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ABSTRACT

This paper compares the size distribution of income over two decades after allocating all government taxes and expenditures to households. Extending our prior work (Discussion Paper 191-74) back an additional decade, and extensive further sensitivity analyses leaves our prior conclusions unaffected. Specifically, despite sizable efforts towards a more egalitarian distribution, and despite a sizable increase in benefits accruing to the low end of the distribution, aggregate income inequality in the final distribution is virtually unaltered.

POST-FISC DISTRIBUTIONS OF INCOME: 1950, 1961, AND 1970

This paper compares size distributions of income in 1950, 1961, and 1970 after allocating all government taxes and expenditures across households (final income). The motivation, of course, is to detect changes in final income distributions over two decades. Interest in distributional matters has revived, and this study contributes by employing the conventional techniques of public finance to assign burdens (taxes) and benefits (expenditures) in a single country over a considerable time interval. There have been many forerunners in this kind of enterprise, as well as contemporary efforts, but none of these efforts have been directed toward producing a systematic, intertemporal comparison of final income distributions.[1] In this study, data bases constructed for three earlier studies are combined with equivalent incidence assumptions in a number of experiments to produce comparable measures of dispersion in final incomes for 1950, 1961, and 1970.[2] Some disaggregation of Gini coefficients is attempted plus statistical testing for significant differences in income dispersion.

I. COMPARING AGGREGATE DISTRIBUTIONS

Establishing a Set of Expectations

The National Income Accounts reveal some trends for 1950 to 1970. Nominal Net National Product (NNP) has grown from \$265 billion in 1950 to \$886 billion in 1970, an increase in each decade of about 80 percent. During these years government has grown much faster, raising the share going to government at all levels from 20 percent of NNP in 1950 to 31 percent in 1961 to more than 35 percent in 1970. From a purely accounting point of view, the growth of the government share is a factor that reduces inequality in the after-tax, after-expenditure pattern of distribution because public output is more equally distributed than private output.[3]

Estimated post-fisc distributions are affected not only by the size of the government share but also by its composition. First, consider the composition of taxes. Total state and local taxes have risen from 42 percent of total federal taxes in 1950 to 51 percent in 1961 and to 58 percent in 1970. This would imply a gradual decline in the degree of progressivity of the overall tax structure because state and local tax structures are generally believed to be less progressive than the federal tax structure.[4] Among state and local taxes, the personal income tax and sales taxes, excises, and fees have grown most rapidly, with each type of tax raising its relative share in tax receipts by five percentage points. The relative decline has occurred among property taxes, which fell from 43 percent of all state and local tax receipts in 1950 to 33 percent in 1970. This would commonly be interpreted as indicating a decline in the degree of regressivity in the average state-local tax structure because property taxes are often viewed as the most regressive tax with respect to current income. Obviously, however, this interpretation is very sensitive to the assumed incidence pattern for each kind of tax.

The structure of the federal tax totals has changed more dramatically than the national tax totals for state and local governments. The corporate income tax has gradually declined from 27 percent of federal tax receipts in 1950 to 16 percent in 1970. Similarly, excise and customs taxes have declined from 20 percent in 1950 to 10 percent in 1970. Social Security payroll taxes have grown much more rapidly than all federal taxes, increasing their share from less than 9 percent in 1950 to 26 percent in 1970. Receipts from the personal income tax have grown slightly faster than all federal taxes, increasing their share by four percentage points to 46 percent. Although a judgment about the net change in the degree of progressivity in the federal tax structure depends upon incidence assumptions, these changes appear to decrease progressivity. The large changes are declining corporate income taxes but growing payroll taxes, which is generally regarded as a regressive change unless the corporate tax is believed to fall almost exclusively upon consumers. The relative decline of federal excise receipts and the relative increase in personal income taxes can be viewed as largely offsetting each other. According to these arguments, it appears that the federal tax structure became less progressive over time while state and local governments, on average, became less regressive.

