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THE DISTRIBUTIONAL CONSEQUENCES OF GOVERNMENT SPENDING AND TAXATION IN THE U.S., 1989 AND 2000

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We assess the effects of government expenditures and taxation on household economic well-being in the United States in 1989 and 2000. Net government expenditure is estimated as the difference between government expenditures incurred on behalf of the household sector—transfers and public consumption—and the taxes paid by that sector. We incorporate the estimates of net government expenditures into a wealth-adjusted measure of income. We find that overall inequality in our income measure is considerably reduced by net government expenditures. Results from decomposition analysis show that the inequality-reducing effect of net government expenditures owed more to expenditures than to taxes.

1. Introduction

This paper assesses the effects of government expenditures and taxation on household economic well-being in the United States in 1989 and 2000 on the basis of household-level data.[1] While there is an enormous literature on particular aspects of government expenditures and taxation, there has been no study of the net effect of the government budget on economic well-being over the 1980s and 1990s. The last comprehensive estimates were published in 1981 and the estimates were for the year 1970 (Ruggles and O'Higgins, 1981). The present study seeks to fill this gap in the existing literature by developing comprehensive estimates that take into account all relevant government expenditures and taxes for an admittedly remarkable period in recent U.S. economic history (Auerbach, 2000; Blinder and Yellen, 2001; Stiglitz, 2003).

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[1]We have chosen to study 1989 and 2000 because they can be considered as the terminal years of the last two economic expansions in the United States. The two phases of economic expansion, defined here as consecutive quarters of positive real GDP growth, may be dated respectively as 1983:1 to 1990:2 and 1991:2 to 2000:4. This makes the years 1989 and 2000 the last full years before the 1990–91 and 2001 recessions. It may also be noted that the unemployment rate hit its troughs during 1989 and 2000.

We address this task by incorporating a number of novel features in our methods and data.[2] First, we develop comprehensive measures of well-being that take into account assets and liabilities of households. Second, the allocation and distribution procedures used in the study utilize much detailed information assembled from a variety of sources. Third, the functional breakdown of government expenditures and their geographical distribution are as exhaustive as permitted by the available data. Finally, decomposition analysis is utilized to shed light on the effects of government expenditures and taxation on overall inequality.

We begin with a brief overview of existing approaches and contrast them with our approach. The subsequent section (Section 3) outlines the sources and methods used in the study. This is followed by a discussion of our results (Section 4). We conclude by summarizing the main findings of the study and its limitations.

2. Net Government Expenditures and Economic Well-Being

2.1. *Previous Literature*

Most existing empirical studies aimed at answering the question "how does government affect distribution" can be classified into two categories. Studies in the first category involve two steps in the allocation and distribution of taxes and government expenditures. First, assumptions are made regarding the incidence of various taxes on different categories of factor incomes and types of consumer expenditures and regarding the beneficiaries of various types of government expenditures. Such incidence assumptions are generally derived from a specific theoretical framework, a combination of theoretical predictions and empirical findings from testing theoretical predictions, or, when theoretical arguments and empirical evidence are inconclusive, just plain arbitrarily. In the second step, taxes and expenditures are distributed across households, grouped into different income groups, in accordance with the incidence assumptions and, when appropriate, other household-level characteristics relevant to the determination of tax liability and expenditure incidence (e.g. Reynolds and Smolensky, 1977).

The second category of studies is based on computable general equilibrium (CGE) models that allow for estimating the effects of all types of taxes and government expenditures simultaneously on factor and product prices (e.g. Piggott and Whalley, 1987). A CGE model does not need to make assumptions regarding the incidence of particular types of taxes because their incidence is determined endogenously (e.g. Ballard *et al.*, 1985). Further, being based on explicit utility-maximizing behavior of households, such a model can also assess welfare losses from taxes suffered by different types of households and the deadweight loss from taxation. However, regarding public goods, the problem still remains because preferences for public goods have to be necessarily imputed.

Several criticisms have been advanced against both types of studies. A key issue plaguing the first category is the sensitivity of estimates to the incidence assumptions

[2]We define the scope of the effects studied here narrowly by ignoring the effects of the budget on changes in employment and output, consumer preferences, individual decisions regarding labor market participation, and business decisions on the location and scale of activity. Effects of monetary policy, regulation of factor and product markets, etc, are also ignored. This is in line with the previous research on this question (e.g. Musgrave *et al.*, 1974).

(Whalley, 1984). Some have also argued that by equating tax burden with actual tax payments, the approach does not allow for the assessment of welfare losses to households or the deadweight loss associated with the tax system (Fullerton and Metcalf, 2002, p. 26). Similar considerations also apply to the expenditure side. On the other hand, the specification of the underlying utility (including preferences for public goods) and production functions in a CGE model involves a degree of arbitrariness that may not be significantly different than what was involved in the traditional incidence assumptions (Whalley, 1984, p. 678). Questionable assumptions of continuous full employment and perfectly competitive markets are generally made in both approaches to determine tax and expenditure incidence.

2.2. *A Social Accounting Method*

The approach taken in the present study might be described as a social accounting method (Hicks, 1946). Unlike the approaches described above, we do not make any assumptions regarding technology and the behavior of agents. Since it is essentially an accounting approach, we also need not make any assumptions regarding market structure or macroeconomic outcomes. We adopt a sectoral view of the economy, i.e. the overall economy as constituted by the household, government and other sectors. Our aim is to account for the flows of purchasing power and products between the government and household sectors during a given accounting period in an ex post fashion. We take the individual household as the unit of analysis and build estimates of how much the government spends for each household and how much the government takes from each household in taxes.

This approach is similar in several practical respects to the methods used by the national statistical agencies in the U.K. and Australia to assess annually the effects of taxes, transfers and some public expenditures on household income as well as by the OECD for estimating net social expenditure (Australian Bureau of Statistics, 2001; Lakin, 2002).[3] While it is true that our approach ignores the general equilibrium effects of government expenditures and taxes, there is a trade-off between constructing estimates of precise and detailed direct effects versus crude and aggregate indirect effects. This trade-off exists partly because of the absence of a detailed description of the direct effects—an absence this study seeks to fill.

The social accounting approach to government expenditures yields the generally accepted conclusion in the case of government cash transfers: they are to be considered entirely as part of money incomes of the recipients. Our approach to non-cash transfers is that they must be distributed among recipients on the basis of the appropriate average cost incurred by the government.[4] However, it has been argued on theoretical grounds that the income-value for the recipient from a given non-cash transfer is, on the average, less than the average cost incurred by the government in providing that benefit (see, e.g. Canberra Group, 2001, pp. 24, 65). In practice, a method of imputation consistent with this argument (often referred to as the cash-equivalent method) involves estimating how much the household

[3]A similar approach has also been followed in estimating the impact of net government expenditures on the functional distribution of income between labor and capital (Shaikh, 2003).

[4]In the case of Medicare and Medicaid—by far the biggest items in this list—the relevant cost is the "insurance value" differentiated by risk classes.

could have paid for the transfer, after meeting its expenditures on some basic items (such as food, clothing etc) out of current income,[5] with the maximum payment for the transfer set equal to the average cost incurred by the government.

The alternative is not pursued by us primarily because of its important implication that households with incomes below the minimum threshold and participating in the program are presumed to receive no benefit from a product that they actually consume. This is inconsistent with our goal of measuring the flow of purchasing power and products between the government and household sectors. Further, unlike the social accounting approach, the alternative method would not, by definition, yield the actual total government expenditure when aggregated across recipients. Such a feature is incompatible with our goal of estimating net government expenditures using a consistent methodology.

In addition to cash and non-cash transfers, we include public consumption—government expenditures on direct provisioning for the household sector—in our measure of well-being. In deciding to allocate expenditures to the household sector we attempt to follow, as much as possible, the general criterion that a particular expenditure must be considered as incurred directly on behalf of the households and as expanding their consumption possibilities. The implementation of the approach is carried out in two stages.

