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INTRODUCTION

Academic economists find, periodically, that the most pressing question they wish to answer is different from what it was just a little earlier. Each change in fashion inevitably results in a call to broaden or alter the National Income Accounts. Currently the U.S. Accounts primarily reflect

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the question: "Will aggregate demand be sufficient to fully employ labor?" Recently, Christensen and Jorgenson, as well as Nancy and Richard Ruggles, and John Kendrick have tried to shift the emphasis to aggregate supply in response to the question: "How can the long-term growth rate be raised?" In the Christensen and Jorgenson variant, appropriately accounting for the functional distribution of income emerges as a key complementary issue. More recently the question has been: "What can be done to raise social welfare?" with a key complementary issue being appropriately accounting for the size distribution of personal income. The most recent question heightens, even more than the growth question, the ever present tension between national income as an index of wealth versus national income as an index of welfare (Nordhaus and Tobin).

This paper is in the latest fashion. It is concerned with one important issue in appropriately accounting for the size distribution of income—the treatment of in-kind transfers. Hesitantly, and with great diffidence, it puts welfare before wealth, and the size distribution before the functional distribution. Opening the accounts to welfare concepts is full of familiar complications. For example, measuring the benefits of in-kind transfers appears to require recourse to a utility function.

The paper is in two main parts. First, we offer a rationale and an illustrative set of T accounts with which to account for in-kind transfers. In the accounts, benefits are attributed both to direct recipients and to taxpayers. Second, we offer an illustrative set of numbers to show that appropriately accounting for in-kind transfers alters our view of the size distribution of income and affects aggregate measures of inequality. In-kind transfers in this paper refer only to those quantitatively large government programs which subsidize quite specific goods or services to potentially identifiable people.¹ Even this thoroughly expedient definition of in-kind transfers poses thorny theoretical issues. One fundamental question is: "Should the benefits of in-kind transfers to recipients be valued at their cost to taxpayers?" A simulation experiment suggests a surprising response. We then draw some conclusions on the desirability of expanding the number of subsidiary tables of the Personal Income and Outlay Account, in order to provide a more satisfactory picture of in-kind transfers.

I. ACCOUNTING FOR IN-KIND TRANSFERS

We shall be concerned primarily with the Personal Income and Outlay Account. Personal income is household income, where households are

defined to include nonincorporated business, nonexistent businesses (to take account of imputed rental income), nonprofit institutions, and private trust and pension funds, so that charity flows can be conveniently netted out of the Commerce Department work load unless they pass through corporations or the government. Current procedures include cash transfers and the food stamp subsidy in personal income, but most of what we will call in-kind transfers appear only as purchases in Table 3.10 (Government Expenditures by Type of Function).

We shall consider here three modifications in the current procedure. The first is by now no longer controversial and we mention it merely in passing. We accept the suggestion of Nancy and Richard Ruggles and Kendrick that government capital formation and capital consumption be included in the accounts as separate items. This is important for us, because it would raise the dollar value of in-kind transfers. Indeed, for programs like public housing, in which the transfer consists largely of not charging tenants for the cost of capital consumption, nothing else makes sense.

Our second suggestion is to include in-kind transfers to direct beneficiaries in Personal Income and to value them at the minimum cash payment the recipients would accept to forgo those in-kind transfers. (Call this "recipient benefits.") The final modification we propose is to recognize that in-kind transfers benefit the givers and to assign that benefit to taxpayers. (Call this "taxpayer benefits.") These modifications are proposed both to get the totals correct and to redress a bias in the related size distribution.

The modifications of the accounts proposed in this paper (beyond the inclusion of government capital consumption allowances) apply only to the Personal Income Accounts. The Income and Product and the Government Accounts are left unchanged to permit the continued provision of data for aggregate employment demand models.

Rationale for the Suggested Modifications

Enlarging the concept of income to include in-kind transfers is a short extension of existing practice. The most basic plausible definitions of income and output—the value of money income received by factor owners and the dollar value of market output—have proven unsuitable even for narrow purposes. Accordingly, we already add selectively from nonmarketed private production. We also add money transfer payments which gives us both a better measure of aggregate demand and a measure closer to welfare. We go even further and add transfers of vouchers for goods, in particular, food stamps. Having added cash and vouchers, why

not add commodities? Business in-kind transfers are probably too small to be worth the effort.² Government may pose the opposite problem, since, at the limit, all expenditures as well as taxes may be transfers. Still, a substantial proportion of in-kind transfers of goods and services goes to specific recipients. It certainly seems desirable to extend the concept of personal income to encompass these changes for the same reasons that cash transfers are accounted for.

Our proposed modifications, which would account for in-kind transfers at their cash equivalent values and would account for taxpayer benefits are, however, not simple extensions of current practice. If adopted, they will establish an unwelcome precedent for evaluating private goods at their cash equivalent value, ex post. Yet, if we are to have a meaningful measure of the size distribution for issues of vertical equity, or if we are to bring philanthropy, public and private, into positive economics, or even if we are to obtain sensible Engel curves for the lower end of the income distribution, we cannot logically proceed in any other way.

Conceptual Issues

Our procedure requires that we measure the cash value of in-kind transfers to recipients. A simple extension of current practice would equate recipient benefits to taxpayer costs. However, most economists expect recipient benefits to be less than taxpayer costs.³ To the extent that this expectation is realized, following current practice would bias the distribution. Thus, we propose to measure the recipient's valuation of in-kind programs as the minimum cash transfer (ΔY) which would be necessary to get the recipient to the utility level achieved after receipt of the in-kind transfers.

The size of ΔY depends upon the functional form and parameters of the recipient's utility function as well as on the number of in-kind programs available to the recipient, the extent of the subsidies, and any possible consumption restrictions associated with the relevant public program. A utility function must be chosen to calculate ΔY , and hence an arbitrary element is introduced.

An additional major problem associated with using the ΔY valuation of recipient benefits is that it is not consistent with the valuation of other goods in the accounts. Current practice values intramarginal units at their marginal benefits, unless the good is of an all-or-nothing kind, whereas ΔY includes any consumer surplus.

Turning to taxpayer benefits, current practice regards expenditure on transfers as a burden on taxpayers rather than as a purchase which

increases their welfare. Because the tax system, as conventionally measured, is mildly progressive, treating taxes in this manner biases the size distribution of disposable income toward equality. Our proposal attempts to redress this presumed bias.

Theoretical support for considering taxpayer benefits is based on the current literature on "Pareto Efficient Redistribution," which rationalizes cash and in-kind transfers by postulating that taxpayer and recipient utility functions are interdependent. Indeed, the literature assumes that the donors rationally maximize their own welfare by making transfers, cash and in kind, until the marginal cost of a transfer payment equals the marginal benefit of the payment (Hochman and Rodgers; von Furstenberg and Mueller). If we accept the assumption of rational maximizing behavior on the part of donors, the accounting framework must assume that transfers make neither the taxpayer nor the recipient worse off. It follows not only that taxpayer benefits must be measured, but also that total benefits to taxpayers must be at least equal to total cost.⁴

Once we admit the existence of benefits to taxpayers, their value must be calculated. We shall make the strong lower-bound assumption that for each in-kind program total benefits to taxpayers equal the total cost to taxpayers. That is, we assume total (as opposed to marginal) benefit taxation. This assumption implies that if recipients benefit at all, the total benefits of the program to recipients and to taxpayers exceed the total costs in the aggregate (but not necessarily at the margin).

The Modified Personal Income and Outlay Accounts

The proposed treatment of in-kind transfer programs in the Personal Income and Outlay Account is presented in this section using Medicaid and public housing as examples. The accounting procedure for *cash* transfers is presented first to establish a norm for comparison. The cash transfer entries entail only one modification, on the outlay side of the account. The in-kind transfers entries will modify both the outlay and the income sides of the accounts.⁵

Cash Transfers

Assume that the government provides 30 cash transfers in a given year, earned income is 100, the only government activity is the transfer program, and all disposable income is consumed. The Personal Income and Outlay Account would presently appear as follows:

EXHIBIT 1

Outlay		Income	
Personal consumption expenditures	100	Earned income	100
Personal tax payments	30	Government transfers to persons	30

These entries correctly value the cash transfer to the recipient, but ignore the value of the payment to the taxpayers.⁶ To represent taxpayer benefits, we propose the following entries modifying what now appears on the Outlay side in the following way:

EXHIBIT 2

Outlay		Income	
Personal consumption expenditures	100	Earned income	100
Personal tax payments	30	Government transfers to persons	30
Personal consumption of redistribution	30		
Personal tax reduction due to government purchase of redistribution	-30		

On the outlay side, we treat the 30 just like any consumption purchase in the private market but the government is the intermediary, funneling the tax outlay into consumption of redistribution for the taxpayer.⁷ To indicate the taxpayers' consumption benefits, we enter 30 under consumption outlays and correspondingly reduce the tax outlay. Having started from the published accounts rather than de novo, taxes must be reduced to offset the 30 added to consumption outlays.⁸ The new entry also emphasizes the underlying conceptual change. Instead of a burden, the transfer is identified as a welfare-increasing purchase.

