distribution.^{3/}

(4) Four studies, less than one in twelve, attempted estimating the effects of public expenditures. One reason for this lack of

^{3/} There is a tendency to regard poor countries as taxing as fully as their administrative apparatus, and their economies, permit. Taxation is thus limited in magnitude and composition, not by choice but necessity. Hence, the argument runs, tax reform is generally a will-o'-the-wisp. Nevertheless a great deal of evidence suggests that the basic problem is politics, in other words a matter of choice. The constraint is of this type rather than economic or administrative. While perhaps hackneyed, this old exhortation toward basic reform remains valid.

attention is the general or collective character of much of public expenditure, which precludes identification of specific groups of beneficiaries. Defense, diplomacy, general administration, police protection all fit this category. Researchers typically classify over 40 percent of public expenditures as collective and therefore unallocable. Identification of beneficiaries of the remaining expenditures is also difficult because of very fragmentary data. Consequently the measure of expenditure impact is extremely crude, actually inchoate. Hence conclusions even restricted to the four study sample itself are hazardous. However, unlike taxes, the studies do suggest - particularly in the case of the US experience - that expenditures have substantial redistributive impact. This conclusion is reached by regarding the collective or general expenditures as neutral - that is income-proportional - in their effect on income distribution. The specific expenditures are then allocated to beneficiaries, usually with significant pro-poor redistributive effect.

Ignoring general expenditures, that is treating them as neutral, is plausible since "benefits" from such outlays are very different in character from other public expenditures. In a sense the very existence of the economy depends upon the "hard core" of such expenditures. Without a legal framework (rules) and police protection (sanctions) modern economic life is impossible. If we expand the proposition to define as an unlimited value certain current basic institutions - private

ownership of capital, free enterprise in most developing countries - then the "hard core" of necessary expenditures expands to include most of diplomacy, defense and other general expenditures designed to maintain the institutional status quo. They provide the framework for income producing activity, for the production of benefits be it through private markets or through the political mechanism. But they themselves are not such benefits. They can be viewed as the "sunk costs" of maintaining the "system."

Recommendations

(5) Even if one rejects the rationale above and therefore its implications, one can still assert that general are inferior to specific expenditures as a means of redistribution because (a) rich and poor both consume collective goods in equal amounts and (b) the valuation per unit of such collective goods is likely to decrease as the family's wealth decreases, due to a "smaller stake in the system." This suggests that pursuit of egalitarian income distribution is enhanced through minimizing general as opposed to specific expenditures. Maximization of the latter is desirable, particularly those most effective in redistributing income. Note that AID's sector lending policy, by operating primarily through specific government expenditures (agriculture, education) is potentially a very useful mechanism for helping borrowing countries achieve some redistribution.

It is also worth noting here that this recommendation is not necessarily inconsistent with a policy of using public resources to maximize growth. Many specific expenditures simultaneously foster both growth and redistribution. The short run effects of welfare transfers to the poor may appear more egalitarian than investment in human capital through public education, public health services, or improved nutrition for infants and so forth. But this is likely to be misleading. Private returns to such public investment, given well planned and executed programs, are apt to be very high. Consequently the total value of the latter through the years may well exceed the total value of an alternative simple cash transfer. In other words, cash transfers can only reduce poverty as long as they continue; public investment can imply permanent reduction in the number of the poor.

(6) Current AID policy stresses sector analysis as means to enhance welfare of the poorest. One way to greatly increase the quality of such analysis and programming is to get more information about the poorest, probably among the least studied groups in the developing world. To this end, sample surveys emphasizing economic characteristics of subsistence households and other poor are useful but rare. (I say subsistence households as such, because I surmise that little work has taken as the point of departure the fact of subsistence and its structural implications; e.g., very low tax capacity.) The next step would be study of size distribution of income with emphasis on the lowest brackets. This in turn could be complimented by study of fiscal impact on income with emphasis on the beneficiaries of specific

government expenditures. The latter needs emphasis since specific government expenditures are frequently the means by which AID sector loan resources are channeled to final users in the recipient economies. By now the Agency has sufficient history with sector lending to permit some evaluation of planned and actual effects of such projects useful in developing future sector analysis and loan programming. What I am suggesting is both the desirability of such evaluation and that it give inter alia substantial weight to the question of how such lending has affected (a) the overall pattern of public expenditures in the recipient country and (b) the distribution of income, particularly the income of the lowest brackets.

II. Overall Treatment

General Equilibrium Study of Fiscal Incidence

Estimating fiscal incidence is the general equilibrium problem par excellence. It can be approached on two levels: The first, all-encompassing level, refers to the role of government in maintaining the basic institutional framework, through the police power (police, courts, prisons), through interpretation of laws and customs (bureaucracy), and through political activity; e.g., parliaments. In other words, governments make possible economic systems. One can therefore study such systems - whose most pronounced differences are in the extent and functions of the public sphere - as a variable, comparing the empirical income distributions of

countries with widely differing organization; e.g. private enterprise contrasted with socialism.

Economists and other researchers have carried out very substantial comparative work on such systems. However there is little information on their comparative income distribution. In general, in socialist countries, data on size distribution and on the impact of government on that size distribution are fragmentary. As a consequence there are even less hard data indicating the extent to which differences between the various systems can explain differences in the way incomes are distributed. Nevertheless, investigation of these differences could be fruitful in indicating the degree to which income inequality is a natural consequence of modern economic life, and the degree to which different systems result in changed income distributions. Obviously our review found little work concerned with this question.

On the second narrower level, the general economic system, what Kuznets terms the "institutionalized valuations of society," is taken as largely given, and the focus is on those societies which are private enterprise and private property in orientation. Here the general equilibrium perspective implies that fiscal incidence involves all variables affecting the distribution of income and manipulable by governments. In addition to taxes and public expenditures, these variables include foreign exchange rates, interest rates, special treatment of business, wage and migration policy, rates of inflation and other. The review of empirical studies completed by 1971 of size distribution of income found none which offered quantitative

or other assessment of fiscal incidence on income distribution incorporating such a general equilibrium approach. Further, although the items listed above are generally regarded as key variables, the very substantial attention which they have individually received has overwhelmingly reflected primary concern with increasing efficiency. How the manipulation affects and can affect individual income is by and large terra incognita. Study of fiscal incidence has been overwhelmingly restricted to incidence of taxes and expenditures.

Table 1

TREATMENT OF FISCAL INCIDENCE IN EMPIRICAL STUDIES OF INCOME DISTRIBUTION
IN DEVELOPING COUNTRIES

(1)	(2)	(3)	(4)	(5)
Total studies reviewed	Selected studies not assessing fiscal effects	Studies including tax incidence only	Studies including tax and expenditure incidence	Special studies of fiscal effects
24	9	9	4	2

We reviewed material available involving quantitative estimation of size distribution of income in poor countries, including more than four dozen empirical distributions of income.^{4/} (See Bibliography.) Of this total, 13 distributions, a small minority, considered one aspect or another of fiscal incidence.

Fiscal Incidence in Empirical Studies

As shown in Table 1, we reviewed in detail 24 of the studies of developing countries. This includes 9 of the majority which simply ignored fiscal

^{4/}Adelman and Morris compiled a complete listing of relevant studies in their work on the determinants of income distribution. They pieced together empirical income distributions for 44 developing nations. This has greatly expedited our work.

incidence. These were included because of interest in their definition of income. Two were special studies and did not focus on empirical income distribution. Of the 13 which did assess fiscal effects, all distributed tax burden, partial or total, among different income groups. Four attempted to allocate benefits of government expenditures. Table 2 lists the studies concerned with fiscal incidence with information on their individual treatment of taxes and expenditures. It also includes two studies of the US to provide useful contrast.

Immediate conclusions followed: (1) Fiscal incidence was explicitly considered in only a small minority of developing countries. Nine of these 13 countries were in Latin America and 7 of these 9 were primarily studies of public finances. In short, most of the interest in fiscal impact on income distribution has come from those primarily interested in public finance, and most of the relevant empirical work has been done in Latin America.

The error in empirical estimates of size-distribution resulting from this failure to consider fiscal incidence may be serious. According to a recent IMF Study of 49 developing countries, the tax to GNP ratios (1966-68 average) exceeded 15 percent in 39 percent of the countries and 20 percent in 14 percent of the countries. (Chelliah pp. 302-303). Tax and public expenditure incidence in such magnitudes could easily substantially modify income distributions.

Table 2

COUNTRY STUDIES ESTIMATING IMPACT OF FISCAL ACTIVITY ON INCOME DISTRIBUTION

Country	Year of Data	Author	Before Fiscal Incidence Income Concept ^{a/}	Taxes Considered ^{b/}	Expenditures Considered
Venezuela	1957	Carl S. Shoup	National Income minus taxes paid by oil companies, and social security tax plus; capital gains	All, except certain taxes on oil companies and government profits on foreign exchange transactions	None
10 South American Countries	1958	Richard A. Musgrave	National Income	All	None
Colombia	1961	Milton C. Taylor	National Income minus corporate retained earnings	All, including local government taxes	None
Colombia	1966	Charles E. McLure, Jr.	National Income minus $\frac{1}{2}$ of the corporate profits tax	All, including exchange profit on coffee exports.	None
Peru	1963	Eugene A. Brady	National Income	Corporate profits taxes only	None

Table 2 (continued)

Country	Year	Author	Before Fiscal Incidence Income Concept ^{a/}	Taxes Considered ^{b/}	Expenditures Considered
Greece	1957	Andreas Michalakis	"Household income," approximates Personal Income	Indirect taxes, including import duties	None
India	1959-60	V.K.R.V. Rao	Non-Agricultural Taxable Income (5.78% of National Income)	Income and sur-taxes only	None
India	1953-57	P.D. Ojha and V.V. Bhatt	Money Income	Direct taxes on persons only	None
Ceylon	1952-53	Survey of Ceylon's Consumer Finances (Colombo, 1954) ^{c/}	Approximates Personal Income	Income and other direct taxes on persons	None
El Salvador	1946	Adler and Wallich	Money Income	All	All
Brazil	1961-63	Aaron	Money Income	All	All

Table 2 (cont'd)

Country	Year	Author	Before Fiscal Incidence Income Concept ^{a/}	Taxes Considered ^{b/}	Expenditures Considered
Guatemala	1947-48	Adler, Schlesinger, & Olson	Money Income	All	All
Argentina	1959	UN/ECLA	Money Income, plus subsistence agriculture production	All except corporate profit and export taxes	Expenditures on education, public health, social security, and subsidies
US	1968	Herriot and Miller	NNP plus realized capital gains	All	All
US	1960	Gillespie	Money Income plus imputed income	All	All

- a/ "Money Income" is similar to Personal Income as defined by the U.S. Department of Commerce.
- b/ Major inclusions and exclusions are listed. Many minor inclusions or exclusions were not noted in the studies or were left out here due to limited space.
- c/ Data reproduced in Kuznets.