We begin with a detailed functional classification of government expenditures on direct provisioning and exclude certain functions entirely because they fail to satisfy the general criterion. Most such functions form part of general social overhead and their major effect is to keep the ship of state afloat (e.g. national defense). Expenditures under other functional categories also may not meet the general criterion fully because part of such expenditures can be considered as being incurred on behalf of the business sector (e.g. transportation). The household sector's share in such expenditures can be approximated on the basis of information regarding its utilization or consumption of products provided via the expenditures. Finally, expenditures under certain functional categories are considered as incurred completely on behalf of the household sector (e.g. health).

In the second stage, the allocated expenditures for each functional category—public consumption—are distributed among the households. The distribution procedures followed by us build on the earlier studies employing the government cost approach (e.g. Ruggles and O'Higgins, 1981) in that some expenditures are distributed, in the same way as the split was made between the household and other sectors, on the basis of estimated patterns of utilization or consumption and some expenditures are distributed equally among the relevant population.

The final step in constructing net government expenditure is to define the household tax burden. Our approach is to determine, in an accounting sense, the distribution of the actual tax payments by households among those in different income and demographic groups, rather than incidence in a theoretical sense. However, for the bulk of the taxes paid by households—personal income taxes—most theoretical models of incidence concur that the tax is borne by the taxpayer (e.g. Fullerton and Metcalf, 2002). In addition, we also consider property taxes on

[5]The rationale behind setting a threshold is that households with incomes below that level will not be able to pay anything for the transfer and therefore the transfer has a zero income-value for them.

owner-occupied housing, payroll taxes (both employee and employer portion), and consumption taxes as a part of the household tax burden. Inclusion of the property taxes is required for consistency with the inclusion of imputed rental cost on the income side. The other taxes can be considered as reducing the potential command that households could exercise over commodities. Finally, taxes on corporate profits, taxes on business-owned property, and other business taxes were not allocated to the household sector because they are considered, in an accounting sense, as paid out of the incomes of the business sector.[6]

In sum, in the social accounting approach, taxes paid by the household sector are considered as reducing the command over products. Symmetrically, transfers and public provisioning received by the household sector are considered as expanding the command over products. The difference between the government expenditures incurred on behalf of the household sector and the taxes paid by that sector is defined as net government expenditure.

While the distribution of government spending and taxation is interesting in itself, such a picture is insufficient since ultimately what matters is the distribution of economic well-being, after accounting for government spending and taxation (Lambert and Pfahler, 1988, p. 198). Economic well-being is defined for the purposes of this study as the magnitude of the command or access exercised by members of a household over the products produced (excluding self-provisioning by households) in a modern market economy during a given period of time (Wolff and Zacharias, 2003). We construct two measures of economic well-being. One, which may be called "pre-fisc" income, reflects primarily the actual or potential command over products that the members of the household derive from market or quasi-market transactions. The other, called "post-fisc" income, is the sum of pre-fisc income and net government expenditure.[7]

Gross money income—the yardstick used in the current official measures of poverty and income inequality—is an inadequate measure of pre-fisc income because it includes government cash transfers. The first step, therefore, in constructing the pre-fisc income measure is to subtract from gross money income the cash transfers included in it. In the second step, we need to add the value of employer-provided in-kind benefits that enhance the current command of the household over commodities, but not included in gross money income. Finally, the property income component of gross money income has to be replaced by an alternative measure that better reflects the economic advantage derived from wealth.[8] To this end, we add an "annuity" component derived from non-home wealth (see Section 3.1) as well as the imputed rental cost of owner-occupied housing. The latter reflects the value of the services of owner-occupied housing consumed by homeowners.

[6]Some previous studies have included corporate income taxes and corporate income in the household sector's income and tax. The effect of the inclusion on overall inequality depends on the assumptions made regarding incidence. Pechman found that if the incidence of corporate income tax were equally distributed between corporate stockholders and consumption, then the inclusion will leave inequality unchanged; if the incidence were to fall entirely on stockholders, then the inclusion will reduce overall inequality (Pechman, 1985, p. 57).

[7]We borrow the terms "pre-fisc income" and "post-fisc income" from Reynolds and Smolensky (1977).

[8]Of course, in the case of households with negative net worth, what is relevant is the disadvantage from liabilities.

3. Empirical Methodology

Our empirical strategy is to begin with the public-use datafiles developed by the U.S. Bureau of the Census from the Current Population Survey's Annual Demographic Supplement (ADS).[9] The calculation of the income measures involves a set of imputations based on additional information available from other sources, such as household surveys on wealth and national income and product accounts (NIPA). Sources and methods used in constructing these estimates are described below.

3.1. *Imputed Rent and Annuities*

The ADS contains no information on household wealth.[10] We therefore combined the 1989 and 2001 rounds of the Survey of Consumer Finances (SCF) conducted by the Federal Reserve Board and the ADS for the respective years via statistical matching.[11]

After matching the SCF and the ADS we estimated imputed rent and annuities. Imputed rent is the replacement cost of the services derived from owner-occupied housing. We estimate this amount by distributing the total amount of imputed rent on non-farm owner-occupied housing in the GDP (available from the Bureau of Economic Analysis) to homeowners in the ADS, based on the gross values of their houses. A lifetime annuity flow—reflecting the benefit or loss from non-home wealth—was estimated for each household in two steps. In the first step, we estimated the annuity flow generated by each component of non-home wealth using average total real rates of return for each component from 1960 to 2000.[12] Then, we calculate the weighted sum of the annuity flows for each household with the portfolio shares of the components serving as weights to take into account differences in the portfolio composition. The annuity amount calculated is such that: (i) it is the same for all remaining years of the younger spouse's life;[13] and (ii) it brings wealth down to zero at the end of the expected lifetime (Wolff *et al.*, 2004). The annuity approach is preferred to using a bond coupon approach (applying the average rate of return on net worth) since the annuity value gives the sustainable consumption possible over the remainder of a person's lifetime.

3.2. *Government Transfers*

Estimates of government transfers are "NIPA-consistent," in the sense that in the aggregate they are equal to the appropriate NIPA benchmarks. The latter are derived from the national accounts by making adjustments for differences

[9]There were approximately 59,000 and 78,000 household records in the ADS in, respectively, 1989 and 2000.

[10]Wealth is defined here as net worth. Assets included are homes, real estate and businesses, liquid assets, financial assets, and retirement assets (excluding defined-benefit pensions and Social Security). Liabilities included are mortgage debt and other debt.

[11]Details regarding the matching algorithm are available from the authors on request.

[12]The rationale for using long-run average rates of return (instead of using the rate of return in an arbitrarily chosen year) is that the annuity value estimated this way is a better indicator of the resources available to the household on a sustainable basis over its lifetime.

[13]Information on remaining lifetimes comes from the tables on vital statistics and is differentiated by race, sex and age (U.S. Bureau of the Census, 2002, table 93).

in definition and coverage. Transfers for which actual or imputed amounts are reported in the ADS are aggregated across recipients and compared against the benchmarks.[14] Any discrepancy between the ADS total and the NIPA benchmark for a given transfer payment is distributed across recipients according to the distribution of that transfer payment in the ADS. Transfers for which there are no actual or imputed amounts reported in the ADS can be divided into two categories: those for which recipients are identified in the ADS itself and those for which we had to impute recipiency. For the first category, we distributed the relevant NIPA amount across households equally, adjusted by the number of recipients in a household. For the second category, we distributed the NIPA amount equally among households selected using appropriate eligibility criteria (see Wolff *et al.*, 2004 for details).