Our modification suggests that two different size distributions be calculated. The income side would be distributed by income class

according to "Earned Income" and "Government Transfers to Persons" in the usual way. The outlay side would normally have the same distribution. In our accounts the outlay side is distributed according to the two categories "Personal Consumption Expenditures" and "Personal Consumption of Redistribution." To the extent that "Personal Consumption of Redistribution" is distributed differently than "Personal Tax Payments" the distribution of our Outlays will differ from the distribution of Income. The two distributions would provide an upper and lower measure of income inequality. Since we expect that taxpayer benefits are more unequally distributed than taxes, the outlay side will be more unequally distributed.

In-Kind Transfers Directly Financed

In this section we describe the procedures to be used for all directly financed in-kind transfers. To simplify the exposition, assume earned income is 100, all disposable income is consumed, and the only government activities are an expenditure of 10 for a pure public good and a transfer program that provides at no charge 30 units of medical services. Suppose ΔY is the cash equivalent value placed on this in-kind transfer by recipients.

Current accounting for the Personal Income and Outlay Account in this situation is as follows:

EXHIBIT 3

Outlay		Income	
Personal consumption expenditures	60	Earned income	100
Personal tax payments	40		

The consumption of 30 units of subsidized medical care does not appear in these accounts, but would be found in the government accounts as a government purchase.

Our proposal would recognize explicitly that this form of medical care is an in-kind type of income and consumption. The recipient cash equivalent, ΔY , would be added to personal income as "Recipient Benefits from In-Kind Transfers" and to personal outlays as "Personal (In-Kind) Consumption Expenditures." As with cash transfers, we would further consider the 30 Personal Tax Payments which financed the

transfer to be a consumption purchase of redistribution services. Hence, our accounts would appear as:

EXHIBIT 4

Outlay		Income	
Personal consumption expenditures	60 + ΔY	Earned income	100
Personal tax payments	10	Recipient benefits from in-kind transfers	ΔY
Consumption of redistribution	30		

The proposed accounting procedure requires slight modification for food stamps, which presently are included in personal income and outlay but at the cost to taxpayer and with no attribution of donor benefits.⁹ On the income side, food stamps appear in "Government Transfers to Persons." It is therefore necessary to reduce this entry by the taxpayer cost and add in our new account, "Recipient Benefits . . .," their cash-equivalent value.

On the outlay side, consumption must be adjusted to allow for the fact, made so explicit on the income side, that recipients may not value their increased food consumption at market prices. Furthermore, "Personal Tax Payments" should be lowered and "Consumption of Redistribution" increased by an equal amount.

In-Kind Transfers Indirectly Financed

The treatment of public housing in the accounts must differ from the preceding because the subsidy is not financed directly from tax outlays. The subsidy arises because rental income is not sufficient to amortize capital costs. The taxpayer cost is an opportunity cost rather than a direct tax outlay. The accounts as presently constructed ignore entirely the subsidized recipient benefit and the taxpayer cost, because government capital consumption is not included.

Our proposed modifications require the prior assumption that the accounts have been changed to include government capital consumption and then entail further changes. We include the Income and Product and the Government Accounts to clarify the capital consumption problems.

It will facilitate the exposition of the accounting framework to use some numbers. Assume:

The gross rent (assumed equal to resource cost) which a public housing unit would obtain in the private market	74
Maintenance costs of a public housing unit	42
Rental value of public housing capital (depreciation + interest)	32
Rent charged tenants	44
Market value of subsidy to tenant	30

The following is presumed to be the current accounting practice for the rental of public housing units in the Income and Product Accounts:

EXHIBIT 5-A

Product		Income	
Personal consumption expenditures	44	Earned income	42
		Current surplus of government enterprises less subsidies	2

The Government Receipts and Expenditure Account is presumably the following:

EXHIBIT 5-B

Expenditures		Receipts	
Purchases	42	Personal tax and nontax payments	44
Current surplus, etc.	2	Nontax payments	44
		Tax payments	0

The entries appearing in the Personal Income and Outlay Account would be:

EXHIBIT 5-C

Outlay		Income	
Personal consumption expenditures	44	Earned income	42
		Current surplus of government enterprises less subsidies	2

A specific method for entering government capital consumption into the accounts has been proposed (Nancy and Richard Ruggles). This method increases total outlays and income in the Product and Government accounts, but leaves the Personal Accounts unchanged as in the following:

EXHIBIT 6-A

Product		Income	
Personal consumption expenditures	44	Earned income	42
Imputed services of durables	30	Current surplus of government enterprises less subsidies	2
		Capital consumption	30

Notice that GNP is increased by 30. On the income side of the account an addition of 30 in capital consumption is included; on the product side a new item appears, imputed services of durables, which probably ought to go into the government account.

The Government Receipts and Expenditures Account would then look as follows:

EXHIBIT 6-B

Expenditures Outlays		Receipts Income	
Purchases	42	Personal tax and nontax payments	44
Imputed services of durables	30	Imputed income from durables	30
Government surplus on income and product account	2		

Again the accounts are increased by 30 of imputed income on the income side and imputed services on the outlay side.

The following entries would appear in the Personal Income and Outlay Account:

EXHIBIT 6-C

Outlay		Income	
Personal consumption expenditures	44	Earned income	42
		Current surplus of government enterprises less subsidies	2

Our proposals would go on to assign the benefits of public housing to taxpayers on the one hand and to tenants on the other. The final table therefore is:

EXHIBIT 6-D

Outlay		Income	
Personal consumption expenditures	44	Earned income	42
Imputed services of durables to consumers	ΔY	Current surplus of government enterprises less subsidies	2
Personal consumption of redistribution	30	Capital consumption	30
		Recipient benefits from capital consumption	ΔY

The accounts for public housing differ from that of cash and voucher transfers because the subsidy is not financed directly out of taxes.¹⁰ On the income side, an implicit cash flow from capital consumption has been added. It is this income which is transferred to tenants, and their valuation of this benefit, ΔY , must also be recorded. On the outlay side, no adjustment is made to taxes paid. The imputed services of durables are consumption expenditures assigned to tenants. The implicit transfer of 30 is entered as "Personal Consumption of Redistribution."

All other indirectly financed in-kind transfers can be treated in this way.

Summary and Conclusions on the Accounting Framework

Several principles emerge from the proposed treatment of in-kind transfers which should prove applicable when further modifications of the accounts are considered.

1. Capital consumption allowances are an important element of the redistribution process and must be carefully accounted for.
2. The double-entry nature of the accounts serves as more than a check on consistency when transfers are assumed to be Pareto efficient. The size distributions based upon the two sides provide a lower and upper bound to the degree of inequality in the distribution of income.

II. SOME ILLUSTRATIVE NUMBERS

Up to this point, the paper has stressed that in-kind transfers should be included in Personal Income, and a procedure for doing this was specified. The remainder of this paper implements the accounting system and discusses three implications for the size distribution. We wish to show first that accounting for in-kind transfers reduces income inequality compared to the distribution of cash income. Second, since recipient benefits may be less than the cost to the government, this difference is measured and its implications discussed. Finally, a technique for measuring donor benefits from in-kind transfers is implemented and the results evaluated.

At the outset, we simplify matters by setting benefits equal to costs to taxpayers. This assumption is then relaxed.

Defining and Accounting for In-Kind Transfers

A reasonable definition of an in-kind transfer would be the difference between what the taxpayer would pay for a good or service in a Lindahl equilibrium and what he does pay (Behrens and Smolensky). Every program would probably then involve some transfer. In this paper, only goods and services provided to clearly identifiable beneficiaries at other than marginal cost are called transfers. Even this approach implies a relatively broad view of what constitutes in-kind transfers. The programs that ordinarily are classed as in-kind transfers are included—food stamps, Medicaid and Medicare, public housing, and so forth. Such programs provide what we label as *consumption* in-kind benefits. Our definition also includes *investment* in-kind transfers. This category is comprised of direct expenditures on public education, subsidies, and grants to students (e.g., GI Bill and manpower programs); in short, subsidized programs which principally increase the recipient's human capital. The distinction between consumption and investment transfers is not always clear-cut; health programs could be either, for example. Since we treat both types in identical ways in our analysis, the distinction is merely an expositional convenience.

TABLE 1 Major In-Kind Transfer Programs, 1970
(Millions of dollars)

Program	Federal Expenditures	State-Local Expenditures	All Government
Consumptions transfers			
Food stamps ^a	1,577		1,577
Commodity distribution ^a	321		321
Child nutrition ^b	703	185	888
Public housing ^c	368		368
Rent supplements ^b	18		18
Medicare ^d	5,255		5,255
Medicaid ^e	2,548	2,260	4,808
Veterans hospital and medical care ^b	1,651		1,651
OEO health and nutrition ^b	123		123
Legal aid	51		51
Subtotal	12,615	2,445	15,060
Investment transfers			
Elementary, secondary and other education ^f	1,214	42,934	44,148
Higher education ^f	336	11,325	11,661
Manpower programs	1,149	98	1,247
MDTA institutional ^g	173		173
MDTA on-the-job ^h	36		36
NYC in-school ^g	41		41
NYC out-of-school ^g	21		21
Operation Mainstream	9		9
Concentrated employment ^g	82		82
JOBS ^g	82		82
Job Corps ^g	96		96
WIN ^g	50		50
Vocational rehabilitation ⁱ	340	98	438
Other manpower ^g	219		219
Veterans education benefits ^j	991		991
Total in-kind transfer expenditures	16,305	56,802	73,107

^aA. Skolnik and S. Dales, "Social Welfare Expenditures," unpublished tables of the Office of Research, Social Security Administration. Total includes administrative costs and is for FY 1971.