Sources: See bibliography

Concepts of Income-To-Be-Measured

A major problem is the concept of income-to-be-measured. One can postulate an ex ante concept consisting of all factor payments with certain adjustments; e.g. eliminating factor payments to foreigners, inclusion of capital gains.^{5/} In many cases the income distribution used is based in part on the results of a sample survey, which does not give data coincidental with those of the national accounts because of errors in both series and more importantly because the income concepts differ greatly between survey and national income accounts. The national income concept most useful in developing an ex ante theoretic concept is personal income (US Department of Commerce) with certain adjustments. As Table 2 illustrates, different ex ante concepts have been used, ranging from a concept of money income which approximates personal income (US Department of Commerce), to explicit use of net national product. In much of the more detailed work, the concept is constructed from various sources of data including tax returns, sample surveys, and national accounts data. Because of statistical shortcomings, ingenuity is the watchword.

In those studies which ignore fiscal impact, the most common concept is one of money income before payment of direct personal taxes and indirect taxes, but excluding direct corporate taxes, retained

^{5/} For a discussion of the relevant income concept see Gillespie; for a good example of revaluation of official data see Herriot/Miller.

profits, undistributed social security payments and including government transfers. This concept lies, therefore between ex ante and ex post fiscal incidence, although it is probably far closer to the former on average. It follows that in such studies it is impossible to gauge accurately the impact of government expenditures and taxes.

III. Tax Incidence

The studies available indicate that a conventional approach to estimating tax burden has evolved. It is well illustrated by McLure's work on Colombia. His pivotal concept approximates personal income. He estimated this for 8 different income brackets by piecing together data from tax returns, national accounts, material on the economic characteristics of the population, and other data. The data were broken out as capital or labor income.^{6/}

McLure allocated the exchange rate tax on coffee^{7/} retained corporate earnings, and "unshifted corporate income taxes" to this approximation

^{6/}The result was an approximation. As McLure states, "References...to personal income are not technically correct, in that this term is used (in the study) to refer to national income minus retained earnings and taxes of corporations, without allowance for transfers, social security taxes, or interest on the national debt." (p. 247) McLure argues that in the Colombian system, social security taxes are in the nature of fees rather than true taxes.

^{7/}"Although these exchange earnings (of the government) are treated as indirect taxes in the national accounts, they have more nearly the effect of direct taxes; because the price of coffee is determined in the world market, this quasi-tax can only reduce the net earnings of coffee growers." (p. 247)

by income brackets to derive a distribution of quasi total factor payments or quasi national income. This became his estimated pre-tax distribution of income.^{8/}

He also stripped direct taxes from the personal income distribution to derive an estimate of disposable income for each income bracket. Sales taxes were allocated against this distribution of disposable income in accordance with the presumed pattern of consumption expenditures based on a study by Levin of Colombian sales taxes.

Taxes collected at the national, departmental, and municipal levels were classified into 9 categories and allocated to the various income brackets on the basis of assumptions about their incidence. These assumptions reflect the "conventional wisdom," which has evolved over the decades from work on tax-incidence. For example, personal income taxes are assumed unshifted, while "the shifted half of the taxes on corporations, the remaining two thirds of the property tax, all import duties, and all other indirect taxes were allocated on the basis of non-food expenditures." (McLure p. 254). The results are reproduced in Table 3. The final column of that table indicates that the Colombian tax system is mildly progressive. The upper income groups do pay somewhat more than the average rate of taxation of 15 percent; the lower brackets somewhat less.

^{8/}For a similar derivation for the USA, based on more detailed data see, W. Irwin Gillespie, pp. 173-175. These workers avoid the concept quasi national income or quasi factor payments although that best describes it.

McClure's work is typical of serious attempts to gauge the impact of taxation on income distribution. Three aspects of all such work are basic: (1) the use of personal income as a pivotal concept; (2) ingenuity in using fragmentary sources to piece together the necessary data; (3) the use of shifting assumptions which reflect the recent work concerning tax incidence in developed countries.

McClure emphasizes the hypothetical nature of his tax-allocation assumptions. For example "the total of taxes on alcohol, beer, and tobacco...was allocated arbitrarily to income brackets on a somewhat less than per capita basis in the lower range and on a somewhat more than per capita basis in the upper range. ...all import duties, and all other indirect taxes were allocated on the basis of nonfood expenditures" (McClure p. 254). These assumptions mean taxes on spirits and tobacco were very regressive; e.g. the bottom third of the population spent over 6 percent of its income on taxes on alcoholic beverages and tobacco. Taxes on imports and other indirect taxes were at best proportional. (See Table 3.) The two categories sum to 48 percent of total taxes, so that their weight in total collections is very high. To the extent that these distribution assumptions exaggerate regressivity, the tax-system will be more progressive than assumed.

There was substantial consensus among all of the studies in assuming regressiveness of indirect taxes and progressiveness of direct taxes.

Table 3

COLOMBIA, EFFECTIVE RATES OF TAXATION FOR VARIOUS TAXES BY
INCOME BRACKETS, 1966^a
(percentages)

Population	Income Bracket	Personal Income and Transfer Taxes	Corporation Income Taxes	Sales Tax	Property Taxes	Alcohol, Tobacco, and Beer Taxes	Motor Vehicle Taxes	Import Duties and Other Indirect Taxes	Exchange Earnings on Coffee	Total, all Taxes
35.5	Lowest		0.96	1.07	0.43	6.48	0.18	3.41	0.13	12.6
12.9	2nd		0.89	0.77	0.41	4.61	0.17	3.13	0.46	10.4
8.6	3rd		1.22	1.21	0.58	4.40	0.17	4.49	1.34	13.4
25.3	4th	0.19	1.48	1.53	0.68	2.98	0.15	5.33	0.48	12.8
8.8	5th	0.22	1.46	1.37	0.66	1.88	0.12	5.22	0.94	11.8
4.9	6th	0.96	1.52	1.41	0.70	1.34	0.13	5.48	1.68	13.2
3.3	7th	2.74	4.16	1.05	1.25	0.60	0.24	4.85	0.46	15.4
0.5	8th	5.87	4.73	0.82	1.32	0.19	0.26	3.77	0.11	17.1
0.1	9th	8.12	5.18	0.66	1.42	0.24	0.27	3.76	-	19.7
Average		2.13	2.68	1.22	0.92	2.26	0.20	4.63	0.62	14.8

^a Columns may not average exactly because of rounding.

Source: McLure, p. 259

These assumptions reflect what is taken to be the general case with respect to regressivity of indirect taxes in empirical studies in rich countries. Nevertheless it is unclear to what extent this experience is similar in developing countries where much of the population lives outside the market economy. Households whose income is overwhelmingly subsistence in nature will have very low indirect taxes because of minute monetary transactions. This group is concentrated in the lowest income bracket. To illustrate, in McLure's study, this bracket accounts for 36 percent of total population. If half of this bracket, pays little taxes because most of its income is subsistence, the other half would be burdened with - for example - alcohol and beer taxes of say over 10 percent of income, since the average rate of such burden is estimated at 6.48 percent for the bracket as a whole.^{9/}

These considerations not only raise questions as concerns the degree of regressiveness of indirect taxes in poor countries, but also strongly suggest the desirability of analyzing an income bracket as explicitly subsistence in nature, defined as including say all households with 80 percent or more subsistence income. As is the case with respect to many structural characteristics, the subsistence sector

^{9/}If half the bracket, receives $\frac{2}{3}$ of the income, and pays all of the taxes then the tax-rate for the upper half is $(\frac{3}{2})$ (6.48 percent) = 9.72 percent. In his footnote 33, McLure expresses inconclusive concern with the possibly exaggerated regressivity of these taxes; e.g., they imply "13% to 20% of income in the lowest class...spent on these products."

can be expected to differ radically from the rest of the economy with respect to tax-incidence.

Impact of Taxation on Income Distribution

Putting aside the caveats on the presumed regressivity of indirect taxes in poor countries, I have taken at face value the pre-tax and post-tax income distributions and calculated ex-ante and ex-post Gini coefficients, for each study which considered tax impact.^{10/} The results are reproduced in Table 4. They permit a few generalizations. All of the 6 studies estimating total tax incidence were of Latin American countries. As indicated in Table 4, in none of these 6 countries did taxation so redistribute income that the Gini coefficient decreased by more than 4 percent.

Three of the four studies of partial taxation, concerned solely direct taxes. In these three cases, no Gini coefficient decreased more than 4 percent. Presumably making these studies comprehensive by including indirect taxes would mean increasing the Gini coefficient, perhaps even beyond the ex-ante tax magnitude so that possibly even slight regressivity of the tax system would be the overall outcome.

Other data suggest that the minute tax-progressivity for the countries in Table 4 is generally true in poor nations. On average the tax to GNP ratios corresponding to the countries in Table 4 do not deviate greatly from mean ratios for developing countries as a whole. A

^{10/}This makes things simple. But we should not forget that the received canons of tax incidence continue to be controversial among public finance economists.

recent IMF cross-country study of tax-performance in poor countries gave a mean tax ratio for 27 countries (for which data were available) in 1953-55 of 11.3 percent, rising to 13.8 percent in 1966-68 (Chelliah, p. 263.) According to the same study, in 30 developing countries for 1966-68, indirect taxes, less taxes on exports, were 62 percent of total taxes. (Chelliah, p. 271.)^{11/} Given the probable regressiveness of indirect taxes, the total weight of the latter in total taxation suggests that tax systems of poor countries simply cannot be very progressive.

To take the tax experience of the countries in Table 4 as representative is therefore warranted. To do so forces the basic conclusion that in developing countries, tax systems have not substantially redistributed income from the rich to the poor. There is a corollary to this. Assuming "expenditure-neutrality," without basic tax reform in developing countries, in general, increasing total taxation can not be expected to improve income distribution.

^{11/}Chelliah considers property taxes as direct.

Table 4

GINI COEFFICIENTS BEFORE AND AFTER TAXES,
TAX RATIOS IN DEVELOPING COUNTRIES

<u>Author</u> <u>Country</u> <u>Year of Data</u>	<u>Extent of</u> <u>Taxes</u> <u>Considered</u>	<u>Gini Coefficient</u> <u>Before</u> <u>After</u> <u>Taxes</u> <u>Taxes</u>		<u>Number of</u> <u>Gini</u> <u>Observations</u>	<u>Percentage</u> <u>Decrease</u> <u>in Gini</u>	<u>Taxes as</u> <u>Percent of</u> <u>National</u> <u>Income</u> <u>1951-60</u>
Wallich El Salvador 1946	total	.403	.398	5	1.2	11.5 (1961-67)
Adler Guatemala 1947-48	total	.475	.460	7	3.2	10.3
Shoup Venezuela 1957	total	.520	.501	3	3.7	21.8
UN/ECLA Argentina 1961	total	.418	.414	7	1.0	7.2 (1966)
Taylor Colombia 1961	total	.463	.457	4	1.3	13.1
McClure Colombia 1966	total	.572	.562	9	1.7	13.1
Kuznets Ceylon 1952-53	direct taxes on persons	.420	.410	5	2.4	21.6 (1961-66)
Ojha and Bhatt India 1954-57	direct taxes on persons	.338 ^{a/}	.333	11	1.5	8.8
Michalaklis Greece	indirect taxes including import duties	.610	.625	6	2.5	19.5
Brady Peru 1963	corp. profit taxes only	.678	.654	10	3.6	15.2

^{a/} The Gini coefficient is of consumption, which will be lower than that of income.
Final column source: (IBRD)

IV. Expenditure Incidence

Introduction

Most of the work on fiscal incidence has concentrated on the incidence of taxes. Expenditures have usually, but not always, received short shrift. This reflects in part the problem of public "collective goods" not allocable to beneficiaries, because not liable to private market allocations. Nevertheless most government expenditures produce private or mixed goods benefitting a small group rather than the community at large. Usually this is true of well over half of public expenditures. (See Table 6, below.) However, the allocation by beneficiary of truly collective goods, does present problems hitherto solved solely through arbitrary assumptions, which is to say, not solved at all.

