NEW ESTIMATES OF THE DISTRIBUTION OF INDIVIDUAL INCOME AND TAXES

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Paper Presented in the Session:
Federal Tax Issues: Recent Research at IRS

Acknowledgments

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NEW ESTIMATES OF THE DISTRIBUTION OF INDIVIDUAL INCOME AND TAXES

Different approaches have been used to measure the distribution of individual income over time. Survey data, such as those from the U.S. Census Bureau's Current Population Survey (CPS) and Survey of Income and Program Participation (SIPP), have been compiled with comprehensive enumeration, but underreporting of incomes, inadequate coverage at the highest income levels, and omission of a key income type jeopardize the validity of results. Administrative records, such as individual income tax returns, may be less susceptible to underreporting of income but exclude certain nontaxable income types. In addition, estimates of change can be unreliable in periods when the tax law has been substantially altered. Record linkage studies have capitalized on the advantages of both approaches, but are costly and severely restricted by the laws governing interagency data sharing.

This paper is the fourth in a series examining trends in the distribution of individual incomes and tax burdens based on a consistent and comprehensive measure of income derived from individual income tax returns.[1,2,3] In the three previous papers, we demonstrated that the shares of income accounted for by the highest income-size classes have clearly increased over time, although some of this increase was tempered by corresponding increases in the shares of taxes paid by these groups. We also demonstrated the superiority of our comprehensive and consistent income measure, the 1979 Retrospective Income Concept, particularly in periods of tax reform.

In this paper, we continue the analysis of individual income and tax distributions. The paper has four sections. In the first section, we briefly summarize this measure of individual income derived as a "retrospective concept" from individual income tax returns. In the second section, we present the results of our analysis of time series data on individual incomes and taxes. Next, we estimate Lorenz curves and compute Gini coefficients from these data and summarize our findings. Finally, data sources, limitations, and conclusions are presented.

DERIVATION OF THE 1979 RETROSPECTIVE INCOME CONCEPT

The tax laws of the 1980's and 1990's made significant changes to both the tax rates and definitions of taxable income. The tax reforms of 1981 and 1986 significantly lowered individual income tax rates, and the latter also substantially broadened the income tax base. The tax law changes effective for 1991 and 1993 initiated rising individual income tax rates and further modifications to the definition of taxable income.[1,2,3] Law changes effective for 1997 substantially lowered the maximum tax rate on capital gains. With all of these changes, the questions that arise are what has happened to the distribution of individual income, the shares of taxes paid, and average taxes by the various income-size classes?

In order to analyze changes in income and taxes over time, consistent definitions of income and taxes must be used. However, as noted above, the Internal Revenue Code has been substantially changed in the last 22 years—both the concept of taxable income and the tax rate schedules have been significantly altered. The most commonly used income concept available from Federal income tax returns, Adjusted Gross Income (AGI), was designed to facilitate tax administration, and its definition has changed over time to reflect modifications to the Internal Revenue Code. These changes made it difficult to use AGI for inter-temporal comparisons of income.

For this reason, an income definition that would be both comprehensive and consistent over time was developed.[4,5,6,7] The 1979 Retrospective Income Concept was designed to include the same income and deduction items from items available on Federal individual income tax returns. Tax Years 1979

through 1986 were used as base years to identify the income and deduction items, and the concept was subsequently applied to later years by including the same income components common to all years. As shown in Figure A (see end of file for all figures and tables), the calculation of the 1979 Retrospective Income Concept includes several items partially excluded from AGI for the base years, the largest of which was capital gains. The full amounts of all capital gains, as well as all dividends and unemployment compensation, were included in the income calculation. Total pensions, annuities, IRA distributions, and rollovers were added, including nontaxable portions that were excluded from AGI. Social Security benefits were omitted because they were not reported on tax returns until 1984. Also, any depreciation in excess of straight-line depreciation, which was subtracted in computing AGI, was added back.