^bIbid., excludes administrative costs, and is for FY 1970.

^cEstimated value of subsidy derived from Table 3.

^dData from *Social Security Bulletin Annual Statistical Supplement, 1970*, Table 117, row 2; net of SMI premium cost to recipients and adjusted slightly downward since the Current Population Survey (used to derive Table 3) counts less eligibles than did the Social Security Administration. Data is for calendar year 1970. (Excludes administrative costs.)

Notes to Table 1 (concluded)

^cTotal expenditure data is for calendar year 1970 and is from *Number of Recipients and Amounts of Payments Under Medicaid, 1970*, HEW, Social and Rehabilitation Services publication number (SRS) 73-03153. Allocation between federal and state-local governments is based on the average of the proportion of Medicaid expenditures found in Skolnik-Dales, for FY 1970 and 1971. (Excludes administrative costs.)

^fReynolds-Smolensky, Appendix D, for FY 1970.

^gData is for FY 1970 and is from U.S. Bureau of the Budget, *Special Analyses, Budget of the United States, 1972* (Washington, D.C., 1971), p. 138. (Excludes administrative costs. Expenditures adjusted to exclude estimated cash payments to participants.)

^hData is for FY 1970 but on obligations basis—U.S. Department of Labor, *Manpower Report of the President, 1971* (Washington, D.C., 1971), p. 299. (Excludes administrative costs. Expenditures adjusted to exclude estimated payments to participants.)

ⁱSkolnik and Dales, "Social Welfare Expenditures." (Excludes administrative costs. Expenditures adjusted to exclude estimated cash payments to participants.)

^jAdministrator of Veterans Affairs, *1972 Annual Report*, p. 166.

In 1970 the federal government provided \$16 billion in in-kind transfer benefits. State and local governments administered another \$57 billion, mainly for education. The major in-kind programs (as we define them) and their costs are listed in Table 1. The dollar volume of in-kind transfers exceeded that of cash transfers, which totaled \$63 billion in 1970.¹¹

In what follows we restrict our attention to seven major in-kind transfer programs (\$68.8 billion in 1970).¹² Implementing the proposed accounting system to record these expenditures produces the following accounts:

**TABLE 2 Personal Income and Outlay, 1970
(Millions of dollars)**

Outlay		Income	
Personal consumption	} 647,607 ^b	Earned income	} 647,607 ^a
Personal consumption of cash redistribution		Cash transfers	
Personal tax payments			
Personal savings			
Personal consumption of in-kind redistribution	68,845	Recipient benefits from government in-kind transfers	68,845
	<u>716,452</u>		<u>716,452</u>

^aCurrent Population Survey money income, as reported in Projector and Bretz, Table 5.

^bPersonal contributions for social insurance are not deducted on the income side and, consequently, are included on the outlay side.

The Distribution of In-Kind Income

We focus here on the right-hand side of Table 2 and ask how the provision of \$68.8 billion of in-kind transfers affected average household incomes and the degree of income inequality. Table 3 shows that in-kind transfers markedly increase the average incomes of all groups (col. 12). For the poorest group, the difference of \$559 (col. 10) increases income by 215 percent.

There is a strong positive relationship between benefits and income. Regression indicates that a rise in cash income of 1 percent is, on the average, associated with a .22 percent gain in in-kind transfer income. An exception in this pattern for the range \$6,000–\$7,999 results largely from decreased Medicaid benefits after \$6,000.

Consumption transfers, nevertheless, are distributed in a strongly propoor pattern (col. 5). Investment transfers, which account for 79 percent of all in-kind transfers, rise steadily with income (col. 9).

Although in-kind transfers are proric, they are more evenly distributed than cash incomes. Hence, including them in personal income decreases the degree of "inequality." The Gini coefficient for cash income was .398; adding all in-kind benefits shifts it down to .371. Similarly, including in-kind transfers raises the share of income going to the four poorest income classes—the bottom 24 percent—from 5.2 percent to 6.5 percent. A third measure of inequality, the coefficient of variation, declines from .52 to .49 when income includes in-kind transfers.

The high level of aggregation and our use of averages obscures the fact that in any given income bracket, some households receive above-average benefits by participating in many in-kind programs, while others with nearly equal cash incomes obtain few or no benefits (Joint Economic Committee). Though the degree of equity of some individual in-kind transfer programs has been studied (Smolensky and Gomery, Feldstein), currently available data do not permit a study of this issue for the *complete system* of in-kind transfers. National data on program enrollment and benefits at the family level are needed but are nonexistent.

The data in Table 3 are meant to be illustrative of orders of magnitude only. No attempt has been made to adjust for known sources of bias (e.g., underreporting of money income in the CPS), or for inconsistencies in reporting periods (some data are for the calendar, some for the fiscal, year), and so forth. Often, distributing benefits by income class required heroic assumptions.

One slightly less obvious caveat to note about Table 3 is that it does not measure, even conceptually, the redistribution of income due to in-kind transfers. Measuring the redistribution of income due to the fisc, or any

part of it, requires a quite different accounting framework. The essential element of this framework is a counterfactual which recognizes the general equilibrium interdependence between the fisc and the distribution of earned income. What is important in Table 3 is that the sum of columns 10 and 11 represents a more complete distribution of personal income.

Finally, it should be noted that human capital investments are valued at their supply price. Two comments are in order on this procedure. Though the supply price may differ from the capitalized value of the associated future earnings stream, any such difference does not affect current income. Second, the cash equivalent of the subsidy need not equal the supply price, since human capital investments are in-kind transfers.

A Simulation Approach to Benefit Weights

It has been demonstrated that in-kind benefits when valued at taxpayer cost affect measured income inequality. In this section we determine if this conclusion would be altered by valuing in-kind transfers at their cash equivalence to recipients. Our procedure is to calculate a set of scalars (benefit weights) which convert taxpayers' costs to benefits as evaluated by the recipient. A range of benefit weights for a selected list of programs is obtained via simulation.

Five programs were selected for this simulation—food stamps, public housing, rent supplements, Medicare, and Medicaid. We assume each recipient family participates in a package of in-kind transfer programs, and is enrolled in at most one housing and one medical program. A utility function, a budget constraint (Y) and maximizing behavior are assumed and the utility the family obtains is calculated. The cash income that the family would need if it were to enjoy the same level of utility but received *no* in-kind transfers, EY , is then computed. It is inferred that the bundle of in-kind benefits increased the family's welfare, measured in dollar terms, by $EY - Y$. The ratio of $EY - Y$ to the taxpayer cost of providing this set of transfers is the benefit weight.

Specifying the Utility Function

A variant of the displaced Constant Elasticity of Substitution (CES) utility function was used in this exercise.¹³ Because the five in-kind programs we are concerned with involve only three commodities—food, housing, and medical insurance—the utility function has just four arguments, these three and “other.” Hence, we assume

TABLE 3 Distribution of Average Household Benefits of Selected In-Kind Transfers, 1970

Income Class	Consumption Transfers				Investment Transfers				All In-Kind Transfers (10)	Average Cash Income ^a (11)	In-Kind Transfers as a Percent of Cash Income (12)	
	Food Stamps ^a (1)	Public Housing ^b (2)	Medicare ^c (3)	Medicaid ^d (4)	Total (5)	Elem., Sec. and Other Education ^e (6)	Higher Education ^e (7)	Manpower Training ^f (8)				Total (9)
\$ 0-999	18	6	104	94	222	272	4	61	337	559	260	215.0
1-1,999	50	20	179	184	433	272	4	47	323	756	1,508	50.1
2-2,999	71	18	173	191	453	358	10	44	412	865	2,461	36.4
3-3,999	62	15	146	134	357	444	16	39	499	856	3,468	25.5
4-4,999	53	12	122	156	343	543	36	31	610	953	4,471	21.7
5-5,999	36	7	90	142	275	612	52	19	683	958	5,445	17.8
6-6,999	24	4	69	59	156	634	61	5	700	856	6,452	13.3
7-7,999	17	2	55	33	107	721	71	6	798	905	7,458	12.1
8-9,999	16	-	46	26	88	807	96	3	906	994	8,920	11.2
10-14,999	3	-	35	24	62	843	231	-	1,074	1,136	12,120	9.4
15-24,999	-	-	37	11	48	795	367	-	1,162	1,210	18,410	6.5
25,000+	-	-	50	-	50	744	1,171	-	1,915	1,965	35,755	5.5

^a Assumes total food stamp subsidies equal \$1,577 million as shown in Table 1. Relative distribution of benefits obtained from tabulations of the magnetic tape files of *A Panel Survey of Income Dynamics*, Institute for Social Research, Survey Research Center, Ann Arbor, Michigan, 1972.

^b Distribution among income classes of public housing tenants obtained from U.S. Department of Housing and Urban Development, *Statistical Yearbook, 1970*, Tables 107, 112 and 148. A average subsidy based on Smolensky-Gomery, Table 1-B, inflated to 1970 price level.

^c All eligible recipients are assumed to receive the same benefit, which was computed by dividing total payments (net of premium cost) by total number of Medicare enrollees. The distribution of enrollees was derived from the *Current Population Reports*, Series P-60, #80, "Money Income in 1970 of Persons and Families," Tables 17 and 22.