Estimating Expenditure Incidence

As indicated in Table 2, of the few studies in developing countries concerned with fiscal impact on income distribution, a third have attempted to quantify expenditure-incidence. Unlike tax incidence, there are neither well developed general techniques nor theory for handling expenditures. Nevertheless all researchers used an approach similar to that which has evolved in estimating tax incidence.

Musgrave (p. 23., and 31) characterized such estimates as:

...an uneasy marriage between theoretical hypotheses on the incidence of various taxes by broad economic categories of factor shares and consumer outlays, and the translation of these hypotheses into distributional changes by size brackets of income. The result therefore is a quantification of theoretical deductions, rather than empirical evidence in the econometric sense.

Replace taxes by expenditures, and the quotation remains equally valid. However in moving beyond this generalization, work on expenditures is characterized by the diversity of "theoretical hypotheses," with respect to those expenditures which can be allocated to specific beneficiaries. This is clearly reflected in Table 5 which details the procedures for allocating expenditures in all available studies of developing countries as well as a comprehensive study for an advanced country, namely that of Gillespie for the USA.^{12/}

Table 5 below distributes public expenditures into analytical categories implicit in the studies. Of the three, transfer payments alone do not present serious conceptual difficulties in assessing expenditure incidence: It is both convenient and rigorous to define transfers as a negative tax and integrate them into the tax incidence analysis.

Classification of exhaustive expenditures into general and specific is conventional. Ideally, specific expenditures are predominantly private-good in character. And ideally, general expenditures are those to which the exclusion principle does not apply and in whose consumption all citizens participate. In the real world goods have both public and private characteristics so that classification is made according to which characteristic is thought to predominate.

Different researchers take different tacks so that one person's private good is another man's public. Recognizing this ambiguity

Aaron and McGuire distributed education, welfare expenditures,

^{12/}Using the same technique an additional study has been carried out by George Bishop for the Tax Foundation using more recent US data.

^{—/}Exhaustive expenditures are defined in contradistinction to transfers. They are expenditures which the government itself finances through purchase of goods and services.

Table 5a

ALLOCATION OF PUBLIC EXPENDITURES IN STUDIES
OF EL SALVADOR, GUATEMALA, ARGENTINA

<u>Type of expenditure:</u>	<u>Allocation by:</u>
(Wallich/Adler, El Salvador, 1946)	
cultural and social (16%) (education, social security, subsidies to "cultural and social institutions")	families with income less than 3600 colones per year receive 20% more than their share distributed on an income-proportional basis. Remaining expenditures allocated on an income proportional basis.
other (84%)	income proportional; and alternatively per capita
(Adler/Schlessinger/Olson, Guatemala, 1947-48)	
cultural and social (27%)	per capita
other (73%)	income proportional
(UN/ECLA - Argentina, 1967)	
social security (19%)	workers' wage income
subsidies to government enterprises (15%)	input-output matrix of final demand used to determine the amounts of subsidized inputs in each item of final demand. Subsidies then allocated by consumer expenditures corresponding to each income bracket.
other transfers (3%)	proportional to pre-tax income
education, primary and secondary (9%)	per capita
education, universities (2%)	enrollment in universities by income bracket
public health (5%)	increasing share as income bracket decreases; above average income assumed to receive no benefit
other expenditures (47%)	proportional to pre-tax income

Table 5b

ALLOCATION OF PUBLIC EXPENDITURES BY AARON FOR BRAZIL 1961-63

Type of Expenditure:

Allocation by:

Specific (64%)	business income	number of households	wage & salary income	transport expenditures	consumption outlays	Ann. incomes < 10,000	Income	pension income	bus. utility & income	other
public utilities, and state-owned industry		1/2				1/2				
industry and commerce	1									
mines and energy	1									
National Department of Highways				1						
Ministry of Roads and Public Works	part	part		part		part	part		part	
other transport and communication	1/2					1/2				
Ministry of Agriculture							1			
Natural Resources, Agriculture and Livestock	1/2						1/2			
health			1							
housing and urban services				1						
Ministry of Labor and Social Security				1						
other labor, social security and welfare				1/2				1/2		
education										1
<u>General</u> (36%)										
administration, foreign relations, miscellaneous	1							1		1

Table 5c
ALLOCATION OF PUBLIC EXPENDITURES BY
GILLESPIE FOR USA, 1960

Education (14%)

Using data from various educational cost studies, Gillespie estimated hypothetical average level and distribution of educational achievement per student at completion of education by corresponding family income bracket. The corresponding costs of such a distribution were applied to the number of students in each income bracket. The resulting total costs per income bracket were then related to combined costs for all brackets and the percentage of each bracket computed. These "standardized" percentages were then applied, by income bracket, to the actual public expenditures on education in 1960 to allocate them per income bracket.

Health (5%)

Most such expenditures assumed to be 'pure social goods' and equally divided among all families. Expenditures for general and mental hospitals allocated by economic characteristics of patients. Expenditures for sewerage control and sanitation by "weighted average of owner-occupied and renter-occupied housing units."

Housing (1%)

Data providing actual income brackets of public housing occupants.

Highways (7%)

Using data from transport studies, expenditures were initially distributed as either benefitting truck-transport or passenger car-transport. These two components were distributed using as proxy variables family expenditures on gas and oil by income bracket and again by income bracket, on presumed consumption of transportable goods.

Social Security (15%)

Federal old age, survivors, and disability insurance was allocated to income brackets by the series, OASDI beneficiaries estimated from data of the Social Security Survey. Allocation of public assistance payments for the aged, blind, dependent children, and the totally disabled, was based on a distribution of public assistance recipients who reside in low-rent public housing projects. Unemployment compensation for those out of work for more than a year was allocated entirely to the under \$2000 income bracket. A U.S. Census data series was used to distribute the remaining portion of unemployment benefit payments.

Veterans (4%)

Non-pension expenditures are divided between World War I and World War II veterans (including Korean veterans) and distributed by the series available for World War II veterans and the assumed distribution for World War I veterans. Disabled veterans are assumed randomly distributed throughout the veteran populations of the two groups and therefore distributed among pension classes in the same proportions as the entire group. All pension payments are allocated to World War I veterans.

Agriculture (2%)

Net value to the community of the crop-support program for 4 major crops was estimated as consisting of gains to farm factors of production less consumer loss due to increased prices plus assumed market value of the surplus, while ignoring support payments; i.e., adding them in upon the tax side. These losses and gains were allocated by farm operator family income and by food consumption. The other agricultural expenditures, accounting for 68% of the total, principally for research, marketing, and administration, were allocated solely to farm income according to an unspecified distribution based on farm family incomes.

Miscellaneous Expenditures (7%)

These expenditures were allocated according to various assumptions. However more than half were allocated according to consumption by income bracket; e.g., natural resources, postal services, commercial regulation, commerce and business subsidies.

Interest Payments (excluded)

Allocated by the series of owners of the debt; e.g., savings bonds distributed by the series "value of savings bonds held."

General Expenditures (45%)

Allocated according to four assumptions:

- A. per family distribution
- B. income proportional distribution
- C. distribution of capital income
- D. distribution of disposable income (family income minus tax payments)

Sources: Relevant volumes in bibliography.

agriculture, veterans' benefits, and streets and highways between both specific and the general categories. In a recent article they described this as "high total quantity of public goods." "Low quantity of public goods" excluded the items enumerated as producing no external benefits. (2. Aaron, p. 916) (See Table 6.)

Table 6

PERCENTAGE DISTRIBUTION OF BASIC COMPONENTS OF PUBLIC EXPENDITURES IN FIVE COUNTRY STUDIES

	<u>El Salvador</u>	<u>Guatemala</u>	<u>Argentina</u>	<u>Brazil</u>	<u>U.S.A. (Gillespie)</u>	<u>U.S.A. (Aaron-McGuire)</u>	
						<u>high</u>	<u>low</u>
A <u>Transfer Payments</u>	> 35	62	37	64	22	28	47
B <u>Specific Exhaustive</u>	^{a/}		16		36		
C <u>General Exhaustive and Debt Service</u>	65 ^{a/}	38	47	36	44	72	53

^{a/} of which debt service is 24 percentage points (1946)

Sources: See Table 4.

Incidence of Specific Expenditures

The two basic problems in dealing with exhaustive expenditures are valuation of benefits and their distribution. With respect to specific exhaustive expenditures, researchers have finessed the valuation problem by assuming allocative efficiency, i.e., that the cost of producing the expenditures equals their value to the beneficiaries. This amounts to the supposition that at the margin the political process reallocates resources from the private sector as "efficiently" as the latter uses them. The assumption converts an insoluble problem into a manageable one. Nevertheless making it may be seriously invalid because it grossly oversimplifies and excludes other likely possibilities. These are schematically designated below.

SCHMATIC REPRESENTATION OF VALUATION OF PUBLICLY FINANCED EXPENDITURES

Beneficiary Group	Utility	?	Disutility	"Market" Value	?	Cost of Production
	$U > D$	$U = D$	$U < D$	$"M"V > CP$	$"M"V = CP$	$"M"V < CP$
Specific	A				X	A
General						
Combined						

"Market" value ("M"V) of an expenditure corresponds to the sum of individual revealed preferences. For a given group of beneficiaries it may equal, exceed, or fall short of cost of production (CP). Utility (U) is the sum of individual utilities corresponding to the expenditures. Disutility (D) is the total decrease in utility corresponding to the tax paid. A simplifying assumption is to assume that all taxes cover all

public expenditures in the proportion of each expenditure to total expenditures. Since earmarking is very uncommon this is probably a good assumption. With a few important exceptions taxes are not closely associated with benefits, other than in accidental historical sense, and a researcher would be hard put to rank them in terms of some measure of community preference. All specific expenditures have externalities, although these are presumed miniscule. Consequently we have specific and general benefits and their combined or total incidence.