3.3. *Public Consumption*

Estimates of public consumption by households are constructed in three steps. First, expenditure totals by function and level of government are obtained. Second, the expenditure totals are allocated between the household sector and other sectors of the economy. Finally, the expenditures allocated to the household sector are distributed among households. Table 1 summarizes the functional classifications used in the study and the allocation and distribution assumptions associated with each function. Of the total government consumption and gross investment expenditures, we estimated that public consumption made up 44 and 51 percent, respectively, in 1989 and 2000. In both years, roughly a quarter of public consumption was distributed equally among persons (or households), while the remainder was distributed according to relevant characteristics.[15]

3.4. *Taxes*

The household tax burden consists of federal and state individual income taxes, property taxes on owner-occupied housing, payroll taxes, and, state and local consumption taxes (excise and sales). Federal and state individual income taxes, property taxes on owner-occupied housing, and employee portion of payroll taxes have imputed values in the ADS (estimated by the Census Bureau).[16] The ADS aggregates of these taxes are aligned with their NIPA counterparts by distributing the discrepancy between the NIPA and ADS aggregate for each tax among households according to the share of each household in the ADS aggregate.[17]

State and local consumption taxes are calculated on the basis of estimates published by the Institute on Taxation and Economic Policy (e.g. McIntyre

[14]The only exception to this procedure is educational assistance for which we lack information to split the NIPA amount between recipients residing in households and student-housing (such as dormitories). Hence no modification is made to the amount reported in the ADS.

[15]Further details regarding sources and methods for estimating public consumption are available from the authors on request.

[16]Payroll taxes paid by the self-employed are also included here.

[17]The only exception was consumption taxes for which we have no independent estimate of the household shares in the NIPA total.

TABLE 1

ALLOCATION AND DISTRIBUTION OF GOVERNMENT CONSUMPTION EXPENDITURES AND GROSS INVESTMENT BY FUNCTION

No.	Function	Allocation	Distribution
	General public service		
1	Executive and legislative	Non-household	
2	Tax collection and financial management	Non-household	
3	Other public service	Non-household	
4	National defense	Non-household	
	Public order and safety		
5	Police	Household and non-household (50 : 50)*	Population
6	Fire	Household and non-household (50 : 50)*	Population
7	Law courts	Non-household	
8	Prisons	Non-household	
	Economic affairs		
9	General economic and labor affairs	Household	Population
10	Agriculture	Share of family farms in total sales of farm products	Farm income
11	Energy	Share of household sector in total energy consumption	Energy expenditures
12	Water resources (federal only)	Households	Population
13	Land conservation and management (federal only)	Households	Population
14	Forestry (state and local only)	Households	Population
15	Fish and game (state and local only)	Households	Population
16	Pollution control and abatement	Share of household sector in total pollution[1]	Polluting consumption expenditures[2]
17	Highways	Share of passenger vehicles in total highway costs	Vehicle miles traveled
18	Air	Share of commercial air carrier miles in total air carrier miles	Person-miles traveled
19	Railroad	Share of passenger car-miles in total car-miles	Person-miles traveled
20	Public transit	Household	Person-miles traveled
21	Postal service (federal only)	Household	Expenditures on postage and stationery
22	Parking facilities (state and local only)	Household	Vehicle owning households
23	Liquor stores (state and local only)	Household	Expenditures on alcohol
24	Miscellaneous commerce (state and local only)	Household	Population
	Housing and community services		
25	Water supply (state and local only)	Domestic-use share of total deliveries from the public water supply	Expenditures on water and other public services by households receiving public water supply
26	Sewerage (state and local only)	Domestic share of total water discharges from all sectors	Expenditures on water and other public services by households using public sewerage

Table 1 continued on next page

TABLE 1 (*continued*)

No.	Function	Allocation	Distribution
27	Solid waste management (state and local only)	Residential share of total municipal solid waste	Expenditures on non-durables and entertainment (less fees and admissions)
28	Other housing and community development	Household	Recipients of government housing assistance
	Health		
29	Public health	Household	Population
30	Public hospitals	Household	Population
31	Occupational safety and health	Household	Employed
32	Administrative costs of Medicare	Household	Medicare recipients
33	Medical and related services for veterans	Household	Veterans
34	Recreation and culture	Household	Population
	Education		
35	Elementary and secondary education	Household	Elementary and secondary public-school students
36	Higher education	Household and non-household	Higher education students residing in households
37	Other education	Household	Population
38	Libraries (state and local only)	Household	Population
	Income security		
39	Disability assistance	Household	Recipients of public disability assistance
40	Retirement	Household	Recipients of Social Security
41	Welfare and social services	Household	Recipients of means-tested public assistance
42	Unemployment	Household	Recipients of unemployment insurance
43	Other public welfare	Household	Recipients of means-tested public assistance
44	Welfare institutions (state and local only)	Household	Population

Notes: *Expenditures split equally between the two sectors.

[1]Average household contribution to four pollution types: air, CO_2, water and municipal solid wastes.

[2]Expenditures on non-durable goods, energy, water and other public services, public transportation, and entertainment (less fees and admissions).

et al., 2003). For each of the 50 states, estimates are available for the average tax rates for "general sales-individuals" and "other sales and excise-individuals" differentiated for households in each quintile of the household income distribution and selected portions of the top quintile. We assigned the average tax rates to households in the corresponding positions in the ADS household income distribution.

The NIPA aggregate of employer portion of payroll taxes is distributed among the wage and salary workers in the ADS in accordance with the distribution of the employee portion of such taxes among them. The latter is available in the ADS.

TABLE 2

Derivation of Post-Fiscal Income

1	**Census money income**[1]
2	*Less:*
3	Government cash transfers[1]
4	Property income[1]
5	*Plus:*
6	Employer contributions for health insurance[1]
7	Employer portion of payroll taxes[2]
8	Consumption taxes (state)[2]
9	*Equals:*
10	**Base income**
11	***Plus: Income from wealth***
12	Imputed annuity from non-home wealth[2]
13	Imputed rent on owner-occupied housing[2]
14	***Equals:***
15	**Wealth adjusted, pre-fisc income**
16	***Plus: Government cash and non-cash transfers***[3]
17	***Equals:***
18	**Wealth adjusted, comprehensive income (CIW)**
19	***Plus:***
20	Public consumption[2]
21	***Less: Taxes***
22	Income taxes[3]
23	Payroll taxes (employer and employee)[3]
24	Property taxes[3]
25	Consumption taxes (state)[2]
26	***Equals:***
27	**Wealth adjusted, post-fisc income**

Notes:
[1]Estimates reported in the ADS.
[2]Authors' estimates.
[3]Estimates reported in the ADS and modified by the authors. The modifications were: (a) alignment with the NIPA benchmarks; and (b) for non-cash transfers, valuation by government cost rather than fungible value.

3.5. *Pre-Fisc and Post-Fisc Income Measures*

Table 2 shows the derivation of the income measures used in this study. We first subtract government cash transfers and property income—both as measured in the ADS—from census gross money income and then add in the employer contribution for health insurance, the employer portion of payroll taxes and state-level consumption taxes to obtain "base income." We then add income from wealth as imputed rent on owner-occupied housing and the imputed annuity on non-home wealth to obtain "wealth-adjusted pre-fisc income." Government cash and non-cash transfers are added then to obtain "comprehensive income" (line 18).[18] Finally, we add in public consumption and subtract income, payroll, property, and consumption taxes to obtain "post-fisc income."

[18]See Congressional Budget Office (2003) also for the use of the term "comprehensive income." The CBO definition of pre-tax comprehensive income includes all cash income (both taxable and tax-exempt), taxes paid by businesses, employee contributions to 401(k) retirement plans, and the value of income received in kind from various sources (including employer-paid health insurance premiums, Medicare and Medicaid benefits, and food stamps, among others).

