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Series P-23, No. 147

After-Tax
Money
Income Estimates
of
Households:
1984

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2

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U.S. Department of Commerce

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Symbols Used in Text

- X Not applicable.
 — Represents zero.
 B Base is less than 75,000.

After-Tax Money Income Estimates of Households: 1984

INTRODUCTION

This report is the fifth in a series presenting estimates of after-tax household income and taxes paid by households. Previous special studies released by the Census Bureau contained estimates of after-tax household income for 1974 and 1980 through 1983. Data from the Annual Housing Survey, the Income Survey Development Program, and the Internal Revenue Service were combined with the March 1985 Current Population Survey (CPS) data to derive the estimates shown in this report. The main purpose of this report is to provide a better measure of year-to-year changes in household purchasing power and of differences in purchasing power between subgroups of the population. Four types of taxes were simulated and subsequently deducted from the total money income received by households in order to estimate after-tax income: Federal individual income taxes, State individual income taxes, FICA and Federal retirement payroll taxes, and property taxes on owner-occupied housing. A discussion of the important limitations of the simulation procedures and underreporting of income in the CPS is contained in the limitations section. A detailed description of the tax simulation methodology can be found in appendix A, along with comparisons of the results of the tax simulation with data from the Internal Revenue Service and other administrative sources. The 1983 income figures in this report differ from those previously published. The section on revised survey procedures describes the reasons for these differences.

HIGHLIGHTS

- Mean household income after taxes was \$21,560 in 1984, up by 2.7 percent over the 1983 figure after accounting for the 4.3-percent rise in consumer prices. This is the third consecutive increase in mean after-tax income.
- Mean household income before taxes (\$27,460) increased between 1983 and 1984 by 2.9 percent after adjusting for inflation. (The increases in before- and after-tax incomes are not statistically different from one another.)
- Payment of the taxes covered in this report reduced the amount of income available to households by about \$513 billion in 1984, or 22 percent of the total money income received.
- Households paid a mean of \$6,400 in taxes in 1984, \$200 higher than the mean taxes paid in 1983 after adjusting for price changes.

- In 1984, 64 percent of households with incomes below the poverty level paid one or more of the types of taxes covered in this study. Taxes paid by poverty households amounted to 7 percent of the total money income received.
- The percentage of income paid in taxes ranged from 10 percent in households with incomes less than \$10,000 to 28 percent in households with incomes of \$50,000 or more.

AFTER-TAX INCOME

In 1984, mean after-tax household income increased faster than inflation for the third consecutive year. The 1984 mean was \$21,560, a 2.7-percent increase over the 1983 figure of \$21,000, after accounting for the 4.3-percent increase in consumer prices. Improved economic conditions and a 5-percent reduction in 1984 Federal income tax rates contributed to this increase. The 1984 Federal income tax reduction was the last of four annual tax rate reductions scheduled by the Economic Recovery Tax Act of 1981. The increase in after-tax income in 1984 was not statistically different from the 2.9-percent rise in mean before-tax income (from \$26,700 to \$27,460). This is the first time in three years that the increase in household income after taxes was not greater than the before-tax increase.

The mean after-tax income of both White households (\$22,370) and Black households (\$14,800) increased significantly in 1984. The income of Spanish-origin households (\$17,360) also increased between 1983 and 1984.

After-tax incomes of households in the Northeast (\$22,000), South (\$20,950), and West (\$23,040) Regions were higher in 1984. There was some evidence of an increase in the mean income of households in the Midwest (\$20,870) Region.¹

Mean after-tax incomes increased in 1984 for married-couple family households both with children (\$26,840) and without children (\$26,450). There was also an increase among female-maintained family households with no husband present (\$12,240). This is the first statistically significant increase in the mean after-tax income of female-maintained family households since the start of this income series in 1980.

The payment of the four types of taxes simulated in this study reduced the income available to households by about

¹Mean after-tax incomes in the Midwest and South Regions are not significantly different from one another.

**Table A. Comparisons of Mean After-Tax Household Income, by Selected Characteristics:
1984 and 1983**

(In 1984 dollars)

Characteristic	1984	1983 ^r	Percent change
All households.....	\$21,564	\$21,004	*2.7
RACE OR SPANISH ORIGIN			
White.....	22,370	21,799	*2.6
Black.....	14,799	14,316	*3.4
Spanish origin ¹	17,359	16,730	*3.8
REGION			
Northeast.....	22,001	21,343	*3.1
Midwest.....	20,865	20,588	**1.3
South.....	20,951	20,418	*2.6
West.....	23,038	22,169	*3.9
TYPE OF FAMILY HOUSEHOLD			
Married couples with children.....	26,839	25,918	*3.6
Married couples without children.....	26,454	25,706	*2.9
Female householder, no husband present, with related children.....	12,242	11,799	*3.8
AGE OF HOUSEHOLDER			
Under 65 years.....	23,104	22,509	*2.6
65 years and over.....	15,745	15,311	*2.8

*Significant at the 95-percent confidence level.

**Significant at the 90-percent confidence level.

^r Revised.

¹Persons of Spanish origin may be of any race.

\$513 billion in 1984. This decrease in income available is illustrated in tables B and C by comparisons of the distribution of household income before and after taxes. Following the payment of taxes, the number of households with incomes of \$50,000 or more fell from about 11.1 million to 4.4 million. In contrast, the number of households with incomes less than \$15,000 increased from 28.9 million before taxes to 34.5 million after taxes.

TAXES AND THE POVERTY POPULATION

In 1984, about 64 percent of households with incomes below the poverty level paid one or more of the four taxes covered in this study. (See table D.) The taxes paid by poverty households amounted to about 7 percent of their before-tax money incomes. The payment of taxes reduced the mean income of poverty households from \$4,700 before taxes to \$4,420 after taxes.

The most common type of tax paid by households below the poverty level was FICA payroll taxes: 44 percent paid this type of tax in 1984. Nine percent of all poverty households paid Federal income taxes in 1984, and 15 percent paid State income taxes. One-third of the 11.1 million poverty households paid property taxes on their homes in 1984. There were increases between 1983 and 1984 in the percentages of households paying Federal and State income taxes. The

percentage of poverty households paying FICA payroll and property taxes did not change significantly.

DISTRIBUTION OF TAXES AND TAXES PAID

Ninety-two percent of U.S. households paid one or more of the taxes covered in this study in 1984 (table E). This proportion showed a slight increase from 1983. In 1984, about 77 percent of all households paid Federal income taxes, 64 percent paid State income taxes, 75 percent paid FICA payroll taxes, and 61 percent paid property taxes on their own homes. There were increases in the proportions of households paying Federal and State income taxes between 1983 and 1984. The proportions of households paying FICA payroll and property taxes showed no statistically significant change.

The mean amount of taxes paid in 1984 (\$6,400) was about \$200 higher than in 1983, after adjustment for inflation. Mean Federal income taxes (\$4,330) did not change significantly between 1983 and 1984. State income taxes (\$1,190) and FICA payroll taxes (\$1,700) were both higher in 1984 than in 1983.

The proportion of before-tax income paid in taxes averaged about 22 percent in 1984 for households paying at least one of the four types of taxes. The average for households paying Federal income taxes was about 13 percent, compared with only about 4 percent for State income taxes. Among house-

Table B. Number and Percentage of Households, by Before- and After-Tax Income: 1984

(Numbers in thousands)

Household income	Before taxes		After taxes	
	Number	Percent distribution	Number	Percent distribution
Total.....	86,789	100.0	86,789	100.0
Under \$5,000.....	6,884	7.9	7,672	8.8
\$5,000 to \$7,499.....	6,185	7.1	6,832	7.9
\$7,500 to \$9,999.....	5,287	6.1	6,590	7.6
\$10,000 to \$12,499.....	5,578	6.4	6,726	7.7
\$12,500 to \$14,999.....	4,979	5.7	6,636	7.6
\$15,000 to \$17,499.....	5,269	6.1	6,369	7.3
\$17,500 to \$19,999.....	4,603	5.3	6,235	7.2
\$20,000 to \$22,499.....	4,772	5.5	5,670	6.5
\$22,500 to \$24,999.....	4,240	4.9	5,108	5.9
\$25,000 to \$27,499.....	4,422	5.1	4,594	5.3
\$27,500 to \$29,999.....	3,599	4.1	4,122	4.7
\$30,000 to \$32,499.....	3,702	4.3	3,393	3.9
\$32,500 to \$34,999.....	2,941	3.4	2,961	3.4
\$35,000 to \$37,499.....	2,998	3.5	2,470	2.8
\$37,500 to \$39,999.....	2,432	2.8	1,992	2.3
\$40,000 to \$44,999.....	4,472	5.2	3,077	3.5
\$45,000 to \$49,999.....	3,346	3.9	1,908	2.2
\$50,000 and over.....	11,080	12.8	4,432	5.1
Median income.....	\$22,415	(X)	\$18,530	(X)
Mean income.....	\$27,464	(X)	\$21,564	(X)
Income per household member.....	\$10,207	(X)	\$8,015	(X)
Index of income concentration.....	.406	(X)	.377	(X)

X Not applicable.

holds paying FICA payroll taxes, the average amount paid was about 5 percent of the average before-tax income. Property taxes accounted for about 2 percent of the before-tax income of households paying this tax.

Fifty-seven percent of the \$513 billion in taxes paid in 1984 were Federal income taxes. FICA payroll taxes accounted for another 21 percent of the total tax. State taxes and homeowner property taxes made up 13 and 8 percent of the total, respectively.

The after-tax income data also provide information on the average amount of taxes paid and the percentage of income paid in taxes for households at different positions along the income distribution. The percentage of average income paid in taxes, as shown in table F, gives a good approximation of the effective average tax rates by income interval. Overall, average tax rates showed no significant change between 1983 and 1984. The 1984 tax rates ranged from 10 percent for households with incomes under \$10,000 to 28 percent for

Table C. Percent Share of Aggregate Income Received by Each Fifth of Households Before and After Taxes: 1984

Fifth	Before taxes		After taxes	
	Lower limit	Percent share of aggregate income	Lower limit	Percent share of aggregate income
Lowest fifth.....	(X)	4.0	(X)	4.7
Second fifth.....	9,527	9.8	8,581	11.0
Third fifth.....	17,788	16.4	15,100	17.2
Fourth fifth.....	27,407	24.6	22,172	24.8
Highest fifth.....	41,509	45.3	32,073	42.3

X Not applicable.

Table D. Comparison of Households Below the Poverty Level Paying Taxes: 1984 and 1983

(Numbers in thousands)

Characteristic	1984	1983 ^r	Difference, 1984-83
Number below the poverty level ¹	11,124	11,675	*-551
Percent of before-tax money income paid in taxes.....	7.3	6.7	0.6
Percent paying—			
One or more taxes.....	63.7	63.6	0.1
Federal income taxes.....	8.9	7.8	*1.1
State income taxes.....	14.7	13.5	*1.2
FICA payroll taxes.....	43.9	44.4	-0.5
Property taxes on their own home.....	32.7	33.3	-0.6

*Significant at the 95-percent confidence level.

^r Revised¹These poverty figures differ slightly from those previously published. For further details, see appendix B.

households with incomes of \$50,000 or more. Households in each of the income categories above \$20,000 experienced statistically significant declines in the percentage of income paid in taxes.²

LIMITATIONS ON THE ESTIMATES OF AFTER-TAX INCOME

The estimates of after-tax income shown in this report were derived by simulating the amount of taxes paid by sample households on the March Current Population Survey (CPS) data file. The tax simulation procedures were based on a "statistical" combination of data from the Internal Revenue Service (IRS), summary of State individual income tax regulations, data on the characteristics of persons paying FICA payroll taxes from the Social Security Administration, property tax information from the Annual Housing Survey (AHS), and the March CPS microdata file. In order to combine these data sets in the estimation process, important assumptions were made that may have affected the after-tax income estimates. In addition, the general sampling and nonsampling errors associated with survey data, especially the underreporting of income, must always be kept in mind. Following is a brief discussion of some of the more important limitations on the estimates and the estimation process. The first limitation that should be mentioned is the difference between CPS and IRS income concepts. One phase of the tax estimation process is the calculation of adjusted gross income (AGI) based on the CPS income. The CPS excludes capital gains (or losses) while AGI for tax purposes includes income from this source. Amounts of capital gains were simulated for the CPS in the tax estimation procedure. (See details in appendix A of this report.) The computation of AGI on Federal individual income

tax returns allows "adjustments" and various exclusions from total income. These include Individual Retirement Accounts, moving expenses, disability income exclusion, alimony paid, and employee business expenses. A simulation of the Individual Retirement Accounts was made using IRS statistics and data reported in the May 1983 CPS supplement. In addition, deductions were simulated for married-couple tax-filing units in which both spouses had earnings. Simulations for the other adjustments were not made. Had these adjustments been simulated, the estimated AGI levels from the CPS would have been lower resulting in slightly higher after-tax incomes. While, the overall CPS-estimated AGI was about the same as the IRS figure for 1984, the CPS and IRS amounts differ considerably by income type as discussed later.

Second, an initial step in the tax simulation process is the formation of tax filing units using the survey information on household relationship, marital status, and dependency rules based on income. The CPS records this information for each "permanent" household member as of the time of interview in March. The simulation of tax filing units does not, therefore, account for differences in household composition that may have existed during the year for which taxes were simulated. Because of the CPS household definition, it was also not possible to simulate dependents living outside the household. The exact effect of these limitations is difficult to estimate since some simulated tax units will have too few dependents (exemptions) and some will have too many. It seems likely that, overall, too few exemptions would be simulated. This situation probably results in a slight underestimate of after-tax income levels because all exemptions have not been accounted for.

The combination of IRS tax return statistics with the March CPS income data may have also affected the final estimates to a small degree because the IRS returns include units which are not contained in the CPS universe. These include 1) prior year delinquent returns, 2) returns of Armed Forces members living overseas or on base *without families*, and 3) returns of decedents.

²There was some evidence of a decline in the tax rate of households in the "\$20,000 to \$24,999" group.

Table E. Comparison of Households Paying Taxes, by Type of Tax: 1984 and 1983

(In 1984 dollars)

Type of tax	1984	1983 ^F	Difference, 1984-83
PERCENTAGE OF HOUSEHOLDS PAYING SPECIFIED TAX			
One or more taxes.....	92.4	92.1	*0.3
Federal income taxes.....	77.3	75.8	*1.5
State income taxes.....	64.2	63.1	*1.1
FICA payroll taxes.....	74.5	74.2	0.3
Property taxes on own home.....	60.7	60.7	-
MEAN AMOUNT OF TAXES PAID			
One or more taxes.....	\$6,398	\$6,203	*\$195
Federal income taxes.....	4,326	4,302	24
State income taxes.....	1,194	1,130	*64
FICA payroll taxes.....	1,699	1,625	*74
Property taxes on own home ^I	774	768	6
MEAN AMOUNT OF TAXES PAID AS A PERCENT OF MEAN TOTAL MONEY INCOME			
One or more taxes.....	21.9	21.8	0.1
Federal income taxes.....	13.0	13.1	-0.1
State income taxes.....	3.6	3.5	*0.1
FICA payroll taxes.....	5.3	5.2	*0.1
Property taxes on own home ^I	2.4	2.4	-
Total amount of taxes (billions).....	\$513.2	\$487.1	*\$26.1
PERCENTAGE OF TAXES PAID BY TYPE OF TAX			
One or more taxes.....	100.0	100.0	(X)
Federal income taxes.....	56.5	57.1	-0.6
State income taxes.....	13.0	12.5	*0.5
FICA payroll taxes.....	21.4	21.1	0.3
Property taxes on own home ^I	7.9	8.2	-0.3
MEAN INCOME OF HOUSEHOLDS PAYING TAXES BY TYPE OF TAX			
One or more taxes.....	\$29,245	\$28,509	(X)
Federal income taxes.....	33,397	32,851	(X)
State income taxes.....	32,944	32,521	(X)
FICA payroll taxes.....	31,770	31,020	(X)
Property taxes on own home ^I	32,709	31,984	(X)

*Significant at the 95-percent confidence level.