^d Table values are the sum of two separate distributions since Medicaid recipients are divided into two groups—those receiving public assistance and those not on public assistance but qualifying as "medically indigent." For the public assistance group the percentage distribution of eligible recipients among income classes was obtained from tabulations of the magnetic tape files of *A Panel Survey of Income Dynamics* (see above). Multiplying the percentage by total Medicaid payments gave the total benefits to an income class. A average household benefits for that class then equaled total class benefits divided by the total number of households in the class. For the "medically indigent" the same procedure was used, except that Medicaid eligibility was determined by comparing the household's income to the limits set by its state of residence. These limits were found in "Income and Resources Levels for Medically Needy in Title XIX Plans in Operation as of April 15, 1970," unpublished table of the Social Security Administration. Resource levels were not considered due to data limitations, but it is believed that no serious bias resulted.

^e Drawn from Reynolds-Smolensky, Appendix D.

^f Includes all manpower programs listed in Table 2 except "Other." For all included programs except Vocational Rehabilitation, distribution of benefits based on Tables F-5, 7, 10, 11, 12, 13, 14 of *Manpower Report, 1971*. For Vocational Rehabilitation, distribution of benefits based on Table 4 of "Characteristics of Clients Rehabilitated in Fiscal Years 1967-71," U.S. Department of Health, Education, and Welfare, Social and Rehabilitation Services, 1973.

^g Source is Table 5 of "Measurement of Transfer Income in the CPS," by Dorothy S. Projector and Judith Bretz, in James D. Smith, ed., *The Personal Distribution of Income and Wealth* (New York: NBER, 1975).

$$(1) \quad U = \sum_{i=1}^4 b_i (x_i - g_i)^{\sigma-1/\sigma} \quad \text{if } \sigma \neq 1$$

$$(2) \quad U = \prod_{i=1}^4 (x_i - g_i)^{c_i} \quad \text{if } \sigma = 1$$

where

x_i = quantity of good j consumed;
 g_i = displacement parameter (minimum quantity consumed);
 b_i, c_i = parameters; and
 σ = elasticity of substitution.¹⁴

To proceed with the simulation, equations 1 and 2 must be given empirical content, which in turn requires identifying the c_i, g_i, b_i , and σ . To show that the c_i 's are the marginal propensities to consume, assume that good 4 is "other," $g_4 = 0$, and quantity units are specified so that market prices equal unity. Maximizing equation 2 with the constraint $Y = \sum x_i$ gives

$$(3) \quad x_i = g_i + c_i \left(Y - \sum_{i=1}^4 g_i \right) \quad j = 1, 2, 3$$

The parameter values of the c_i were chosen for the utility functions of five prototype families, which differ by size and/or income, from the expenditure data in the *Survey of Consumer Expenditures, 1960-61*.¹⁵ The data themselves are observations of the money spent on x_1, \dots, x_4 by family size and income, and from them we computed crude estimates of c_1, \dots, c_4 .

To determine the minimum consumption expenditures on each good (g_i) we solve the demand equations of (3) and obtain

$$(4) \quad g_i = x_i - \frac{c_i}{c_4} x_4 \quad j = 1, 2, 3$$

To identify the b_i , maximize (1), and solve the demand equations for g_i to obtain

$$(4') \quad g_i = x_i - b_i^{\sigma} x_4$$

Comparing (4') to (4) shows that

$$b_i = \left(\frac{c_i}{c_4} \right)^{1/\sigma}$$

Only σ remains to be identified. The simulations were run by successively assuming $\sigma = .5, .75$, and 1.

Maximizing Utility with the Transfer Programs

Substituting our choice of σ and our parameters into (1) and (2) produces a specific utility function for each prototype family. Assigning a particular package of in-kind benefits to a family, we maximize its utility using this estimated function, subject to the budget constraint (5) which exists when in-kind transfers are received

$$(5) \quad Y = \sum_I (1 - s_j) x p_j + \sum_{II} x p_j - \sum_{II} s_j x r_j + \sum_{III} (1 - s_j) x r_j$$

We are assuming units are chosen such that all prices are unity and

Y = family cash income;

s_j = subsidy rate for good j which depends on the transfer program's features and may depend on Y ;

$x p_j$ = total amount of good j consumed when family receives the assigned set of in-kind transfers;

$x r_j$ = quantity of good j required to be consumed if received as an in-kind transfer. This number is constant for each recipient and is determined by the government.

I, II, III = program categories which are defined next.

As indicated in equation 5, each commodity falls into one of three categories depending upon the way in which the rules of the program affect the budget constraint.

Goods in category I are one of three types:

- a. nonsubsidized ($s_j = 0$) because the family does not participate in an in-kind program providing good j ;
- b. "other" goods, where no subsidy is ever available, or
- c. subsidized at rate s_j both on the margin and inframarginally. That is, there is no quantity restriction on the consumption of this transfer (e.g., Medicare), or some maximum limit has been set by the administrators which is larger than the amount actually desired at the subsidized price.

Category II contains commodities for which the subsidy ceases at quantity $x r_j$ and the recipient must purchase at least $x r_j$, but is free to supplement this level of consumption at market prices without losing the subsidy *and does so*. In this case the family pays $(1 - s_j) x r_j$ for the subsidized goods, and $x p_j - x r_j$ for the unsubsidized portion. The total cost is $x p_j - s_j x r_j$ as shown in (5). Note that $s_j x r_j$ is de facto an outright cash transfer since the subsidy does not affect the family's market behavior at the margin.¹⁶

Subsidized items in category III are those for which the recipient either *must* consume a prescribed fixed quantity $x r_j$ or desires to consume this

amount. Public housing, which restricts a recipient to one particular apartment, falls in this category.

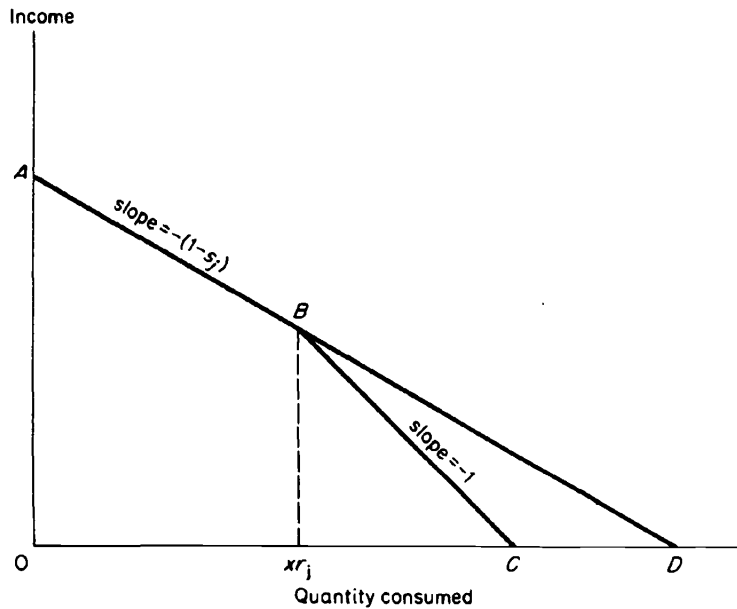
Figure 1 relates the three categories to the budget constraint for a subsidized commodity. If the good is in category I, there is no relevant restraint imposed by regulation on the quantity the household can consume and the budget constraint is therefore AD . If the commodity is in category II, it is subsidized up to some quantity, xr_j , and the household must consume at least that quantity but consumes additional units purchased at the market price. Hence the household is restricted to the segment BC . In category III, the quantity the household must consume and the price it must pay are both fixed; the budget constraint collapses to point B .

Now that the budget constraint (5) has been explained, we proceed to indicate the demand functions for each category of goods obtained from maximizing utility.

$$(6) \quad \text{Category I} \quad xp_j = g_j + c_j(1-s_j)^{-\sigma} \left[\sum_I c_i(1-s_i)^{1-\sigma} + \sum_{II} c_i \right]^{-1} A$$

$$(7) \quad \text{Category II} \quad xp_j = g_j + c_j \left[\sum_I c_j(1-s_j)^{1-\sigma} + \sum_{II} c_i \right]^{-1} A$$

FIGURE 1 Budget Constraints for Subsidized Commodities



$$(8) \quad \text{Category III} \quad xp_i = xr_i$$

for all σ and where

$$A = Y + \sum_{\text{II}} s_i(xr_i - g_i) - \sum_{\text{I,III}} (1 - s_i)g_i - \sum_{\text{III}} (1 - s_i)xr_i$$

The Simulations

To obtain the simulated numerical values for the xp_j from equations 6, 7, and 8, we need estimates of c_j , g_j , s_j , xr_j , Y , and σ . The first two are known from the utility function, while we chose various representative values of Y and σ . We approximated the s_j and xr_j that a prototype family would face if it participated in program j by examining the specific regulations of each of the five in-kind programs and making several assumptions.¹⁷

The numerical values for the xp_j are substituted into (1) and (2) to compute the family's utility U^* , given that it receives a particular set of in-kind transfers.

At this point we observe from (6) through (8) that the amount of food, shelter, and medical care (i.e., the xp_j) demanded can vary as the category in which the corresponding in-kind transfer is placed varies. In turn, this means that U^* , a function of the xp_j , is not unique. The problem is partially mitigated because one can unambiguously assign Medicare and Medicaid to category I, and public housing to III. However, food stamps may fall in either category II or category III, since the program permits a family's xp_{food} to exceed xr_{food} (II) or to be equal to it (III). The actual outcome depends upon the family's demand functions for *all four* commodities simultaneously. (Rent supplements, similarly, can be in any category.)