TABLE 3
COMPOSITION OF NET GOVERNMENT EXPENDITURES, 1989 AND 2000

Components	Mean (in 2000 dollars)			Shares (in percent)		
	1989	2000	Change	1989	2000	Change
Government transfers	6,912	8,421	22%	100	100	0
Social Security	3,248	3,562	10%	47	42	–5
Medicare	1,391	1,895	36%	20	23	2
Medicaid	718	1,392	94%	10	17	6
All others	1,555	1,573	1%	23	19	–4
Public consumption	7,211	8,242	14%	100	100	0
Police and fire	361	489	36%	5	6	1
Public health and hospitals	794	811	2%	11	10	–1
Education	3,698	4,389	19%	51	53	2
Highways	651	714	10%	9	9	0
All others	1,708	1,839	8%	24	22	–1
Taxes	15,440	19,655	27%	100	100	0
Federal income taxes	6,705	9,231	38%	43	47	4
State income taxes	1,382	1,853	34%	9	9	0
Payroll taxes—employee	2,847	3,311	16%	18	17	–2
State consumption taxes	1,269	1,578	24%	8	8	0
Property taxes	885	906	2%	6	5	–1
Payroll taxes—employer	2,352	2,775	18%	15	14	–1
Net government expenditures	–1,318	–2,992	127%			

4. FINDINGS

4.1. *Size and Composition of Net Government Expenditures*

Estimates of net government expenditures show that, in both 1989 and 2000, the value of total government transfers and that of public consumption were very close—the latter was 4 percent higher in 1989 and 2 percent lower in 2000 than the former (Table 3). If we consider both transfers and public consumption jointly, then education ranks first in 2000, at 26 percent of government spending, followed by health spending (including Medicare, Medicaid, and public health and hospitals) at 25 percent (up from 21 percent in 1989), and then Social Security, at 21 percent (down from 23 percent in 1989). It seems clear that health spending will soon surpass education as the largest component of government expenditure for households. The growth in health spending was driven by the growth in Medicare and Medicaid. The share of Medicare in total transfers rose from 20 to 23 percent, while there was an even larger increase, from 10 to 17 percent, in the share of Medicaid. Expenditures on public health and hospitals, however, grew at a much slower rate than overall public consumption (2 versus 15 percent). On the other hand, expenditures for police and fire departments grew by a notable 36 percent and education increased by a more modest 19 percent.

The largest component of the taxes paid by households and individuals are federal income taxes. They comprised 47 percent of total taxes in 2000, up from 43 percent in 1989. The second largest component is payroll taxes (employee plus employer), which fell from 34 percent to 31 percent in 2000. State income taxes accounted for another 9 percent in the two years, state consumption taxes another 8 percent, and property taxes between 5 and 6 percent.

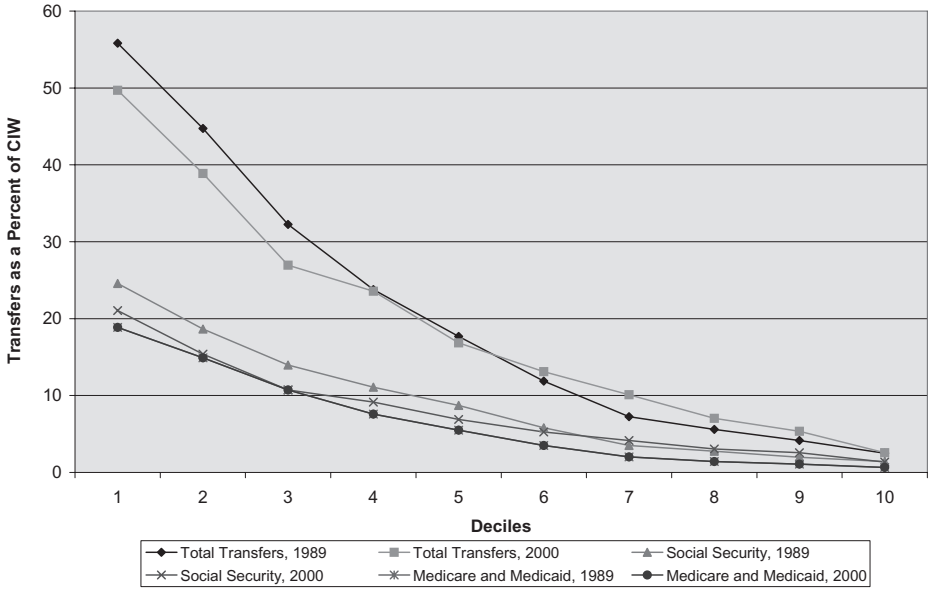

Figure 1. Social Security Payments and Total Government Transfers as a Percent of Wealth-Adjusted Comprehensive Income (CIW) by CIW Decile, 1989 and 2000

Total government expenditures for the household sector fell short of total household tax payments in both years.[19] In 1989, mean net government expenditures amounted to –1,318 dollars or –9 percent of household tax payments. In 2000, mean net government expenditures more than doubled to about –3,000 dollars or –15 percent of household tax payments. This change reflected a much more rapid growth in taxes than in either transfers or public consumption. The sharp growth in federal income taxes was due to the strong growth in taxable income rather than any increase in effective tax rates on nominal income, since the latter actually declined over the period.[20]

4.2. *Transfers, Public Consumption, and Taxes by Income Decile*

We next group households by income decile. For convenience, we use wealth-adjusted comprehensive income (CIW) as the income definition.[21] Figure 1 shows the distribution of transfers by income decile for selected transfer components. Total government transfers were extremely progressive, falling monotonically

[19]As pointed out by an anonymous reviewer, this finding is contingent on the assumptions that we have made regarding which taxes and expenditures are to be allocated to the household sector. While we believe that our assumptions are appropriate from an accounting perspective, it is entirely plausible that alternative assumptions that yield a different result could be made from other perspectives.

[20]The change in the size of net government expenditures reported here could be the result of changes in the structure of taxes and expenditures. It could also stem from changes in their levels. We are grateful to an anonymous reviewer for highlighting this point.

[21]The results reported below are quite similar when gross money income or comprehensive income (CI) is used. CI is similar to CIW, except that income from non-home wealth in CI is equal to the sum of net realized capital gains and property income.

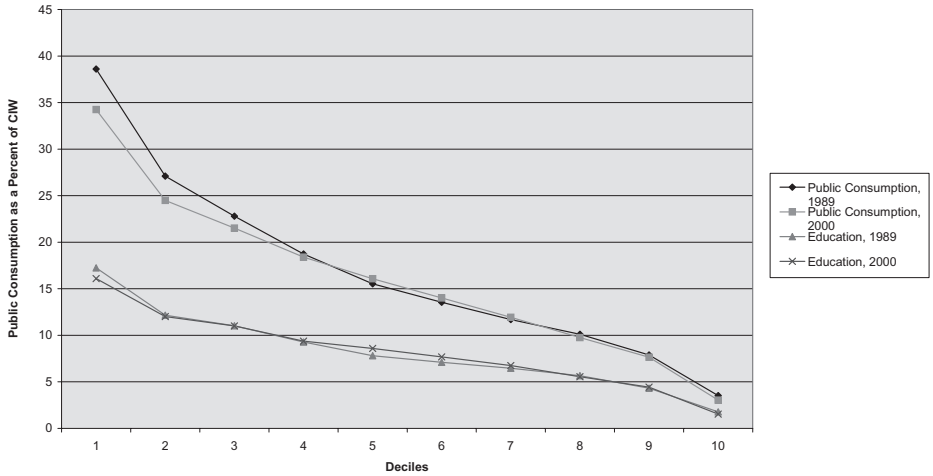

Figure 2. Educational Spending and Total Public Consumption as a Percent of Wealth-Adjusted Comprehensive Income (CIW) by CIW Decile, 1989 and 2000

from 56 percent of CIW for the lowest decile to 2.5 percent for the top decile in 1989 and from 50 percent to 2.6 percent in 2000. The same pattern held for the largest government transfers, Social Security and medical benefits (Medicare plus Medicaid). Similar patterns could be observed for other transfers too, with one or two exceptions.

Public consumption was also highly progressive, though not quite as strongly as transfers (see Figure 2). Unlike transfers, the absolute amount of public consumption did not fall as we move to the higher income deciles; only the ratio of public consumption to income falls, reflecting the fact that the disparity in income is far bigger than the disparity in public consumption. Total public consumption falls monotonically from 39 percent of CIW for the lowest decile to 3.5 percent for the top decile in 1989 and from 34 percent to 3.0 percent in 2000. The same pattern could be observed for the largest source of public consumption, educational expenditures, as well as other types of public consumption.