X Not applicable.

^I Revised

^I Estimates of property taxes for 1984 and 1983 are not directly comparable because of differences in the methods of computation. See Appendix A for details, as well as a discussion of differences between simulated property tax amounts and those reported on the Annual Housing Survey (AHS).

The procedures for simulating Federal and State individual income taxes tend to underestimate the actual variation in taxes paid by AGI level and, therefore, may tend to underestimate the variation in after-tax incomes. This occurs because the simulation procedures used, in some cases, averages within AGI level to assign statuses and amounts to CPS tax filing units. For example, the amount of deductions for units assigned itemizing status were simulated using a matrix showing the IRS ratio of itemized deductions to AGI for all tax units by AGI interval, type of return, number of dependents, and presence of a home mortgage. The true variation in deductions was not simulated since all units within a specified matrix cell were assigned the same proportion of their AGI as deductions. The net effect of this aspect of the

simulation procedure on the final after-tax income estimates is not known.

Comparisons of the distribution of AGI derived from the March CPS with that based directly on tax returns indicate significant differences and year-to-year variation in these differences. These differences for 1984 can be examined in table A-4 of appendix A. Year-to-year variations can be examined by referring to similar tables in previous reports. Of note is the change in the relationship between simulated and IRS data for the "\$75,000 and over" category. In 1983, the simulated estimate for number of taxable returns in this AGI interval was 6 percent higher than the IRS figure. For 1984 the simulated number is 13 percent higher. The reasons for the CPS overestimate of taxable returns in this interval are

Table F. Taxes Paid as a Percent of Total Money Income, for Households Paying Taxes: 1984 and 1983

Before-tax money income	1984	1983 ^r	Percent change
Total.....	21.9	21.8	0.5
Under \$10,000.....	9.8	9.3	5.4
\$10,000 to \$14,999.....	11.6	11.5	0.9
\$15,000 to \$19,999.....	14.5	14.5	-
\$20,000 to \$24,999.....	17.2	17.3	** -0.6
\$25,000 to \$29,999.....	18.9	19.2	* -1.6
\$30,000 to \$34,999.....	20.4	21.0	* -2.9
\$35,000 to \$39,999.....	21.7	22.2	* -2.3
\$40,000 to \$44,999.....	22.7	23.1	* -1.7
\$45,000 to \$49,999.....	23.6	24.1	* -2.1
\$50,000 and over.....	28.1	29.0	* -3.1

*Significant at the 95-percent confidence level.

**Significant at the 90-percent confidence level.

^r Revised.

not clear, although the fact that the simulation does not account for most adjustments to income certainly is a factor. Had the CPS simulation allowed for adjustments such as business and moving expenses, the CPS and IRS estimates in this AGI interval would be more comparable.

Finally, another important limitation is the underreporting of money income in the survey. This is a common problem encountered in household surveys that attempt to collect income data. Underreporting results in a downward bias in the estimates of income from the March CPS. While income underreporting is a serious problem in household surveys such

as the March CPS, its effect on measures of year-to-year change in levels of income and poverty is much less important because year-to-year variations in underreporting are relatively small. Estimates of underreporting are contained in appendix D.

REVISED SURVEY PROCEDURES

The 1983 income estimates in this report differ in two ways from those previously published. The basis for the first difference is a revision to the CPS survey weighting procedures. In previous years' reports the estimation procedures used in the CPS involved the inflation of weighted sample results to independent estimates of the noninstitutional population by age, sex, and race. There was, therefore, no specific control of the survey estimates for the Spanish population. During the last several years, the Bureau of the Census has developed independent population controls for the Spanish population by sex and detailed age groups and revised weighting procedures to incorporate these new controls. The 1983 and 1984 estimates in this report reflect these revised procedures. A second difference between the 1983 income estimates in this report and those previously published resulted from a change in the imputation system. A modification in the procedures used to impute interest income to nonrespondents was incorporated into the March 1985 processing system. The 1983 estimates in this report have been revised to reflect the changes in the way 1984 interest income was imputed.

For further details concerning both of these revisions, see the section of the text, "Revised Survey Procedures," Series P-60, No. 151.

Table 1. All Households, Aggregate Income, Mean Income, Income per Household Member (Before and After Taxes), and Number of Persons in Households, by Before-Tax Money Income Levels and Selected Characteristics: 1984—Con.

(Households as of March 1985. For meaning of symbols, see text)

Before-tax money income level and characteristic	All households		Before taxes				After taxes				Total number of persons in households (thous.)		
	Number (thous.)	Percent distribution	Aggregate income		Mean income		Income per household member (dol.)	Aggregate income		Mean income			
			Amount (bil. of dol.)	Percent distribution	Value (dol.)	Standard error (dol.)		Amount (bil. of dol.)	Percent distribution	Value (dol.)		Standard error (dol.)	
RACE AND SPANISH ORIGIN OF HOUSEHOLDER—CON.													
Spanish Origin¹													
Total	4 883	100.0	103.2	100.0	21 129	389	6 147	84.8	100.0	17 359	285	5 050	16 786
Under \$2,500	192	3.9	.2	.2	917	143	356	.2	.2	813	152	315	494
\$2,500 to \$4,999	415	8.5	1.6	1.6	3 861	52	1 546	1.6	1.9	3 780	55	1 514	1 037
\$5,000 to \$7,499	452	9.3	2.8	2.7	6 223	51	2 159	2.7	3.2	6 031	50	2 092	1 304
\$7,500 to \$9,999	391	8.0	3.4	3.3	8 671	57	2 724	3.2	3.7	8 107	68	2 546	1 245
\$10,000 to \$12,499	380	7.8	4.2	4.1	11 158	63	3 458	3.8	4.5	10 077	76	3 123	1 464
\$12,500 to \$14,999	342	7.0	4.7	4.5	13 683	60	4 021	4.2	4.9	12 136	88	3 567	1 184
\$15,000 to \$17,499	338	6.9	5.4	5.2	16 018	64	4 720	4.7	5.5	13 886	99	4 092	1 147
\$17,500 to \$19,999	233	4.8	4.3	4.2	18 620	77	5 140	3.7	4.4	15 966	138	4 407	843
\$20,000 to \$22,499	311	6.4	6.6	6.4	21 134	68	5 692	5.6	6.6	17 929	116	4 829	1 156
\$22,500 to \$24,999	247	5.1	5.9	5.7	23 704	69	6 552	4.8	5.8	19 767	151	5 484	895
\$25,000 to \$27,499	241	4.9	6.3	6.1	26 103	77	7 371	5.2	6.1	21 384	150	6 038	855
\$27,500 to \$29,999	190	3.9	5.4	5.3	28 666	77	7 469	4.5	5.3	23 534	178	6 132	729
\$30,000 to \$32,499	194	4.0	6.0	5.8	31 046	93	8 041	4.9	5.8	25 366	206	6 570	749
\$32,500 to \$34,999	123	2.5	4.1	4.0	33 714	100	7 857	3.4	4.0	27 349	242	6 454	519
\$35,000 to \$37,499	119	2.4	4.3	4.2	36 168	109	8 686	3.5	4.1	29 061	273	6 980	495
\$37,500 to \$39,999	115	2.4	4.4	4.3	38 546	92	9 648	3.6	4.2	30 928	290	7 742	460
\$40,000 to \$44,999	191	3.9	8.1	7.8	42 107	165	10 447	6.4	7.5	33 364	288	8 278	771
\$45,000 to \$49,999	120	2.5	5.7	5.5	47 423	205	12 277	4.4	5.2	36 985	359	9 575	464
\$50,000 to \$59,999	121	2.5	6.6	6.3	54 124	384	11 967	5.0	6.0	41 694	513	9 219	547
\$60,000 to \$74,999	98	2.0	6.4	6.2	65 400	639	16 544	4.8	5.6	48 796	640	12 344	386
\$75,000 and over	69	1.4	6.7	6.5	(B)	(B)	(B)	4.7	5.6	(B)	(B)	(B)	299
Median income	16 992	(X)	(X)	(X)	(X)	(X)	(X)	(X)	(X)	(X)	(X)	(X)	(X)
Standard error	402	(X)	(X)	(X)	(X)	(X)	(X)	(X)	(X)	(X)	(X)	(X)	(X)
REGION													
Northeast													
Total	18 348	100.0	525.6	100.0	28 645	227	10 686	403.7	100.0	22 001	153	8 192	49 276
Under \$2,500	381	2.1	.3	.1	734	124	403	.2	—	427	138	235	693
\$2,500 to \$4,999	1 127	6.1	4.5	.9	4 029	26	2 276	4.3	1.1	3 813	34	2 154	1 995
\$5,000 to \$7,499	1 261	7.4	8.4	1.6	6 155	25	3 228	7.9	2.0	5 784	31	3 034	2 595
\$7,500 to \$9,999	1 049	5.7	9.1	1.7	8 695	29	4 022	6.3	2.1	7 895	44	3 652	2 267
\$10,000 to \$12,499	1 079	5.9	12.1	2.3	11 240	30	5 176	10.8	2.7	10 039	44	4 623	2 343
\$12,500 to \$14,999	986	5.4	13.5	2.6	13 664	30	6 351	11.7	2.9	11 880	53	5 522	2 121
\$15,000 to \$17,499	1 027	5.6	16.6	3.2	16 144	31	6 661	14.1	3.5	13 701	55	5 653	2 489
\$17,500 to \$19,999	895	4.9	16.7	3.2	18 635	30	7 654	14.0	3.5	15 682	69	6 442	2 179
\$20,000 to \$22,499	931	5.1	19.7	3.7	21 138	33	8 136	16.1	4.0	17 276	72	6 650	2 418
\$22,500 to \$24,999	806	4.4	19.1	3.6	23 690	32	8 602	15.5	3.8	19 172	79	6 961	2 220
\$25,000 to \$27,499	891	4.9	23.3	4.4	26 168	34	9 016	18.6	4.6	20 637	77	7 179	2 587
\$27,500 to \$29,999	788	4.3	22.6	4.3	28 660	33	10 021	18.0	4.5	22 869	85	7 997	2 254
\$30,000 to \$32,499	727	4.0	22.6	4.3	31 125	38	10 694	17.6	4.4	24 278	92	8 341	2 114
\$32,500 to \$34,999	607	3.3	20.5	3.9	33 694	38	10 669	16.1	4.0	26 445	107	8 374	1 917
\$35,000 to \$37,499	667	3.6	24.1	4.8	36 137	39	11 269	18.5	4.6	27 793	104	8 667	2 140
\$37,500 to \$39,999	535	2.9	20.7	3.9	38 675	40	12 314	15.9	3.9	29 804	117	9 490	1 679
\$40,000 to \$44,999	1 031	5.6	43.5	8.3	42 206	60	13 026	33.2	8.2	32 165	102	9 927	3 341
\$45,000 to \$49,999	800	4.4	37.7	7.2	47 134	66	14 715	28.3	7.0	35 374	125	11 044	2 561
\$50,000 to \$59,999	1 025	5.6	55.5	10.6	54 159	117	15 664	41.0	10.1	39 983	139	11 564	3 543
\$60,000 to \$74,999	857	4.7	56.5	10.8	65 957	184	18 494	40.7	10.1	47 454	208	13 306	3 056
\$75,000 and over	779	4.2	78.6	15.0	100 948	1 367	28 455	53.0	13.1	68 070	700	19 187	2 764
Median income	23 550	(X)	(X)	(X)	(X)	(X)	(X)	(X)	(X)	(X)	(X)	(X)	(X)
Standard error	274	(X)	(X)	(X)	(X)	(X)	(X)	(X)	(X)	(X)	(X)	(X)	(X)
Midwest													
Total	21 697	100.0	577.4	100.0	26 612	188	9 856	452.7	100.0	20 865	131	7 727	58 587
Under \$2,500	565	2.6	—	—	28	168	13	—	—	—273	175	—125	1 233
\$2,500 to \$4,999	1 096	5.1	4.3	.7	3 920	27	2 001	4.1	.9	3 731	31	1 905	2 147
\$5,000 to \$7,499	1 644	7.6	10.2	1.8	6 187	24	3 105	9.5	2.1	5 807	28	2 915	3 276
\$7,500 to \$9,999	1 326	6.1	11.8	2.0	8 747	26	4 121	10.7	2.4	8 096	33	3 814	2 814
\$10,000 to \$12,499	1 296	6.0	14.5	2.5	11 150	28	4 897	12.9	2.9	9 978	40	4 382	2 952
\$12,500 to \$14,999	1 198	5.5	16.5	2.9	13 776	26	6 095	14.5	3.2	12 148	49	5 374	2 707
\$15,000 to \$17,499	1 279	5.9	20.7	3.6	16 213	28	6 917	17.8	3.9	13 887	54	5 925	2 998
\$17,500 to \$19,999	1 210	5.6	22.6	3.9	18 674	27	7 614	19.1	4.2	15 818	59	6 450	2 968
\$20,000 to \$22,499	1 196	5.5	25.2	4.4	21 093	29	8 010	20.8	4.6	17 390	66	6 604	3 150
\$22,500 to \$24,999	1 128	5.2	26.8	4.6	23 729	28	8 378	21.9	4.8	19 393	64	6 847	3 194
\$25,000 to \$27,499	1 152	5.3	30.1	5.2	26 154	30	8 797	24.2	5.4	21 043	66	7 078	3 424
\$27,500 to \$29,999	988	4.6	28.3	4.9	28 656	30	9 451	22.7	5.0	22 993	78	7 583	2 995
\$30,000 to \$32,499	1 014	4.7	31.6	5.5	31 147	32	10 402	25.0	5.5	24 628	81	8 225	3 036
\$32,500 to \$34,999	772	3.6	26.0	4.5	33 697	33	11 125	20.3	4.5	26 363	93	8 703	2 338
\$35,000 to \$37,499	794	3.7	28.7	5.0	36 191	36	11 705	22.4	4.9	28 209	89	9 123	2 441
\$37,500 to \$39,999	676	3.1	26.2	4.5	38 681	34	11 668	20.3	4.5	29 959	101	9 037	2 241
\$40,000 to \$44,999	1 132	5.2	47.9	8.3	42 335	57	13 021	36.6	8.1	32 299	98	9 934	3 680
\$45,000 to \$49,999	803	3.7	37.9	6.6	47 168	68	13 843	28.8	6.4	35 810	117	10 509	2 737
\$50,000 to \$59,999	1 066	4.9	57.9	10.0	54 346	119	16 425	43.3	9.6	40 629	127	12 280	3 526
\$60,000 to \$74,999	750	3.5	49.5	8.6	66 055	211	19 381	36.2	8.0	48 227	198	14 150	2 556
\$75,000 and over	613	2.8	60.9	10.5	99 245	1 544	28 193	41.7	9.2	68 032	909	19 326	2 159
Median income	22 586	(X)	(X)	(X)	(X)	(X)	(X)	(X)	(X)	(X)	(X)	(X)	(X)
Standard error	213	(X)	(X)	(X)	(X)	(X)	(X)	(X)	(X)	(X)	(X)	(X)	(X)

¹Persons of Spanish origin may be of any race.