To deal with this simultaneity problem, all permutations of categories were considered when the transfer package at hand included food stamps and/or rent supplements. Inconsistent results were eliminated; of the remainder, the one yielding the highest utility was selected for further analysis.¹⁸

Having determined the recipient family's utility U^* , given its cash income and its participation in a set of in-kind transfer programs, we next compute how much money income, EY , it would need to maintain the same U^* if *no* in-kind transfers were available. We maximize (1) or (2) subject to the usual constraint that is in force when no in-kind transfers exist

$$(9) \quad EY = \sum_{j=1}^4 xp_j$$

This gives the quantities demanded as a function of EY

$$(10) \quad xp_j^* = g_j + c_j \left(EY - \sum_{i=1}^4 g_i \right) \quad j = 1, \dots, 4$$

Substituting the right-hand side into (1) or (2) produces the indirect utility function $U(EY)$. Solving

$$(11) \quad U(EY) = U^*$$

gives EY^* the cash equivalent of cash income, Y , plus in-kind transfers. Hence the transfers provide a dollar benefit of $EY^* - Y$.

The taxpayer cost is

$$(12) \quad TC = \sum_i (s_i + p_i - 1) xp_i^* + \sum_{ii,iii} (s_i + p_i - 1) xr_i^*$$

where market prices = 1 and p_j = ratio of government cost price to market price. (Note that when $p_j = 1$, TC is simply the direct subsidy at market prices given to recipients.)

The benefit weight is

$$(13) \quad \frac{EY^* - Y}{TC}$$

TABLE 4 Benefit Weights for Selected Programs

Program Package	—Two-Person Family—				—Four-Person Family—					
	Y = \$2,869		Y = \$4,883		Y = \$3,414		Y = \$4,706		Y = \$6,572	
	$\sigma = .5$	$\sigma = 1$	$\sigma = .5$	$\sigma = 1$	$\sigma = .5$	$\sigma = 1$	$\sigma = .5$	$\sigma = 1$	$\sigma = .5$	$\sigma = 1$
f	1.0	1.0	na	na	1.0	1.0	1.0	1.0	na	na
p	0.61	0.78	na	na	0.62	0.80	0.86	0.93	na	na
r	na	na	na	na	na	na	0.99	1.0	0.99	0.99
mr	0.81	0.89	0.91	0.95	na	na	na	na	na	na
md	0.64	0.76	na	na	0.67	0.78	0.74	0.85	na	na
f, p	0.72	0.85	na	na	0.90	0.95	0.94	0.97	na	na
f, r	na	na	na	na	na	na	0.98	0.99	na	na
f, mr	0.88	0.93	na	na	na	na	na	na	na	na
f, md	0.72	0.81	na	na	0.86	0.91	0.83	0.90	na	na
p, md	0.74	0.85	na	na	0.75	0.86	0.87	0.93	na	na
r, md	na	na	na	na	na	na	0.84	0.91	na	na
f, p, md	0.80	0.87	na	na	0.91	0.95	0.92	0.95	na	na
f, r, md	na	na	na	na	na	na	0.86	0.92	na	na
f, p, mr	0.85	0.92	na	na	na	na	na	na	na	na

NOTE: na = ineligible for program
 f = food stamps
 p = public housing
 r = rent supplements
 mr = Medicare
 md = Medicaid

A sample of the benefit weights obtained appears in Table 4. Of the five prototype families, two were two-person households and can be thought of as elderly couples. One had a low income of \$2,869 and was eligible for several transfers; the other's income of \$4,883 entitled it only to Medicare. We assumed that these families would not receive rent subsidies. The three remaining families had four members and incomes of \$3,414, \$4,706, and \$6,572.¹⁹

Several notable observations emerge from the table. Turning first to those instances in which households participate in only one program, one conclusion easily drawn is that the food stamp program is a de facto cash transfer. All families attach a weight of one to their benefits, because most families spend more on food than their stamp allotment even if they receive no stamps. Rent supplements can also be considered cash transfers in view of the benefit weights of .99 and 1. Public housing, in contrast, benefits the recipients less than the government's cost of providing it. For low income households, the benefit weights in the range .6 to .8 indicate that the gain from renting public housing at, say, \$500 below market prices (i.e., an in-kind transfer costing \$500) is between \$300 and \$400.²⁰ For the middle-income family, government housing subsidies are converted into direct consumption benefits at more efficient rates (on the order of .9). Compared to food stamps and rent supplements, the lower benefit weights for public housing presumably reflect its category III nature. Recipients must purchase the housing services of the assigned apartment, no more, no less, and this rigid requirement may create a large distortion in consumption patterns. The two medical transfers also have a wide range of benefit weights. Even though Medicaid is free, its weights are not one.

Many families that receive one of the five in-kind transfers also receive others. Because of this, the benefit weights for selected groups of in-kind transfers are also presented in Table 4. The weight for a two- or three-program bundle is not an easily computed weighted average of the several separate weights, but can only be derived independently. For example, the benefit weight of a low-income two-person family receiving both public housing and Medicaid is greater than the weight of either program taken singly. These outcomes arise because the addition of a new transfer changes the relative prices of all commodities and thereby affects the total pattern of consumption. The general tenor of these multi-transfer benefit weights is that they are on the high side. Few dip below .8 and a number are close to one.

To determine if our earlier conclusions on the impact of in-kind benefits on the size distribution could be affected by moving to a cash-equivalent basis, we modified the entries in Table 3 based on the results of Table 4. That set of benefit weights which would yield the

TABLE 5 The Distribution of In-Kind Transfers at Their Cash-Equivalent Values

Income Class	Recipient (ΔY) Valuation of Consumption Benefits							Total (5)	Taxpayer Cost of 1-4 (6)	Recipient Valuation of All In-Kind Transfers (7)	Taxpayer Cost of In-Kind Transfers (8)
	Food Stamps (1)	Public Housing (2)	Medicare (3)	Medicaid (4)	Total						
\$ 0-999	9	2	62	47	120	222	457	559			
1-1,999	30	10	123	110	273	433	594	756			
2-2,999	50	11	138	153	352	453	764	865			
3-3,999	53	11	117	114	295	357	794	856			
4-4,999	45	10	104	133	292	343	902	953			
5-5,999	34	7	81	135	257	275	940	958			
6-6,999	24	4	66	59	156	156	856	856			
7-7,999	17	2	55	33	107	107	905	905			
8-9,999	16	-	46	26	88	88	994	994			
10-14,999	3	-	35	24	62	62	1,136	1,136			
15-24,999	-	-	37	11	48	48	1,210	1,210			
25,000+	-	-	50	-	50	50	1,965	1,965			

maximum change in Table 3's figures was chosen for this exercise.²¹ Nonetheless, Table 5 indicates relatively little change when compared with Table 3, except for the three lowest income classes. A more prorich pattern than that of Table 3 (as reproduced here in column 8) results because benefit weights generally rise with income, but the change is slight. The income elasticity of unweighted transfers is .22; after the cash-equivalent adjustment, it is .27. For the unweighted distribution based on taxpayer cost the Gini coefficient was .371; on a cash-equivalent basis it rises to .374.

Our benefit weights apply only to consumption transfers. Consequently, they have greater impact when attention is restricted to this type of transfer, as is seen when columns 5 and 6 are compared. Again, of course, benefit weight calculations modestly increase the progressivity of in-kind transfers. Unweighted consumption transfers have income elasticity of $-.46$; applying the weights increases this number to $-.33$.

Table 6 displays the proposed Income and Outlay Account when in-kind transfers are incorporated at our minimum cash equivalent values (ΔY). Compared to the earlier accounts of Table 2, ΔY is \$2,041 million (3 percent) less than the taxpayer cost. For food stamps, public housing, Medicare, and Medicaid, the only programs for which we have calculated benefit weights, the cash equivalent is 83 percent of taxpayer cost.²²

TABLE 6 Personal Income and Outlay, 1970
(Millions of dollars)

Outlay		Income	
Personal consumption	} 645,566	Earned income	} 647,607
Personal consumption of cash redistribution		Cash transfers	
Personal tax payments			
Personal savings			
Personal consumption of in-kind redistribution	68,845	Recipient benefits from government in-kind transfers	66,804
	<u>714,411</u>		<u>714,411</u>

We have not calculated the cash-equivalent transfers for education. That the benefit weights appropriate to education may differ from 1 (at least for some income classes) is plausible enough to merit testing. Conceptually the framework developed for consumption goods is applicable, but the required assumptions are strained even more, and the data

requirements are more burdensome. For example, since private education is consumed even when public education is available, public and private education must be quite different goods. Appeal to budget data, therefore, will not yield a marginal propensity to consume public education directly, if at all. This, and the many other problems are not insuperable, but the effort required to overcome them was beyond our immediate resources.