It is somewhat more difficult to generate expectations about the distributive effects of expenditures because of the relatively recent development of incidence asssumptions for various types of expenditures. First, consider the relative size of state-local expenditures compared to federal expenditures. State-local expenditures have increased much more rapidly than have federal expenditures, rising from 38 percent of federal expenditures in 1950 to 56 percent in 1961 to 74 percent in 1970.[5] This change in the composition of government expenditures could affect the distributive impact of government, but there is no consensus about whether federal or state-local governments are more progressive in expenditures.[6]

Among federal expenditures, there have been sizable declines between 1950 and 1970 in the share of the budget used for veterans' benefits, interest paid, and agriculture. The budget shares increased in each of three primary areas: national defense, other "indivisible" government expenditures, and most dramatically, Social Security expenditures; the last grew from less than 6 percent of the federal budget in 1950 to 23 percent in 1970. If allocated across income classes in a conventional manner, these shifts in the structure of federal outlays are increasingly pro-poor. The only major budget changes in aggregate state and local outlays are a sharp growth in the share of educational expenditures, from 24 percent in 1950 to 41 percent in 1970, and a reduction in the share for streets and highways from more than 21 percent in 1950 to less than 12 percent in 1970. Somewhat surprisingly, public assistance and similar transfer programs are not a higher share of state-local budgets in 1970 than in 1950 and 1961. Other compositional changes at the state and local level are difficult to assess, but it appears likely that expenditure patterns are more pro-poor in later years.

On balance, the combined distributive impact of all levels of government upon the distribution of final income cannot be confidently predicted from these factors. Most of the changes in the size and composition of governments, however, appear to be increasingly pro-poor. Only the expansion of state-local governments relative to the federal government and the apparently lower progressivity of the federal tax structure are factors reducing the pro-poor direction of the fisc, at least in an accounting sense.

Methods for Comparing Post-Fisc Distributions

There is no consensus about the best way to describe a size distribution of income, much less about a way to compare size distributions over time.[7] Some methods of measuring dispersion--or inequality--are more popular than others, and we have chosen what seems to be the most popular and hence most familiar index of income inequality--the Gini coefficient. Of course, if distributions of income vary greatly in their shape, a single measure of dispersion can be misleading. For example, Lorenz curves can intersect but have identical Gini coefficients. Since this occurs in some comparisons, careful interpretation is warranted, especially when differences between Gini coefficients are small.[8] Also, normative interpretations of the Gini indexes are best discouraged in view of the recent work relating various inequality orderings to social welfare functions.[9]

Distributive comparisons depend not only upon a well-behaved measure of inequality but also equivalent data to generate income distributions for each year. As might be expected, the data are not identical in the previous studies for 1950, 1961, and 1970. For example, the number of income classes range from 7 for 1950 to 9 for 1961 and 11 for 1970; the incidence series for 1950 number 23 entries versus 27 for 1961 and 24 for

1970; and the studies have treated differently budget details like grants-in-aid to local governments or net government borrowing. However, none of these difficulties prevent transformation of information to equivalent income, budget, and incidence forms that will permit inferences about the probable trend of post-fisc distributions over time. We are confident that noncomparabilities and errors between the data sets are small enough to permit inferences when numerical results show large differences among distributions.

One more measurement issue that deserves attention before the statistical results are described, is the definition of the initial income base. A number of aggregate income bases can and have been used, possibly because each is appropriate for answering a particular question but also possibly because little attention is generally given to this issue. In an intertemporal comparison, uniformity of definition is perhaps more important than finding the most appropriate aggregate income base, but nonetheless an income base must be selected. Our income base adds up to net national product. This seems appropriate because ultimately all claims to net output accrue to people; since we are dealing with all government taxes and expenditures, we should compare tax burdens and imputed expenditure gains with total output and hence total income by income group, from which taxes come and expenditures go.[10] Of course, other income totals in a small neighborhood around NNP would have little effect on the distributive comparisons.

NNP is initially distributed across income classes in two ways: (1) by the distributions of money income for each year, and (2) by a distribution of factor earnings. The former distribution means that the sizable difference between personal money income and NNP is imputed to households in the same manner as money income. This distribution, which we shall name "money NNP," is identical to those used in the studies of 1961 and 1970.

Because money NNP is an only one of many possible pre-fisc distributions, we have also constructed a factor earnings distribution for comparative purposes. One possible objection to the distribution of money NNP is that it already includes government transfer payments. This would result in an exaggerated share of income at the lower tail of the distribution because government transfers are distributed across income classes in subsequent calculations to produce post-fisc distributions, and a type of double counting results. One answer to this objection is to construct an alternative income base that includes only factor earnings but also aggregates to NNP. Appendix A describes how this was done for 1970. The Gini coefficient (x 1000) for factor NNP in 1970 is 446; for money NNP it is 400. The distribution of factor income was also more unequal than the distribution of money NNP in 1950 and 1961.

Post-Fisc Distributions With Money NNP

Table 1 shows the results of selected distributive experiments. Row 1 shows Gini coefficients for initial money NNP, or the pre-tax and pre-expenditure distribution. Recall, however, that it is affected by government transfer income. By this measure, 1961 was most equal (362), followed by 1950 (391) and 1970 (400) respectively.