Table 2. All Households, Aggregate income, Mean income, Income per Household Member (After Taxes), and Number of Persons in Households, by After-Tax Money Income Levels and Selected Characteristics: 1984—Con.

(Households as of March 1985. For meaning of symbols, see text)

After-tax money income level and characteristic	All households		Aggregate income		Mean income		Income per household member (dollars)	Total number of persons in households (thousands)
	Number (thousands)	Percent distribution	Amount (billions of dollars)	Percent distribution	Value (dollars)	Standard error (dollars)		
RACE AND SPANISH ORIGIN OF HOUSEHOLDER—CON.								
Spanish Origin¹								
Total	4 883	100.0	84.8	100.0	17 359	285	5 050	16 786
Under \$2,500	197	4.0	.2	.2	843	150	7 325	510
\$2,500 to \$4,999	428	8.8	1.6	1.9	3 832	52	1 558	1 053
\$5,000 to \$7,499	521	10.7	3.2	3.8	6 237	47	2 165	1 501
\$7,500 to \$9,999	483	9.9	4.2	5.0	8 734	50	2 779	1 520
\$10,000 to \$12,499	466	9.6	5.3	6.2	11 269	52	3 590	1 464
\$12,500 to \$14,999	412	8.4	5.6	6.7	13 709	55	3 839	1 471
\$15,000 to \$17,499	340	7.0	5.5	6.5	16 228	62	4 744	1 162
\$17,500 to \$19,999	369	7.6	6.9	8.2	18 750	59	4 972	1 392
\$20,000 to \$22,499	325	6.7	6.9	8.1	21 204	60	6 009	1 148
\$22,500 to \$24,999	251	5.1	6.0	7.0	23 753	75	5 994	995
\$25,000 to \$27,499	205	4.2	5.4	6.3	26 143	75	6 403	839
\$27,500 to \$29,999	174	3.6	5.0	5.9	28 701	78	7 150	700
\$30,000 to \$32,499	158	3.2	4.9	5.8	31 154	87	7 617	645
\$32,500 to \$34,999	117	2.4	4.0	4.7	33 768	107	8 205	482
\$35,000 to \$37,499	107	2.2	3.9	4.6	36 183	106	8 431	459
\$37,500 to \$39,999	65	1.3	2.5	3.0	(B)	(B)	(B)	260
\$40,000 to \$44,999	94	1.9	4.0	4.7	42 428	232	9 339	428
\$45,000 to \$49,999	62	1.3	2.9	3.5	(B)	(B)	(B)	274
\$50,000 to \$59,999	62	1.3	3.4	4.0	(B)	(B)	(B)	271
\$60,000 to \$74,999	29	.6	1.9	2.2	(B)	(B)	(B)	153
\$75,000 and over	16	.3	1.5	1.7	(B)	(B)	(B)	60
Median income	14 597	(X)	(X)	(X)	(X)	(X)	(X)	(X)
Standard error	330	(X)	(X)	(X)	(X)	(X)	(X)	(X)
REGION								
Northeast								
Total	18 348	100.0	403.7	100.0	22 001	153	8 192	49 276
Under \$2,500	439	2.4	.3	.1	576	124	318	794
\$2,500 to \$4,999	1 297	7.1	5.2	1.3	4 015	25	2 325	2 240
\$5,000 to \$7,499	1 466	8.0	9.1	2.3	6 201	25	3 211	2 832
\$7,500 to \$9,999	1 303	7.1	11.4	2.8	8 773	26	4 037	2 832
\$10,000 to \$12,499	1 366	7.4	15.4	3.8	11 272	26	5 279	2 917
\$12,500 to \$14,999	1 372	7.5	18.9	4.7	13 743	26	5 779	3 263
\$15,000 to \$17,499	1 227	6.7	20.0	4.9	16 271	27	6 714	2 973
\$17,500 to \$19,999	1 200	6.5	22.5	5.6	18 765	28	6 817	3 302
\$20,000 to \$22,499	1 180	6.4	25.1	6.2	21 257	27	7 331	3 421
\$22,500 to \$24,999	1 057	5.8	25.1	6.2	23 732	30	8 079	3 106
\$25,000 to \$27,499	939	5.1	24.6	6.1	26 241	31	8 440	2 918
\$27,500 to \$29,999	873	4.8	25.1	6.2	28 739	31	9 054	2 770
\$30,000 to \$32,499	748	4.1	23.4	5.8	31 207	34	10 175	2 295
\$32,500 to \$34,999	718	3.9	24.2	6.0	33 684	34	10 402	2 324
\$35,000 to \$37,499	568	3.1	20.5	5.1	36 181	39	10 985	1 870
\$37,500 to \$39,999	430	2.3	16.6	4.1	38 713	45	11 131	1 494
\$40,000 to \$44,999	730	4.0	30.8	7.6	42 256	70	12 128	2 543
\$45,000 to \$49,999	432	2.4	20.5	5.1	47 469	91	12 432	1 650
\$50,000 to \$59,999	479	2.6	26.0	6.4	54 262	171	14 845	1 751
\$60,000 to \$74,999	348	1.9	23.2	5.7	66 734	293	17 851	1 299
\$75,000 and over	177	1.0	15.9	3.9	89 434	1 484	23 226	683
Median income	18 965	(X)	(X)	(X)	(X)	(X)	(X)	(X)
Standard error	184	(X)	(X)	(X)	(X)	(X)	(X)	(X)
Midwest								
Total	21 697	100.0	452.7	100.0	20 865	131	7 727	58 587
Under \$2,500	636	2.9	—	—	—22	160	—10	1 374
\$2,500 to \$4,999	1 278	5.9	5.1	1.1	3 961	25	2 016	2 512
\$5,000 to \$7,499	1 753	8.1	10.9	2.4	6 220	23	3 145	3 467
\$7,500 to \$9,999	1 643	7.6	14.4	3.2	8 766	23	4 054	3 552
\$10,000 to \$12,499	1 569	7.2	17.6	3.9	11 246	25	5 103	3 458
\$12,500 to \$14,999	1 718	7.9	23.7	5.2	13 810	23	6 016	3 945
\$15,000 to \$17,499	1 605	7.4	26.0	5.8	16 231	24	6 428	4 051
\$17,500 to \$19,999	1 627	7.5	30.5	6.7	18 744	24	6 749	4 519
\$20,000 to \$22,499	1 525	7.0	32.3	7.1	21 203	25	7 228	4 474
\$22,500 to \$24,999	1 399	6.4	33.2	7.3	23 754	24	7 775	4 275
\$25,000 to \$27,499	1 201	5.5	31.4	6.9	26 161	27	8 656	3 629
\$27,500 to \$29,999	1 115	5.1	32.1	7.1	28 778	29	9 045	3 547
\$30,000 to \$32,499	849	3.9	26.5	5.9	31 194	33	9 550	2 774
\$32,500 to \$34,999	716	3.3	24.1	5.3	33 706	36	10 139	2 380
\$35,000 to \$37,499	592	2.7	21.4	4.7	36 193	40	10 779	1 987
\$37,500 to \$39,999	477	2.2	18.5	4.1	38 712	41	11 406	1 620
\$40,000 to \$44,999	701	3.2	29.7	6.6	42 342	73	12 599	2 355
\$45,000 to \$49,999	458	2.1	21.7	4.8	47 290	93	13 577	1 597
\$50,000 to \$59,999	434	2.0	23.6	5.2	54 390	184	14 860	1 588
\$60,000 to \$74,999	273	1.3	18.2	4.0	66 488	329	18 323	992
\$75,000 and over	127	.6	11.7	2.6	92 456	2 579	23 986	488
Median income	18 493	(X)	(X)	(X)	(X)	(X)	(X)	(X)
Standard error	150	(X)	(X)	(X)	(X)	(X)	(X)	(X)

¹Persons of Spanish origin may be of any race.

Table 3. Mean Income of Households and Income per Household Member (Before and After Taxes), by Selected Characteristics: 1984 and 1983

(In 1984 dollars. Households as of March of the following year. An asterisk (*) preceding percent change indicates a statistically significant change at the 95-percent confidence level. For meaning of symbols, see text)

Characteristic	Mean income						Income per household member					
	Before taxes			After taxes			Before taxes			After taxes		
	1984 (dol.)	1983 ¹ (dol.)	Percent change	1984 (dol.)	1983 ¹ (dol.)	Percent change	1984 (dol.)	1983 ¹ (dol.)	Percent change	1984 (dol.)	1983 ¹ (dol.)	Percent change
All households	27 464	26 699	*2.9	21 564	21 004	*2.7	10 207	9 839	*3.7	8 015	7 740	*3.6
RACE AND SPANISH ORIGIN OF HOUSEHOLDER												
White	28 597	27 814	*2.8	22 370	21 799	*2.6	10 826	10 437	*3.7	8 469	8 180	*3.5
Black	17 966	17 321	*3.7	14 799	14 316	*3.4	6 071	5 800	4.7	5 001	4 794	4.3
Spanish origin ¹	21 129	20 169	*4.8	17 359	16 730	*3.8	6 147	5 743	*7.0	5 050	4 765	*6.0
REGION												
Northeast	28 645	27 675	*3.5	22 001	21 343	*3.1	10 666	10 269	*3.9	8 192	7 919	*3.4
Midwest	26 612	26 328	1.1	20 865	20 588	1.3	9 856	9 706	1.5	7 727	7 591	1.8
South	26 203	25 445	*3.0	20 951	20 418	*2.6	9 791	9 320	*5.0	7 829	7 479	*4.7
West	29 450	28 262	*4.2	23 038	22 169	*3.9	10 873	10 439	*4.2	8 505	8 189	*3.9
TYPE OF HOUSEHOLD												
Family households	31 265	30 261	*3.4	24 535	23 788	*3.1	9 595	9 229	*4.0	7 525	7 254	*3.7
Married-couple families:												
With no related children under 18	33 980	32 929	*3.2	26 454	25 706	*2.9	14 253	13 749	*3.7	11 097	10 733	*3.4
With related children under 18	34 487	33 247	*3.7	26 839	25 918	*3.6	8 175	7 847	*4.2	6 362	6 118	*4.0
Female householder, no husband present, with related children under 18	14 180	13 581	*4.4	12 242	11 799	*3.8	4 171	4 001	4.2	3 601	3 476	3.6
All other family households	25 577	24 387	*4.9	20 508	19 642	*4.4	9 263	8 938	3.6	7 428	7 199	3.2
Nonfamily households	17 514	17 207	1.8	13 828	13 588	*1.8	14 512	14 256	1.8	11 458	11 258	1.8
AGE OF HOUSEHOLDER												
15 to 24 years	16 644	16 065	*3.6	13 723	13 355	2.8	7 151	7 038	1.6	5 896	5 851	.8
25 to 29 years	24 509	23 133	*5.9	19 333	18 426	*4.9	9 260	8 573	*8.0	7 304	6 828	*7.0
30 to 34 years	27 729	27 097	*2.3	21 643	21 180	*2.2	9 056	8 758	*3.4	7 069	6 845	*3.3
35 to 39 years	32 273	31 534	*2.3	24 770	24 149	*2.6	9 459	9 154	3.3	7 260	7 010	*3.6
40 to 44 years	34 761	34 424	1.0	26 591	26 289	1.1	9 869	9 551	3.3	7 550	7 294	*3.5
45 to 49 years	36 393	35 413	2.8	27 765	27 032	*2.7	11 042	10 318	*7.0	8 424	7 877	*7.0
50 to 54 years	35 603	36 176	-1.6	27 104	27 345	-0.9	11 881	11 908	-2	9 045	9 001	.5
55 to 59 years	33 366	31 899	*4.6	25 319	24 216	*4.6	12 976	12 478	4.0	9 846	9 473	3.9
60 to 64 years	27 660	26 761	3.4	21 553	20 955	2.9	12 608	12 102	4.2	9 824	9 476	3.7
65 years and over	18 279	17 621	*3.7	15 745	15 311	*2.8	10 316	9 971	*3.5	8 886	8 664	2.6
SIZE OF HOUSEHOLD												
One person	15 327	15 014	2.1	12 141	11 914	*1.9	15 327	15 014	2.1	12 141	11 914	1.9
Two persons	27 873	26 914	*3.6	21 922	21 236	*3.2	13 713	13 262	*3.4	10 785	10 464	*3.1
Three persons	31 983	30 708	*4.2	24 871	23 975	*3.7	10 484	10 081	*4.0	8 153	7 870	*3.6
Four persons	34 891	34 163	*2.1	27 136	26 548	*2.2	8 654	8 489	1.9	6 730	6 596	*2.0
Five persons	35 499	33 837	*4.9	27 975	26 654	*5.0	7 031	6 727	*4.5	5 541	5 298	*4.6
Six persons	33 489	33 120	1.1	26 982	26 618	1.4	5 494	5 451	.8	4 427	4 381	1.1
Seven persons or more	31 132	30 220	3.0	25 907	25 207	2.8	3 935	3 824	2.9	3 274	3 190	2.6
TENURE												
Owner occupied	32 055	31 205	*2.7	24 863	24 228	*2.6	11 262	10 835	*3.9	8 735	8 413	*3.8
Renter occupied, including no cash rent	19 178	18 495	*3.7	15 611	15 135	*3.1	7 958	7 672	*3.7	6 478	6 278	*3.2

¹Persons of Spanish origin may be of any race.

²Revised. For further details, see text.

Table 4. Number of Poverty Households, Mean Household Income (Before and After Taxes), and Percent of Households Paying Specified Taxes: 1984

(Households as of March 1985. For meaning of symbols, see text)

Characteristic	Number ¹ (thousands)	Mean household income		Taxes as a percent of total money income	Percent of households paying—					
		Before taxes (dollars)	After taxes (dollars)		One or more taxes	Federal income taxes	State income taxes	FICA payroll taxes	Federal retirement taxes	Property taxes
Total	11 124	4 696	4 418	7.3	63.7	8.9	14.7	43.9	.8	32.7
RACE AND SPANISH ORIGIN OF HOUSEHOLDER										
White	7 922	4 599	4 293	8.1	66.3	9.5	15.3	44.4	.7	36.5
Black	2 875	4 869	4 677	5.2	56.6	7.1	13.0	41.7	.9	22.9
Spanish origin ²	1 212	5 630	5 409	5.3	55.3	10.7	6.1	48.0	.4	17.3
TYPE OF HOUSEHOLD										
Family households	7 047	5 502	5 181	7.7	69.5	9.1	17.4	55.6	1.0	32.1
Married-couple families:										
With no related children under 18	1 136	4 059	3 611	11.4	79.4	8.7	11.5	39.2	.8	61.6
With related children under 18	2 330	7 050	6 559	9.4	66.9	14.8	24.1	79.1	1.4	37.7
Female householder, no husband present, with related children under 18	2 975	5 029	4 887	4.6	52.3	4.2	13.7	44.3	.8	16.6
All other family households	605	4 578	4 268	7.9	67.8	11.6	20.8	51.4	.7	31.8
Nonfamily households	4 077	3 301	3 100	6.1	53.8	8.7	10.0	23.7	.4	33.6
AGE OF HOUSEHOLDER										
15 to 24 years	1 208	4 113	3 984	5.6	65.9	11.7	19.5	62.9	1.1	8.6
25 to 29 years	1 344	5 044	4 850	6.0	63.5	11.5	19.8	59.3	.6	12.9
30 to 34 years	1 223	5 564	5 285	7.1	67.8	11.1	18.8	62.7	1.5	20.7
35 to 39 years	1 014	5 586	5 191	8.9	72.0	9.9	19.5	61.5	1.2	31.2
40 to 44 years	827	5 341	4 975	8.8	70.0	11.1	18.7	59.1	1.3	34.2
45 to 49 years	630	5 176	4 778	9.1	67.7	14.2	18.6	58.7	.3	36.4
50 to 54 years	668	4 552	4 113	10.8	71.8	13.7	18.9	52.3	1.1	44.6
55 to 59 years	731	3 872	3 486	10.7	68.9	15.8	18.0	42.3	.2	44.4
60 to 64 years	854	4 020	3 718	8.0	58.7	6.0	13.1	25.1	1.1	44.7
65 years and over	2 624	4 203	4 007	4.7	52.9	.9	2.3	7.9	.1	48.5
NUMBER OF EARNERS										
No earners	5 816	3 958	3 805	3.9	33.5	.9	1.6	-	-	32.5
One earner	3 786	5 070	4 733	8.9	95.9	17.2	27.9	89.8	1.2	28.9
Two earners	1 238	6 144	5 623	11.3	89.2	16.6	28.8	97.2	2.5	40.6
Three earners	225	8 254	7 360	13.1	100.0	29.9	41.3	98.8	3.2	49.4
Four earners or more	59	(B)	(B)	(X)	100.0	32.5	53.6	100.0	4.6	69.9

¹The household poverty figures differ slightly from those previously published. For further details, see appendix B.