In terms of the schematic representation, the assumption of allocative efficiency of specific expenditures simply stipulates, that the specific beneficiaries value the benefit at cost of production, ($M^V = CP$ and marked by X.) Externalities are considered neither more nor less important than for the typical private good. All other possibilities are excluded. Some of these may be important. For example we can be confronted with the possibility of a valuation of a specific expenditure by the corresponding beneficiary-group below its cost of production, but at a marginal utility above that corresponding to the average disutility of the group which pays for the benefit. (This situation is designated A in the schema.) This is likely to be the case to the extent that marginal utility is a declining function of income and net benefits (expenditures - taxes) are enjoyed by the poor and paid by the wealthy. The schema provides for all other combinations. Note that any U/D relationship is consistent with any M^V/CP relationship.

None of the studies of fiscal incidence on size distribution of income

even remotely considered situation A or other alternatives. The universal approach to specific benefits has been solely in terms of presumed valuation by private beneficiary-group at cost of production.^{13/}

Incidence of General Expenditures

The value of general expenditures is also universally assumed at cost-of-production. This is even more heroic than similar valuation of specific expenditures since it implies that the sum of marginal valuation of the various general expenditures by the families "consuming" them exactly equals their cost of production. (It also ignores private benefit aspects.) Obviously the taxes and expenditures ground out through the political process do not nearly approach such fine tuning. Equally noteworthy is that this valuation assumption is made independently of the presumed distribution of benefits.

Researchers have used from 1 to 3 basic assumptions for distributing general expenditures by income brackets: Income proportional, equal per family or capita, and marginal utility functions. Distribution to families in proportion to post-tax income is neutral in the sense that the relative size distribution of income is unaffected by general expenditures. Distributing them in equal amount to each family implies very substantial diminution of inequality since general expenditures are calculated at anywhere from a third to two thirds of total public

13/

Aaron/McGuire describe this approach -- fruitfully -- in mathematical terms.

expenditures. Even in developing countries total public expenditures occasionally exceed 25 percent of national income.^{14/} Hence in many cases this assumption amounts to a radically egalitarian redistribution of 10 percent or more of national income.

The difficulty of defending such allocation is probably the major reason why researchers have used this alternative primarily for illustrative purposes.

Distribution of general exhaustive expenditures by explicit utility functions has been carried out by McGuire and Aaron. They worked with an updated study by the Tax Foundation of U.S. expenditure incidence which used Gillespie's methodology. The two functions they used were (pp. 914-915);

$$(1) U = A \log Y$$

$$(2) U = E - C/Y$$

U: utility

A,E,C: arbitrary constants

Y: post tax income plus specific good benefits.

They made a number of simplifying assumptions; e.g., allocative efficiency in the public sector; all utility functions identical;

^{14/}In recent years this has been the case in Algeria, Brazil, Chile, Guyana, Liberia, Yugoslavia, Zambia (IBRD).

all public goods homogeneous and "consumed" by all households; private and public goods were assumed substitutes in "consumption;" independence of utility between public and private "consumption." The model produced as a necessary consequence increasing relative valuation of public goods as income increases; i.e., the rich are willing to pay a higher price per unit of public goods than the poor. In other words, the benefits from public goods increase with income, although not necessarily at the same rate. Hence either a pro-poor or pro-rich outcome is possible.^{15/}

Obviously a researcher can arrive at innumerable distributions of general expenditures depending on choice of utility function even given the assumption of allocative efficiency. This is Aaron/McGuire's basic point. And their apparently reasonable assumptions lead to substantially increased income-inequality ex-post.

^{15/}In terms of the Aaron/McGuire model:

$$MRS_1 \cdot MU_1 = \text{a constant}$$

$$\sum_1 MRS_1 = MC \text{ public good} = AC \text{ public good} = \text{total tax imposed per unit of public good.}$$

MRS_1 : Marginal Rate of Substitution of private income for public goods of i^{th} household.

MU_1 : Marginal utility of income of i^{th} household.

Since MU is a declining function of income, valuation of public goods (MRS_1) is an increasing function of income.

It is noteworthy that use of equation (1) in their model is equivalent to distributing general benefits income-proportionately. The model requires that general benefits be distributed by household in proportion to the reciprocal of the marginal utility of private goods expenditure. The marginal utility in equation (1) is A/Y , in short the reciprocal of income. Hence benefits are distributed proportionate to income. In equation (2), marginal utility is C/Y^2 . Hence benefits are distributed as Y^2/C , i.e. proportionate to the square of income. This latter gives results which appear extreme. For example, at \$5,000 per year, marginal utility is 49 times higher than at \$35,000 per year.

Nevertheless, Aaron and McGuire very usefully emphasize the critical importance of finding an acceptable way to distribute benefits from general public expenditures.

Results

The estimates of expenditure incidence in terms of reduced Gini coefficients for the various studies are given in Table 7. All studies found expenditure-incidence regressive (pro-poor). The variance in expenditure incidence as measured by the Gini coefficient among the different studies is due in part to variance in the proportion of public outlays included under the - usually - neutral general exhaustive category and in part because of variance in the shares of total

resources moved through the public sector.^{16/} In the case of three of the four countries studied, Guatemala, the Argentine and the United States, specific expenditures had far more impact on redistribution, than the entire tax systems. In the El Salvador study, most expenditures (84 percent) were included in the general category, so that minute expenditure incidence was the necessary consequence.

As tentative, weak, and restricted as these results are, they do suggest that on average increasing specific expenditures has been an effective device for decreasing income-concentration. The fact that tax systems are at least largely income proportional indicates no a priori constraint on the tax side.

^{16/}Distributing general expenditures income-proportionately is neutral only in the sense of leaving the size distribution unchanged. We could also define neutral fiscal incidence as total benefits equal to total taxes paid. Under this definition, coincidence of income-proportional benefits and neutral incidence would be rare.

Table 7

FISCAL INCIDENCE MEASURED IN GINI COEFFICIENTS, COUNTRY STUDIES

Author Country Year of Data	Number of Income Brackets	Gini Coefficient		After Public		% Decrease in	
		Before Taxes	After Taxes	Expenditures	Expenditures	Gini due to Fiscal incidence	
Wallich El Salvador 1946	5	.403	.398	.397 ^{a/}		1.5	
Adler Guatemala 1947-48	7	.475	.460	.448		5.7	
UN/ECLA Argentina 1961	7	.418	.414	.397		9.3	
Herriot/Miller U.S.A. 1968	9	.439		.351	.360	20.0	18.0
Gillespie U.S.A. 1960	9	.410	.458	.341		16.8	
				<u>high</u>	<u>low</u>	<u>high</u>	<u>low</u>
Tax Foundation U.S.A. 1961	9	.407	.402	.321	.316	21.1	22.4
Aaron/McGuire ^{b/} U.S.A. 1961	9	.407		.362	.341	11.1	16.2

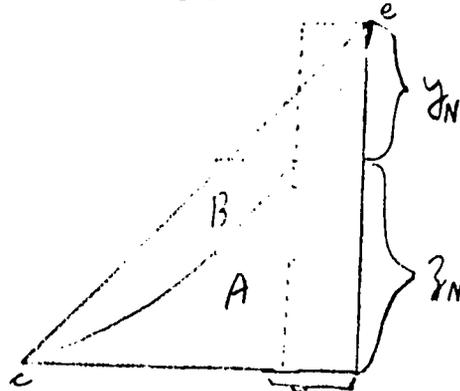
^{a/} Unallocable expenditures assumed distributed income-proportionately

^{b/} Used Tax Foundation data. Results presented here are those from use of $U = A \log Y$ to allocate public expenditures.

APPENDIX

V. Method Used to Calculate Gini Coefficients

In the figure, the horizontal axis measures percent of population, the vertical axis corresponding percent of income received. The curved line



ce describes the cumulative income distribution or Lorenz Curve. The Gini Coefficient is described geometrically as:

$$(1) \text{ Gini C.} = \frac{(A+B) - A}{(A+B)}$$

where A and B sum to the area of the triangle.

The data in the paper are in percentage terms, hence $(A+B) = \frac{1}{2}$. Hence equation (1) can be expressed as:

$$(2) \text{ Gini C.} = 1 - 2A$$

Throughout the paper A is calculated as:

$$(3) A = \sum_{i=1}^N (X_i \cdot Y_i / 2 + X_i Z_i)$$

X_i : % of population in i^{th} population group

Y_i : % of income corresponding to i^{th} population group

Z_i : cumulative income; $Z_i = \sum_{i=1}^{Z_i-1} Y_i$

(3) assumes that all incomes within groups are equally distributed.

These relationships are geometrically illustrated for the N^{th} interval in the figure.

The equation used to calculate the Gini Coefficient was therefore:

$$(4) \text{ Gini } C = 1 - 2 \sum_{i=1}^N \left(\frac{X_i \cdot Y_i}{2} + X_i \cdot Z_i \right)$$

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FISCAL INCIDENCE IN
EMPIRICAL STUDIES OF INCOME
DISTRIBUTION IN POOR COUNTRIES

Jacob Meerman

A.I.D. Discussion Papers are circulated for the information of the addressees and their staffs. These papers are intended to serve several functions: to improve knowledge of analytical studies, research results and assistance policies among Agency personnel, to encourage the careful recording and analysis of Agency experience and problems by persons currently engaged in them; and to share such experience and ideas with interested persons outside the Agency. These papers are designed to stimulate and serve as background for discussion. They represent the view of the authors and are not intended as statements of Agency policy.

December, 1972

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Introduction

Recent concern with income distribution results from increasing awareness that economic development has been very uneven and of little benefit to a very large part of the poor in developing countries. As Robert McNamara stated:^{1/}

A recent study of income distribution patterns in more than 40 developing countries estimates that at the beginning of the First Development Decade the average share in the national income of the richest 20 percent of the people was 56 percent - but the share of the poorest 60 percent of the people was only 26 percent. Preliminary indications are that this severely distorted income distribution is not only continuing, but in many countries may be growing worse.

Such developments have contributed to the demise of the faith that development per se would automatically absorb into the modern sector the impoverished millions. Huge traditional sectors characterized by malnutrition, disease, illiteracy, and early death are now expected to persist unless very radical changes occur in public policy.

The issue can be seen in terms of low levels of output per head and extremely skewed distribution of that output. If increasing output per head is not a short run solution, the question following hard thereon is, can current output be distributed more equally? Government as an engine to redistribute wealth is an ancient notion. In many advanced countries it is a reality and governments are effective in this regard. But what is feasible in the poor countries? The first step in answering this question is to determine the actual current

^{1/}Robert S. McNamara, President of the World Bank, speech at the Third UNCTAD in Santiago, Chile on 4/14/72.

impact of government on income distribution in the developing world. This paper largely addresses this question. Its vehicle is examination of recent studies of income distribution in poor countries to determine how fiscal effects are considered

For the busy reader, a brief summary of the paper's findings and recommendations follow the introduction. The paper itself breaks into five parts: (1) Summary of findings and recommendations; (2) Overall treatment of the public sector in individual studies; (3) the techniques for allocating tax-burden; (4) the treatment of public expenditures; (5) an appendix on the calculation of the Gini coefficients. To enhance interest and understanding the results of these studies are compared with results of similar studies of the USA.