Row 2 shows the first measure of post-fisc inequality of income. We have called this "normal" because it depends upon incidence assumptions for taxes and expenditures that can be termed the conventional, intermediate assumption of previous studies, especially those for 1961 and 1970.[11] Incidence is intermediate in the sense that more regressive or progressive assumptions are plausible. Key assumptions are that personal income taxes are not shifted, estate and gift taxes are paid by the highest income class, the corporate income tax is divided equally between dividend recipients and consumers, excise and sales taxes are borne entirely by consumers, Social Security payroll taxes are borne entirely by employees, and the property tax is paid by consumers of housing in the residential sector and consumers of general output for commercial property taxes. The incidence of expenditures is assumed to fall entirely on recipients rather directly identified as

TABLE 1

Gini Coeffficients for Selected Experiments, 1950, 1961, 1970

Money NNP

	(Gini x 1,000)		
Distributive Experiment	1950	1961	1970
1. Initial Money NNP	391	362	400
2. Normal	312	272	290
3. Normal Except General Expenditures by Income	327	302	322
4. Regressive	337	311	331
5. Progressive	283	228	239
Column Mean	330	295	316

beneficiaries--for example, automobile owners for highway expenditures or children under 18 for elementary and secondary expenditures. The general expenditures of government for which direct beneficiaries cannot be readily identified are arbitrarily distributed one-half by the distribution of households and one-half by share of initial income. The rationale is that households benefit on some equalitarian basis as well as in proportion to income. These expenditures are about one-half of federal and one-third of state and local outlays.

The Gini coefficients produced by this normal post-fisc experiment are much smaller than the initial coefficients in each year. By this measure there were sizable redistributions of net output toward the lower end of the income distribution due to government activity. Post-fisc dispersion is smallest for 1961 (272), followed by 1970 (290) and 1950 (312). The difference between initial and post-fisc Gini coefficients was smallest in 1950 and largest in 1970.

Now consider some alterations to the post-fisc distribution. Row 3 results from an experiment in which normal incidence assumptions are preserved except that the general expenditures of government are distributed according to money income alone. This would reflect a belief that the indivisible expenditures of government are neutral with respect to the distribution of money income rather than redistributing in favor of lower incomes. The Gini coefficients are 327 in 1950, 302 in 1961, and 322 in 1970. Two features are interesting: 1961 remains the most equal year and the difference in post-fisc inequality between the years 1950 and 1970 virtually disappears.

The next experiment is a regressive distribution of taxes and expenditures. This variant distributes expenditures in the normal way except that general government expenditures are distributed via money income. The incidence assumptions for three taxes are changed from the normal. First, estate and gift taxes are distributed according to the distribution of income taxes paid on these transfers. Far more importantly, corporate income taxes are entirely shifted forward to consumption expenditures. In addition, 60 percent of property taxes are distributed by housing expenditures, and 40 percent by consumption expenditures, a slightly more regressive distribution. These more regressive tax assumptions raise Gini coefficients by only ten points in each year (Row 4), compared to the normal with neutral general expenditures (Row 3). These are very small increases in income inequality, as measured by Gini coefficients.

The next experiment adopts relatively progressive incidence assumptions. The changes from the normal assumptions are (1) the corporate income tax and sales-excise taxes are distributed 33 percent by dividends, 33 percent by wages and salaries, and 33 percent by consumption expenditures; (2) the Social Security tax is distributed 50 percent by covered payrolls, 25 percent dividends, and 25 percent by consumption expenditures; and (3) property taxes are distributed 40 percent by housing expenditures, 30 percent by dividends, and 30 percent by consumption expenditures.[12] All expenditures are distributed according to the normal use except for general expenditures, which are assigned according to the distribution of households. These incidence assumptions lower Ginis a considerable amount compared with normal assumptions (Row 5): 29 points for 1950, 44 points for 1961, and 51 points in 1970.

To summarize these experiments based upon money NNP, as well as others not reported here, post-fisc distributions are more equal in all years than are distributions of money income. They are generally smaller by "substantial" amounts.[13] Also, the rank by year never changes--1950 is always most unequal, 1961 most equal, and 1970 intermediate. Finally, the variation in Gini coefficients as incidence assumptions are altered is smallest in 1950 and largest in 1970. This is confirmed by the range of coefficients reported in Table 1, as well as the variance of coefficients among a larger set of experiments. Obviously this is related to the increased share of NNP controlled by governments in more recent years.