²Persons of Spanish origin may be of any race.

Table 5. Number and Percent of Households Paying Taxes, by Level of Before-Tax Money Income and Type of Tax: 1984

(Numbers in thousands. Households as of March 1985)

Before-tax money income level	All house- holds	Households paying—											
		One or more taxes		Federal income taxes		State income taxes		FICA payroll taxes		Federal retirement taxes		Property taxes	
		Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Total	86 789	80 209	92.4	67 059	77.3	55 756	64.2	64 696	74.5	3 484	4.0	52 694	60.7
Under \$5,000 ¹	6 884	3 729	54.2	284	4.1	492	7.1	2 028	29.5	30	.4	2 219	32.2
\$5,000 to \$7,499	6 185	4 240	68.5	963	15.8	1 226	19.8	2 360	38.2	46	.8	2 495	40.3
\$7,500 to \$9,999	5 287	4 527	85.6	1 917	36.3	2 076	39.3	2 845	53.8	55	1.0	2 415	45.7
\$10,000 to \$12,499	5 578	5 197	93.2	3 544	63.5	2 926	52.5	3 647	65.4	85	1.5	2 680	48.0
\$12,500 to \$14,999	4 979	4 797	96.3	3 803	76.4	3 002	60.3	3 448	69.3	101	2.0	2 584	51.9
\$15,000 to \$17,499	5 269	5 194	98.6	4 589	87.1	3 570	67.8	3 955	75.1	111	2.1	2 722	51.7
\$17,500 to \$19,999	4 603	4 555	99.0	4 265	92.7	3 412	74.1	3 584	77.9	130	2.8	2 588	56.2
\$20,000 to \$22,499	4 772	4 754	99.6	4 637	97.2	3 698	77.5	3 878	81.3	163	3.4	2 732	57.2
\$22,500 to \$24,999	4 240	4 232	99.8	4 162	98.1	3 341	78.8	3 580	84.4	158	3.7	2 567	60.5
\$25,000 to \$27,499	4 422	4 422	100.0	4 384	99.1	3 463	78.3	3 849	87.0	237	5.3	2 870	64.9
\$27,500 to \$29,999	3 599	3 598	100.0	3 580	99.5	2 986	82.9	3 107	86.3	160	4.4	2 432	67.6
\$30,000 to \$32,499	3 702	3 702	100.0	3 690	99.7	3 046	82.3	3 292	88.9	238	6.4	2 606	70.4
\$32,500 to \$34,999	2 941	2 939	99.9	2 931	99.6	2 413	82.0	2 649	90.1	156	5.3	2 140	72.7
\$35,000 to \$37,499	2 998	2 998	100.0	2 998	100.0	2 442	81.4	2 730	91.1	169	5.6	2 232	74.5
\$37,500 to \$39,999	2 432	2 432	100.0	2 430	99.9	2 042	84.0	2 245	92.3	164	6.8	1 853	76.2
\$40,000 to \$44,999	4 472	4 471	100.0	4 468	99.9	3 698	82.7	4 062	90.8	348	7.8	3 438	76.9
\$45,000 to \$49,999	3 346	3 346	100.0	3 346	100.0	2 766	82.7	3 107	92.9	271	8.1	2 651	79.2
\$50,000 and over	11 077	11 077	100.0	11 070	99.9	9 158	82.7	10 330	93.2	843	7.6	9 472	85.5

¹Includes households with losses.

Table 6. Mean Taxes Paid and Taxes Paid as a Percentage of Mean Before-Tax Income, by Level of Before-Tax Money Income and Type of Tax: 1984

(For meaning of symbols, see text)

Before-tax money income level	One or more taxes		Federal income taxes		State income taxes		FICA payroll taxes		Federal retirement taxes		Property taxes	
	Mean tax (dollars)	Percent	Mean tax (dollars)	Percent	Mean tax (dollars)	Percent	Mean tax (dollars)	Percent	Mean tax (dollars)	Percent	Mean tax (dollars)	Percent
Total	6 398	21.9	4 326	13.0	1 194	3.8	1 699	5.3	1 661	4.3	774	2.4
Under \$5,000 ¹	391	14.4	129	3.4	52	1.6	170	6.2	(B)	(X)	473	16.5
\$5,000 to \$7,499	555	8.9	247	3.9	73	1.1	330	5.3	(B)	(X)	497	8.0
\$7,500 to \$9,999	805	9.2	403	4.6	111	1.3	483	5.3	(B)	(X)	540	6.2
\$10,000 to \$12,499	1 220	10.9	582	5.2	175	1.6	625	5.6	474	4.2	540	4.8
\$12,500 to \$14,999	1 678	12.2	821	6.0	242	1.8	780	5.6	719	5.2	581	4.2
\$15,000 to \$17,499	2 296	14.1	1 114	6.9	330	2.0	935	5.8	802	5.0	661	4.1
\$17,500 to \$19,999	2 770	14.8	1 385	7.3	402	2.2	1 062	5.7	919	4.9	579	3.1
\$20,000 to \$22,499	3 520	16.7	1 702	8.1	506	2.4	1 271	6.0	992	4.7	669	3.3
\$22,500 to \$24,999	4 193	17.7	2 111	8.9	610	2.6	1 382	5.8	1 189	5.0	695	2.9
\$25,000 to \$27,499	4 898	18.7	2 470	9.4	720	2.8	1 553	5.9	1 256	4.8	721	2.8
\$27,500 to \$29,999	5 466	19.1	2 791	9.7	844	2.9	1 653	5.8	1 445	5.1	735	2.6
\$30,000 to \$32,499	6 326	20.3	3 248	10.4	991	3.2	1 852	5.9	1 492	4.8	752	2.4
\$32,500 to \$34,999	6 924	20.6	3 591	10.7	1 086	3.2	1 991	5.9	1 523	4.5	792	2.3
\$35,000 to \$37,499	7 780	21.5	4 107	11.4	1 219	3.4	2 144	5.9	1 761	4.9	844	2.3
\$37,500 to \$39,999	8 509	22.0	4 537	11.7	1 352	3.5	2 270	5.9	1 815	4.7	816	2.1
\$40,000 to \$44,999	9 590	22.7	5 274	12.5	1 568	3.7	2 419	5.7	1 924	4.6	877	2.1
\$45,000 to \$49,999	11 129	23.6	6 298	13.3	1 807	3.8	2 608	5.5	2 081	4.4	943	2.0
\$50,000 and over	20 145	28.1	13 092	18.3	3 421	4.8	3 276	4.6	2 574	3.8	1 147	1.6

¹Includes households with losses.

Table 7. Total Taxes Paid and Percentage of Total Taxes Paid, by Level of Before-Tax Money Income and Type of Tax: 1984

Before-tax money income level	Total taxes paid (bil. of dol.)	Percent of total taxes paid					
		Total	Federal income taxes	State income taxes	FICA payroll taxes	Federal retirement taxes	Property taxes
Total	513.2	100.0	56.5	13.0	21.4	1.1	7.9
Under \$5,000 ¹	1.5	100.0	2.5	1.8	23.7	.2	71.8
\$5,000 to \$7,499	2.4	100.0	10.1	3.8	33.0	.4	52.7
\$7,500 to \$9,999	3.6	100.0	21.2	6.3	36.1	.6	35.6
\$10,000 to \$12,499	6.3	100.0	32.5	8.1	35.9	.6	22.8
\$12,500 to \$14,999	8.0	100.0	38.8	9.0	32.6	.9	18.7
\$15,000 to \$17,499	11.9	100.0	43.1	9.9	31.1	.8	15.1
\$17,500 to \$19,999	12.6	100.0	46.1	10.9	30.2	1.0	11.9
\$20,000 to \$22,499	16.7	100.0	47.2	11.2	29.4	1.0	11.3
\$22,500 to \$24,999	17.7	100.0	49.5	11.5	27.9	1.1	10.1
\$25,000 to \$27,499	21.7	100.0	50.0	11.5	27.6	1.4	9.6
\$27,500 to \$29,999	19.7	100.0	50.8	12.8	26.1	1.2	9.1
\$30,000 to \$32,499	23.4	100.0	51.2	12.9	26.0	1.5	8.4
\$32,500 to \$34,999	20.3	100.0	51.7	12.9	25.9	1.2	8.3
\$35,000 to \$37,499	23.3	100.0	52.8	12.8	25.1	1.3	8.1
\$37,500 to \$39,999	20.7	100.0	53.3	13.3	24.6	1.4	7.3
\$40,000 to \$44,999	42.9	100.0	55.0	13.5	22.9	1.6	7.0
\$45,000 to \$49,999	37.2	100.0	56.8	13.4	21.8	1.5	6.7
\$50,000 and over	223.1	100.0	65.0	14.0	15.2	1.0	4.9

¹Includes households with losses.

Appendix A. Methodology and Procedures

INTRODUCTION

This section describes the methodology and procedures which were developed to estimate taxes paid for the March 1985 CPS microdata files. In all, four types of taxes were simulated: 1) Federal individual income taxes, 2) State individual income taxes, 3) property taxes on owner-occupied housing, and 4) payroll taxes.

Development of the after-tax simulation procedures began with the March CPS annual demographic supplement. This microdata file contains demographic and economic information for approximately 59,000 sample households and the persons living in these households. It includes detailed information on household and family relationship; age; marital status; race and ethnicity; educational attainment; weeks and hours worked during the calendar year; occupation, industry, and class of worker of the job held longest during the calendar year; and income amounts for wages and salary, nonfarm and farm self-employment income, interest, dividends, rental income, estates and trusts, royalties, pension income, unemployment compensation, and sources of nontaxable income as described in appendix B.

The second major element in the simulation system was statistical summaries of individual income tax returns compiled by the Internal Revenue Service. These statistics are made available in the IRS publication series, Statistics of Income (SOI). Some unpublished statistical summaries from the IRS were also used to develop these procedures.

A third element was the 1983 Annual Housing Survey microdata file. This element was used to assign property taxes paid to the March CPS sample households residing in owner-occupied housing.

Finally, in order to estimate proportions of tax filers owning homes and itemizing deductions, tabulations were made from Interview No. 5 (6) of the 1979 Income Survey Development Program.

The system for estimating taxes paid and after-tax income created a modified March CPS microdata file. This file was formed by expanding the March CPS format to include variables relevant to the simulation of taxes paid. The detailed tables contained in this report were derived from this modified March CPS data file.

Federal Income Taxes

Simulation of Federal income taxes required up to four separate operations. First was the formation and classification

of tax filing units using household relationship, marital status, and dependency rules. Second, was the calculation of adjusted gross income for each of those units. Third was the simulation of amount of Federal income taxes paid. Finally, the calculation of earned income tax credits was made, when applicable.

Formation and classification of Federal income tax filing units.

A Federal tax filing "unit" was defined as any individual (or married couple) with either \$400 in self-employment income, \$1,000 in wages or salary, or a total of \$1,000 in interest, dividends, rents and royalties, estates and trusts, or pension income in 1984. These income levels were chosen because they either corresponded to tax laws or helped bring the estimated number of filing units on the CPS in line with 1984 IRS Statistics of Income (SOI) data.

The next step in the formation of Federal tax filing units was the assignment of dependency status. The algorithm for assigning dependency for each tax unit used the following rules:

- All filing primary family householders and spouses were included as dependents on their own tax returns.
- All children under age 15 who were members of the primary family were counted as dependents on the return of the family householder. Children aged 15 and over (except related subfamily members) with a total taxable income of less than \$1,000 were assigned dependency to the tax return of the primary family householder. Children aged 15 and over who were students were assigned dependency to the primary family householder regardless of income level.
- All other primary family members (except related subfamily members) with taxable income of less than \$1,000 were assigned as dependents on the tax return of the primary family householder.
- Related subfamilies having at least one Federal tax filing unit were treated separately in the same manner as primary families. Members of a related subfamily containing no Federal tax filing unit were assigned dependency to the tax return of the primary family householder.
- All unrelated subfamilies were treated in the same manner as primary families.
- Primary and secondary unrelated individuals age 15 and over were treated as dependents only on their own tax returns.

All simulated filing units were classified into one of three return types. Married couples and persons whose marital status was "married, spouse absent in Armed Forces" were assumed to file joint returns. Unmarried family householders with dependents were assumed to file head of household returns. All other persons classified as Federal tax filing units were assumed to file as single individuals.

Computation of adjusted gross income. Adjusted gross income (AGI) for each simulated tax filing unit was calculated by summing the income amounts from all taxable sources and an imputed amount for capital gains. The sources of CPS income included in AGI were wages and salaries, net farm and non-farm self-employment income, net rental and royalty income, dividends, interest, estates and trusts, and income from private and government pensions.

Capital gains were imputed to tax filing units based on data obtained from a Statistics of Income (SOI) public use file and reports summarizing information reported on Federal tax returns. These data provide estimates of the probability that a filing unit in a given matrix cell reported capital gains and the mean amount of capital gains for that cell. The variables in this probability matrix were: level of AGI, type of return, and age of tax filer. A Monte Carlo technique was used to randomly assign capital gains: a random number (between 0 and 1) was generated for each filing unit; if that number was less than or equal to the probability of filing units in that matrix cell reporting capital gains, the mean amount of capital gains, as computed above, was added to that unit's AGI. This procedure does not control on demographic and other characteristics which might affect the allocation of this source of income.

In the calculation of adjusted gross income, a portion of unemployment compensation was also included in AGI if the sum of AGI and unemployment compensation for that tax unit exceeded \$12,000 (\$18,000 for joint returns). In these cases, the lesser of 1) the amount of unemployment compensation or 2) one-half of the difference between the sum of AGI and unemployment compensation and the income limit was included in AGI.

Beginning in 1984, a portion of Social Security income was included in AGI if the sum of AGI and half of the total Social Security amount exceeded \$25,000 (\$32,000 for joint returns). In these cases, the lesser of 1) one-half of the Social Security payments or 2) one-half of the difference between the modified AGI and the income limit was included in AGI.