The federal income tax was uniformly progressive in 1989, as shown in Figure 3A. The average federal income tax rate rose from 2.5 percent in the bottom decile to 12.7 percent in the top decile, while in 2000 the average tax rate increased steadily from 2.2 percent in the first decile to 13.8 percent in the ninth and then dropped a bit to 13.5 percent in the top decile. State income taxes are also progressive (with two exceptions). Payroll tax rates increases modestly between the first and eighth deciles and then declines over the top two deciles. State consumption taxes were (not unexpectedly) regressive in the two years, with average tax rates falling across deciles from 3.4 to 0.9 percent in 1989 and from 3.7 to 0.8 percent in 2000. Property taxes are generally regressive in the two years. This reflects the fact that though house values rise with income, they decline as a *percent* of income across income classes.

Overall, total personal taxes by decile were generally progressive. In 1989, total personal tax rate declined a bit between the first and second decile, from 13.7

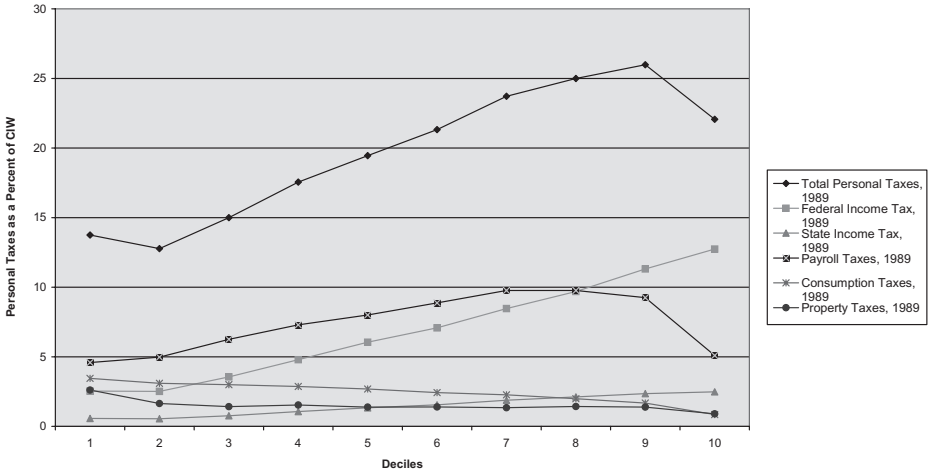

Figure 3A. Personal Taxes as a Percent of Wealth-Adjusted Comprehensive Income (CIW) by CIW Decile, 1989

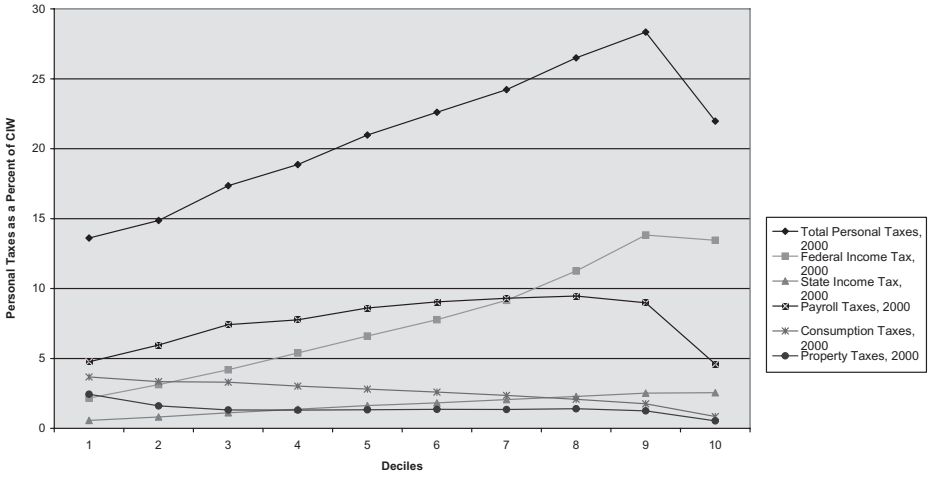

Figure 3B. Personal Taxes as a Percent of Wealth-Adjusted Comprehensive Income (CIW) by CIW Decile, 2000

to 12.8 percent and then rose steadily to 26.0 percent in the ninth decile before shrinking to 22.1 percent in the top decile. In 2000, the average personal tax rate rose continuously from 13.6 percent in the lowest decile to 28.3 percent in the ninth decile and then plummeted once again, to 22.0 percent in the top decile (see Figure 3B). The sharp drop off in the average tax rate between the ninth and tenth deciles is largely a reflection of the correspondingly sharp decline in the average payroll tax between these two deciles.

Since our overall tax schedules are somewhat at odds (though not completely) with those reported in some of the previous literature on the subject (see, for

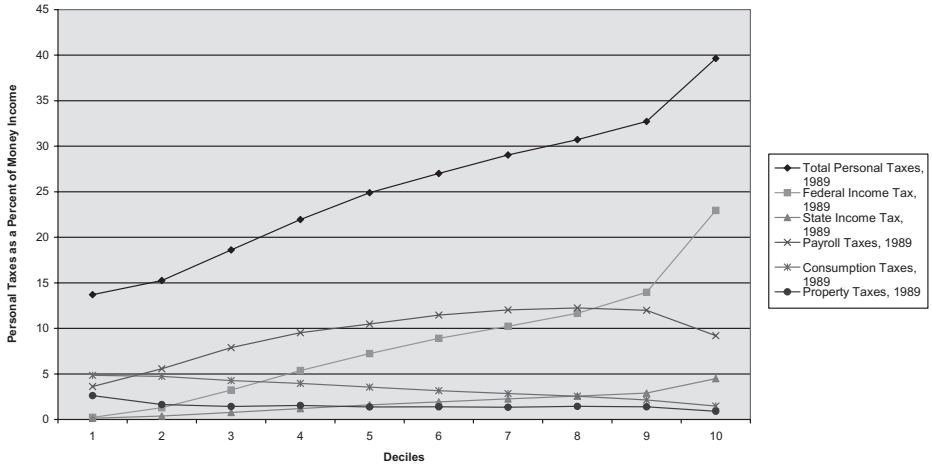

Figure 3C. Personal Taxes as a Percent of Gross Money Income by Gross Money Income Decile, 1989

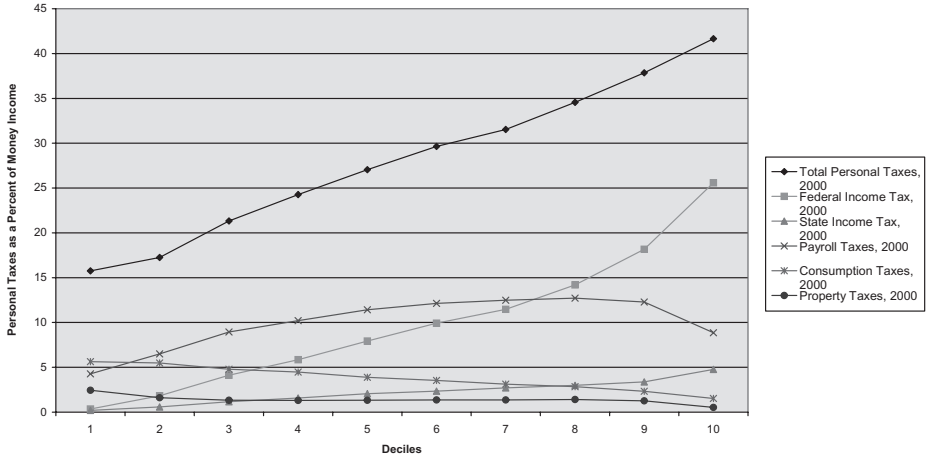

Figure 3D. Personal Taxes as a Percent of Gross Money Income by Gross Money Income Decile, 2000

example, Pechman and Okner, 1974), we also show the same set of tax schedules by census money income decile (see Figures 3C and 3D). Here, the pattern is different. The average personal federal income tax rate increases steadily with income decile in the two years, including between the 9th and 10th decile. Payroll taxes as a percent of income rises continuously with income up to the 9th decile and then drops off somewhat in the 10th decile, though not as steeply as in Figures 3A and 3B. Moreover, the total personal tax rate exhibits the same pattern in both years. The main reason why the tax schedules differ when money income is used instead of CIW is due to the relatively high level of income in the top decile