Sources of Declines in Gini Coefficients

If all taxes and expenditures were distributed by the initial distribution of income, Gini coefficients would be identical for the initial and post-fisc distributions. If all taxes and expenditures but one were distributed by the initial distribution of income, any difference between the initial and post-fisc distributions could be attributed to the effects of that single tax or expenditure. Of course, this would be true only in an arithmetic sense because the direct and indirect economic effects of the tax or expenditure are not included. Nonetheless, this technique provides an interesting way to disaggregate the sources of lower post-fisc Gini coefficients in an additive manner. The size of any changes in Gini coefficients would depend upon the size of the tax or expenditure and the nature of the incidence assumptions.

Table 2 shows the results of disaggregating the difference between initial and respective post-fisc coefficients under normal incidence assumptions. Some striking features emerge. The decrease in Gini coefficients due to transfer payments grows dramatically between 1950 and 1970. Of course this is consistent with the huge increases in expenditures, especially for Social Security. The decreases due to other specifically allocable expenditures shows no definite trend. Given normal incidence assumptions, the reduction in final income inequality due to the tax structure clearly declines over time. In fact, the decrease due to taxes (7) in 1970 means that if taxes are distributed by the standard incidence assumptions, the net effect of all taxes is close to neutral. This must be qualified, however, because the data are highly aggregate so that non-neutral effects within income classes are ignored. The same decline over time in the redistributive impact of the tax structure occurs if alternative but consistent incidence assumptions are used.[14] Finally, there does not seem to be a consistent, sizable trend in the total decrease in Ginis due to the fisc if general expenditures are treated as neutral. If general expenditures are believed to be redistributive toward lower incomes, however, there is a trend toward larger differences between initial and post-fisc Gini coefficients.

Post-Fisc Distributions With Factor NNP

Table 3 shows the results for the same distrbutive experiments presented in Table 1 except that the initial income distribution is based upon factor

TABLE 2

Sources of Absolute Declines in Inequality
1950, 1961, and 1970

Money NNP

	(Gini x 1,000)		
	1950	1961	1970
1. Decline due to transfer Payments[a]	18	32	51
2. Decline due to other specific expenditures	25	14	20
3. Decline due to all taxes (Normal Incidence)	21	12	7
Subtotal	64	58	78
4. Decline due to general expenditures	15	30	32
5. Total decline in Gini Coefficient	79	88	110

[a]Transfer payments consist of Social Security, unemployment compensation, public assistance, and other cash transfers.

TABLE 3

Gini Coefficients for Selected Experiments,
1950, 1961, and 1970

Factor NNP

Distributive Experiment	(Gini x 1,000) 1950	1961	1970
1. Initial Factor NNP	436	400	446
2. Normal	360	311	339
3. Normal Except General Expenditures by Income	376	343	375
4. Regressive	386	353	384
5. Progressive	329	264	284
Column Mean	377	334	366

earnings (Appendix A). It is similar to a base constructed by subtracting government transfers from money income, and it produces initial Gini coefficients that are substantially larger than those for money NNP--larger by about 40 points, or 10 percent (Row 1). The order of dispersion by year is unchanged however.

If normal incidence assumptions are adopted, post-fisc Gini coefficients are substantially lower than they are for initial factor NNP, just as was true for money NNP (Row 2). The decreases are nearly identical to those for money NNP in Table 1. If general expenditures are assigned according to factor income (Row 3), Gini coefficients rise above the normal post-fisc distributions by slightly higher amounts than in Table 1.

Row 4 reports the results for a regressive distribution of taxes. Post-fisc Gini coefficients increase by about 10 points compared to Row 3, just as with money NNP. If progressive tax assumptions are used, the Gini coefficients drop slightly further below the normal post-fisc distribution than was true with money NNP (Row 5). In sum, the only difference in distributive results with a factor NNP base is an increase of ten to twelve percentage points in the size of the initial Gini coefficients and hence, an increase of ten to twelve percentage points in all the corrresponding post-fisc measures. Choosing between these income bases might be important if we wanted to know what is the "true" magnitude of post-fisc income dispersion but the choice is relatively unimportant if we are only concerned with intertemporal comparisons. Both bases tell the same story, in the aggregate and when disaggregated.

II. Predicted Shares and Significance Tests

Predicted Shares

To extend the analysis, we have fit the data to a particular functional form. The purpose is, first, to facilitate estimation of shares of income received by various proportions of households, and second, to statistically test for the significance of differences among distributions. The functional form has been suggested by Kakwani and Podder,[15] namely,

(1) $\eta = \pi e^{-\beta(1-\pi)}$,

where η = cumulative proportion of income,

and π = cumulative proportion of households.