In 1984, married-couple filing units in which both spouses had earnings were allowed to deduct 10 percent of the earned income of the lesser-earnings spouse (to a maximum of \$3,000). This adjustment is reflected in the 1984 tax model. In addition, payments to Individual Retirement Accounts (IRA's) were simulated for the 1984 tax model. The May 1983 CPS pension supplement was used to estimate probabilities of tax-filing units contributing to IRA's and the average amounts contributed. These probabilities were then used to assign IRA contributions to individual tax-filing units on the

CPS file. The IRA payments were deducted from the total income received by the tax-filing units in order to compute adjusted gross income.

Computation of taxable income and taxes paid. Taxable income was computed by subtracting the estimated allowable deductions from AGI. The first step in this process consisted of predicting which filing units itemized deductions. Homeownership was determined to be the most important variable available from the CPS for assigning itemization status to tax filers. Outlined below is a step-by-step description of the procedures used to assign itemization status.

1. A statistical match was made of the March CPS and Annual Housing Survey (AHS) data files in order to assign a monthly mortgage amount and a property tax amount to each owner-occupied unit on the March CPS file.¹
2. Probabilities of itemizing for homeowner, tax-filing units were computed by size of monthly mortgage payment from the 1979 Income Survey Development Program (ISDP) test panel. Probabilities for renters were computed by AGI level.
3. The probabilities described in step 2 were used to randomly assign itemization status within monthly mortgage (or AGI) intervals using the same Monte Carlo technique used in the assignment of capital gains.
4. The amount of itemized deductions for tax filing units was computed using a matrix showing the ratio of itemized deductions to AGI for all units by AGI interval, type of tax return, number of dependents, and presence of a home mortgage. The ratios of itemized deductions to AGI were computed using a 1980 SOI public use file and 1984 SOI data.

Next, a standard deduction was estimated for each tax filing unit by multiplying the number of exemptions by \$1,000. Taxable income was then estimated by subtracting the itemized and standard deductions from AGI. Tax liability was then computed using the appropriate tax schedule for that simulated return type.

The dependent child care credit was simulated for the 1984 Federal tax model and subtracted from the total tax liability. This credit allows tax filers to deduct a portion of child care expenses while they work or look for work. Data from the June 1982 CPS supplement were used to estimate probabilities of tax filers paying for child care.

The simulation procedures do not capture variations in proportions of income paid in taxes within AGI intervals. The proportion of income paid in taxes for households with similar AGI amounts may differ relative to factors such as race, age of household members, number of household members, and marital status. The extent to which these variations exist has not been measured, therefore, caution should be used when interpreting relatively small differences between the incomes of various subgroups of the population.

¹A detailed description of the CPS-AHS statistical match can be found later in appendix B.

Computation of the earned income tax credit. Earned income tax credits were simulated for the 1984 tax model. These tax credits were used in the calculation of net Federal tax liability and computation of after-tax household income for filing units with one or more dependent children, less than \$10,000 in AGI, and earnings between \$1 and \$10,000.

State Individual Income Taxes

There were 44 States that required payment of individual income taxes in 1984. For the purpose of this model, the definitions of tax filing units and AGI used for the estimation of Federal income taxes were also used for the simulation of State income taxes.

The amounts of State individual income taxes paid were computed by developing a model of each State's income tax regulations. Information on the State tax systems was obtained from a publication entitled, *State Tax Handbook*, October 1, 1984. While every detail of each State's income tax system was not simulated, most of the important aspects were accounted for.

Property Taxes on Owner-Occupied Housing

In 1983, property taxes were estimated using a data file created by the statistical match of the March 1984 CPS and the 1983 AHS. In that statistical match, property tax amounts reported on the 1983 AHS for owner-occupied housing units were assigned to CPS households with similar characteristics (as defined by the matching variables). There was no comparable data file from the AHS for 1984. Property taxes in 1984 were estimated in a two-step process. First, the March 1984 and March 1985 CPS files were statistically matched. The March 1984 property tax amounts (those taken from the 1983 AHS) were then assigned to March 1985 CPS households.

Second, these 1983 amounts were increased based on the rate of increase between 1983 and 1984 in the Bureau of Economic Analysis's figures for residential property taxes adjusted to reflect the increase in the number of households. Property taxes paid on secondary residences such as vacation homes, could not be simulated. Also, the proportion of rent that pays the property taxes on renter-occupied housing units was not estimated.

The estimation procedures for property taxes paid by homeowners produces estimates that do not correspond precisely with those available from the AHS. These differences are mainly the result of differing universes and use of the statistical matching procedure. The published AHS estimate for property taxes is based on a universe that excludes condominiums, cooperatives, and mobile homes, the simulated universe includes these cases. In 1981, the published AHS estimate of property taxes was \$671, compared with the \$649 estimate based on the March CPS simulation.

Payroll Taxes

The Social Security payroll tax (FICA) and the Federal Employee Retirement tax were simulated using occupation of

longest job and earnings data reported on the CPS. Social Security payroll taxes were calculated directly from the reported CPS earnings using the Social Security payroll tax formula for 1984. For wages and salary, the tax rate used was 6.7 percent up to a maximum of \$37,800.

The tax rate for self-employment was 11.3 percent of the amount between \$400 and \$37,800. Not all workers were assigned coverage under Social Security and, therefore, a small number were not subject to Social Security taxes. All Federal employees and specific proportions of workers in certain occupation groups were assigned noncovered status. Unpublished statistics supplied by the Social Security Administration were used to make these assignments.

Retirement taxes paid by each Federal employee were simulated by multiplying their wages and salary amount by the 7.0 percent tax rate. The identification of Federal employees was based on the class of worker of longest job as reported on the survey.²

COMPARISON OF SIMULATION RESULTS WITH DATA FROM IRS AND OTHER INDEPENDENT SOURCES

The procedures described in the preceding section were translated into a computer simulation model. Tables A-1 through A-4 in this section provide a basic evaluation of the accuracy of this model by presenting comparison of the simulation results with data from independent sources.

Number of Federal Tax Filing Units and Amount of Adjusted Gross Income

Shown in tables A-1 through A-3 are comparisons of IRS and CPS distributions of adjusted gross income and number of returns with specified income types. The 1984 CPS tax simulation yielded 99.7 million Federal tax filing units, about the same as the 1984 preliminary IRS Statistics of Income figure of 99.6 million. The CPS simulated aggregate adjusted gross income was \$2,165.7 billion, which was not significantly different from the preliminary IRS figure of \$2,157.7 billion. While the CPS and IRS adjusted gross income amounts are not significantly different, there are major differences in the components of total adjusted gross income. Although the IRS data indicate a larger amount of wages and salary income and interest income than the CPS, the CPS recorded significantly larger amounts of self-employment and pension income. Larger total amounts of self-employment income by the CPS can be attributed to the far fewer number of losses reported in the survey than on tax returns. The reasons for these differences are not fully understood. The larger amount of pension income from the CPS probably occurs because the IRS aggregate is based on the taxable portion of the pension while the CPS figure is based on the entire pension amount.

²According to the National Income and Product Accounts published by the Bureau of Economic Analysis (BEA), neither Social Security (FICA) nor Federal Employee Retirement payments are treated as taxes. Instead, they are both included under Federal Government receipts as "Contributions for Social Insurance." We have included them under the broad heading of taxes here for convenience as both are mandatory deductions from gross earnings.

Table A-1. Comparison of IRS and CPS Simulated Number of Federal Individual Tax Returns, by Type of Return and Number of Exemptions: 1984

(Numbers in thousands)

Type of return	Number of returns		Total exemptions	
	CPS	IRS	CPS	IRS
Total returns.....	99,704	99,605	231,127	241,493
Married returns, total.....	48,134	48,564	160,923	167,104
Married, filing jointly.....	48,134	47,732	160,923	165,636
Married, filing separately ¹	(NA)	832	(NA)	1,469
Head of household returns, total.....	7,518	9,475	19,953	25,492
Surviving spouse returns ¹	(NA)	112	(NA)	312
Other head of household returns.....	7,518	9,363	19,953	25,179
Single returns.....	44,052	41,566	50,251	48,897

NA Not available.

¹Not a separate filing unit type in the CPS simulation model.

Number of Federal Taxable Returns and Amount of Taxable Income

The 1984 CPS simulation estimated 81.5 million Federal tax filing units with taxable income (after credits). This estimate is not significantly different from the IRS preliminary figure of 81.8 million. (See table A-4.)

While, overall, there are relatively small differences between the simulated CPS number of taxable returns, there are significant differences in many of the AGI intervals as shown in table A-4. The smaller number of returns in the "Under \$5,000" category for the CPS (about 29 percent less) results mainly

because the procedures did not simulate tax returns for dependents specifically.

Amount of Federal Income Taxes Paid (Net Tax Liability)

According to the CPS simulation, the total amount of Federal individual income taxes paid in 1984 was \$293.9 billion, about 14 percent of the estimated CPS adjusted gross income. (See table A-4.) This estimate is not significantly different from the IRS total of \$302.1 billion in net tax liability (after credits) for 1984. Overall, the IRS and CPS proportion of taxes paid by

Table A-2. Comparison of IRS and CPS Simulated Number of Federal Individual Income Tax Returns, by Adjusted Gross Income: 1984

(Numbers in thousands)

Adjusted gross income	Number of returns		Percent difference
	CPS	IRS	
Total.....	99,704	99,605	0.1
Under \$2,000.....	5,836	6,758	*-13.6
\$2,000 to \$3,999.....	8,592	6,830	* 25.8
\$4,000 to \$5,999.....	6,468	6,848	-5.5
\$6,000 to \$7,999.....	6,057	6,691	*-9.5
\$8,000 to \$9,999.....	5,759	6,532	*-11.8
\$10,000 to \$11,999.....	5,700	5,975	-4.6
\$12,000 to \$14,999.....	7,963	8,106	-1.8
\$15,000 to \$19,999.....	11,049	11,522	-4.1
\$20,000 to \$24,999.....	9,280	8,852	4.8
\$25,000 to \$29,999.....	7,925	7,634	3.8
\$30,000 to \$39,999.....	11,175	11,105	0.6
\$40,000 to \$49,999.....	6,332	5,896	5.6
\$50,000 to \$74,999.....	5,263	4,693	*12.1
\$75,000 and over.....	2,305	2,063	*11.7

*Significant at the 95-percent confidence level.

Table A-3. Comparison of IRS and CPS Simulated Number of Federal Individual Income Tax Returns and Adjusted Gross Income, by Type of Income: 1984

(Numbers in thousands and aggregate adjusted gross income in billions of dollars)

Type of income	Number of returns		Aggregate adjusted gross income			
			CPS		IRS	
	CPS	IRS	Amount	Percent distribution	Amount	Percent distribution
Total AGI.....	99,704	99,605	2,165.7	100.0	2,157.7	100.0
Wages and salary.....	84,296	86,346	1,768.0	81.6	1,818.6	84.3
Nonfarm self-employment.....	9,423	11,229	127.3	5.9	69.9	3.2
Farm self-employment.....	1,623	2,692	9.4	0.4	-12.7	-0.6
Interest.....	61,646	62,200	137.3	6.3	173.9	8.1
Dividends, rents, royalties, and estates or trusts.....	15,907	(NA)	54.4	2.5	49.1	2.3
Pensions.....	11,730 ¹	11,573	85.2 ¹	3.9	80.0	3.7
Other income minus adjustments.....	(NA)	(NA)	-15.9	-0.7	-21.1	-1.0

NA Not available.

¹Includes nontaxable pensions or the nontaxable portions of pensions.

adjusted gross income level are quite similar as indicated in table A-4.

State Income Taxes Paid

The CPS tax simulation yielded \$66.6 billion in State income taxes paid in 1984. According to the Bureau of the Census

publication entitled "Quarterly Summary of State and Local Tax Revenue: October-December 1984," the net amount of individual income taxes collected by the States during calendar year 1984 was \$61.9 billion. The overestimation of State income taxes paid by the CPS tax simulation can be attributed to several factors. First, the simulation did not account for every detail of each State's income tax regulations. Second,

Table A-4. Comparison of IRS and CPS Simulated Number of Taxable Returns, Federal Income Tax, and Income Taxes Paid as a Percent of Adjusted Gross Income: 1984

(Numbers in thousands and taxes in billions of dollars)

Adjusted gross income	Number of taxable returns			Federal income tax after credits		Federal income taxes as a percent of adjusted gross income	
	CPS	IRS	Percent difference	CPS	IRS	CPS	IRS
Total.....	81,517	81,789	0.3	293.9	302.1	13.6	14.0
Under \$5,000 ¹	3,266	4,581	*-28.7	0.3	0.5	0.6	3.1
\$5,000 to \$5,999 ¹	2,134	2,202	-3.1	0.6	0.5	2.5	2.8
\$6,000 to \$7,999.....	4,414	4,612	-4.3	1.6	1.8	3.9	3.8
\$8,000 to \$9,999.....	4,975	5,662	*-12.1	2.7	3.1	5.3	5.3
\$10,000 to \$11,999.....	5,529	5,609	-1.4	4.2	4.3	6.9	6.5
\$12,000 to \$14,999.....	7,881	7,800	1.0	8.6	8.5	8.1	7.8
\$15,000 to \$19,999.....	11,038	11,324	-2.5	18.6	18.5	9.8	9.2
\$20,000 to \$24,999.....	9,280	8,735	*6.2	22.9	21.0	11.1	10.6
\$25,000 to \$29,999.....	7,925	7,550	5.0	25.0	23.8	11.6	11.4
\$30,000 to \$39,999.....	11,175	11,030	1.3	50.0	48.7	13.0	12.6
\$40,000 to \$49,999.....	6,332	5,970	6.1	42.8	38.8	15.2	14.6
\$50,000 to \$74,999.....	5,263	4,669	*12.7	56.5	47.3	18.1	17.1
\$75,000 and over.....	2,305	2,044	*12.8	60.3	85.3	24.2	27.8

*Significant at the 95-percent confidence level.

¹Single returns with AGI less than \$3,300 and joint returns with AGI less than \$5,400 were not considered taxable under the CPS simulation, even though a small percentage of those returns do incur a tax liability.

the simulation did not include various State tax credits and exemptions which could not be computed from the data available on the March CPS file; these included credits for home energy-saving expenditures, and charitable contributions.

Payroll Taxes

According to the simulation, Social Security payroll taxes totaled \$109.9 billion in 1984. This estimate is slightly lower than the aggregate amount of \$112.7 billion according to figures from the Social Security Administration. Based on administrative statistics from the Office of Personnel Management, Federal retirement taxes totaled \$4.6 billion in 1984. The comparable figure from the tax simulation model was

somewhat higher, \$5.8 billion. The higher estimate of Federal retirement tax may have occurred because the CPS wage and salary figure represents the amount received from all jobs, not just Federal employment. Also, there are a number of noncontributory retirement programs within the Federal system which could not be simulated and a small number of employees not covered by any Federal retirement program.

Amount of Property Taxes

The simulation produced an estimated \$40.8 billion in property taxes for 1984. This compares with the \$43.4 billion figure published in the National Income Accounts by the Bureau of Economic Analysis (BEA).

Appendix B. Definitions and Explanations

Population coverage. This report includes the civilian noninstitutional population of the United States (the 50 States and the District of Columbia) and members of the Armed Forces living off post or with their families on post, but excludes all other members of the Armed Forces.

Household. A household consists of all the persons who occupy a housing unit. A house, an apartment or other group of rooms, or a single room is regarded as a housing unit when it is occupied or intended for occupancy as separate living quarters; that is, when the occupants do not live and eat with any other persons in the structure and there is either (1) direct access from the outside or through a common hall or (2) a kitchen of cooking equipment for the exclusive use of the occupants.

A household includes the related family members and all the unrelated persons, if any, such as lodgers, foster children, wards, or employees who share the housing unit. A person living alone in a housing unit or a group of unrelated persons sharing a housing unit as partners is also counted as a household. The count of households excludes group quarters.