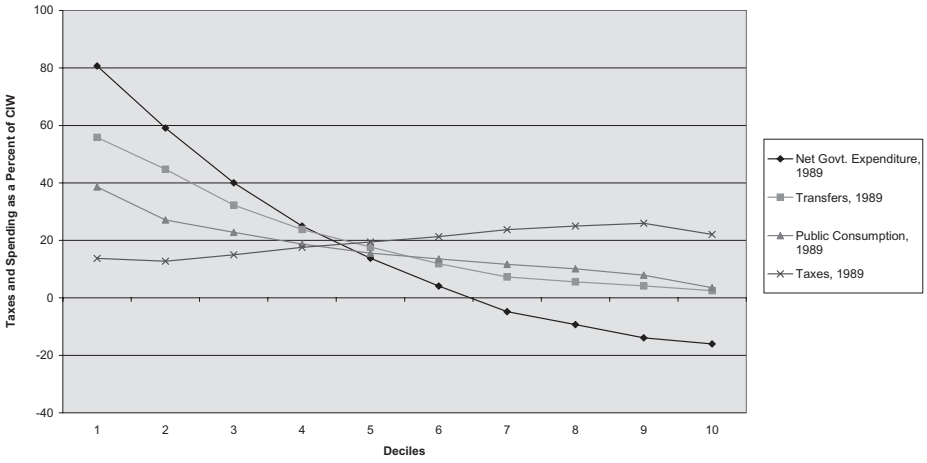

Figure 4A. Net Government Expenditure as a Percent of Wealth-Adjusted Comprehensive Income (CIW) by CIW Decile, 1989

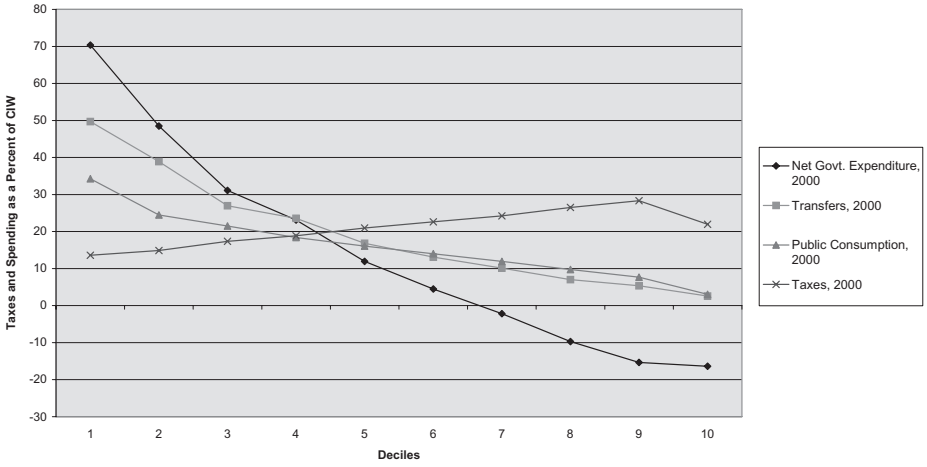

Figure 4B. Net Government Expenditure as a Percent of Wealth-Adjusted Comprehensive Income (CIW) by CIW Decile, 2000

with CIW (3.7 times the overall mean in 2000) than with standard money income (3.3 times the overall mean).

The distribution of net government expenditures by decile is shown in Figures 4A and 4B. In both 1989 and 2000, net government spending is extremely progressive. Net government spending as a percent of CIW plummets from 81 percent for the lowest decile to –16 percent for the top in 1989 and from 70 to –16 percent in 2000. Net government expenditure is positive for the lowest six deciles (and at the median) and negative for the top four deciles. A comparison of the tax schedule and the net government expenditure schedule shows that the latter yields a much more progressive view of the fiscal system, thus confirming Richard

TABLE 4

Income Measures, Mean and Median Values in 1989 and 2000 (2000 dollars)

Income Measure	Median			Mean		
	1989	2000	Change	1989	2000	Change
Money income	40,167	42,000	5%	49,570	57,140	15%
Pre-fisc income (wealth adjusted)	45,972	50,631	10%	63,224	77,528	23%
Comprehensive income (wealth adjusted)	51,508	58,041	13%	70,136	85,950	23%
Post-fisc income (wealth adjusted)	48,226	53,876	12%	61,906	74,537	20%
Equivalence scale adjusted						
Money income	53,655	57,095	6%	65,659	76,235	16%
Pre-fisc income (wealth adjusted)	61,102	68,309	12%	84,345	104,344	24%
Comprehensive income (wealth adjusted)	69,238	78,601	14%	94,704	116,999	24%
Post-fisc income (wealth adjusted)	63,511	71,189	12%	82,585	100,259	21%

Musgrave's observation that the distribution of net fiscal burden is more "pro-poor" than is the distribution of tax burden "anti-rich" (Musgrave, 1994, p. 354).

4.3. *Level and Distribution of Economic Well-Being by Income Measure*

The picture of average economic well-being as conveyed by the census money income and three of our wealth-adjusted measures are shown in Table 4. The average level of well-being (as measured by either the mean or median) is the lowest for the money income measure. The adjustments made to money income to arrive at pre-fisc income have the effect of increasing the average level relative to money income. Comprehensive income (CIW), which is calculated by adding government transfers to pre-fisc income, shows average levels that are still higher. As suggested by the evidence presented on net government expenditures, post-fisc income has an average level that is lower relative to CIW. The fact that net government expenditures were negative in both years is reflected in the result that mean values of post-fisc are less than those of pre-fisc income in the two years. Conversely, the redistributive impact of net government expenditure is reflected in finding that the median value of post-fisc income is higher than of pre-fisc income in both years.

While median money income increased by 5 percent over the period, median CIW grew notably faster, by 13 percent because of the surge of annuity income from wealth over this period. Post-fisc income grew slower than CIW over the 1989–2000 period. This difference is largely due to the rapid increase in personal taxes over the period and the consequent decline in net government expenditure (actually becoming more negative over the period).

Estimates of overall inequality are portrayed in Table 5. Pre-fisc income shows the highest degree of inequality, followed by CIW, and then post-fisc income. The reason for the former is that, overall, transfers are highly progressive, so that their exclusion results in a higher level of measured inequality (pre-fisc income versus CIW). The rationale for the latter is that the combined effect of adding in-kind benefits and public consumption to income and netting out taxes is also highly progressive, so that their addition lowers measured inequality (CIW versus post-fisc income). The difference in Gini coefficients among these three

TABLE 5
INEQUALITY BY INCOME MEASURE, 1989 AND 2000 (GINI COEFFICIENT × 100)

Income Measure	Gini Coefficient × 100		Change
	1989	2000	
Money income	41.8	46.0	4.2
Pre-fisc income (wealth adjusted)	51.3	54.7	3.3
Comprehensive income (wealth adjusted)	44.0	47.7	3.8
Post-fisc income (wealth adjusted)	40.4	44.4	4.0
Equivalence scale adjusted			
Money income	40.0	44.1	4.1
Pre-fisc income (wealth adjusted)	51.2	54.4	3.2
Comprehensive income (wealth adjusted)	43.0	46.7	3.7
Post-fisc income (wealth adjusted)	38.2	42.3	4.1

measures is quite large. Moreover, both pre-fisc and CIW show a higher degree of inequality than standard money income—a result that is largely due to the addition of annuities to income.[22]

The Gini coefficient shows a marked rise over the 1989–2000 period according to all income measures. However, of the three new measures, post-fisc income shows the greatest rise over the period, followed by CIW and then pre-fisc income. The widening gap between the Gini coefficients for post-fisc income and CIW is indicative of a fall in the equalizing effect of adding public consumption to income. Similarly, the bigger gap between the Gini coefficients for pre-fisc income and CIW is suggestive of a fall in the equalizing effect of transfers between the two years. These issues are examined in greater detail in the next section.