If $\beta = 0$, the Lorenz curve coincides with the income equality line and if $\beta > 0$, the curve lies below the income equality line.

The Gini coefficient (G) for this function is

(2) $G = 1-2 \frac{(\beta-1)}{\beta^2} - \frac{2e^{-\beta}}{\beta^2}$

for $\beta > 0$. If $\beta = 0$, the Gini ratio equals zero. If $\beta = \infty$, the Gini ratio equals one.

Table 4 presents selected results for fitting the data to this Lorenz function (1) by ordinary least squares. The initial money NNP and normal post-fisc results are shown for each year. The number of income classes is 7 for 1950, 9 for 1961, and 11 for 1970. The function fits the data very well as measured by the coefficient of determination (R^2) and t-ratios are extremely high.

The column named "approximate Gini" shows the coefficients used thus far, which have been calculated by trapezoidal approximations. This technique underestimates Gini coefficients, and the error generally decreases as the number of income classes increases. The last column, named "OLS Gini" for ordinary least squares, shows the coefficients calculated from equation (2). The estimated OLS Gini coefficients are generally larger than the "approximate Ginis" in all but one case, but the differences are quite small for post-fisc distributions. Note however that OLS Ginis are not required to exceed approximate Ginis because OLS Ginis can either over or underestimate.

The estimated β parameters permit the pre- and post-fisc distributions to be shown in terms of quintiles or deciles. This cannot be done with the original data without an interpolation technique because the income intervals and corresponding shares of households are different for each year. Table 5 shows the predicted shares for quintiles that can be calculated from the β parameters of Table 4. These results coincide with the rankings discussed earlier. For example, the post-fisc share of the lowest quintile was highest in 1961, lowest in 1950, with 1970 in between. Similarly, the post-fisc share of the highest quintile was highest in 1950 and lowest in 1961.

TABLE 4

Lorenz Estimation Results, 1950-70

	$\hat{\beta}$	t-ratio	R^2	Approximate Gini	OLS Gini
Initial Money NNP 1950	1.940	14.26	.97	.391	.424
Normal post-fisc 1950	1.274	25.94	.99	.312	.318
n = 7					
Initial money NNP 1961	1.636	26.26	.99	.362	.380
Normal post-fisc 1961	1.035	37.69	.99	.272	.272
n = 9					
Initial money NNP 1970	2.029	24.19	.98	.400	.434
Normal post-fisc 1970	1.168	35.90	.99	.290	.298
n = 11					

TABLE 5

Predicted Share of Income, Quintiles,
1950, 1961, and 1970

	Share of Lowest 20%	Share of Middle 60%	Share of Highest 20%
1950 Initial money NNP	4.2%	50.1%	45.7%
1950 Normal post-fisc	7.2	54.8	38.0
1961 Initial money NNP	5.4	52.3	42.3
1961 Normal post-fisc	8.7	56.3	35.0
1970 Initial money NNP	3.9	49.4	46.7
1970 Normal post-fisc	7.9	55.5	36.6

Significance Test

Comparisons among Gini coefficients in this paper have thus far been confined to informal statements such as one coefficient is "substantially lower" than another or is "virtually equivalent" to another. Now we can consider a formal statistical test for differences in income dispersion between alternative years or for differences among distributions in the same year. The underlying economic rationale for such a test is that if economic relations were unchanged, income distributions should be identical except for chance variation. In other words, Gini coefficients should not differ significantly if structural relationships have not been altered.

One way to formalize this concept is to use equation (1) and in general hypothesize that

(3) $\beta_{1950} = \beta_{1961} = \beta_{1970} = \beta$

$\hat{\beta}$ is an estimate of income dispersion, and testing for equality of coefficients constitutes a test for equality of income dispersion between years or experiments. The procedure for executing this test is specified by Chow.[16] The Chow test for equality of regression coefficients is an F test in which if $F > F_{\varepsilon}$, we reject the hypothesis that $\beta_1 = \beta_2 = \beta$.

Four main results emerge from the Chow tests. First, normal post-fic coefficients are significantly more equal than those for initial distributions in each year (data not shown here). This might be interpreted as saying that the revenue and expenditure system significantly reduces final income inequality. Second, as shown in Table 6, the inequality coefficients (β) for 1950 never differ significantly from those for 1970 in any experiment. Third, the data for 1961 are significantly more equal than both 1950 and 1970 in all experiments with money NNP. In other words, differences that large in β coefficients for 1961 versus 1950 or 1970 would be due to chance only five of one hundred times. Fourth, if the factor NNP base is used, signficant differences in inequality vanish in all but one instance. The increase in β coefficients (inequality) associated with this income base apparently diminishes the relative importance of the differences in coefficients.