Money income before taxes. The before-tax money income distributions and income summary measures (such as medians and means) shown in this report are limited to money income before payment of Federal, State, local, or Social Security (FICA) taxes and before any other types of deductions, such as union dues and Medicare premiums. Total money income before taxes is the sum of the amounts received from wages and salaries, self-employment income (including losses), Social Security, Supplemental Security Income, public assistance, interest, dividends, rent, royalties, estates or trusts, veterans' payments, unemployment and workers' compensations, private and government retirement and disability pensions, alimony, child support, and any other source of money income which was regularly received. Capital gains (or losses) and lump sum or one-time payments such as life insurance settlements are excluded.

Money income after taxes. To compute the after-tax money income distributions and summary measures shown in this report, simulated Federal and State income taxes, Social Security (FICA) taxes, and property taxes were deducted from total money income before taxes as defined above. Total money income after taxes also includes capital gains, which were imputed to some households during the Federal income tax simulation.

Underreporting. As in most household surveys, the estimates of the number of money income recipients and the total

amount of money income derived from the March CPS are somewhat less than comparable estimates derived from independent sources, such as the Bureau of Economic Analysis, Social Security Administration, and Veterans Administration. The difference between the survey estimate and the independent estimate is generally termed "underreporting." Underreporting tends to be more pronounced for income sources such as public assistance and welfare, unemployment compensation, and property income (interest, dividends, and net rental income). Estimates of income from wages and salaries tend to have less underreporting than most income types. For 1983 (the latest year for which estimates of underreporting are available), underreporting of total money income was about 10 percent. For further details concerning the reporting of money income, see appendix D.

Poverty definition. Families and unrelated individuals are classified as being above or below the poverty level using the poverty index originated at the Social Security Administration in 1964 and revised by Federal Interagency Committees in 1969 and 1980. The poverty index is based solely on money income and does not reflect the fact that many low-income persons receive noncash benefits such as food stamps, Medicaid, and public housing. The index is based on the Department of Agriculture's 1961 Economy Food Plan and reflects the different consumption requirements of families based on their size and composition. It was determined from the Department of Agriculture's 1955 Survey of Food Consumption that families of three or more persons spend approximately one-third of their income on food; the poverty level for these families was, therefore, set at three times the cost of the economy food plan. For smaller families and persons living alone, the cost of the economy food plan was multiplied by factors that were slightly higher in order to compensate for the relatively larger fixed expenses of these smaller households. The poverty thresholds are updated every year to reflect changes in the Consumer Price Index (CPI). The average poverty threshold for a family of four was \$10,609 in 1984, about 4.2 percent higher than the comparable 1983 cutoff of \$10,178. Weighted average poverty thresholds by size of family are shown in table B-1. For further details, see Current Population Reports, Series P-60, No. 147.

Differences in after-tax poverty concept. In previous reports households have been classified according to the poverty status of the household's primary family or individual. Using this method for determining poverty status, it is possible for households classified as below the poverty level to have total household incomes above the poverty level based on the

Table B-1. Weighted Average Poverty Thresholds In 1984

Size of family unit	Threshold
One person (unrelated individual).....	\$ 5,278
15 to 64 years.....	5,400
65 years and over.....	4,979
Two persons.....	6,762
Householder 15 to 64 years.....	6,983
Householder 65 years and over.....	6,282
Three persons.....	8,277
Four persons.....	10,609
Five persons.....	12,566
Six persons.....	14,207
Seven persons.....	16,096
Eight persons.....	17,961
Nine persons or more.....	21,247

inclusion of income received by unrelated subfamilies or secondary individuals. The presence of these high-income "poverty" households was thought to be inappropriate for the purpose of this study. Consequently, the poverty universe for this study was modified to exclude households in which the total household income exceeded the poverty threshold for the primary family or individual. This modification resulted in a decline in the number of poverty households from 11,887,000 to 11,124,000 for 1984.

AHS-CPS statistical match. In order to simulate property taxes for owner-occupied housing units, the March 1984 CPS simulation file was statistically matched to a file from the 1983 Annual Housing Survey (AHS). Since the AHS file contained responses to questions on annual property tax expenses the statistical match allowed the transfer of property tax amounts to CPS records when a CPS and AHS household were found to have similar characteristics. The group of variables used to match the two files were: age of householder, tenure, public or subsidized housing status, SMSA and central-city status of the household, household income, household size, number of living quarters, and the race, sex, and educational attainment of the householder. Using a very detailed combination of recodes based on the above variables, the two files were matched. If there was no AHS household with the ex-

act combination of characteristics as a particular CPS household, a match was then attempted at a new level that did not have quite as much detail. This was repeated until a match was found for every CPS household.

Households on the AHS file that did not answer the question dealing with property tax expenses were ineligible for the match. Since monthly mortgage expenses, which were used to simulate itemization status for Federal taxpayers, were also assigned to CPS households using this match, households that did not answer the AHS questions on that subject were similarly excluded from the match.

Index of income concentration. The index of income concentration (or Gini index) is a statistical measure of income inequality ranging from 0 to 1. A measure of 1 indicates perfect inequality, i.e., one person having all the income and the rest having none. A measure of 0 indicates perfect equality, i.e., all persons having equal shares of the income. For a more detailed discussion see Current Population Reports, Series P-60, No. 123.

Table B-2. Annual Average Consumer Price Index (CPI): 1947 to 1984

(1977 = 100)

Year	CPI	Year	CPI
1947.	36.9	1966.	53.6
1948.	39.7	1967.	55.1
1949.	39.3	1968.	57.4
1950.	39.7	1969.	60.5
1951.	42.9	1970.	64.1
1952.	44.6	1971.	66.8
1953.	44.1	1972.	69.0
1954.	44.4	1973.	73.3
1955.	44.2	1974.	81.4
1956.	44.8	1975.	88.8
1957.	46.4	1976.	93.9
1958.	47.7	1977.	100.0
1959.	48.1	1978.	107.6
1960.	48.9	1979.	119.8
1961.	49.4	1980.	136.0
1962.	49.9	1981.	150.1
1963.	50.2	1982.	159.3
1964.	51.2	1983.	164.4
1965.	52.1	1984.	171.4

Source: Department of Labor, Bureau of Labor Statistics.

Appendix C. Source and Reliability of Estimates

SOURCE OF DATA

Data from the Annual Housing Survey (AHS), the Income Survey Development Program (ISDP), and the Internal Revenue Service (IRS) were combined with Current Population Survey (CPS) data to create simulations of taxes paid, number of tax filing units, adjusted gross income, and other tax characteristics for the March 1984 and 1985 CPS. See the sections of this report entitled "Methodology and Procedures" and "Definitions and Explanations" for more details. In addition, unpublished data from the Social Security Administration (SSA), administrative data from the Office of Personnel Management (OPM), data from the National Income Accounts prepared by the Bureau of Economic Analysis (BEA), and Bureau of the Census publication "Quarterly Summary of State and Local Tax Revenue: October-December 1984" have all been referenced. The following describes the sources of data from which the tax simulations were made; except for the CPS these descriptions are brief. Additional information about these data sources can be found in the reports referenced in the brief descriptions given below.

Annual Housing Survey. Housing data are collected by the Bureau of the Census acting as collecting agent for the Department of Housing and Urban Development. The population covered by the sample for the AHS are all housing units in the United States. A structure must meet specific criteria developed by the Bureau of the Census before it is termed a "housing unit." For a more detailed description of the sample design, see the report "Annual Housing Survey: 1983, Part C, Financial Characteristics of the Housing Inventory, Current Housing Reports, Series H-150-83, U.S. Department of Commerce." The AHS was not conducted in 1984; therefore, property tax estimates for 1984 are based on the 1983 AHS. A series of statistical matches were made and estimates were updated to reflect changes between 1983 and 1984. Since the procedures used to obtain estimates for 1983 and 1984 differ, caution should be used in comparing year-to-year changes in property taxes. A more detailed description of this procedure can be found in the section entitled "Methodology and Procedures."

Income Survey Development Program. The Income Survey Development Program (ISDP) was the research and development phase for the Survey of Income and Program Participation (SIPP). The ISDP was intended to examine and resolve design, operational, and technical issues for SIPP. The household sample for the 1979 ISDP was a nationwide

multiple frame sample. The majority of sample households was drawn from addresses contacted in the 1976 Survey of Income and Education. The remainder of sample households was drawn from a reserve file of sample cases maintained by the Census Bureau. For a more detailed description of this sample design, see the report *Wage and Salary Data from the Income Survey Development Program: 1979 (Preliminary Data from Interview Period One)*, Current Population Reports, Special Studies, Series P-23, No. 118.

Internal Revenue Service data. Much of the Internal Revenue Service (IRS) data in this report comes from the Statistics of Income (SOI) series, in particular, *SOI Bulletin: Spring 1986, Individual Income Tax Returns, Preliminary Data: 1984*. This report, based on a sample drawn from all tax returns filed through September 1985, presents information on taxpayers' income, exemptions, deductions, credits, and tax.

Data from other sources. Administrative statistics on Federal retirement taxes from the Office of Personnel Management (OPM) and on Social Security taxes from the Social Security Administration (SSA) are from unpublished records kept by those agencies. Data on property taxes are from administrative statistics published by the Bureau of Economic Analysis (BEA) in the March 1986 issue of *Survey of Current Business*. Data on state income taxes are from administrative records published by the Bureau of the Census in the publication "Quarterly Summary of State and Local Tax Revenue: October-December 1984."

CURRENT POPULATION SURVEY

The CPS estimates in this report are based on data obtained annually in March of 1980 through 1985 from the Current Population Survey (CPS) conducted by the Bureau of the Census and from supplementary questions to the CPS. The monthly CPS deals mainly with labor force data for the civilian noninstitutional population. Questions relating to labor force participation are asked about each member in every sample household. In addition, supplementary questions are asked every March about money income and work experience for the previous year. In order to obtain more reliable data for the Hispanic population, the March CPS sample was enlarged to include all households from the previous November sample which contained at least one sample person of Spanish origin. For this report, persons in the Armed Forces living off post or with their families on post are included.

CPS Design Phase-in

Since the inception of the CPS in 1940, the sample has been redesigned several times, most recently in the early 1980's, to upgrade the quality and reliability of the data and to meet changing data needs. Beginning in April 1984, the old 1970 design was phased out through a series of changes that were completed in July 1985. The March 1985 CPS sample consisted of three rotation groups from the 1970 census files, four rotation groups from the 1980 census files, and one rotation group from both files. The coverage was in all 50 States and the District of Columbia. The sample is continually updated to reflect new construction. Due to the phase-in of the new design, the March 1985 CPS sample had three rotation groups located in 629 sample areas comprising 1,148 counties, independent cities, and minor civil divisions from the old design; and five rotation groups located in 729 sample areas comprising 1,973 counties and equivalent geographic areas in the United States from the new design. This current number of sample areas is not completely comparable to the old number of sample areas since many of the sample areas have been redefined. In this sample, approximately 59,500 occupied households were eligible for interview.¹ Of this number, about 2,500 occupied units were visited but interviews were not obtained because the occupants were not found at home after repeated calls or were unavailable for some other reason. For a description of the previous CPS sample design and a more detailed explanation of the effects of the phase-in procedure on the March 1985 data, see the detailed reports in Current Population Reports, Series P-60.

The following table provides a description of some aspects of the CPS sample designs in use during the referenced data collection periods.

Interview period	Number of sample areas	Housing units eligible	
		Interviewed	Not interviewed
1985.....	629/729	57,000	2,500
1982 to 1984..	629	59,000	2,500
1980 to 1981..	629	65,500	3,000

CPS Estimation Procedure

The estimation procedure used in this survey involves the inflation of the weighted sample results to independent estimates of the total civilian noninstitutional population of the United States by age, race, sex, and Spanish origin. These independent estimates are based on statistics from the decennial censuses of population; statistics on births, deaths, immigration and emigration; and statistics on the strength of the Armed Forces. The independent population estimates used

in this report to obtain data for 1983 and 1984 are based on the 1980 decennial census. The estimation procedure for the data in the report also involves a further adjustment so that husband and wife of a household receive the same weight. Simulation techniques were used to obtain estimates of after-tax income based on CPS data. For more details on this procedure see the sections of this report entitled "Methodology and Procedures" and "Definitions and Explanations."

The estimates in this report for 1983 and 1984 are also based on revised survey weighting procedures for persons of Spanish origin. In previous years the estimation procedures used in this survey involved the inflation of weighted sample results to independent estimates of the noninstitutional population by age, sex, and race. There was, therefore, no specific control of the survey estimates for the Spanish origin population. During the last several years, the Bureau of the Census has developed independent population controls for the Hispanic population by sex and detailed age groups and has adopted revised weighting procedures to incorporate these new controls. It should be noted that the independent population estimates include some, but not all, illegal immigrants.

RELIABILITY OF ESTIMATES

Since the CPS estimates are based on a sample, they may differ somewhat from the figures that would have been obtained if a complete census had been taken using the same questionnaires, instructions, and enumerators. There are two types of errors possible in an estimate based on a sample survey: sampling and nonsampling. The accuracy of a survey result depends on both types of errors, but the full extent of the nonsampling error is unknown. Consequently, particular care should be exercised in the interpretation of figures based on a relatively small number of cases or on small differences between estimates. The standard errors provided for the CPS estimates primarily indicate the magnitude of the CPS sampling error. They also partially measure the effect of some of the CPS nonsampling errors in responses and enumerations; but do not measure any systematic biases in the data. (Bias is the difference, averaged over all possible samples, between the estimate and the desired value.)

In addition, these standard errors are not entirely applicable to estimates from the CPS simulation. These standard errors were computed from CPS data alone and do not reflect any sampling or nonsampling errors present in data from other sources or any other errors due to the simulation process. There are no data available on the size of these additional error sources. Thus, care must be used in interpreting estimates from the CPS simulation.

Nonsampling variability. Nonsampling error is present in both the CPS and other data sources mentioned in this report. The interaction of nonsampling errors when combining data from many surveys may result in an additional component of error. An unknown component is also introduced by the use of the mathematical model. The total extent of these additional errors

¹Numbers reflect the initial size of the CPS sample and do not include expansions for Hispanic households.

is unknown. Particular caution should be used in drawing conclusions based on small differences.

Nonsampling errors can be attributed to many sources, e.g., inability to obtain information about all cases in the sample, definitional difficulties, differences in the interpretation of questions, inability or unwillingness on the part of the respondents to provide correct information, inability to recall information, errors made in collection, such as in recording or coding the data, errors made in processing the data, errors made in estimating values for missing data, and failure to represent all units with the sample (undercoverage).

Undercoverage in the CPS results from missed housing units and missed persons within sample households. Overall undercoverage, as compared with the level of the 1980 decennial census, is about 7 percent. It is known that CPS undercoverage varies with age, sex, and race. Generally, undercoverage is larger for males than for females and larger for Blacks and other races combined than for Whites. Ratio estimation to independent age-sex-race Hispanic population controls, as described previously, partially corrects for the bias due to survey undercoverage. However, biases exist in the estimates to the extent that missed persons in missed households or missed persons in interviewed households have different characteristics than interviewed persons in the same age-sex-race Hispanic group. Further, the independent population controls used have not been adjusted for undercoverage in the 1980 census.

In most cases, the questionnaire entries for income are based on the memory or knowledge of one person, usually the wife. The memory factor in data derived from field surveys of income probably produces underestimates because the tendency is to forget minor or irregular sources of income. Other errors of reporting are due to misrepresentation or to misunderstanding as to the scope of the income concept. See also the section entitled "Underreporting of Income."