Any reasonable set of benefit weights for education would be expected to rise with income, thus accentuating the prorich character of education beyond that in Table 3. However, the weights would have to be very low at the bottom end to affect any conclusions of the study in a critical way. To turn education benefits proportional over the income range from \$1,500 to \$20,000, the benefit weight in the class \$1,000–\$1,999 would have to be as low as .14. On the other hand, introducing benefit weights for consumption goods did reduce the income of the lowest class from those transfers by almost 50 percent. If the weights at the low end of the distribution are as low for education as they may be for Medicaid, the increase in welfare of the poor due to in-kind transfers could be substantially overstated by Table 3.²³

Though subject to considerable qualification, we conclude that our benefit weights undercut the argument that donor benefits rationalize the existence of in-kind transfers. Since in-kind transfers do not greatly alter consumption choices, they cannot be justified on donor benefit grounds.

Of course, our results are hardly definitive. Some, for example, may conclude from Tables 3 and 5 that consumption choices are importantly altered. Our failure to calculate benefit weights for education, the largest in-kind transfer and the one most likely to generate external benefits, is another limitation of the study.²⁴ Our estimated marginal propensities to consume were crudely derived, as were our specifications of program characteristics. Only one utility function was simulated. Other valid criticisms can also be offered. Nevertheless, we believe our results will prove robust. Our utility function is fairly flexible and was simulated with a wide range of elasticities of substitution.

Taxpayer Benefits from In-Kind Transfers: Estimating Redistribution Services

In this section, we turn to the outlay side of our accounts and examine the effects on the size distribution of personal outlays of distributing the entry "Personal Consumption of Redistribution." Relying on our tentative simulation results, we ignore any benefits which may result from the alteration of recipient consumption patterns. We simply assume that the

giving of in-kind transfers is a pure public good generating donor benefits. Hence, we can use the methodology suggested by Aaron and McGuire and Maital to quantify the taxpayer benefits from in-kind transfers. We intend these calculations to be suggestive rather than definitive.

Maital's Methodology

Assume that for persons with income y ,

$$(14) \quad mu(g) = t(y)\lambda(y)$$

where:

$mu(g)$ = marginal utility of in-kind transfer g ;
 $t(y)$ = tax price per unit of g ; and
 $\lambda(y)$ = marginal utility of income.

Multiplying (14) by G , the number of units of in-kind transfers, and rearranging gives

$$(15) \quad Gt(y) = Gmu(g)/\lambda(y)$$

Since the left-hand side is the total taxes a household with income y would be willing to pay for the benefits it receives from public goods, $Gt(y)$ is its imputed benefits, B , from giving. Making the strong assumption that all households have the same, separable utility function, $mu(g)$ is a constant across all donors since, by definition, they consume the same quantity of redistribution. Applying (15) to donors i and j and dividing i 's equation by j 's produces

$$(16) \quad B_i/B_j = \lambda(y_j)/\lambda(y_i)$$

Hence, the imputed benefits of G vary inversely with the marginal utility of income.

To apply (16) we assume, along with Aaron and McGuire and Maital, that $\lambda(y) = ay^{-\theta}$, where θ is the elasticity of marginal utility with respect to income. Hence (16) becomes

$$(17) \quad B_i/B_j = (y_i/y_j)^\theta$$

As Maital explains, estimates of θ have been obtained from many econometric studies of consumption which use CES utility functions. These studies suggest that for the United States, $\theta \doteq 1.5$.

We can compute the distribution of taxpayer benefits from equation 17, and our lower-bound assumption that the sum of the B_k equals total cost, and the additional assumption that each household has the mean cash income of its class. We then have

$$(18) \quad B_i/B_j = (y_i/y_j)^{1.5}$$

and

$$(19) \quad \sum_{k=1}^{12} P_k B_k = \$68.8 \text{ billion}$$

where y_k = mean income of class k , P_k = number of households in class k , and \$68.8 billion = total spent on our selected set of in-kind transfers in 1970. The resulting benefits per household are shown in Table 7 (col. 1).

Column 1 indicates that taxpayer benefits are distributed in a steeply proric pattern, a result which necessarily follows from our use of equation 18, with its income elasticity of benefits of 1.5.

To calculate the size distribution of outlays we sum "Consumption of Redistribution," the recipient value of consumption from in-kind transfers (ΔY) (col. 4), personal consumption, personal savings and adjusted personal taxes. For consumption, savings, and all personal taxes, we substitute Current Population Survey cash income (col. 3). The required adjustment to taxes was made quite explicit in Exhibit 4 where aggregate personal taxes were reduced by the value of "Consumption of Redistribution." That reduction is distributed in column 2, "Offsetting Tax Reduction," according to the incidence of all personal taxes in 1970 (Reynolds and Smolensky, Appendix C).

For each income class, the difference between personal income per household (cols. 3 + 4) and personal outlay per household (cols. 1 + 2 + 3 + 4) is the net sum of columns 1 + 2.²⁵ In setting up our accounts, we expected that personal outlays would be more unequally distributed than personal income. That expectation was fulfilled, but the difference is small. The Gini coefficient for the size distribution of outlays (col. 5) is .382, which slightly exceeds the coefficient on personal income (.374). It appears that donor benefits add about as much to inequality as the offsetting taxes reduce it.

Some Further Comparisons

Our measures of income inequality are sensitive to the definition of income. The distribution of factor earnings plus private transfers as measured in the Current Population Survey has a Gini coefficient of .444. Adding governmental cash transfers, which yields the conventional concept of personal income, lowers the measure to .398. Our further modifications—adding in-kind transfers at their cash-equivalent value,

TABLE 7 Taxpayer Benefits and the Distribution of Personal Outlays per Household

	Consumption of Redistribution (1)	Offsetting Tax Reduction (2)	Cash Income (3)	Recipient Value of In-Kind Transfers (4)	(1) + (2) + (3) + (4) (5)
\$ 0-999	4	-67	260	457	654
1-1,999	53	-67	1,508	594	2,088
2-2,999	112	-176	2,461	764	3,161
3-3,999	186	-300	3,468	794	4,148
4-4,999	273	-441	4,471	902	5,205
5-5,999	366	-540	5,445	940	6,211
6-6,999	473	-632	6,452	856	7,149
7-7,999	588	-731	7,458	905	8,220
8-9,999	770	-879	8,920	994	9,805
10-14,999	1,138	-1,143	12,120	1,136	13,251
15-24,999	2,285	-1,654	18,410	1,210	20,251
25,000+	6,179	-6,788	35,755	1,965	37,111

and taxpayer benefits with the appropriate adjustment to taxes paid—further lowers the Gini coefficient to .382.

Our accounts lead naturally to a modified concept of disposable income. To the conventional definition of consumption plus savings we add in-kind consumption at cash-equivalent value and donor benefits. The Gini coefficient for this concept of disposable income is .372 compared to a coefficient of .380 for the conventional notion.

Comparing the reduction in inequality which results from altering the definition of income suggests the following:

1. Adding governmental cash transfers to factor income plus private transfers lowers inequality by .046. In contrast, adding in-kind transfers to factor income plus private transfers lowers inequality by .011.
2. Personal Outlay as we define it has a Gini coefficient of .382, while as conventionally measured it is .398. This difference results from two opposing forces. Adding in-kind transfers to cash receipts reduces inequality by .024 but donor benefits increase inequality by .008.
3. Subtracting Personal Taxes for our concept of Personal Outlay reduces inequality by .010.

CONCLUSION

We have urged that current practice in accounting for in-kind transfers in the Personal Income and Outlay Account be altered in the following ways.

1. All government in-kind transfers accruing to clearly identifiable beneficiaries should be included. The most important omissions are the transfers which augment human capital.
2. Transfer income should be valued at the minimum cash transfer the recipients would accept to forgo the in-kind transfer.
3. The process of making the transfer should be viewed as an activity with a final output to be accounted for—a collective purchase which raises personal consumption (with an offsetting reduction in taxes).

To make more concrete what our proposals would involve, we illustrated them with a specific set of T accounts. Our proposed accounting practices could alter substantially our conceptions of the prevailing degree of income inequality. To the extent that in-kind transfers are distributed differently from cash income, the income side could show a marked change in income inequality. On the outlay side, the definition of disposable income is significantly altered, which also could shift measured income inequality.

We then provided an illustrative set of numbers to show how the size distribution of income was altered when in-kind transfers, treated our way, were distributed across income classes and added to cash income. The resulting changes were, in fact, quite small. Redistribution through in-kind transfer appears to consist of shuffling a great mass of things about, mainly in the dense middle of the distribution, with those in the lower tail gaining some.

The emphasis we put on valuing recipient benefits on a cash equivalent basis for the study of income distribution seems misplaced. Our simulations, while only suggestive, yielded rather high benefit weights. Therefore, donor benefits generated by the alteration of recipient consumption patterns cannot be important.

Our results are in no sense definitive, however, and more work could usefully be done. A low-income-household survey that determined the number of recipients receiving more than one in-kind transfer and the mix of benefits that they receive would be especially helpful. If most low-income families are in several programs, then practical concern over recipient valuations of in-kind transfers would be ended. (Of course, why we engage in such transfers when benefit weights are 1 would emerge as an important issue in public economics.) If only a small proportion of households receive transfers from more than one source, attention to consumption of subsidized commodities by low-income families would yield better income elasticities than were available for this study. Such a survey might also help to answer a variety of horizontal equity questions not otherwise tractable. The data collected would also permit rearranging households into an after-transfer distribution permitting a better understanding of the short-run effect of government on the distribution of income, when income is rather broadly defined.

An issue not yet amenable to household survey solutions is the better conceptualization, and subsequent calculation, of the set of benefit weights appropriate for education and other human-capital-augmenting public programs.