For this study, retrospective income was computed for all individual income tax returns in the annual Statistics of Income (SOI) sample files for the period 1979 through 2000. Loss returns were excluded and the tax returns were tabulated into income-size classes based on the size of retrospective income and ranked from highest to lowest. Percentile thresholds were estimated or interpolated for income-size classes ranging from the top 0.1 percent to the bottom 20 percent.[8,9,10] For each size class, the number of returns and the amounts of retrospective income and taxes paid were compiled. From these data, income and tax shares and average taxes were computed for each size class for all years. Table 1 presents the income thresholds for all of the years.

THE DISTRIBUTION OF INCOME AND TAXES

With this database, we sought to answer the following questions—have the distribution of individual incomes (i.e., income shares), the distribution of taxes (i.e., tax shares), and the average effective tax rates (i.e., tax burdens) changed over time? As a first look at the data, we examined the income thresholds of the bottom (or entry level) of each income-size class and a clear pattern emerged. While all of the income thresholds have increased over time, the largest increases in absolute terms, and on a percentage basis, were with the highest income-size classes.

For example, while $233,539 was needed to enter the top 0.1 percent for 1979, $1,696,322 was needed for entry into this class for 2000. This represents a more than 626-percent increase. Also, while $79,679 of retrospective income was needed to enter the top 1-percent size class for 1979, $354,035 was needed for entry into this size class for 2000, an increase of 344 percent. For the top 20 percent, the threshold increased by 157 percent, and, for the bottom 20 percent, the increase was only 118 percent. Since much of these increases are attributable to inflation, we computed constant dollar thresholds, using the Consumer Price Index, which are plotted in Figure B and shown in Table 2.[11]

What is most striking about these data are the changes between 1979 and 2000 for the various income-size percentile thresholds. For example, the threshold for the top 0.1 percent grew (using a 1982-1984 base) from $321,679 for 1979 to $985,088 for 2000, an increase of 206 percent. Similarly, the threshold for the taxpayers in the 1-percent group rose from $109,751 for 1979 to $205,595 for 2000, an increase of over 87 percent. However, the thresholds for each lower percentile class show smaller increases in the 22-year period; the top 20-percentile threshold increased only 8.2 percent, and the 40-percent and all lower thresholds declined in inflation-adjusted dollars, with larger percentage reductions for the smaller income-size classes.

Income shares

The data on income shares by percentile-size classes are provided in Table 3 (see end of file for all figures and tables) and summarized in Figure C (see end of file for all figures and tables)

for 1979 through 2000. The share of income accounted for by the top 1 percent of the income distribution has climbed steadily from a low of 9.58 percent (3.28 for the top 0.1 percent) for 1979 to a high of 21.58 percent (10.49 for the top 0.1 percent) for 2000. While this increase is quite steady, there were some significantly large jumps, particularly for 1986, due to a surge in capital gains realizations after the passage, but before implementation, of the Tax Reform Act of 1986 (TRA). The top 1-percent share also increased for 1996 through 2000, when sales of capital assets also grew considerably each year. Notable declines in the top 1-percent share occurred in the recession years of 1981 and 1990-1991.

This pattern of an increasing share of total income is mirrored in the 1-to-5 percent class but to a considerably lesser degree. For this group, the income share increased from 12.60 percent to 15.25 percent in this period. All of the other lower percentile-size classes, from the 5-to-10 and 10-to-20 percent classes to the four lowest quintiles, show declines in shares of total income over the 22-year period. Overall, the top quintile increased its share of total income from 50 percent for 1979 to over 62 percent for 2000.

Tax shares

Data on tax shares by the percentile-size classes are shown in Table 4 (see end of file for all figures and tables) and summarized in Figure D(see end of file for all figures and tables).[12] The share of taxes accounted for by the top 1-percent group also climbed steadily in this period, from initially at 19.75 percent (7.38 for top 0.1 percent) for 1979, then declining to a low of 17.42 percent for 1981, before rising to 36.30 percent (19.44 for top 0.1 percent) for 2000. The corresponding percentages for 2000 for the 1 percent and 0.1 percent groups are 37.68 and 19.44 percent, respectively accounting for the 2000 tax rebate, which is discussed below. As with incomes, there were some unusually large increases, particularly for 1986, but also for 1982, 1983, 1988, 1992, 1993 (the first year of the 39.6-percent top marginal tax rate), 1995, 1996, 1999, and 2000. One common feature for all these years was that net capital gains reported in AGI showed double-digit growth from the previous year.[6,7]

The 1-to-5 percent size class exhibited relatively modest change in its share of taxes, increasing from 17.53 percent to 19.88 percent in the period. The 5-to-10 percent class, and all lower income-size classes, had declining shares of total tax. The top quintile increased its share of taxes from 66.82 percent to 81.09 percent of the total in the 1979 to 2000 period.