4.4. *Inequality and Net Government Expenditures*

We address two issues regarding the relationship between overall inequality and net government expenditures. The first is the differences in the degree of inequality among alternative measures of economic well-being. The second issue relates to incremental effects or the expected change in inequality resulting from a slight proportionate change in one of the components of the measure, with other components remaining the same.

4.4.1. Reranking and Redistribution

The change in the Gini coefficient between measures (or income definitions) can be decomposed into effects from the reranking of households and changes in the income gaps between households.[23] We use the standard method of decomposing the change in the Gini coefficient into gap-narrowing and reranking effects (e.g. Lambert, 2001, p. 40). Assume that A and B are two measures of well-being that are related to each other by addition or subtraction of individual components

[22]The Gini coefficient for the most inclusive definition of disposable income published by the Census Bureau was 0.403 in 2000. Our post-fisc income measure showed a much higher Gini, primarily because of the inclusion of annuities as the measure of income from non-home wealth.

[23]In contrast, the Musgrave–Thin index of progressivity is simply the difference between the Gini coefficients for pre-tax and post-tax income.

TABLE 6

DECOMPOSITION OF THE CHANGES IN THE GINI COEFFICIENT FROM ADDING NET GOVERNMENT EXPENDITURES, 1989 AND 2000

A. Net Government Expenditures

	1989			2000		
	Total Effect	Gap-Reduction	Reranking	Total Effect	Gap-Reduction	Reranking
Y_1 to Y_2	–0.009	–0.002	–0.007	–0.010	0.047	–0.057
se	*0.007*	*0.007*	*0.007*	*0.004*	*0.004*	*0.005*
Y_2 to Y_3	0.088	0.108	–0.019	0.082	0.105	–0.023
se	*0.007*	*0.008*	*0.008*	*0.005*	*0.005*	*0.005*
Y_3 to Y_4	0.030	0.039	–0.009	0.031	0.039	–0.009
se	*0.007*	*0.007*	*0.007*	*0.005*	*0.005*	*0.005*
Y_1 to Y_4	0.109	0.146	–0.037	0.103	0.143	–0.040
se	*0.006*	*0.007*	*0.007*	*0.004*	*0.004*	*0.005*

B. Gini Coefficients

	Y_1	Y_2	Y_3	Y_4
1989	0.513	0.522	0.434	0.404
se	*0.004*	*0.005*	*0.005*	*0.005*
2000	0.547	0.557	0.475	0.444
se	*0.003*	*0.003*	*0.003*	*0.003*

Key: Y_1 = Pre-fisc income; Y_2 = Pre-fisc income less taxes; Y_3 = Income after taxes and transfers; Y_4 = Income after net government expenditure (Y_3 plus public consumption); se = standard error.

Note: "Total effect" for each pair of income definitions is obtained by subtracting the Gini ratio of the second income definition from the Gini ratio of the first income definition. For example, total effect on inequality for moving from definition Y_1 to Y_2 is calculated by subtracting the Gini ratio of Y_2 from that of Y_1. The reranking effect for each pair of income definitions is calculated by subtracting the concentration ratio of the second definition from the Gini ratio of the first definition and the gap-reduction effect is calculated by subtracting the Gini ratio of the second definition from the concentration ratio of the second definition. The concentration ratio of the second definition is calculated using the ranks of households according to the first definition.

(e.g. pre-tax and post-tax income). Let G_a be the Gini coefficient for A, G_b the Gini coefficient for B, and C_{ab} the concentration coefficient for A with respect to B. Then, the difference between the Gini coefficients can be written as:

$$G_b - G_a = (G_b - C_{ab}) + (C_{ab} - G_a),$$

with the first term indicating the gap-narrowing effect and the second indicating the reranking effect of moving from definition A to definition B.[24] Results from deploying this method are shown in Table 6. We begin with wealth-adjusted pre-fisc income (Y_1) and then subtract taxes to obtain post-tax pre-fisc income (Y_2). We then subtract the Gini coefficient of Y_2 from that of Y_1 and report it under "total effect." As can be seen from the first line of the table, the total effect of the movement from pre-fisc income to post-tax, pre-fisc income is a slight *increase* in

[24]Since $C_{ab} < G_a$ by construction, the gap-narrowing effect will always have to be greater than the change in the Gini. Consequently, for a given difference in the Ginis, a higher degree of reranking will always be associated with greater gap-reduction (Lerman and Yitzhaki, 1995, p. 51). We also conducted the analysis using the Lerman–Yitzhaki approach that avoids this difficulty with the standard decomposition. The results were qualitatively similar.

the Gini coefficient.[25] The standard errors (shown in italics under the estimates), suggest that the increase was (statistically) significantly different from zero in 2000 but not in 1989.[26] This is mainly a reflection of the sharp drop in the overall average tax rate between the ninth and tenth decile. Reading along the same row reveals that reranking played a substantial role in rendering the tax system, as a whole, to be neutral at best and slightly regressive at worst.

The next line of the top panel shows the effect of moving from post-tax pre-fisc income to an income definition that now adds in transfers (Y_3). Gap-reducing effects far outweigh reranking and bring about a substantial decline in the Gini coefficient in both years. Although the total reduction in inequality due to transfers appears to be lower in 2000 than in 1989, tests based on standard errors suggest that the change in the redistributive effect was not significant.

The effect of moving from pre-fisc to post-fisc income (Y_4) is shown in the last line of the top panel. Inequality falls further when public consumption is added to the well-being measure, but the inequality-reduction from this source is much smaller relative to that induced by transfers. Reranking played a substantial role in reducing the extent of diminution in overall inequality from net government expenditures: expressed as a percentage of the difference in the Gini between pre-fisc and post-fisc income, it was *negative* 34 and 39 percent, respectively in 1989 and 2000. The impact of net government expenditures in reducing inequality has weakened somewhat between the two years, though the weakening was not statistically significant.

We also examined the impact of the major individual components of taxes, transfers and public consumption on pre-fisc inequality (Table 7). As shown in panel A of the table, the progressive effect of income taxes is substantially reduced when payroll taxes are added to the household tax burden. The inclusion of property taxes and consumption taxes makes the distribution of post-tax income more unequal than pre-fisc income. As for transfers, estimates reported in panel B indicate that the two major social insurance programs of the federal government, Social Security and Medicare, which mainly benefit the elderly, have a big inequality-reducing impact. Together, they accounted for 4.3 points out of the 6.8 percentage point difference between the Gini ratios for pre-fisc income and pre-fisc income plus transfers in 2000. Education appears to be the main inequality-reducing component of public consumption (see panel C). The contribution of public consumption to a reduction in pre-fisc inequality is smaller than that of transfers. But, a comparison between income taxes and expenditures on public safety, health and education show that pre-fisc income after income taxes is more unequally distributed than pre-fisc income adjusted for these public expenditures.

[25]In general, the results of this type of decomposition are sensitive to the order in which the different components are introduced. However, we have also done this decomposition with different orderings and the results remain quite similar.

[26]The standard errors were estimated via the jack knife method using the algorithm discussed in Ogwang (2000).

TABLE 7

CHANGES IN THE GINI COEFFICIENT FROM TAXES, TRANSFERS AND PUBLIC CONSUMPTION, 1989 AND 2000

	A. Taxes					
	1989			2000		
	Total Effect	Gap-Reduction	Reranking	Total Effect	Gap-Reduction	Reranking
Y_1 to Y_{t1}	0.011	0.015	–0.004	0.014	0.017	–0.003
Y_1 to Y_{t2}	0.003	0.009	–0.006	0.003	0.009	–0.006
Y_1 to Y_{t3}	–0.001	0.006	–0.007	–0.002	0.005	–0.006
Y_1 to Y_{tx}	–0.009	–0.002	–0.007	–0.010	–0.004	–0.007

Key: Y_1 = Pre-fisc income; Y_{t1} = Pre-fisc income less income taxes; Y_{t2} = Pre-fisc income less income and payroll taxes; Y_{t3} = Pre-fisc income less income, payroll and property taxes; Y_{tx} = Pre-fisc income less all taxes (Y_{t3} minus consumption taxes).