The issues surrounding the concept of donor benefits also need considerably more attention. It would be especially useful to contrast the results from assuming Pareto optimal redistribution with other models such as the median voter framework.

In summary, it seems quite acceptable to continue to account for in-kind transfers at cost (but including capital costs). The concept of in-kind transfers in Personal Income and Outlay should be broadened, however, to include education and manpower training. The notion that redistribution is an activity augmenting personal income with a concomitant reduction in taxpayer burdens requires further theoretical and empirical consideration.

NOTES

1. Since there is little reason to believe that taxes are on a marginal benefit basis, all government expenditures can be thought of as having a transfer component. In another paper, Reynolds and Smolensky have distributed all government expenditures and taxes by income size class. In that paper, however, in-kind transfers are treated in the traditional way. It would also have been consistent to enter in-kind taxes (imprisonment, compulsory school attendance, jury duty, military conscription), but no attempt was made to do so.
2. Lampman has, however, asked why receipts of insurance benefits, which he considers to be a transfer, as well as inter-household transfers are not accounted for.
3. In theory, it should be noted, the cash equivalent which recipients put on their in-kind transfers may exceed, equal, or be less than their cost to government (Schmundt, Stiefel and Smolensky).
4. Since recipient benefits are expected to be less than taxpayer costs, it may appear reasonable to value taxpayer benefits as the difference between taxpayer costs and recipient benefits. The above discussion makes it clear, however, that this method is inappropriate.
5. Schmudt, Smolensky, and Stiefel have shown that correctly measuring recipient benefits from in-kind programs (ΔY) requires simultaneously evaluating all in-kind benefits received by the recipient. For expository purposes only, the in-kind programs are treated separately.
6. We assume that there is no "stigma" or other effects associated with cash transfers which would cause the recipient to value the transfer at less than the dollar amount.
7. A more complete specification would treat the government's costs in effecting that transfer as "value added by government." That cost appears in both the current and modified accounts in "Government Purchases."
8. If we had started de novo, the two offsetting tax entries would not have appeared.
9. In recent years, the cost to the government of the food stamp program can be found primarily in line 27, other health, labor and welfare, and the column federal transfer payments and "net interest paid," of Table 3.10, "Government Expenditures by Type of Function," in the July issue of the *Survey of Current Business* and hence in the various other displays related to government.
10. Indeed, the Public Housing Authorities run a surplus on current account.
11. A. Skolnik and S. Dales, Table 1, *Social Security Bulletin*, December 1972.
12. The seven programs are food stamps, public housing, Medicare, Medicaid, elementary-secondary-other public education, higher public education, and man-power programs.
13. Of all the possible functional forms for a utility function, this is one of the few that is empirically tractable and yields demand functions consistent with economic theory (Goldberger). Recent work on consumer benefits from public housing lends empirical support to our choice (Murray).
14. In equation 1, omitting the exponent $\sigma/\sigma - 1$ simplifies calculations and does not affect the final results.
15. This procedure assumes identical utility functions for all families of a given size and income but allows them to vary across income classes and by family size.
16. An example of an in-kind transfer in this category is the school lunch program, in which a student can get a 60 cent lunch for 30 cents, but not a 40 cent lunch for 20 cents nor two 60 cent lunches, but who may bring a sandwich. Of the five programs in this simulation, food stamps can fall into this category, though they may not if the family does not exceed its food stamp allotment when buying food. Similarly, rent subsidies may or may not be in this category, depending on family consumption choices.

17. For example, federal regulations indicate that a two-person family with cash income of \$2,869 in 1970 was eligible for \$725 of food stamps at a cost of \$583, a subsidy rate of .20. Because the family must buy all the stamps if it is to receive any, $xr = \$725$.
18. An inconsistent case exists if assigning good j to one category yields, from (6) through (8), an xp_j that contradicts the assignment. For instance, a permutation placing rent supplements in category II (where $xp > xr$) might result in $xp < xr$; this case would be excluded.
19. These income figures correspond to the income classes in the *Summary of Consumer Expenditures*, 1960-61, which are the original data, but are inflated to 1970 price levels.
20. The benefit weights on public housing are more variable than our table suggests and fall as low as .24 in one instance. Packages of transfers which contain public housing also, therefore, have quite variable, and frequently quite low, benefit weights. To a lesser extent, there is some greater variability in the weights than revealed by Table 4 for other housing programs as well.
21. Specifically, we assumed $\sigma = .5$, and (1) public-housing tenants receive no other benefits, (2) Medicare enrollees receive no other benefits, and (3) all food stamp recipients are on Medicaid and vice versa. These conditions, of course, do not reflect the true pattern of program overlap in 1970. Also a greater change in Table 3's figures could be produced by assuming, e.g., that some Medicaid recipients receive no food stamps. Our choices, however, yield the largest change of any simple set of assumptions.

Since the simulations cover a limited income range, rough extrapolations were used to obtain a full set of benefit weights. Table 5 was constructed with the following weights:

Income Class	Public Housing	Medicare	Food Stamps and Medicaid
\$0-999	0.3	0.6	0.5
1-1,999	0.5	0.7	0.6
2-2,999	0.6	0.8	0.7
3-3,999	0.7	0.85	0.85
4-4,999	0.85	0.9	0.85
5-5,999	0.95	0.95	0.95
6,000+	1.00	1.00	1.00

22. One interpretation of Table 6, obviously, is that in-kind transfers in 1970 may have wasted as much as \$2 billion.
23. However, the Gini coefficient is not substantially altered when the Medicaid weights are applied to all human-investment programs.
24. See footnote 23, however.
25. This section assumed a CES utility function that is constant for all people; earlier we explicitly allowed the function to vary across income classes and by family size. Hence combining these results in Table 7 is not strictly justifiable.

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1 | COMMENTS

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My discussion falls into three parts: (1) a brief summary of the argumentation and conclusions of Smolensky, Schmundt, Plotnick, and Stiefel; (2) an explication of their major points; and (3) a critical evaluation of their contribution.

I

Our authors contend that the National Income Accounts should be adapted to reflect the impact of in-kind transfers on both recipients' and taxpayer-donors' income. Specifically they propose that the Personal Income and Outlay Account be altered to include in-kind transfers valued at their minimum cash value to recipients and that taxpayer benefits from redistribution be added to the outlay side of the account. Assuming "Pareto Efficient Redistribution," our authors would enter as an outlay "Consumption of Redistribution," that is, the taxpayer benefit from redistribution, with an offsetting reduction in the entry for personal taxes. The estimated minimum cash value to the recipients of a selected number of in-kind transfers is based on a simulation exercise involving utility maximization. The benefit weights derived for the in-kind transfers from this exercise are all close to unity. Our authors find that the size distribution of income is altered only slightly if in-kind transfers, evaluated in this manner, are distributed across income classes. They conclude with several qualifications of their procedures and suggestions for extending their work.

II

Our authors wish to put "welfare before wealth and the size distribution [of income] before the functional distribution" as the purpose of the national accounts. To this end they (1) propose changes in the Personal Income and Outlay Account to reflect both the benefits recipients receive from in-kind transfers and the benefits received by taxpayers from redistribution programs; and (2) provide some illustrative numbers indicating the general order of magnitude these changes make in the estimated size distribution of income.

Our authors illustrate their proposed changes in the national accounts in terms of a cash transfer program as well as medical care and public housing in-kind transfer programs. Assume that earned income is 100, that there is no saving, and that there are two government outlays, 10 for a pure public good and 30 for a program providing medical services at no charge, as shown in Exhibit 4. Under current procedures, personal consumption expenditures would be entered as

60, equal to disposable income, with personal tax outlays of 40 ($10 + 30$), as shown in Exhibit 4. The authors would explicitly recognize the consumption of the medical service by the recipients by adding the minimum cash value of this service to personal outlay (ΔY). Taxpayer benefits from the program would be recorded as "Consumption of Redistribution" and evaluated at the cost of the program, in this instance, 30. Offsetting this addition would be a reduction of personal taxes of 30, with a similar increase in disposable income. Thus personal taxes would be 10, the amount needed to finance the public good. On the income side, the minimum cash value of the medical service to the recipients (ΔY) is added to earned income.

The authors' proposal for the treatment of in-kind transfers from a program such as public housing, which is not directly financed by tax outlays, involves not only the procedures just discussed but also the introduction of government capital consumption into the accounts, as proposed, for example, by Nancy and Richard Ruggles, and illustrated in Exhibits 4-A, 6-B, 6-C, and 6-D.

Our authors illustrate their accounting proposals with seven programs (food stamps, public housing, Medicare, Medicaid, public elementary and secondary education, public higher education, and manpower) for which total expenditures by all levels of government in 1970 were \$68.8 billion. (Total cash transfers were \$63 billion in that year.) The authors believe that these seven programs are vehicles for in-kind transfers, since they provide goods and services "to clearly identifiable beneficiaries at other than marginal cost." Although these in-kind transfers, evaluated at taxpayer cost, accrue in a prouder manner, as seen in Table 3, column 10, they are indeed more evenly distributed than cash income. Hence, including them in personal income decreases the Gini coefficient from .398 to .371, as shown graphically in Figure 1.