Average tax rates

Average tax rates by income-size class are presented in Figure E (see end of file for all figures and tables) and Table 5 (see end of file for all figures and tables). What is most striking about these data is that the levels of the average tax burdens increase with income size in most years (the only exceptions being 1980 and 1986 for just the two highest groups). The progressivity of the individual income tax system is clearly demonstrated.

Despite the fact that the overall average tax rate increased by less than one percentage point between 1979 and 2000 (i.e., rising from 13.96 percent to 14.85 percent), the average rate for all but the very lowest size class actually declined.[13] While this at first appears to be inconsistent, it is clear how this did in fact occur – over time, the proportion of income has shifted to the upper levels of the income distribution, where it is taxed at higher rates. As for the tax share data, accounting for the 2000 rebate had a significant effect, lowering the overall average tax rate to 14.28 percent.

In examining the average tax data by income size, four distinct periods emerge. First, the average tax rates were generally climbing up to the implementation of the Economic Recovery Tax Act (ERTA)

effective for 1982. This was an inflationary period, and prior to indexing of personal exemptions, the standard deduction, and tax brackets, which caused many taxpayers to face higher tax rates. (Indexing became a permanent part of the tax law for Tax Year 1985.[6]) Also, this period marked the recovery from the recession in the early 1980's.

Similarly, average taxes also climbed in the period after 1992, the period affected by the Omnibus Budget and Reconciliation Act (OBRA). This was not surprising for the highest income-size classes, ones affected by the OBRA-initiated 39.6-percent top marginal tax rate, but the average tax rate increases are also evident in the smaller income-size classes for most years in the 1993 to 1996 period as well.

For the majority of intervening years (i.e., 1982 through 1992), average tax rates generally declined by small amounts for most income-size classes, although the period surrounding the implementation of the 1986 Tax Reform Act (TRA) gave rise to small increases in some classes. Despite the substantial base broadening and rate lowering initiated by TRA, for most income-size classes, the changes to average rates were fairly small. However, it should be kept in mind that individuals can and do move between income-size classes.

The rates for the top 0.1 percent clearly show the effects of the 1986 capital gains realizations, in anticipation of the ending of the 60-percent long-term gains exclusion, which began in 1987. The average tax rate for this income-size class dropped for 1986, but rose sharply for 1987, before dropping again for each of the next three years.

To assess what happened, it is important to look at the underlying data. The substantial increase in capital gains realizations for 1986 swelled the aggregate income and tax amounts for upper income classes and also raised the income thresholds of these top classes. However, since much of the increase in income for these size classes was from net long-term capital gains, which had a maximum effective tax rate of 20 percent (i.e., a 50-percent maximum marginal tax rate combined with the 60-percent exclusion), it is not surprising that the average tax rate for these top size classes declined.

Last, are those years affected by the Taxpayer Relief Act of 1997 (1997 through 2000), where the top rate on long-term capital gains was reduced significantly from 28 to 20 percent. For 1997, the first year under this law, when the lower rates were only partially in effect, the average tax rate fell for the top 0.1-percent group of taxpayers but increased for all other groups. However, for 1998, the first full year under lower capital gains rates, all groups up to the 40-to-60 percent class had reduced average tax rates (while the lowest two quintiles had virtually the same average tax rates). For all groups (except for the 20-40 and the 60-to-80 percent groups in 1999), the average rates returned to increasing for both 1999 and 2000.