I. Findings and Recommendations

Purpose of Paper

Taxes and public expenditures have been traditionally regarded as effective means toward attaining a more egalitarian distribution of income. The paper is basically concerned with assessing these burdens and benefits from this perspective. To do this the author reviewed all available LDC country studies of income distribution to determine how they treat fiscal incidence.

Findings

(1) From a general perspective, fiscal incidence involves all variables which affect the distribution of income and which governments can

manipulate e.g., taxes, public expenditures, foreign exchange rates, interest rates, treatment of business, wage and migration policy, rate of inflation and others. The review found no study, completed by 1971, which offered a quantitative assessment of fiscal impact on income distribution from a general overall approach.

(2) Of over 4 dozen country size-distributions of income reviewed, only 9 in any way considered fiscal effects. The majority of such studies use a concept which is close to paid out money income.^{2/} Most studies ignored tax-effects. Benefits of government expenditures which are quantifiable in financial terms, e.g., health, education, are also nearly always ignored. In short the typical income concept in such studies comes close to that of factor payments before taxes, but not completely. This failure to consider fiscal incidence is a serious shortcoming, since typically 15 to 20 percent of national income is channeled through the public sector. Moreover in recent years, total public expenditures exceeded 25 percent of national income in at least Algeria, Brazil, Chile, Guyana, Liberia, Yugoslavia and Zambia.*/ These data suggest that in poor countries the public sector has the potential for redistributing anywhere from an eighth to over a quarter of national income. Such would occur if all taxes were paid by the rich, and all public benefits accrued to the poor.

^{2/} Income before payment of direct and indirect taxes, excluding corporate taxes and retained earnings and frequently after payment and receipts for social security.

*/Short form references are listed in full in the bibliography.

Obviously such an "ideal" is far from feasible, but it does indicate the overriding need to assess public sector impact when estimating the size-distribution of income.

(3) Of the nine studies considering aspects of fiscal impact, all considered the effects of taxation, either partially or completely. All of these studies showed tax-burden as distributed nearly proportionately, up and down the income distribution. This conclusion is probably valid not only for the nine countries, but in general. It is reinforced by data from an IMF Study measuring indirect taxes, which are usually regressive, as over three-fifths of total taxes. The combined impact of this material permits a strong conclusion: The tax systems of developing countries have not substantially redistributed income from the rich to the poor. There is a corollary to this: Where expenditure is neutral, without basic tax reform in developing countries, in general increasing total taxation cannot be expected to improve income distribution.^{3/}

(4) Four studies, less than one in twelve, attempted estimating the effects of public expenditures. One reason for this lack of

^{3/} There is a tendency to regard poor countries as taxing as fully as their administrative apparatus, and their economies, permit. Taxation is thus limited in magnitude and composition, not by choice but necessity. Hence, the argument runs, tax reform is generally a will-o'-the-wisp. Nevertheless a great deal of evidence suggests that the basic problem is politics, in other words a matter of choice. The constraint is of this type rather than economic or administrative. While perhaps hackneyed, this old exhortation toward basic reform remains valid.

attention is the general or collective character of much of public expenditure, which precludes identification of specific groups of beneficiaries. Defense, diplomacy, general administration, police protection all fit this category. Researchers typically classify over 40 percent of public expenditures as collective and therefore unallocable. Identification of beneficiaries of the remaining expenditures is also difficult because of very fragmentary data. Consequently the measure of expenditure impact is extremely crude, actually inchoate. Hence conclusions even restricted to the four study sample itself are hazardous. However, unlike taxes, the studies do suggest - particularly in the case of the US experience - that expenditures have substantial redistributive impact. This conclusion is reached by regarding the collective or general expenditures as neutral - that is income-proportional - in their effect on income distribution. The specific expenditures are then allocated to beneficiaries, usually with significant pro-poor redistributive effect.

Ignoring general expenditures, that is treating them as neutral, is plausible since "benefits" from such outlays are very different in character from other public expenditures. In a sense the very existence of the economy depends upon the "hard core" of such expenditures. Without a legal framework (rules) and police protection (sanctions) modern economic life is impossible. If we expand the proposition to define as an unlimited value certain current basic institutions - private

ownership of capital, free enterprise in most developing countries - then the "hard core" of necessary expenditures expands to include most of diplomacy, defense and other general expenditures designed to maintain the institutional status quo. They provide the framework for income producing activity, for the production of benefits be it through private markets or through the political mechanism. But they themselves are not such benefits. They can be viewed as the "sunk costs" of maintaining the "system."

Recommendations

(5) Even if one rejects the rationale above and therefore its implications, one can still assert that general are inferior to specific expenditures as a means of redistribution because (a) rich and poor both consume collective goods in equal amounts and (b) the valuation per unit of such collective goods is likely to decrease as the family's wealth decreases, due to a "smaller stake in the system." This suggests that pursuit of egalitarian income distribution is enhanced through minimizing general as opposed to specific expenditures. Maximization of the latter is desirable, particularly those most effective in redistributing income. Note that AID's sector lending policy, by operating primarily through specific government expenditures (agriculture, education) is potentially a very useful mechanism for helping borrowing countries achieve some redistribution.

It is also worth noting here that this recommendation is not necessarily inconsistent with a policy of using public resources to maximize growth. Many specific expenditures simultaneously foster both growth and redistribution. The short run effects of welfare transfers to the poor may appear more egalitarian than investment in human capital through public education, public health services, or improved nutrition for infants and so forth. But this is likely to be misleading. Private returns to such public investment, given well planned and executed programs, are apt to be very high. Consequently the total value of the latter through the years may well exceed the total value of an alternative simple cash transfer. In other words, cash transfers can only reduce poverty as long as they continue; public investment can imply permanent reduction in the number of the poor.

(6) Current AID policy stresses sector analysis as means to enhance welfare of the poorest. One way to greatly increase the quality of such analysis and programming is to get more information about the poorest, probably among the least studied groups in the developing world. To this end, sample surveys emphasizing economic characteristics of subsistence households and other poor are useful but rare. (I say subsistence households as such, because I surmise that little work has taken as the point of departure the fact of subsistence and its structural implications; e.g., very low tax capacity.) The next step would be study of size distribution of income with emphasis on the lowest brackets. This in turn could be complimented by study of fiscal impact on income with emphasis on the beneficiaries of specific

government expenditures. The latter needs emphasis since specific government expenditures are frequently the means by which AID sector loan resources are channeled to final users in the recipient economies. By now the Agency has sufficient history with sector lending to permit some evaluation of planned and actual effects of such projects useful in developing future sector analysis and loan programming. What I am suggesting is both the desirability of such evaluation and that it give inter alia substantial weight to the question of how such lending has affected (a) the overall pattern of public expenditures in the recipient country and (b) the distribution of income, particularly the income of the lowest brackets.

II. Overall Treatment

General Equilibrium Study of Fiscal Incidence

Estimating fiscal incidence is the general equilibrium problem par excellence. It can be approached on two levels: The first, all-encompassing level, refers to the role of government in maintaining the basic institutional framework, through the police power (police, courts, prisons), through interpretation of laws and customs (bureaucracy), and through political activity; e.g., parliaments. In other words, governments make possible economic systems. One can therefore study such systems - whose most pronounced differences are in the extent and functions of the public sphere - as a variable, comparing the empirical income distributions of

countries with widely differing organization; e.g. private enterprise contrasted with socialism.

Economists and other researchers have carried out very substantial comparative work on such systems. However there is little information on their comparative income distribution. In general, in socialist countries, data on size distribution and on the impact of government on that size distribution are fragmentary. As a consequence there are even less hard data indicating the extent to which differences between the various systems can explain differences in the way incomes are distributed. Nevertheless, investigation of these differences could be fruitful in indicating the degree to which income inequality is a natural consequence of modern economic life, and the degree to which different systems result in changed income distributions. Obviously our review found little work concerned with this question.

On the second narrower level, the general economic system, what Kuznets terms the "institutionalized valuations of society," is taken as largely given, and the focus is on those societies which are private enterprise and private property in orientation. Here the general equilibrium perspective implies that fiscal incidence involves all variables affecting the distribution of income and manipulable by governments. In addition to taxes and public expenditures, these variables include foreign exchange rates, interest rates, special treatment of business, wage and migration policy, rates of inflation and other. The review of empirical studies completed by 1971 of size distribution of income found none which offered quantitative

or other assessment of fiscal incidence on income distribution incorporating such a general equilibrium approach. Further, although the items listed above are generally regarded as key variables, the very substantial attention which they have individually received has overwhelmingly reflected primary concern with increasing efficiency. How the manipulation affects and can affect individual income is by and large terra incognita. Study of fiscal incidence has been overwhelmingly restricted to incidence of taxes and expenditures.

Table 1

TREATMENT OF FISCAL INCIDENCE IN EMPIRICAL STUDIES OF INCOME DISTRIBUTION
IN DEVELOPING COUNTRIES

(1)	(2)	(3)	(4)	(5)
Total studies reviewed	Selected studies not assessing fiscal effects	Studies including tax incidence only	Studies including tax and expenditure incidence	Special studies of fiscal effects
24	9	9	4	2

We reviewed material available involving quantitative estimation of size distribution of income in poor countries, including more than four dozen empirical distributions of income.^{4/} (See Bibliography.) Of this total, 13 distributions, a small minority, considered one aspect or another of fiscal incidence.

Fiscal Incidence in Empirical Studies

As shown in Table 1, we reviewed in detail 24 of the studies of developing countries. This includes 9 of the majority which simply ignored fiscal

^{4/}Adelman and Morris compiled a complete listing of relevant studies in their work on the determinants of income distribution. They pieced together empirical income distributions for 44 developing nations. This has greatly expedited our work.

incidence. These were included because of interest in their definition of income. Two were special studies and did not focus on empirical income distribution. Of the 13 which did assess fiscal effects, all distributed tax burden, partial or total, among different income groups. Four attempted to allocate benefits of government expenditures. Table 2 lists the studies concerned with fiscal incidence with information on their individual treatment of taxes and expenditures. It also includes two studies of the US to provide useful contrast.

Immediate conclusions followed: (1) Fiscal incidence was explicitly considered in only a small minority of developing countries. Nine of these 13 countries were in Latin America and 7 of these 9 were primarily studies of public finances. In short, most of the interest in fiscal impact on income distribution has come from those primarily interested in public finance, and most of the relevant empirical work has been done in Latin America.

The error in empirical estimates of size-distribution resulting from this failure to consider fiscal incidence may be serious. According to a recent IMF Study of 49 developing countries, the tax to GNP ratios (1966-68 average) exceeded 15 percent in 39 percent of the countries and 20 percent in 14 percent of the countries. (Chelliah pp. 302-303). Tax and public expenditure incidence in such magnitudes could easily substantially modify income distributions.