III. CONCLUSION

This paper demonstrates that conventional assignments of government expenditures and taxes by income class yield distributions of final income

TABLE 6

Chow Tests for Significant Differences
in β Coefficients

	Money NNP F-ratio	Factor NNP F-ratio
1950-1970 initial	.31	1.64
1950-1961 initial	4.93*	.51
1961-1970 initial	11.56**	5.48*
1950-1970 normal post-fisc	3.13	.50
1950-1961 normal post-fisc	20.35**	3.58
1961-1970 normal post-fisc	8.28**	2.87
1950-1970 post-fisc w/o GE	.02	NA
1950-1961 post-fisc w/o GE	6.19*	NA
1961-1970 post-fisc w/o GE	7.14*	NA

NA = Not yet available.

*Significant at 5% level.
**Significant at 1% level.

that are very similar for the years 1950, 1961, and 1970. More specifically, distributions for 1950 and 1970 are virtually equivalent, and comparable distributions for 1961 are somewhat more equal than either for 1950 or 1970. The less unequal distributions of 1961 pass a test for statistical significance if money NNP is used as an income base, but this result vanishes with a factor income base. Greater equality of final income in 1961 rests upon a more equal initial distribution of income in that year. Although a widening of the income distribution may have occurred during the 1960s,[17] the relatively small changes in size distributions for the post-WWII period make strong statements hazardous.[18]

Measurement errors in consumer surveys, the aggregate nature of much of the data, and choice of incidence assumptions foster conservative statements. It seems safer to conclude that there is little reason to believe that post-fisc inequality has decreased in recent years. Despite vast growth of government expenditures and changes in its composition over two decades, factor markets remain the primary determinant of trends in income inequality.

Some may find these results surprising, or even disappointing. We could find no major changes in final income distributions despite rapid growth of government, sizable changes in the composition of taxes and expenditures, and increasing concern about distributive effects among intellectuals and bureaucrats. Critics might contend that this failure to find a change confirms the hopeless inadequacy of crude research methods. We do not wish to minimize the deficiencies of this and related studies, but we suspect that the explanation for our results lies elsewhere.[19] As Tullock suggests, numerous variables weaken the relationship between current income and government redistribution.[20] Most government benefits are distributed independent of income and depend upon characteristics like being a farmer or aged or a veteran, or driving an automobile, or going to a public college. Thus, much redistribution is back and forth within the middle-income groups, and only a portion of the large and growing share of income controlled by government is directed toward modifying the size distribution of final income. As a final qualification, even though we have performed various experiments in this paper, it has not been directly concerned with causal analysis. Thus, we do not claim, for example, that the 1970 fisc has offset a widening of the distribution of money income since 1961 because the fisc may have indirectly contributed to the widening. In short, this paper is descriptive, and interpretations of the distributive results are left to the reader.

APPENDIX A: TWO INCOME BASES FOR 1970

The income bases chosen for this study add up to net national produce (NNP). A number of aggregate income bases could be used, including GNP, or smaller totals such a national income, personal income, personal disposable income. From these possibilities, we have chosen NNP because it is the broadest measure of net output. Since we are dealing with all government taxes and expenditures, we should compare tax burdens and expenditure gains with total output, and hence total income by income group, from which taxes come and expenditure benefits go.

Table A describes two income bases constructed for 1970. Identical procedures were used to construct income bases for 1950 and 1961. In the first income base for 1970, NNP is simply distributed across income classes by the Current Population Survey distribution of money income (line 11). This distribution was used because it is comparable to those used in earlier studies, and since our concern is an intertemporal comparison, it has been retained.

A major criticism, however, is that this income distribution already includes government cash transfers. The result is that initial income dispersion is smaller than dispersion in factor earnings. Since government transfers are distributed across income classes in subsequent calculations, it could be argued that the degree of dispersion in post-fisc distributions is biased downward. Since cash transfers have been growing rapidly over time, the bias is potentially larger in later data. One answer to this problem is to construct an alternative income base that attempts to include only factor earnings, but also aggregates to NNP. Lines 1-6 in Table A show the dollar amounts of each type of factor income (plus indirect business taxes) imputed to households in the eleven income classes, using appropriate distributors from Table A-1 of Reynolds-Smolensky[21]. The resulting total factor earnings are shown in line 7, and the average factor earnings per household are shown in line 8. The distribution is similar to line 9, except that the share of NNP is slightly smaller in all income classes but the highest. This is primarily due to corporate profits, which are distributed by share of dividend income and, hence, the highest income class realized a higher share. The Gini coefficient for factor NNP (line 8) is 446 and for money NNP (line 9) is 400.