	B. Transfers					
	1989			2000		
	Total Effect	Gap-Reduction	Reranking	Total Effect	Gap-Reduction	Reranking
Y_1 to Y_{tr1}	0.035	0.040	–0.004	0.030	0.034	–0.004
Y_1 to Y_{tr2}	0.048	0.056	–0.008	0.044	0.052	–0.008
Y_1 to Y_{tr3}	0.058	0.067	–0.009	0.058	0.068	–0.010
Y_1 to Y_{tr}	0.074	0.085	–0.011	0.070	0.083	–0.013

Key: Y_1 = Pre-fisc income; Y_{tr1} = Pre-fisc income plus Social Security; Y_{tr2} = Pre-fisc income plus Social Security and Medicare; Y_{tr3} = Pre-fisc income plus Social Security, Medicare and Medicaid; Y_{tr} = Pre-fisc income plus all transfers (Y_{tr3} plus all other transfers).

	C. Public Consumption					
	1989			2000		
	Total Effect	Gap-Reduction	Reranking	Total Effect	Gap-Reduction	Reranking
Y_1 to Y_{pc1}	0.002	0.002	0.000	0.003	0.003	0.000
Y_1 to Y_{pc2}	0.008	0.008	0.000	0.008	0.008	0.000
Y_1 to Y_{pc3}	0.024	0.029	–0.004	0.025	0.029	–0.004
Y_1 to Y_{pc4}	0.028	0.032	–0.004	0.028	0.033	–0.004
Y_1 to Y_{pc}	0.039	0.045	–0.006	0.038	0.044	–0.006

Key: Y_1 = Pre-fisc income; Y_{pc1} = Pre-fisc income plus police and fire; Y_{pc2} = Pre-fisc income plus police, fire and health; Y_{pc3} = Pre-fisc income plus police, fire, health and education; Y_{pc4} = Pre-fisc income plus police, fire, health, education and highways; Y_{pc} = Pre-fisc income plus all public consumption (Y_{pc4} plus all other public consumption).

4.4.2. Incremental Effects

We now turn to incremental effects. From a policy standpoint, they may be the most relevant since policy changes typically operate at the margin. We estimate the incremental effects using the so-called "natural decomposition" method (Lerman, 1999; Yao, 1999).[27] The incremental impact of a particular component of post-fisc income is the proportionate change in post-fisc income inequality due to an incremental, proportionate change in each household's income from that component. It equals the difference between a component's share in inequality and its

[27]For a critique of this type of decomposition and an alternative, see Shorrocks (1982).

TABLE 8

DECOMPOSITION OF THE GINI COEFFICIENT FOR WEALTH-ADJUSTED POST-FISC INCOME, 2000

	2000			
	Share of Income	Amount of Inequality	Share of Inequality	Incremental Effect
Pre-fisc income	1.040	0.520	1.170	0.130
Base income	0.754	0.300	0.676	–0.078
Income from wealth	0.286	0.219	0.494	0.208
Net government expenditure	–0.040	–0.076	–0.170	–0.130
Transfers	0.113	0.009	0.019	–0.093
Social Security	0.048	0.003	0.006	–0.041
Medicare	0.025	0.000	0.001	–0.025
Medicaid	0.019	0.003	0.006	–0.012
All others	0.021	0.003	0.006	–0.015
Public consumption	0.111	0.029	0.066	–0.045
Police and fire	0.007	0.001	0.003	–0.004
Health and hospitals	0.011	0.002	0.004	–0.007
Education	0.059	0.021	0.047	–0.012
Highways	0.010	0.001	0.002	–0.008
All others	0.024	0.005	0.011	–0.013
Taxes	–0.264	–0.113	–0.255	0.008
Federal income taxes	–0.124	–0.066	–0.148	–0.024
State income taxes	–0.025	–0.013	–0.028	–0.003
Payroll taxes	–0.082	–0.028	–0.064	0.018
State consumption taxes	–0.021	–0.004	–0.010	0.011
Property taxes	–0.012	–0.002	–0.005	0.007
Total	1.000	0.444	1.000	0.000

share in post-fisc income. Since the results are similar for both years, only the results for 2000 are shown here (see Table 8).[28]

The results suggest that base income (dominated by labor income) reduces pre-fisc inequality at the margin. This is because income from wealth (especially annuities), the other component of pre-fisc income, is distributed much more unequally than base income. The inequality-enhancing marginal effect of pre-fisc income is thus entirely due to income from wealth. Taxes, transfers and public consumption have incremental effects that are similar in direction to their global effects. Since taxes tend to increase inequality slightly at the margin, the inequality-reducing effect of net government expenditure is entirely attributable to government expenditures. Among transfers, Social Security and Medicare play prominent equalizing roles, accounting for roughly 70 percent of the marginal effect of transfers. Education expenditure is the largest item in public consumption and accounts for nearly 30 percent of the marginal effect of public consumption.

[28]The share of an income component in inequality is calculated as the contribution of that component divided by the overall Gini coefficient. In turn, the contribution of a component to inequality is calculated as the product of its concentration coefficient and its share in total income. In interpreting the results it is useful to note that the marginal effects are calculated on the assumption that no reranking occurs as a result of a slight proportionate change in a particular component and the method of calculation ensures that the sum of marginal effects is equal to zero.

5. Conclusion

Our estimates show that net government expenditures were negative in 1989 and 2000. The distribution of net government expenditure within the household sector reduces inequality considerably. While *mean* post-fisc income (income including net government expenditures) was less than mean pre-fisc income (gross income less government transfers), the opposite was true at the *median*. Indeed, net government expenditure was positive for the bottom six income deciles and negative for the top four. Decomposing the difference in the Gini coefficient between pre-fisc and post-fisc measures showed that transfers (especially Social Security and Medicare) are extremely progressive, public consumption (especially expenditures on education and health) is very progressive but less so than transfers, and that taxation is neutral or even regressive. While average tax rates increase between the first and ninth decile of income, they drop off sharply at the tenth decile. Reranking of households played a substantial role in offsetting the redistributive effects of net government expenditures.

Our analysis of the incremental effects of the components of post-fisc income showed that government expenditures for the household sector are far more potent in their inequality-reducing effect than taxes. We found that the inequality-reducing effect of net government expenditures waned somewhat over the years 1989 to 2000, with the difference in the Gini coefficient between pre-fisc and post-fisc income falling from 0.109 to 0.103 over this period. This result is due to taxes becoming slightly more regressive and transfers turning slightly less progressive over this period. However, the decline in the redistributive effect is not statistically significant.

Several limitations of the estimates reported here must be noted. Estimates of pre-fisc income are obtained from a statistically matched dataset because of the need for imputing income from wealth. While our matching procedure was able to reproduce the main features of wealth distribution, admittedly, it cannot be as good as the information from a single unified household survey. Estimates of the distribution of income, payroll and property taxes in the ADS are based on the amounts imputed by the Census Bureau rather than those reported by taxpayers. Among other things, these imputations have the effect of narrowing the variation in taxes among households of similar demographic characteristics. As in previous studies, the allocation and distribution of government consumption and gross investment expenditures were done on the basis of assumptions that, in our judgment, are reasonable from a social accounting perspective and based on the best available empirical information. However, it should be noted that we have not taken into account intra-state differences in public consumption due to the limitations of the underlying data (the lowest level of geographical identifier available for all household records is the state of residence). It is indeed possible that other equally reasonable assumptions could be made and they can result in different estimates of public consumption, and consequently net government expenditures.

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