Table 2

COUNTRY STUDIES ESTIMATING IMPACT OF FISCAL ACTIVITY ON INCOME DISTRIBUTION

Country	Year of Data	Author	Before Fiscal Incidence Income Concept ^{a/}	Taxes Considered ^{b/}	Expenditures Considered
Venezuela	1957	Carl S. Shoup	National Income minus taxes paid by oil companies, and social security tax plus; capital gains	All, except certain taxes on oil companies and government profits on foreign exchange transactions	None
10 South American Countries	1958	Richard A. Musgrave	National Income	All	None
Colombia	1961	Milton C. Taylor	National Income minus corporate retained earnings	All, including local government taxes	None
Colombia	1966	Charles E. McLure, Jr.	National Income minus $\frac{1}{2}$ of the corporate profits tax	All, including exchange profit on coffee exports.	None
Peru	1963	Eugene A. Brady	National Income	Corporate profits taxes only	None

Table 2 (continued)

Country	Year	Author	Before Fiscal Incidence Income Concept ^{a/}	Taxes Considered ^{b/}	Expenditures Considered
Greece	1957	Andreas Michalakis	"Household income," approximates Personal Income	Indirect taxes, including import duties	None
India	1959-60	V.K.R.V. Rao	Non-Agricultural Taxable Income (5.78% of National Income)	Income and sur-taxes only	None
India	1953-57	P.D. Ojha and V.V. Bhatt	Money Income	Direct taxes on persons only	None
Ceylon	1952-53	Survey of Ceylon's Consumer Finances (Colombo, 1954) ^{c/}	Approximates Personal Income	Income and other direct taxes on persons	None
El Salvador	1946	Adler and Wallich	Money Income	All	All
Brazil	1961-63	Aaron	Money Income	All	All

Table 2 (cont'd)

Country	Year	Author	Before Fiscal Incidence Income Concept ^{a/}	Taxes Considered ^{b/}	Expenditures Considered
Guatemala	1947-48	Adler, Schlesinger, & Olson	Money Income	All	All
Argentina	1959	UN/ECLA	Money Income, plus subsistence agriculture production	All except corporate profit and export taxes	Expenditures on education, public health, social security, and subsidies
US	1968	Herriot and Miller	NNP plus realized capital gains	All	All
US	1960	Gillespie	Money Income plus imputed income	All	All

- a/ "Money Income" is similar to Personal Income as defined by the U.S. Department of Commerce.
- b/ Major inclusions and exclusions are listed. Many minor inclusions or exclusions were not noted in the studies or were left out here due to limited space.
- c/ Data reproduced in Kuznets.

Sources: See bibliography

Concepts of Income-To-Be-Measured

A major problem is the concept of income-to-be-measured. One can postulate an ex ante concept consisting of all factor payments with certain adjustments; e.g. eliminating factor payments to foreigners, inclusion of capital gains.^{5/} In many cases the income distribution used is based in part on the results of a sample survey, which does not give data coincidental with those of the national accounts because of errors in both series and more importantly because the income concepts differ greatly between survey and national income accounts. The national income concept most useful in developing an ex ante theoretic concept is personal income (US Department of Commerce) with certain adjustments. As Table 2 illustrates, different ex ante concepts have been used, ranging from a concept of money income which approximates personal income (US Department of Commerce), to explicit use of net national product. In much of the more detailed work, the concept is constructed from various sources of data including tax returns, sample surveys, and national accounts data. Because of statistical shortcomings, ingenuity is the watchword.

In those studies which ignore fiscal impact, the most common concept is one of money income before payment of direct personal taxes and indirect taxes, but excluding direct corporate taxes, retained

^{5/} For a discussion of the relevant income concept see Gillespie; for a good example of revaluation of official data see Herriot/Miller.

profits, undistributed social security payments and including government transfers. This concept lies, therefore between ex ante and ex post fiscal incidence, although it is probably far closer to the former on average. It follows that in such studies it is impossible to gauge accurately the impact of government expenditures and taxes.

III. Tax Incidence

The studies available indicate that a conventional approach to estimating tax burden has evolved. It is well illustrated by McLure's work on Colombia. His pivotal concept approximates personal income. He estimated this for 8 different income brackets by piecing together data from tax returns, national accounts, material on the economic characteristics of the population, and other data. The data were broken out as capital or labor income.^{6/}

McLure allocated the exchange rate tax on coffee^{7/} retained corporate earnings, and "unshifted corporate income taxes" to this approximation

^{6/} The result was an approximation. As McLure states, "References...to personal income are not technically correct, in that this term is used (in the study) to refer to national income minus retained earnings and taxes of corporations, without allowance for transfers, social security taxes, or interest on the national debt." (p. 247) McLure argues that in the Colombian system, social security taxes are in the nature of fees rather than true taxes.

^{7/} "Although these exchange earnings (of the government) are treated as indirect taxes in the national accounts, they have more nearly the effect of direct taxes; because the price of coffee is determined in the world market, this quasi-tax can only reduce the net earnings of coffee growers." (p. 247)

by income brackets to derive a distribution of quasi total factor payments or quasi national income. This became his estimated pre-tax distribution of income.^{8/}

He also stripped direct taxes from the personal income distribution to derive an estimate of disposable income for each income bracket. Sales taxes were allocated against this distribution of disposable income in accordance with the presumed pattern of consumption expenditures based on a study by Levin of Colombian sales taxes.

Taxes collected at the national, departmental, and municipal levels were classified into 9 categories and allocated to the various income brackets on the basis of assumptions about their incidence. These assumptions reflect the "conventional wisdom," which has evolved over the decades from work on tax-incidence. For example, personal income taxes are assumed unshifted, while "the shifted half of the taxes on corporations, the remaining two thirds of the property tax, all import duties, and all other indirect taxes were allocated on the basis of non-food expenditures." (McLure p. 254). The results are reproduced in Table 3. The final column of that table indicates that the Colombian tax system is mildly progressive. The upper income groups do pay somewhat more than the average rate of taxation of 15 percent; the lower brackets somewhat less.

^{8/}For a similar derivation for the USA, based on more detailed data see, W. Irwin Gillespie, pp. 173-175. These workers avoid the concept quasi national income or quasi factor payments although that best describes it.

McClure's work is typical of serious attempts to gauge the impact of taxation on income distribution. Three aspects of all such work are basic: (1) the use of personal income as a pivotal concept; (2) ingenuity in using fragmentary sources to piece together the necessary data; (3) the use of shifting assumptions which reflect the recent work concerning tax incidence in developed countries.

McClure emphasizes the hypothetical nature of his tax-allocation assumptions. For example "the total of taxes on alcohol, beer, and tobacco...was allocated arbitrarily to income brackets on a somewhat less than per capita basis in the lower range and on a somewhat more than per capita basis in the upper range. ...all import duties, and all other indirect taxes were allocated on the basis of nonfood expenditures" (McClure p. 254). These assumptions mean taxes on spirits and tobacco were very regressive; e.g. the bottom third of the population spent over 6 percent of its income on taxes on alcoholic beverages and tobacco. Taxes on imports and other indirect taxes were at best proportional. (See Table 3.) The two categories sum to 48 percent of total taxes, so that their weight in total collections is very high. To the extent that these distribution assumptions exaggerate regressivity, the tax-system will be more progressive than assumed.

There was substantial consensus among all of the studies in assuming regressiveness of indirect taxes and progressiveness of direct taxes.

Table 3

COLOMBIA, EFFECTIVE RATES OF TAXATION FOR VARIOUS TAXES BY
INCOME BRACKETS, 1966^a
(percentages)

Population	Income Bracket	Personal Income and Transfer Taxes	Corporation Income Taxes	Sales Tax	Property Taxes	Alcohol, Tobacco, and Beer Taxes	Motor Vehicle Taxes	Import Duties and Other Indirect Taxes	Exchange Earnings on Coffee	Total, all Taxes
35.5	Lowest		0.96	1.07	0.43	6.48	0.18	3.41	0.13	12.6
12.9	2nd		0.89	0.77	0.41	4.61	0.17	3.13	0.46	10.4
8.6	3rd		1.22	1.21	0.58	4.40	0.17	4.49	1.34	13.4
25.3	4th	0.19	1.48	1.53	0.68	2.98	0.15	5.33	0.48	12.8
8.8	5th	0.22	1.46	1.37	0.66	1.88	0.12	5.22	0.94	11.8
4.9	6th	0.96	1.52	1.41	0.70	1.34	0.13	5.48	1.68	13.2
3.3	7th	2.74	4.16	1.05	1.25	0.60	0.24	4.85	0.46	15.4
0.5	8th	5.87	4.73	0.82	1.32	0.19	0.26	3.77	0.11	17.1
0.1	9th	8.12	5.18	0.66	1.42	0.24	0.27	3.76	-	19.7
Average		2.13	2.68	1.22	0.92	2.26	0.20	4.63	0.62	14.8

^a Columns may not average exactly because of rounding.

Source: McLure, p. 259

These assumptions reflect what is taken to be the general case with respect to regressivity of indirect taxes in empirical studies in rich countries. Nevertheless it is unclear to what extent this experience is similar in developing countries where much of the population lives outside the market economy. Households whose income is overwhelmingly subsistence in nature will have very low indirect taxes because of minute monetary transactions. This group is concentrated in the lowest income bracket. To illustrate, in McLure's study, this bracket accounts for 36 percent of total population. If half of this bracket, pays little taxes because most of its income is subsistence, the other half would be burdened with - for example - alcohol and beer taxes of say over 10 percent of income, since the average rate of such burden is estimated at 6.48 percent for the bracket as a whole.^{9/}

These considerations not only raise questions as concerns the degree of regressiveness of indirect taxes in poor countries, but also strongly suggest the desirability of analyzing an income bracket as explicitly subsistence in nature, defined as including say all households with 80 percent or more subsistence income. As is the case with respect to many structural characteristics, the subsistence sector

^{9/}If half the bracket, receives $\frac{2}{3}$ of the income, and pays all of the taxes then the tax-rate for the upper half is $(\frac{3}{2})$ (6.48 percent) = 9.72 percent. In his footnote 33, McLure expresses inconclusive concern with the possibly exaggerated regressivity of these taxes; e.g., they imply "13% to 20% of income in the lowest class...spent on these products."

can be expected to differ radically from the rest of the economy with respect to tax-incidence.

Impact of Taxation on Income Distribution

Putting aside the caveats on the presumed regressivity of indirect taxes in poor countries, I have taken at face value the pre-tax and post-tax income distributions and calculated ex-ante and ex-post Gini coefficients, for each study which considered tax impact.^{10/} The results are reproduced in Table 4. They permit a few generalizations. All of the 6 studies estimating total tax incidence were of Latin American countries. As indicated in Table 4, in none of these 6 countries did taxation so redistribute income that the Gini coefficient decreased by more than 4 percent.

Three of the four studies of partial taxation, concerned solely direct taxes. In these three cases, no Gini coefficient decreased more than 4 percent. Presumably making these studies comprehensive by including indirect taxes would mean increasing the Gini coefficient, perhaps even beyond the ex-ante tax magnitude so that possibly even slight regressivity of the tax system would be the overall outcome.