For additional information on nonsampling error including the possible impact on CPS data when known, refer to Statistical Policy Working Paper 3, "An Error Profile: Employment as Measured by the Current Population Survey," Office of Federal Statistical Policy and Standards, U.S. Department of Commerce, 1978 and Technical Paper 40, "The Current Population Survey: Design and Methodology," Bureau of the Census, U.S. Department of Commerce.

Sampling variability. The standard errors given in the following tables are primarily measures of sampling variability, that is, of the variations that occurred by chance because a sample rather than the entire population was surveyed. The sample estimate and its standard error enable one to construct confidence intervals, ranges that would include the average result of all possible samples with a known probability. For example, if all possible samples were selected, each of these being surveyed under essentially the same general conditions and using the same sample design, and if an estimate and its standard error were calculated from each sample, then:

1. Approximately 95 percent of the intervals from two standard errors below the estimate to two standard errors

above the estimate would include the average result of all possible samples.

2. Approximately 90 percent of the intervals from 1.6 standard errors below the estimate to 1.6 standard errors above the estimate would include the average result of all possible samples.

The average estimate derived from all possible samples is or is not contained in any particular computed interval. However, for a particular sample, one can say with a specified confidence that the average estimate derived from all possible samples is included in the confidence interval.

Standard errors may also be used to perform hypothesis testing, a procedure for distinguishing between population parameters using sample estimates. The most common type of hypotheses is that the population parameters are different. An example of this would be comparing the mean after-tax income for 1984 versus the mean after-tax income for 1983. Tests may be performed at various levels of significance, where a level of significance is the probability of concluding that the parameters are different when, in fact, they are identical. To perform the most common test, let x and y be sample estimates for two characteristics of interest. Let the standard error on the difference $x-y$ be DIFF. If the ratio $R = (x-y)/DIFF$ is between -2 and $+2$, no conclusion about the difference between the characteristics is justified at the 0.05 level of significance. If, on the other hand, this ratio is smaller than -2 or larger than $+2$, the observed difference is significant at the 0.05 level. In this event, it is commonly accepted practice to say that the characteristics are different. Of course, sometimes this conclusion will be wrong. When the characteristics are, in fact, the same, there is a 5-percent chance of concluding that they are different. All statements of comparison in the text have passed a hypothesis test at the 0.10 level of significance or better, and most have passed a hypothesis test at the 0.05 level of significance or better. This means that, for most differences cited in the text, the estimated difference between parameters is greater than twice the standard error of the difference. For the other differences mentioned, the estimated difference between parameters is between 1.6 and 2.0 times the standard error of the difference. When this is the case, the statement of comparison will be qualified in some way; e.g., by use of the phrase "some evidence."

Comparability with other data. Data obtained from the CPS and other governmental sources are not entirely comparable. This is due in large part to differences in interviewer training and experience and in differing survey procedures. This is an additional component of error not reflected in the standard error tables. Also, because data from CPS simulations used in this report were derived using statistics from other governmental agencies, the standard error tables are analogously not entirely applicable to data from the CPS simulations. Therefore, **caution should be used when using the standard error tables to compare data from the CPS or CPS simulation versus data from other governmental agencies.** The standard errors provided in this report also do not account for sampling or

nonsampling errors introduced by using the mathematical model.

Care must also be taken when comparing Hispanic estimates over time due to the recent change in weighting of the Hispanic population. For data before 1983, there were no independent population control totals for persons of Spanish origin.

Note when using small estimates. Summary measures, (such as means, medians, and percent distributions), are shown when the base is 75,000 or greater. Because of the large standard errors involved, there is little chance that summary measures would reveal useful information when computed on a smaller base. Estimated numbers are shown, however, even though the relative standard errors of these numbers are larger than those for the corresponding percentages. These smaller estimates are provided primarily to permit such combinations of the categories as serve each data user's needs. However, care must be taken in the interpretation of small differences. For instance, even a small amount of nonsampling error can cause a borderline difference to appear significant or not, thus distorting a seemingly valid hypothesis test.

Standard errors for data based on surveys other than CPS. To compute standard errors of data obtained from the SOI reports, see the report SOI Bulletin: Spring 1986, Individual Income Tax Returns, Preliminary Data: 1984. Additional information on standard errors of different taxes and sources of income can be found in the SOI Bulletin: Individual Income Tax Returns: 1983, November 1985. To compute standard errors of data obtained from the 1983 Annual Housing Survey, see any of the reports in the series Current Housing Reports, Series H-150-83, Annual Housing Survey: 1983. Data from other sources (SSA, BEA, OPM, and the Census publication on state and local taxes) are from administrative records and as such are not subject to sampling error.

Standard errors for data based on the CPS sample. In order to derive standard errors that would be applicable to a large number of estimates and could be prepared at a moderate cost, a number of approximations were required. Therefore, instead of providing an individual standard error for each estimate, generalized sets of standard errors are provided for various types of characteristics. As a result, the sets of standard errors provided give an indication of the order of magnitude of the standard error of an estimate rather than the precise standard error.

Standard error tables and their use. The figures presented in tables C-1 through C-4 are approximations to standard errors of various estimates for households, families, unrelated individuals, and persons in the United States.

To obtain the approximate standard error for a specific characteristic, the appropriate standard error in tables C-1 through C-4 must be multiplied by the factor for that characteristic given in table C-5. The factors applied in table C-5 must be applied to the generalized standard errors in order

Table C-1. Standard Errors of Estimated Numbers of Households, Families, Unrelated Individuals, and Persons for 1983 and 1984 CPS and CPS Simulations:

Total or White

(Numbers in thousands)

Size of estimate	Standard error ¹
75.....	11
100.....	13
250.....	21
500.....	29
1,000.....	41
2,000.....	58
3,000.....	71
5,000.....	91
7,500.....	111
10,000.....	127
15,000.....	154
25,000.....	192
50,000.....	247
100,000.....	269
125,000.....	243
160,000.....	139

¹These values must be multiplied by the appropriate factor in table C-5 to obtain the correct standard error.

to adjust for the combined effect of sample design and the estimating procedure on the value of the characteristic. Standard errors for intermediate values not shown in the generalized tables of standard errors may be approximated by linear interpolation. Standard errors of estimated means and medians are provided in the detailed tables.

Table C-2. Standard Errors of Estimated Numbers of Households, Families, Unrelated Individuals, and Persons for 1983 and 1984 CPS and CPS Simulations

Black or Spanish Origin

(Numbers in thousands)

Size of estimate	Standard error ¹
75.....	12
100.....	14
250.....	22
500.....	30
1,000.....	42
2,000.....	58
3,000.....	69
5,000.....	85
7,500.....	95
10,000.....	99
15,000.....	90
20,000.....	44

¹These values must be multiplied by the appropriate factor in table C-5 to obtain the correct standard error.

Two parameters (denoted "a" and "b") are used to calculate standard errors for each type of characteristic; they are presented in table C-5. These parameters were used to calculate the standard errors in tables C-1 through C-4 and to calculate the factors in table C-5. They also may be used directly to calculate the standard errors for estimated numbers and percentages. Direct computation of the standard errors will give more accurate results than the use of the standard error tables. Methods for direct computation are given in the following sections.

Standard errors of estimated numbers. The approximate standard error, σ_x , of an estimated number shown in this report can be obtained in two ways. It may be obtained by use of the formula

$$\sigma_x = f\sigma \quad (1)$$

where f is the appropriate factor from table C-5, and σ is the standard error on the estimate obtained by interpolation from tables C-1 or C-2. Alternatively, the standard error may be approximated by formula (2), from which the standard errors in tables C-1 and C-2 were calculated. Use of this formula will provide more accurate results than the use of formula (1) above.

$$\sigma_x = \sqrt{ax^2 + bx} \quad (2)$$

Here x is the size of the estimate and a and b are the parameters in table C-5 associated with the particular type of characteristic. When calculating standard errors for numbers from cross-tabulations involving different characteristics, use the f factor or set of parameters which will give the largest standard error.

Illustration of the computation of the standard error of an estimated number. Table B of this report shows that there were 4,422,000 households in the United States with before-tax incomes in the range \$25,000 to \$27,499 in 1984. Table C-5 indicates that the appropriate "a" and "b" parameters to use in calculating a standard error for this estimate are $a = -0.000010$ and $b = 1,721$. Using formula (2), the approximate standard error is

$$\sqrt{(-0.000010)(4,422,000)^2 + 1,721(4,422,000)} = 86,000^2$$

The 95-percent confidence interval for the number of households with incomes between \$25,000—\$27,499 before taxes is from 4,250,000 to 4,594,000 (using twice the standard error). Therefore, a conclusion that the average estimate derived from all possible samples lies within a range computed in this way would be correct for roughly 95 percent of all possible samples.

Standard errors of estimated percentages. The reliability of an estimated percentage, computed using sample data for both numerator and denominator, depends upon both the size of the percentage and the size of the total upon which this percentage is based. Estimated percentages are relatively more reliable than the corresponding estimates of the numerators of the percentages, particularly if the percentages are 50 percent or more. When the numerator and denominator of the percentage are in different categories, use the factor or parameters from table C-5 indicated by the numerator. The

²Using formula (1), the appropriate factor for f from table C-5 (1.0) and interpolation from table C-1, the approximate standard error of 4,422,000 is $(1.0)(85,000) = 85,000$.

Table C-3. Standard Errors of Estimated Percentages of Households, Families, Unrelated Individuals, and Persons for 1983 and 1984 CPS and CPS Simulations: Total or White

Base of estimated percentage (thousands)	Estimated percentage ¹				
	2 or 98	5 or 95	10 or 90	25 or 75	50
75.....	2.1	3.3	4.5	6.6	7.6
100.....	1.8	2.9	3.9	5.7	6.6
250.....	1.2	1.8	2.5	3.6	4.1
500.....	0.8	1.3	1.8	2.5	2.9
1,000.....	0.6	0.9	1.2	1.8	2.1
2,000.....	0.4	0.6	0.9	1.3	1.5
3,000.....	0.3	0.5	0.7	1.0	1.2
5,000.....	0.3	0.4	0.6	0.8	0.9
7,500.....	0.2	0.3	0.5	0.7	0.8
10,000.....	0.2	0.3	0.4	0.6	0.7
15,000.....	0.15	0.2	0.3	0.5	0.5
25,000.....	0.12	0.2	0.2	0.4	0.4
50,000.....	0.08	0.13	0.2	0.3	0.3
100,000.....	0.06	0.09	0.12	0.2	0.2
125,000.....	0.05	0.08	0.11	0.2	0.2
160,000.....	0.05	0.07	0.10	0.14	0.2

¹These values must be multiplied by the appropriate factor in table C-5 to obtain the correct standard error.

Table C-4. Standard Errors of Estimated Percentages of Households, Families, Unrelated Individuals, and Persons for 1983 and 1984 CPS and CPS Simulations: Black and Spanish Origin

Base of estimated percentage (thousands)	Estimated percentage ¹				
	2 or 98	5 or 95	10 or 90	25 or 75	50
75.....	2.2	3.4	4.7	6.8	7.9
100.....	1.9	3.0	4.1	5.9	6.8
250.....	1.2	1.9	2.6	3.8	4.3
500.....	0.9	1.3	1.8	2.7	3.1
1,000.....	0.6	0.9	1.3	1.9	2.2
2,000.....	0.4	0.7	0.9	1.3	1.5
3,000.....	0.4	0.5	0.8	1.1	1.3
5,000.....	0.3	0.4	0.6	0.8	1.0
10,000.....	0.2	0.3	0.4	0.6	0.7
15,000.....	0.2	0.2	0.3	0.5	0.6
20,000.....	0.14	0.2	0.3	0.4	0.5

¹These values must be multiplied by the appropriate factor in table C-5 to obtain the correct standard error.

approximate standard error, $\sigma_{(x,p)}$, of an estimated percentage can be obtained by use of the formula

$$\sigma_{(x,p)} = f\sigma \quad (3)$$

In this formula, f is the appropriate factor from table C-5 and σ is the standard error of the estimate from table C-3 or C-4. Alternatively, the standard error may be approximated by using formula (4), from which the standard errors in tables C-3 and C-4 were calculated. Use of this formula will provide more accurate results than use of formula (3) above.

$$\sigma_{(x,p)} = \sqrt{(b/x) p (100-p)} \quad (4)$$

Here x is the size of the subclass of persons or households which is the base of the percentage, p is the percentage ($0 < p < 100$), and b is the parameter in table C-5 associated with the particular characteristic in the numerator of the percentage.

Illustration of the computation of the standard error of an estimated percentage. Table B shows that 5.1 percent of the 86,789,000 households in the United States had before-tax incomes between \$25,000 and \$27,499 in 1984. Using formula (4) and the appropriate "b" parameter of 1,721 from table C-5, the standard error of 5.1 percent is given by

$$\sqrt{\frac{1,721}{86,789,000} 5.1(100-5.1)} = 0.10^3$$

Thus, rounded to one decimal place, the 95-percent confidence interval for the estimated percentage of households with before-tax incomes of \$25,000 to \$27,499 is from 4.9 to 5.3 percent, i.e., $5.1 \pm (2 \times 0.1)$.

Standard error of a difference. For a difference between two sample estimates, the standard error is approximately equal to

$$\sigma_{(x-y)} = \sqrt{\sigma_x^2 + \sigma_y^2 - 2\rho \sigma_x \sigma_y} \quad (5)$$

where σ_x and σ_y are the standard errors of the estimates x and y , and ρ represents the correlation between the two estimates. The estimates can be numbers, percentages, ratios, etc. For differences between before- and after-tax estimates, assume a value of 0.7 for ρ . For differences between 1983 and 1984 estimates, use the value of ρ for the appropriate characteristic from table C-6. For all other differences, ρ should be assumed zero.

Illustration of the computation of the standard error of a difference. Table 1 of this report shows that the median before-tax 1984 income of owner-occupied households was \$27,282 and the median before-tax 1984 income of renter-occupied households was \$15,493. The published estimates of the standard errors of these medians are \$130 and \$123, respectively. Therefore, the standard error of the estimated difference of \$11,789 is

$$\sqrt{(130)^2 + (123)^2} = 179$$

This means the 95-percent confidence interval for the difference of median income in 1984 before taxes between owner- and renter-occupied households is from \$11,431 to \$12,147. Therefore, a conclusion that the average estimate of the difference derived from all possible samples lies within a range computed in this way would be correct for roughly 95 percent of all possible samples. Since this interval does not contain zero, we can conclude with 95 percent confidence that 1984 median before-tax income for owner-occupied households was higher than 1984 median before-tax income for renter-occupied households.

Standard error of a ratio. Certain mean values for persons in families or households shown in the tables were calculated as the ratio of two numbers. For example, the mean number of persons per family or household is calculated as

$$\frac{x}{y} = \frac{\text{total number of persons in families or households}}{\text{total number of families or households}}$$

³Using formula (3), the appropriate f factor from table C-5 (1.0) and $\sigma = 0.10$ (interpolating from table C-3), the standard error of 5.1 percent is $(1.0)(0.10) = 0.10$.