TABLE A

Two Household Income Bases for 1970
(millions of dollars)

Item	Income Class $0–$2000	$2000–$3000	$3000–$4000	$4000–$5000	$5000–$6000	$6000–$7000	$7000–$8000	$8000–$10,000	$10,000–$15,000	$15,000–$25,000	$25,000+	Total ($)[a]
1. Compensation of employees	1204	4214	7826	12,040	17,458	22,876	28,294	69,832	178,794	175,784	83,076	601,858
2. Proprietors income	134	469	871	1340	1943	2546	3149	7772	19,899	19,564	9,246	66,869
3. Net rental income	1311	1288	1104	1058	1173	943	1150	1564	3128	3910	6417	23,312
4. Net interest	1452	1683	1716	2013	1617	1353	1584	2673	5610	5808	7491	33,012
5. Corporate profits	1207	1349	1420	1349	1775	1349	1562	2911	6532	10,650	40,754	70,836
6. Indirect business taxes	2002	2275	2730	3185	3640	4095	4550	10,556	23,842	22,659	11,648	90,655
7. Total factor NNP	7310	11,278	15,667	20,985	27,606	33,162	40,289	95,308	237,802	238,375	158,632	886,542
8. Average factor NNP per HH	961	2539	3754	5376	6836	8212	9813	11,703	15,987	24,942	63,700	13,170
9. Average money NNP per HH	1515	3393	4674	6131	7465	8782	10,148	12,192	16,570	25,232	48,778	13,170

TABLE A (CON'T.)

Item	Income Class: $0–$2000	$2000–$3000	$3000–$4000	$4000–$5000	$5000–$6000	$6000–$7000	$7000–$8000	$8000–$10,000	$10,000–$15,000	$15,000–$25,000	$25,000+	Total ($)[a]
10. Percent distribution factor NNP	.8	1.3	1.8	2.4	3.1	3.7	4.5	10.8	26.8	26.9	17.9	100.0
11. Percent distribution money NNP	1.3	1.7	2.2	2.7	3.4	4.0	4.7	11.2	27.8	27.2	13.7	100.0

Sources:

[a] *Survey of Current Business*, "National Income and Product in 1970," July 1971, Table 1.10: National Income by Type of Income.

Line: Basis for Distributing Dollar Amounts

1. CPS, 1970, Wage and Salary Distribution, line 2 in Table A-1 (includes proprietor income).
2. Same as line 1.
3. Internal Revenue Service, *Statistics of Income, 1970*, line 19 in Table A-1, Net Income from Rents.
4. Internal Revenue Service, *Statistics of Income, 1970*, line 16 in Table A-1, Interest Income.
5. Internal Revenue Service, *Statistics of Income, 1970*, line 13 in Table A-1, Dividend Income.
6. Share of Consumption by Income Class, line 21 in Table A-1.

7-9. Calculated from lines 1-6.

10. CPS, 1970, Share of Money Income, line 3 in Table A-1.

FOOTNOTES

[1]For some prominent examples, see Alfred H. Conrad, "Redistribution through Government Budgets in the United States, 1950," in Income Redistribution and Social Policy, ed. A. T. Peacock (London: Jonathan Cape, 1954); W. Irwin Gillespie, "Effects of Public Expenditures on the Distribution of Income," in Essays in Fiscal Federalism, ed. R. A. Musgrave (Washington, D.C.: Brookings Institution, 1965); Tax Burdens and Benefits of Government Expenditures by Income Class, 1961 and 1965, by G. A. Bishop (New York: Tax Foundation, Inc., 1967); M. Reynolds and E. Smolensky, "The Post Fisc Distribution: 1961 and 1970 Compared," The National Tax Journal 27 (December 1974): 515-530; J. Pechman and R. Okner, "Who Bears the Tax Burden?" (Washington, D.C.: Brookings Institution, 1974); R. Musgrave, K. Case, and H. Leonard, "The Distribution of Fiscal Burdens and Benefits," Public Finance Quarterly, forthcoming.

[2]Data is drawn from Conrad, "Redistribution through Government Budgets," Tax Foundation, Tax Burdens and Benefits; and Reynolds-Smolensky, "Post Fisc Distribution."

[3]If income originating in the government sector also were more equally distributed than income originating in the private sector, even greater equality in the pretax, pretransfer distributions would result.

[4]For present purposes, progressivity is defined with respect to current money income rather than alternatives like permanent income, or proxy measures for it like house values or consumption expenditures.