Other data suggest that the minute tax-progressivity for the countries in Table 4 is generally true in poor nations. On average the tax to GNP ratios corresponding to the countries in Table 4 do not deviate greatly from mean ratios for developing countries as a whole. A

^{10/}This makes things simple. But we should not forget that the received canons of tax incidence continue to be controversial among public finance economists.

recent IMF cross-country study of tax-performance in poor countries gave a mean tax ratio for 27 countries (for which data were available) in 1953-55 of 11.3 percent, rising to 13.8 percent in 1966-68 (Chelliah, p. 263.) According to the same study, in 30 developing countries for 1966-68, indirect taxes, less taxes on exports, were 62 percent of total taxes. (Chelliah, p. 271.)^{11/} Given the probable regressiveness of indirect taxes, the total weight of the latter in total taxation suggests that tax systems of poor countries simply cannot be very progressive.

To take the tax experience of the countries in Table 4 as representative is therefore warranted. To do so forces the basic conclusion that in developing countries, tax systems have not substantially redistributed income from the rich to the poor. There is a corollary to this. Assuming "expenditure-neutrality," without basic tax reform in developing countries, in general, increasing total taxation can not be expected to improve income distribution.

^{11/}Chelliah considers property taxes as direct.

Table 4

GINI COEFFICIENTS BEFORE AND AFTER TAXES,
TAX RATIOS IN DEVELOPING COUNTRIES

<u>Author</u> <u>Country</u> <u>Year of Data</u>	<u>Extent of</u> <u>Taxes</u> <u>Considered</u>	<u>Gini Coefficient</u> <u>Before</u> <u>After</u> <u>Taxes</u> <u>Taxes</u>		<u>Number of</u> <u>Gini</u> <u>Observations</u>	<u>Percentage</u> <u>Decrease</u> <u>in Gini</u>	<u>Taxes as</u> <u>Percent of</u> <u>National</u> <u>Income</u> <u>1951-60</u>
Wallich El Salvador 1946	total	.403	.398	5	1.2	11.5 (1961-67)
Adler Guatemala 1947-48	total	.475	.460	7	3.2	10.3
Shoup Venezuela 1957	total	.520	.501	3	3.7	21.8
UN/ECLA Argentina 1961	total	.418	.414	7	1.0	7.2 (1966)
Taylor Colombia 1961	total	.463	.457	4	1.3	13.1
McClure Colombia 1966	total	.572	.562	9	1.7	13.1
Kuznets Ceylon 1952-53	direct taxes on persons	.420	.410	5	2.4	21.6 (1961-66)
Ojha and Bhatt India 1954-57	direct taxes on persons	.338 ^{a/}	.333	11	1.5	8.8
Michalaklis Greece	indirect taxes including import duties	.610	.625	6	2.5	19.5
Brady Peru 1963	corp. profit taxes only	.678	.654	10	3.6	15.2

^{a/} The Gini coefficient is of consumption, which will be lower than that of income.
Final column source: (IBRD)

IV. Expenditure Incidence

Introduction

Most of the work on fiscal incidence has concentrated on the incidence of taxes. Expenditures have usually, but not always, received short shrift. This reflects in part the problem of public "collective goods" not allocable to beneficiaries, because not liable to private market allocations. Nevertheless most government expenditures produce private or mixed goods benefitting a small group rather than the community at large. Usually this is true of well over half of public expenditures. (See Table 6, below.) However, the allocation by beneficiary of truly collective goods, does present problems hitherto solved solely through arbitrary assumptions, which is to say, not solved at all.

Estimating Expenditure Incidence

As indicated in Table 2, of the few studies in developing countries concerned with fiscal impact on income distribution, a third have attempted to quantify expenditure-incidence. Unlike tax incidence, there are neither well developed general techniques nor theory for handling expenditures. Nevertheless all researchers used an approach similar to that which has evolved in estimating tax incidence.

Musgrave (p. 23., and 31) characterized such estimates as:

...an uneasy marriage between theoretical hypotheses on the incidence of various taxes by broad economic categories of factor shares and consumer outlays, and the translation of these hypotheses into distributional changes by size brackets of income. The result therefore is a quantification of theoretical deductions, rather than empirical evidence in the econometric sense.

Replace taxes by expenditures, and the quotation remains equally valid. However in moving beyond this generalization, work on expenditures is characterized by the diversity of "theoretical hypotheses," with respect to those expenditures which can be allocated to specific beneficiaries. This is clearly reflected in Table 5 which details the procedures for allocating expenditures in all available studies of developing countries as well as a comprehensive study for an advanced country, namely that of Gillespie for the USA.^{12/}

Table 5 below distributes public expenditures into analytical categories implicit in the studies. Of the three, transfer payments alone do not present serious conceptual difficulties in assessing expenditure incidence: It is both convenient and rigorous to define transfers as a negative tax and integrate them into the tax incidence analysis.

Classification of exhaustive expenditures into general and specific is conventional. -/ Ideally, specific expenditures are predominantly private-good in character. And ideally, general expenditures are those to which the exclusion principle does not apply and in whose consumption all citizens participate. In the real world goods have both public and private characteristics so that classification is made according to which characteristic is thought to predominate.

Different researchers take different tacks so that one person's private good is another man's public. Recognizing this ambiguity

Aaron and McGuire distributed education, welfare expenditures,

^{12/} Using the same technique an additional study has been carried out by George Bishop for the Tax Foundation using more recent US data.

-/ Exhaustive expenditures are defined in contradistinction to transfers. They are expenditures which the government itself finances through purchase of goods and services.

Table 5a

ALLOCATION OF PUBLIC EXPENDITURES IN STUDIES
OF EL SALVADOR, GUATEMALA, ARGENTINA

<u>Type of expenditure:</u>	<u>Allocation by:</u>
(Wallich/Adler, El Salvador, 1946)	
cultural and social (16%) (education, social security, subsidies to "cultural and social institutions")	families with income less than 3600 colones per year receive 20% more than their share distributed on an income- proportional basis. Remaining ex- penditures allocated on an income proportional basis.
other (84%)	income proportional; and alternatively per capita
(Adler/Schlessinger/Olson, Guatemala, 1947-48)	
cultural and social (27%)	per capita
other (73%)	income proportional
(UN/ECLA - Argentina, 1967)	
social security (19%)	workers' wage income
subsidies to government enter- prises (15%)	input-output matrix of final demand used to determine the amounts of subsidized inputs in each item of final demand. Subsidies then allocated by consumer expenditures corresponding to each income bracket.
other transfers (3%)	proportional to pre-tax income
education, primary and secondary (9%)	per capita
education, universities (2%)	enrollment in universities by income bracket
public health (5%)	increasing share as income bracket decreases; above average income assumed to receive no benefit
other expenditures (47%)	proportional to pre-tax income

Table 5b

ALLOCATION OF PUBLIC EXPENDITURES BY AARON FOR BRAZIL 1961-63

Type of Expenditure:

Allocation by:

Specific (64%)	business income	number of households	wage & salary income	transport expenditures	consumption outlays	Ann. incomes < 10,000	Income	pension income	bus. utility & income	other
public utilities, and state-owned industry		1/2				1/2				
industry and commerce	1									
mines and energy	1									
National Department of Highways				1						
Ministry of Roads and Public Works	part	part		part		part	part		part	
other transport and communication	1/2					1/2				
Ministry of Agriculture							1			
Natural Resources, Agriculture and Livestock	1/2						1/2			
health			1							
housing and urban services				1						
Ministry of Labor and Social Security				1						
other labor, social security and welfare				1/2				1/2		
education										1
<u>General</u> (36%)										
administration, foreign relations, miscellaneous	1							1		1

Table 5c
ALLOCATION OF PUBLIC EXPENDITURES BY
GILLESPIE FOR USA, 1960

Education (14%)

Using data from various educational cost studies, Gillespie estimated hypothetical average level and distribution of educational achievement per student at completion of education by corresponding family income bracket. The corresponding costs of such a distribution were applied to the number of students in each income bracket. The resulting total costs per income bracket were then related to combined costs for all brackets and the percentage of each bracket computed. These "standardized" percentages were then applied, by income bracket, to the actual public expenditures on education in 1960 to allocate them per income bracket.

Health (5%)

Most such expenditures assumed to be 'pure social goods' and equally divided among all families. Expenditures for general and mental hospitals allocated by economic characteristics of patients. Expenditures for sewerage control and sanitation by "weighted average of owner-occupied and renter-occupied housing units."

Housing (1%)

Data providing actual income brackets of public housing occupants.

Highways (7%)

Using data from transport studies, expenditures were initially distributed as either benefitting truck-transport or passenger car-transport. These two components were distributed using as proxy variables family expenditures on gas and oil by income bracket and again by income bracket, on presumed consumption of transportable goods.

Social Security (15%)

Federal old age, survivors, and disability insurance was allocated to income brackets by the series, OASDI beneficiaries estimated from data of the Social Security Survey. Allocation of public assistance payments for the aged, blind, dependent children, and the totally disabled, was based on a distribution of public assistance recipients who reside in low-rent public housing projects. Unemployment compensation for those out of work for more than a year was allocated entirely to the under \$2000 income bracket. A U.S. Census data series was used to distribute the remaining portion of unemployment benefit payments.

Veterans (4%)

Non-pension expenditures are divided between World War I and World War II veterans (including Korean veterans) and distributed by the series available for World War II veterans and the assumed distribution for World War I veterans. Disabled veterans are assumed randomly distributed throughout the veteran populations of the two groups and therefore distributed among pension classes in the same proportions as the entire group. All pension payments are allocated to World War I veterans.

Agriculture (2%)

Net value to the community of the crop-support program for 4 major crops was estimated as consisting of gains to farm factors of production less consumer loss due to increased prices plus assumed market value of the surplus, while ignoring support payments; i.e., adding them in upon the tax side. These losses and gains were allocated by farm operator family income and by food consumption. The other agricultural expenditures, accounting for 68% of the total, principally for research, marketing, and administration, were allocated solely to farm income according to an unspecified distribution based on farm family incomes.

Miscellaneous Expenditures (7%)

These expenditures were allocated according to various assumptions. However more than half were allocated according to consumption by income bracket; e.g., natural resources, postal services, commercial regulation, commerce and business subsidies.

Interest Payments (excluded)

Allocated by the series of owners of the debt; e.g., savings bonds distributed by the series "value of savings bonds held."

General Expenditures (45%)

Allocated according to four assumptions:

- A. per family distribution
- B. income proportional distribution
- C. distribution of capital income
- D. distribution of disposable income (family income minus tax payments)

Sources: Relevant volumes in bibliography.

agriculture, veterans' benefits, and streets and highways between both specific and the general categories. In a recent article they described this as "high total quantity of public goods." "Low quantity of public goods" excluded the items enumerated as producing no external benefits. (2. Aaron, p. 916) (See Table 6.)