The authors attempt to determine whether the distribution of in-kind transfers evaluated at their cash value to recipients, rather than at taxpayer cost, would become even more prouder. A range of benefit weights is calculated to convert taxpayers' costs of five programs (food stamps, public housing, rent supplements, Medicare, and Medicaid) to benefits evaluated at their cash equivalency to recipients. Each recipient family is assumed to participate in a package of in-kind transfer programs. A constant elasticity of substitution (CES) utility function, a budget constraint (Y) and maximizing behavior are assumed and the utility that the family receives is calculated. Then that cash income (EY) which will allow the family to reach this same level of utility in the absence of any in-kind transfers is computed. The difference between EY and Y is then defined as the increased welfare in dollar terms generated by the in-kind programs. The ratio of this difference (EY less Y) to the taxpayer cost of the transfer programs is the benefit weight.

Commodities in a transfer program can fall in one of three categories, depending upon the manner in which the rules governing the program affect a household's budget constraint. In category I, there is no relevant constraint imposed on the quantity of the commodity that the household can consume. In category II, a certain amount of the commodity must be consumed but additional units can be purchased at the market price. In category III, the quantity consumed and the price of the commodity are both fixed. Medicare and

Medicaid are examples of programs in category I. The food stamp program can fall in categories II or III; public housing is in category III; and rent supplements can be in any one of the categories.

Benefit weights are computed for five prototype families and several in-kind program combinations. The benefit weights shown in Table 4 range from 0.61 for public housing to 1.0 for food stamps. The weights for two- or three-program packages are generally higher than the weights for programs taken separately.

Since benefit weights generally rise with income, if in-kind transfers adjusted to their cash-equivalent basis are substituted in personal income distribution for in-kind transfers at taxpayer cost, the Gini coefficient rises but only slightly. Thus with in-kind transfers evaluated at taxpayer cost the Gini coefficient is .371; on a cash-equivalent basis it is .374. For the food stamp, public housing, Medicare, and Medicaid programs taken together, the cash equivalent is estimated to be 83 percent of taxpayer cost. Even though our authors judge that on a conceptual basis, benefits from public elementary, secondary, and higher education should be treated as in-kind transfers financed by consumption outlays for redistribution, they do not attempt to estimate weights for these programs.

Finally, the authors distribute the outlay, "Personal Consumption of Redistribution," in a manner first discussed by Aaron and McGuire. Following Maital, our authors assume that the taxpayer benefits from redistribution vary inversely with the marginal utility of income, with 1.5 the value of the elasticity of marginal utility with respect to income. On this basis, taxpayer benefits from redistribution are distributed in a steeply proric pattern with the income elasticity of benefits necessarily being 1.5, as shown in Table 7, column 1.

Consonant with their proposal that the accounts should reflect benefits that taxpayers derive from redistribution, aggregate tax payments must be reduced by \$68.8 billion, the total expenditures for those programs assumed to generate in-kind transfers in 1970. If this offsetting tax reduction is distributed according to the estimated incidence of all personal taxes in 1970, it just happens that the tax reduction in each income class very closely approximates the taxpayer benefits from redistribution allocated to the income class according to the Maital procedure (see Table 7, columns 1 and 2).

III

I am quite sympathetic with the authors' effort to introduce welfare and utility concepts into the quantitative analysis of fiscal outcomes. The theoretical public sector analysis of Samuelson, Musgrave, Buchanan, and others has long clearly pointed in this direction but only very recently have public sector quantitative studies begun to reflect this analysis. I think a significant contribution of our authors is the fact that they have grappled imaginatively with the question of income distribution and the public sector in a manner that reflects a consciously articulated behavioral base. This real accomplishment is not diminished by the fact that I feel a number of deficiencies exist in both their proposed conceptual framework and in their interpretation of some of the quantitative results. Specifically, my critique focuses on these three areas of the paper: (1) their proposed modification of the national accounting framework; (2) their

adjustment of in-kind transfers to a cash-equivalency basis; and (3) their evaluation of "Personal Consumption from Redistribution," the taxpayer-donor benefits from redistribution programs.

The authors propose a new entry in the national accounts, "Personal Consumption of Redistribution," to be measured by the total cost of programs that provide goods and services "to clearly identifiable beneficiaries at other than marginal cost." Such programs are, by definition, transfer programs. I am uncomfortable with this definition of a transfer program. Take the case of public education. The beneficiaries of public education are not all clearly identifiable. Students and their families are indeed known but educational policy for decades has been built on the assumption that there are notable external benefits from elementary and secondary education. The identification and quantification of these external benefits as well as the identification of their recipients are still largely matters of conjecture. Nonetheless, to the extent that these beneficiaries do exist, they enjoy benefits at less than marginal cost and so, by our authors' definition, they are transferees. However, if such an extension of the concept of transferee is accepted, then it would seem that nearly all public services have to be defined as transfer programs. For example, the beneficiaries of national defense services, police and fire protection, the system of justice, and general government all enjoy benefits at other than marginal cost.

Further, even within the population that clearly and directly benefits from education, an additional distinction is crucial. The educational service provided to a child of an affluent family does not seem, for analytical purposes, to be an analogue either of the medical service provided to an indigent family under Medicare or of the education provided to a child of an indigent family. It can be argued that the intent of social policy is to provide medical and educational services at less than marginal cost to indigent households. However, presumably, children in affluent families are given free access to public education in the belief that by so doing some goal, say, socialization, is promoted—a goal quite distinct from redistribution. I think realism is excessively sacrificed if services such as education of the wealthy are denominated in-kind transfers along with public housing and food stamps.

A preferable procedure might be to designate first which programs can by general consensus be denominated redistributive in intent, as for example, Medicaid. Programs which seem to have some redistributive intent, such as public elementary and secondary education, can then be identified. Following this classification exercise, in-kind transfers can be estimated for either all or some fraction of the program's outlay, depending on its designation. Such a procedure is admittedly arbitrary, but I think it may be preferable to forcing programs into a redistributive mold that ill fits them.

Double-entry accounting requires a dollar-for-dollar reduction in personal taxes for each "Personal Consumption of Redistribution" entry. A reduction in taxes presumably implies an increase in households' discretionary power over income. Such an implication is plausible as long as we assume that all transfers are Pareto-efficient. However, I see no logical basis for restricting such reasoning to the transfer portion of government outlays. Must we not just as reasonably assume that all government outlays are Pareto-efficient? This

assumption would then require us to create another entry, "Consumption of Public Services," which, in turn, would be offset dollar-for-dollar against personal taxes. As a consequence, all personal taxes would be eliminated from the Personal Income and Outlay Account. Public consumption would then be treated in the accounts on a par with market consumption, with the clear implication that coercion is not present in the payment of taxes. Although there is normative and undoubtedly considerable operational content to the benefit principle of taxation I think the judgment that all tax payments are discretionary expenditures is not fully justified.

These concerns with our authors' proposals for modifying the national accounts are mitigated, at least in my mind, if the proposals are not taken to require the complete elimination of current procedures. Though Occam's razor is a generally valid, even if little-used tool, I think that in this instance entities might well be multiplied. A useful measure of the distribution of welfare might well be obtained if series based on proposals similar to those of our authors were generated to supplement the current series. The complete elimination of time series data for disposable income, however, seems a high price to pay even for introducing welfare theory into the national accounts.

Our authors conclude that valuing recipient benefits on a cash-equivalent basis actually altered the size distribution of income only slightly, because they found that benefit weights are typically near unity. They infer from this result that donor benefits generated by the alteration of recipient consumption patterns must be unimportant. The authors' finding is undoubtedly valuable for policy considerations, but I am not comfortable with their dismissal of the importance to bureaucrats, if not to donors, of in-kind transfers. I suspect that the apparent long-standing preference for in-kind transfers over cash transfers must satisfy a donor wish that some attempt be made to control the spending patterns of the program recipients, or the dominance of in-kind over cash transfers may testify to the lobbying strength of such groups as the construction industry, the Farm Bureau, and the National Association of Social Workers.

Finally, there is the question of the proposed new entry, "Personal Consumption of Redistribution." Although one may feel a bit ill at ease with the preciseness of the figures displayed in Table 7, I think that their impact on the size distribution of welfare across income classes is entirely proper. Previous government benefit-incidence studies have typically ignored all external benefits whether redistributive or not and consequently have so allocated benefits that the fisc, specifically state and local fiscs, appear to redistribute welfare massively in favor of lower-income classes. Such results have generally been accepted as conventional wisdom even though it is difficult to interpret precisely what is meant by "benefits" in such a context. Certainly these benefits cannot be understood within the framework of benefit taxation. The massive benefits received by the lower-income classes in these studies, for example, cannot form the basis for assessing benefit taxes. Our authors' estimates for the personal consumption of redistribution, on the other hand, do establish a title for assessing benefit taxes.

One final observation concerning "Personal Consumption of Redistribution." What of the anomalous situation that can arise if the benefits represented by the

"Personal Consumption of Redistribution" can be increased merely by increasing the number of poor with a simultaneous increase in the dollar outlay for redistribution. As measured by "Consumption of Redistribution," it might well be that welfare in society increases *pari passu* with the number of poor in a society. This anomaly is dispelled, however, if it is recognized that benefit evaluation is made in a particular context with such variables as total output, income distribution, and the number of poor, all given. If these values change then the welfare measure of benefits must also be adjusted. This means, of course, that a time series of "Consumption of Redistribution" cannot be used unequivocally as an index of welfare across periods.