[5]Put in different terms, state-local expenditures have risen from 5.6 percent of NNP in 1950 to 15.0 percent in 1970 while federal expenditures have risen more slowly from 14.6 percent of NNP in 1950 to 20.4 percent in 1970. Note that $24 billion of state-local expenditures financed by federal grants-in-aid for 1970 appear in state and local expenditures, not in federal expenditures.

[6]Gillespie finds state-local government more pro-poor in expenditure incidence than the federal government, "Effects of Public Expenditures," pp. 164-65, and the Tax Foundation does not explicitly make an expenditure comparison between levels of government, although taxes are compared. Since grants-in-aid and many other factors undoubtedly alter state expenditure and tax schedules it may not be meaningful to arithmetically separate the effects of levels of govenment.

[7]For informative discussions about measuring dispersion, see Harold Lydall, The Structure of Earnings (London, Oxford University Press, 1968), pp. 137-141; Thomas Stark, The Distribution of Personal Income in the United Kingdom 1949-1963 (London: Cambridge University Press, 1972), pp. 137-153; D. G. Champernowne, "A Comparison of Measures of Inequality of Income Distribution," Economic Journal 84 (December 1974):787-816; Peter Wiles, Distribution of Income: East and West (Amsterdam: North Holland, 1974) pp. ix-xii.

[8] For an example see Reynolds-Smolensky, "The Post Fisc Distribution," p. 520.

[9] See A. B. Atkinson, "On the Measurement of Inequality," Journal of Economic Theory 2 (September 1970): 244-263; E. Sheshinski, "Relation between a Social Welfare Function and the Gini Index of Income Inequality," Journal of Economic Theory 4 (February 1972): 98-100; P. Dasgupta, A. Sen, and D. Starret, "Notes on the Measurement of Inequality," Journal of Economic Theory 6 (April 1973): 180-187.

[10] Bishop has defended the use of net national product as the income base. See G. A. Bishop, "Income Redistribution in the Framework of the National Income Accounts," National Tax Journal 19 (December 1966): 378-390. Also see Jacob P. Meerman, "The Definition of Income in Studies of Budget Incidence and Income Distribution," The Review of Income and Wealth 20 (December 1974): 515-522. For a contrary view see Charles E. McLure, Jr., "On the Theory and Methodology of Estimating Benefit and Expenditure Incidence," Rice University, mimeo, April 1974, p. 6.

[11] For a detailed description of these incidence assumptions, see Tax Foundation, Tax Burdens and Benefits, pp. 7-12; and Reynolds-Smolensky, "The Post Fisc Distribution," pp. 522-524.

[12] The progressive distribution of property taxes reflects recent arguments that some part of these taxes are borne by all owners of capital in the economy; see H. Aaron, R. A. Musgrave, et al., "The Property Tax: Progressive or Regressive?" American Economic Association, Papers and Proceedings, 64 (May 1974): 212-235.

[13] Statistical tests for significance of differences are presented later.

[14] If progressive tax assumptions are used, declines in initial Gini coefficients are 36 in 1950, 29 in 1961, and 26 in 1970. If regressive tax assumptions are used, declines in initial Gini coefficients are 11 in 1950, 5 in 1961, and an increase, rather than a decline, of 2 in 1970.

[15] N. C. Kakwani and N. Podder, "On the Estimation of Lorenz Curves From Grouped Observations," International Economic Review 14 (June 1973): 278-292.

[16] G. C. Chow, "Tests of Equality Between Sets of Coefficients in Two Linear Regressions," Econometrica 28 (July 1960): 591-605; also see J. Johnston, Econometric Methods (New York: McGraw-Hill, 1963) pp. 136-138.

[17] P. Henle, "Exploring the Distribution of Earned Income," Monthly Labor Review 95 (December 1972): 16-72.

[18] For a careful discussion, see E. C. Budd, "Postwar Changes in the Size Distribution of Income in the U.S.," American Economic Review 60 (May 1970): 247-260; also, Harmston and Thompson show equal income dispersion for 1951 and 1961 but lower dispersion for 1971, in F. K. Harmston and W. A. Thompson, Jr., "Use of the α Parameter of the Weibull in Measuring Equality of Distribution by Income Category," paper presented at meetings of American Statistical Association, St. Louis, August 26-29, 1974.

[19] See Reynolds-Smolensky, "The Post Fisc Distribution," pp. 521-527.

[20] G. Tullock, "The Charity of the Uncharitable," Western Economic Journal 9 (December 1971): 379-92.

[21] Reynolds-Smolensky, "The Post Fisc Distribution."