Table C-5. "a" and "b" Parameters and "f" Factors for Calculating Approximate Standard Errors of Estimated Numbers and Percentages of Households, Families, Unrelated Individuals, and Persons for 1983 and 1984 CPS and CPS Simulations

Type of characteristic	Parameter		f factor
	a	b	
INCOME			
Number of households, families, or unrelated individuals:			
Total or White.....	-0.000010	1,721	1.00
Black and/or other races.....	-0.000089	1,876	1.00
Spanish origin.....	-0.000237	2,713	1.20
Number of persons:			
Total or White.....	-0.000009	1,885	1.05
Black and/or other races.....	-0.000077	2,155	1.07
Spanish origin.....	-0.000294	3,363	1.34
POVERTY			
Number of households, families, or unrelated individuals:			
Total or White.....	-0.000076	1,876	1.04
Black and/or other races.....	-0.000076	1,876	1.00
Spanish origin.....	-0.000237	2,713	1.20
Number of persons:			
Total.....	-0.000031	7,946	2.15
NONINCOME			
Number of households, families, or unrelated individuals:			
Total or White.....	-0.000010	1,778	1.02
Black and/or other races.....	-0.000066	1,606	0.93 ¹
Spanish origin.....	-0.000159	1,820	0.98
Number of persons:			
Total or White.....	-0.000025	4,480	1.61
Black and/or other races.....	-0.000265	6,426	1.85
Spanish origin.....	-0.000497	5,673	1.74
Number of persons in households or families:			
All households or family members:			
Total or White.....	-0.000031	5,444	1.78
Black and/or other races.....	-0.000391	9,475	2.25
Spanish origin.....	-0.000807	9,475	2.25

¹The "f" factor for these characteristics is to be used for calculating standard errors of percentages only. For standard errors of estimated numbers, the appropriate "a" and "b" parameters and formula (2) must be used.

Ratios of before- to after-tax estimates are also discussed in this report. For example, the ratio of mean household income before and after taxes is calculated as

$$\frac{x}{y} = \frac{\text{mean household income before taxes}}{\text{mean household income after taxes}}$$

Standard errors for these ratios may be approximated as shown below. There are three cases to consider. In the first two cases, the denominator y represents a count of families or households of a certain class, and the numerator x represents a count of persons with the characteristic under consideration who are members of these families or households. In the third case, the numerator x and denominator y represent before- and after-tax estimates.

Case 1: There is at least one person having the characteristic in every family or household of the class: as for example, the mean number of persons per family or the mean number of persons per family with a male householder. For ratios of this kind, the standard errors are approximated by the following formula:

$$\sigma_{x/y} = \sqrt{(x/y)^2 [(\sigma_x/x)^2 + (\sigma_y/y)^2 - 2\rho (\sigma_x/x) (\sigma_y/y)]} \quad (6)$$

The standard error of the estimated number of families or households, σ_y , and the standard error of the estimated number of persons with the characteristics in those families or households, σ_x , may be calculated by methods described previously. In formula (6), ρ represents the correlation coefficient

between the numerator and the denominator of the estimate. In the above examples, and for other ratios of this kind use 0.7 as an estimate of ρ .

Case 2: The number of persons having the characteristic in a given family or household may be 0, 1, 2, 3, or more; for example, the mean number of persons under 18 years of age per household. For ratios of this kind, the standard error is approximated by formula (6), but ρ is assumed to be zero. If ρ is actually positive (negative), then this procedure will provide an overestimate (underestimate) of the standard error of the ratio.

Case 3: The numerator and denominator represent before- and after-tax estimates. For example, the numerator may represent the number of families or households in a certain income category before taxes, and the denominator may represent the number of families or households in the same category after taxes. For ratios of this kind σ_x and σ_y represent the standard errors of before- and after-tax estimates, respectively. Also for such ratios, ρ is assumed to be .7 for before- and after-tax estimates.

Standard errors of estimated means and medians. Estimated standard errors are provided for the means and medians of the published income distributions and do not need to be calculated by the user. However, because of the approximations used in developing the formula used to estimate the standard error of the mean, this statistic will generally be an underestimate. Since some users may wish to combine two or more income distributions and compute means and medians for the combined distributions, the following sections are provided to enable the user to calculate the standard errors for these statistics.

Standard error of an estimated mean. The standard error of a mean can be approximated by formula (7). Because of the approximations used in developing formula (7), an estimate of the standard error of the mean obtained from that formula will generally underestimate the true standard error. The formula used to estimate the standard error of a mean is

$$\sigma_{\bar{x}} = \sqrt{\frac{b}{y} s^2} \quad (7)$$

where y is the size of the base and b is a parameter which depends on the sample size, the sample design, the estimation procedure, and the type of characteristic. The b values are given in table C-5. The variance, s^2 , is given by formula (8):

$$s^2 = \sum_{i=1}^c p_i \bar{x}_i^2 - \bar{x}^2 \quad (8)$$

where \bar{x} is the mean of the distribution, defined by $\sum_{i=1}^c p_i \bar{x}_i$;

c is the number of groups; i indicates a specific group, taking on values 1 through c ;

p_i is the estimated proportion of households, families or persons whose values for the characteristic being considered (x -values) fall in group i ; and

$\bar{x}_i = (Z_{i-1} + Z_i)/2$, where Z_{i-1} and Z_i are the lower and upper interval boundaries, respectively, for group i .

\bar{x}_i is assumed to be the most representative value for the characteristic for households, families or persons in group i . Group c is open-ended, i.e., no upper interval boundary exists. For this group an approximate average value is $\bar{x}_c = \frac{3}{2} Z_{c-1}$.

When two or more distributions are combined, the mean of the combined distribution is:

$$\bar{x} = \left(\frac{1}{y}\right) \sum_j \bar{x}_j y_j$$

where \bar{x}_j is the mean of the j th distribution, y_j is the base of the j th distribution, and $y = \sum_j y_j$. This mean must be computed by the user.

Confidence interval and standard error of a median. The sampling variability of an estimated median depends upon the form of the distribution as well as the size of its base. An approximate method for measuring the reliability of an estimated median is to determine a confidence interval about it. (See the section on sampling variability for a general discussion of confidence intervals.) The following procedure may be used to estimate the 68-percent confidence limits and hence the standard error of a median based on sample data.

1. Determine, using the standard error tables and factors or formula (4), the standard error of the estimate of 50 percent from the distribution;
2. Add to and subtract from 50 percent the standard error determined in step (1);
3. Using the distribution of the characteristic, calculate the 68-percent confidence interval by calculating the values from the distribution corresponding to the two points established in step (2);
4. Once the limits of the 68-percent confidence interval are computed, the standard error of a median can be computed by the formula

$$\sigma_{\text{median}} = (U - L)/2$$

where U = Upper limit of the 68-percent confidence interval, where L = Lower limit of the 68-percent confidence interval.

For calculations of the confidence interval in step (3) use Pareto interpolation for any point in an income interval greater than \$2,500 in width, and linear interpolation otherwise. A 95-percent confidence interval may be determined by finding the values corresponding to 50 percent plus and minus twice the standard error determined in step (1).

The formulas used to implement step (3) for Pareto or linear interpolation are:

Pareto:

$$x_{pN} = A_1 \exp \left[\frac{\ln \left(\frac{pN}{N_1} \right) \ln \left(\frac{A_2}{A_1} \right)}{\ln \left(\frac{N_2}{N_1} \right)} \right] \quad (9)$$

Linear:

$$x_{pN} = \frac{pN - N_1}{N_2 - N_1} (A_2 - A_1) + A_1 \quad (10)$$

where N = total number of households, families, or persons in the distribution,

x_{pN} = estimated value (e.g., income) for which the number pN ($0 \leq p \leq 1$) of households, families, or persons in the distribution have smaller or equal values. For the purposes of calculating the confidence interval, p takes on the two values in step (2). Note that x_{pN} estimates the median when p = 0.50 is used in the formulae,

A_1 and A_2 = the estimated values which are the lower and upper bounds, respectively, on the interval in which x_{pN} falls,

N_1 and N_2 = the estimated number of households, families, or persons with values less than A_1 and A_2 , respectively,

exp is the exponential function,

ln is the natural logarithm function.

It should be noted that a mathematically equivalent result is obtained by using common logarithms (base 10) and antilogarithms.

Since the new, more detailed income intervals used in this report have \$2,500 increments up to \$40,000 for households and families and since Pareto interpolation will only be used when a median income falls in an interval of width larger than \$2,500, this type of interpolation is needed very infrequently (i.e., only in cases where the estimated median income exceeds \$40,000 for households and families). For this reason an illustration of the use of Pareto interpolation in computing a confidence interval for a median is not given here. An illustration of this procedure can be found in the source and reliability section of Current Population Reports, Series P-60, No. 123.

This procedure is needed only for determining standard errors for medians obtained by combining published

distributions. The procedure can also be used to estimate standard errors for quintiles or other percentiles by substituting the proper percentage value for p and following the steps outlined above. Note that when combining distributions the resulting median or percentile may lie in an open-ended interval. To calculate such standard errors the user must call Population Division of the Census Bureau to obtain the detailed distribution.

Illustration of the computation of a confidence interval and the standard error for a median computed using linear interpolation. Table 1 of this report shows that the median before-tax income in 1984 for owner-occupied households in the United States is estimated to be \$27,282. Table 1 also shows that the base of the distribution from which this median was determined is 55,845,000.

1. Using formula (4), the standard error of 50 percent on a base of 55,845,000 is about 0.3 percentage points.
2. To obtain a 68-percent confidence interval on the estimated median, add to and subtract from 50 percent the standard error found in step 1. This yields percent limits of 49.7 and 50.3.
3. From table 1, the 1984 before-tax income of 25,191,000 (45.1 percent) of all owner-occupied households was less than \$25,000, and the 1984 before-tax income of 28,183,000 (50.5 percent) of all owner-occupied households was less than \$27,500.

Thus, the entire 68-percent confidence interval falls in the income interval \$25,000 to \$27,499. Therefore, the upper and lower limits on the confidence interval for the median before-tax income are to be calculated using linear interpolation. Using formula (10), the lower limit on the estimate is found to be about

$$\frac{(.497)(55,845,000) - 25,191,000}{28,183,000 - 25,191,000} (\$27,499 - \$25,000) + \$25,000 = \$27,142$$

Table C-6. Year-to-Year Correlation Coefficients for Income Characteristics: 1983 and 1984

Characteristic	Households, families, or unrelated individuals		Persons	
	Income	Poverty	Income	Poverty
Total.....	.30	.30	.27	.40
White.....	.30	.26	.27	.30
Black and/or other races.....	.30	.30	.27	.40
Spanish origin.....	.47	.47	.40	.58

Similarly, the upper limit is found by linear interpolation to be about

$$\frac{(.503)(55,845,000) - 25,191,000}{28,183,000 - 25,191,000} (\$27,499 - \$25,000) + \$25,000 = \$27,421$$

Thus, the 68-percent confidence interval on the estimated median is from \$27,142 to \$27,421.

4. The standard error of the median is, therefore, $(\$27,421 - \$27,142)/2$, or \$140. (Note: Published standard errors are calculated by the same method as above. However, a different standard error may be obtained because of rounding-off errors. For example, for the above illustration, table 1 gives a standard error of \$130.)

Standard error of estimated per capita income. Certain mean values in this report represent the per capita income for households of a certain class. The mean per capita income is approximately equal to:

$$x_c = \frac{h_c m_c}{p_c}$$

where h_c = number of households in class c ,

m_c = mean income for households in class c ,

p_c = number of persons in households in class c , and

x_c = mean per capita income of persons in households in class c .

Standard errors for these means may be approximated using the following formula:

$$\sigma(x_c) = \sqrt{\left(\frac{h_c m_c}{p_c}\right)^2 \left[\left(\frac{\sigma_{m_c}}{m_c}\right)^2 + \left(\frac{\sigma_{p_c}}{p_c}\right)^2 + \left(\frac{\sigma_{h_c}}{h_c}\right)^2 - 2\rho \left(\frac{\sigma_{p_c}}{p_c}\right) \left(\frac{\sigma_{h_c}}{h_c}\right) \right]} \quad (11)$$

In this formula, ρ represents the correlation between p_c and h_c . There are two cases to consider, depending on the nature of class c :

Case 1: Class c represents households containing a fixed number of persons. For example, h_c could be the number of 3-person households. In this case, there is an exact correlation between the number of persons in the household and the number of households. Therefore, $\rho = 1$ for households of this type.

Case 2: Class c represents households of other demographic types, for example, households in distinct regions, households in which the householder is of a certain age group, and owner-occupied and tenant-occupied households. In these examples and other classes in which there is not a perfect correlation between the number of persons in the household and the number of households, use 0.7 as an estimate of ρ .

Standard error of an estimated aggregate cash value. Aggregates such as AGI or aggregate taxes paid as described in the section entitled "Methodology and Procedures" are computed by multiplying the mean cash value per household or tax filing unit, \bar{x} , by the number of households or tax filing units, y :

$$T = \bar{x}y$$

where T is the aggregate to be computed.

Both \bar{x} and y have a standard error, so the standard error of a product must be computed. Standard errors of aggregates may be approximated using the formula

$$\sigma_T = \sqrt{(\bar{x})^2 (\sigma_y)^2 + y^2 (\sigma_{\bar{x}})^2} \quad (12)$$

where $\sigma_{\bar{x}}$ is computed using formula (7) and σ_y is computed using formula (2). In the above formula, the correlation ρ between \bar{x} and y is assumed to be zero. If ρ is actually positive (negative), then this formula will provide an underestimate (overestimate) of the standard error of the product. Standard errors of mean taxes paid can be obtained by calling Population Division of the Census Bureau to obtain detailed distributions of taxes paid.

Appendix D. Underreporting of Income

This appendix discusses some important aspects of underreporting, its measurement, and presents some estimates of underreporting for the base year 1983. The general survey phenomenon that is commonly termed underreporting actually refers to the tendency of household surveys to underestimate the number of income recipients and/or the amount of income received. There are three main causes for underreporting: failure to report receipt of the income type, underreporting of the amount received, and misclassification of the income type received.

Accurately measuring the extent of underreporting of income is difficult for many of the income types. There are two main components of measuring underreporting: the number of income or recipients and the total amount of income received. Measuring the survey undercount of recipients for the March CPS is extremely difficult because independent estimates (benchmarks or controls) for the CPS noninstitutional, "ever-received during the year" recipient concept are difficult

to validate. In addition, some of the administrative sources required for the derivation of independent estimates have significant errors themselves.

The derivation of accurate underreporting estimates for amounts of income is easier but still not without similar problems. In general, better administrative data are available on the annual amount of benefits received, or income earned, than recipients. Some of the more important problems associated with development of the independent controls for amounts are adjusting independent estimates to the CPS noninstitutional population, significant differences between alternate sources of independent estimates, especially for self-employment income, interest, dividends, and rents, and periodic revisions to the sources of independent estimates that delay availability of data and significantly alter estimates of underreporting. Estimates of underreporting for amounts of money income for 1983 are shown in table D-1.

Table D-1. Comparisons of CPS Aggregate Money Income in 1983 With Independently Derived Estimates, by Income Type

(Billions of dollars)

Source of income	Independent estimate	CPS estimate	CPS as a percent of independent estimate
Total.....	2,402.5	2,164.9	90.1
Wages and salaries.....	1,632.3	1,616.3	99.0
Self-employment.....	112.6	130.1	115.5
Social Security ¹	155.2	142.3	91.7
Supplemental Security Income.....	9.0	7.6	84.9
Aid to Families with Dependent Children.....	13.8	10.5	76.0
Interest, dividends, and rental income.....	315.3	143.2	45.4
Veterans' payments.....	14.0	8.8	63.3
Unemployment compensation.....	26.1	19.7	75.5
Workers' compensation.....	14.1	6.6	47.0
Private, government, and military pensions.....	110.1	79.7	72.4

¹Includes Railroad Retirement Benefits.

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