Table 6

PERCENTAGE DISTRIBUTION OF BASIC COMPONENTS OF PUBLIC EXPENDITURES IN FIVE COUNTRY STUDIES

	<u>El Salvador</u>	<u>Guatemala</u>	<u>Argentina</u>	<u>Brazil</u>	<u>U.S.A. (Gillespie)</u>	<u>U.S.A. (Aaron-McGuire)</u>	
						<u>high</u>	<u>low</u>
A <u>Transfer Payments</u>	> 35	62	37	64	22	28	47
B <u>Specific Exhaustive</u>	^{a/}		16		36		
C <u>General Exhaustive and Debt Service</u>	65 ^{a/}	38	47	36	44	72	53

^{a/} of which debt service is 24 percentage points (1946)

Sources: See Table 4.

Incidence of Specific Expenditures

The two basic problems in dealing with exhaustive expenditures are valuation of benefits and their distribution. With respect to specific exhaustive expenditures, researchers have finessed the valuation problem by assuming allocative efficiency, i.e., that the cost of producing the expenditures equals their value to the beneficiaries. This amounts to the supposition that at the margin the political process reallocates resources from the private sector as "efficiently" as the latter uses them. The assumption converts an insoluble problem into a manageable one. Nevertheless making it may be seriously invalid because it grossly oversimplifies and excludes other likely possibilities. These are schematically designated below.

SCHMATIC REPRESENTATION OF VALUATION OF PUBLICLY FINANCED EXPENDITURES

Beneficiary Group	Utility	?	Disutility	"Market" Value	?	Cost of Production
	$U > D$	$U = D$	$U < D$	$"M"V > CP$	$"M"V = CP$	$"M"V < CP$
Specific	A				X	A
General						
Combined						

"Market" value ("M"V) of an expenditure corresponds to the sum of individual revealed preferences. For a given group of beneficiaries it may equal, exceed, or fall short of cost of production (CP). Utility (U) is the sum of individual utilities corresponding to the expenditures. Disutility (D) is the total decrease in utility corresponding to the tax paid. A simplifying assumption is to assume that all taxes cover all

public expenditures in the proportion of each expenditure to total expenditures. Since earmarking is very uncommon this is probably a good assumption. With a few important exceptions taxes are not closely associated with benefits, other than in accidental historical sense, and a researcher would be hard put to rank them in terms of some measure of community preference. All specific expenditures have externalities, although these are presumed miniscule. Consequently we have specific and general benefits and their combined or total incidence.

In terms of the schematic representation, the assumption of allocative efficiency of specific expenditures simply stipulates, that the specific beneficiaries value the benefit at cost of production, ($M^V = CP$ and marked by X.) Externalities are considered neither more nor less important than for the typical private good. All other possibilities are excluded. Some of these may be important. For example we can be confronted with the possibility of a valuation of a specific expenditure by the corresponding beneficiary-group below its cost of production, but at a marginal utility above that corresponding to the average disutility of the group which pays for the benefit. (This situation is designated A in the schema.) This is likely to be the case to the extent that marginal utility is a declining function of income and net benefits (expenditures - taxes) are enjoyed by the poor and paid by the wealthy. The schema provides for all other combinations. Note that any U/D relationship is consistent with any M^V/CP relationship.

None of the studies of fiscal incidence on size distribution of income

even remotely considered situation A or other alternatives. The universal approach to specific benefits has been solely in terms of presumed valuation by private beneficiary-group at cost of production.^{13/}

Incidence of General Expenditures

The value of general expenditures is also universally assumed at cost-of-production. This is even more heroic than similar valuation of specific expenditures since it implies that the sum of marginal valuation of the various general expenditures by the families "consuming" them exactly equals their cost of production. (It also ignores private benefit aspects.) Obviously the taxes and expenditures ground out through the political process do not nearly approach such fine tuning. Equally noteworthy is that this valuation assumption is made independently of the presumed distribution of benefits.

Researchers have used from 1 to 3 basic assumptions for distributing general expenditures by income brackets: Income proportional, equal per family or capita, and marginal utility functions. Distribution to families in proportion to post-tax income is neutral in the sense that the relative size distribution of income is unaffected by general expenditures. Distributing them in equal amount to each family implies very substantial diminution of inequality since general expenditures are calculated at anywhere from a third to two thirds of total public

13/

Aaron/McGuire describe this approach -- fruitfully -- in mathematical terms.

expenditures. Even in developing countries total public expenditures occasionally exceed 25 percent of national income.^{14/} Hence in many cases this assumption amounts to a radically egalitarian redistribution of 10 percent or more of national income.

The difficulty of defending such allocation is probably the major reason why researchers have used this alternative primarily for illustrative purposes.

Distribution of general exhaustive expenditures by explicit utility functions has been carried out by McGuire and Aaron. They worked with an updated study by the Tax Foundation of U.S. expenditure incidence which used Gillespie's methodology. The two functions they used were (pp. 914-915);

$$(1) U = A \log Y$$

$$(2) U = E - C/Y$$

U: utility

A,E,C: arbitrary constants

Y: post tax income plus specific good benefits.

They made a number of simplifying assumptions; e.g., allocative efficiency in the public sector; all utility functions identical;

^{14/}In recent years this has been the case in Algeria, Brazil, Chile, Guyana, Liberia, Yugoslavia, Zambia (IBRD).

all public goods homogeneous and "consumed" by all households; private and public goods were assumed substitutes in "consumption;" independence of utility between public and private "consumption." The model produced as a necessary consequence increasing relative valuation of public goods as income increases; i.e., the rich are willing to pay a higher price per unit of public goods than the poor. In other words, the benefits from public goods increase with income, although not necessarily at the same rate. Hence either a pro-poor or pro-rich outcome is possible.^{15/}

Obviously a researcher can arrive at innumerable distributions of general expenditures depending on choice of utility function even given the assumption of allocative efficiency. This is Aaron/McGuire's basic point. And their apparently reasonable assumptions lead to substantially increased income-inequality ex-post.

^{15/}In terms of the Aaron/McGuire model:

$$MRS_1 \cdot MU_1 = \text{a constant}$$

$$\sum_1 MRS_1 = MC \text{ public good} = AC \text{ public good} = \text{total tax imposed per unit of public good.}$$

MRS_1 : Marginal Rate of Substitution of private income for public goods of i^{th} household.

MU_1 : Marginal utility of income of i^{th} household.

Since MU is a declining function of income, valuation of public goods (MRS_1) is an increasing function of income.

It is noteworthy that use of equation (1) in their model is equivalent to distributing general benefits income-proportionately. The model requires that general benefits be distributed by household in proportion to the reciprocal of the marginal utility of private goods expenditure. The marginal utility in equation (1) is A/Y , in short the reciprocal of income. Hence benefits are distributed proportionate to income. In equation (2), marginal utility is C/Y^2 . Hence benefits are distributed as Y^2/C , i.e. proportionate to the square of income. This latter gives results which appear extreme. For example, at \$5,000 per year, marginal utility is 49 times higher than at \$35,000 per year.

Nevertheless, Aaron and McGuire very usefully emphasize the critical importance of finding an acceptable way to distribute benefits from general public expenditures.

Results

The estimates of expenditure incidence in terms of reduced Gini coefficients for the various studies are given in Table 7. All studies found expenditure-incidence regressive (pro-poor). The variance in expenditure incidence as measured by the Gini coefficient among the different studies is due in part to variance in the proportion of public outlays included under the - usually - neutral general exhaustive category and in part because of variance in the shares of total

resources moved through the public sector.^{16/} In the case of three of the four countries studied, Guatemala, the Argentine and the United States, specific expenditures had far more impact on redistribution, than the entire tax systems. In the El Salvador study, most expenditures (84 percent) were included in the general category, so that minute expenditure incidence was the necessary consequence.

As tentative, weak, and restricted as these results are, they do suggest that on average increasing specific expenditures has been an effective device for decreasing income-concentration. The fact that tax systems are at least largely income proportional indicates no a priori constraint on the tax side.

^{16/}Distributing general expenditures income-proportionately is neutral only in the sense of leaving the size distribution unchanged. We could also define neutral fiscal incidence as total benefits equal to total taxes paid. Under this definition, coincidence of income-proportional benefits and neutral incidence would be rare.

Table 7

FISCAL INCIDENCE MEASURED IN GINI COEFFICIENTS, COUNTRY STUDIES

Author Country Year of Data	Number of Income Brackets	Gini Coefficient		After Public		% Decrease in	
		Before Taxes	After Taxes	Expenditures	Expenditures	Gini due to Fiscal incidence	Gini due to Fiscal incidence
Wallich El Salvador 1946	5	.403	.398	.397 ^{a/}		1.5	
Adler Guatemala 1947-48	7	.475	.460	.448		5.7	
UN/ECLA Argentina 1961	7	.418	.414	.397		9.3	
Herriot/Miller U.S.A. 1968	9	.439		.351	.360	20.0	18.0
Gillespie U.S.A. 1960	9	.410	.458	.341		16.8	
				<u>high</u>	<u>low</u>	<u>high</u>	<u>low</u>
Tax Foundation U.S.A. 1961	9	.407	.402	.321	.316	21.1	22.4
Aaron/McGuire ^{b/} U.S.A. 1961	9	.407		.362	.341	11.1	16.2

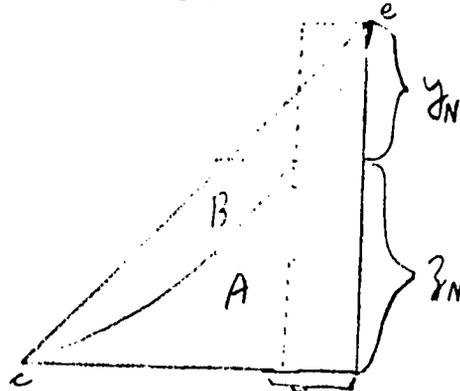
^{a/} Unallocable expenditures assumed distributed income-proportionately

^{b/} Used Tax Foundation data. Results presented here are those from use of $U = A \log Y$ to allocate public expenditures.

APPENDIX

V. Method Used to Calculate Gini Coefficients

In the figure, the horizontal axis measures percent of population, the vertical axis corresponding percent of income received. The curved line



ce describes the cumulative income distribution or Lorenz Curve. The Gini Coefficient is described geometrically as:

$$(1) \text{ Gini C.} = \frac{(A+B) - A}{(A+B)}$$

where A and B sum to the area of the triangle.

The data in the paper are in percentage terms, hence $(A+B) = \frac{1}{2}$. Hence equation (1) can be expressed as:

$$(2) \text{ Gini C.} = 1 - 2A$$

Throughout the paper A is calculated as:

$$(3) A = \sum_{i=1}^N (X_i \cdot Y_i / 2 + X_i Z_i)$$

X_i : % of population in i^{th} population group

Y_i : % of income corresponding to i^{th} population group

Z_i : cumulative income; $Z_i = \sum_{j=1}^i Y_j$

(3) assumes that all incomes within groups are equally distributed.

These relationships are geometrically illustrated for the N^{th} interval in the figure.

The equation used to calculate the Gini Coefficient was therefore:

$$(4) \text{ Gini } C = 1 - 2 \sum_{i=1}^N \left(\frac{X_i \cdot Y_i}{2} + X_i \cdot Z_i \right)$$

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