The Economic Growth and Tax Relief Reconciliation Act of 2001 has further reduced marginal tax rates over several years. One of these reductions was an introduction of a ten-percent bracket on the first $6,000 ($12,000 if married filing a joint return) of taxable income. In an attempt to fuel a recovery from recession, this reduction was introduced retroactively in the form of a rebate based on Tax Year 2000 filings. Therefore, we simulated the rebate on the Tax Year 2000 Individual File to see its effects on average tax rates. When the rebate is taken into account, the average rates decreased for all groups, except for the top 0.1 and the 1-5 percent, reversing the pre-rebate increases.

LORENZ AND GINI ANALYSIS OF THE DISTRIBUTIONS

To further analyze the data, we estimated Lorenz curves and computed Gini coefficients for all years. The Lorenz curve is a cumulative aggregation of income from lowest to highest, expressed on a percentage basis. To construct the Lorenz curves, we re-ordered the percentile classes from lowest to highest and used the income thresholds as "plotting points" to fit a series of third-order regression equations for each income-size interval in the 22 years, both before- and after-taxes.

Lorenz curves for 1979 and 2000 are plotted in Figure F (see end of file for all figures and tables). The 45-degree diagonal or "identity function" in the figure represents the unlikely situation of everyone having equal amounts of income. In this scenario, 10 percent of the tax return filers would account for 10 percent of the income, as would 50 percent, 90 percent, etc. Clearly, although such a situation is only a mathematical possibility, it is a useful yardstick by which to measure the degree of income inequality.

The Lorenz curve for 1979 is above and to the left of that for 2000 — this is because for each cumulative percent of tax returns (as measured on the horizontal axis), the cumulative percent of income for 1979 (measured on the vertical axis) exceeds that for 2000. Clearly this is a situation of less income inequality for 1979, which is also evident from the income share data in Figure C (see end of file for all figures and tables) and Table 3 (see end of file for all figures and tables).

Once the Lorenz curves were estimated for all years, Gini coefficients were calculated. Intuitively, the Gini coefficient is a measure of the degree of inequality—that is, a higher Gini value represents more inequality. From Figure F (see end of file for all figures and tables), the Gini coefficient is measured as follows:

$$\text{Gini coefficient} = \text{Area A} \ / \ (\text{Area A} + \text{Area B}) \ * 100$$

that is, the Gini coefficient is the estimated area above the Lorenz curve but beneath the 45-degree diagonal (i.e., the amount of "inequality") expressed as a percentage of the entire area below the 45-degree diagonal. Thus, if the Lorenz curve were bowed down and to the right, Area A would increase thereby increasing the amount of inequality and the magnitude of the Gini coefficient.

Gini coefficients for all 22 years were estimated for both before- and after-tax income distributions and are presented in Figure G (see end of file for all figures and tables). The Gini coefficients generally increased throughout the 22-year period signifying rising levels of inequality for both the pre- and post-tax distributions. This result was not unexpected since it parallels the rising shares of income accruing to the highest income-size classes. Over this period, the before-tax Gini coefficient value increased from 0.469 to 0.588 (25.4 percent), while the after-tax Gini value increased from 0.436 to 0.551 for a slightly higher percentage increase (26.4 percent).

So what has been the effect of the Federal tax system on the size and change over time of the Gini coefficient values? One way of looking at this question is to compare the before- and after-tax Gini values. Although this is not a perfect measure, since the tax law can also affect the pre-tax income distribution, it is still a useful comparison.[14]

From this comparison, two conclusions are clear. First, Federal income taxation decreases the Gini coefficients for all years. This is not surprising in that the tax rate structure is progressive, with average rates rising with higher incomes, so after-tax income is more evenly distributed than before-tax income. A second question is whether the relationship between the before-tax and after-tax Gini coefficient values has changed over time. From Figure G (see end of file for all figures and tables), the after-tax series closely parallels the before-tax series, with reductions in the value of the Gini coefficient ranging from 0.027 to 0.037. The largest differences, which denote the largest redistributive effect of the

Federal tax system, are usually in the periods of relatively high marginal tax rates, particularly 1979-81 and for 1993 and later years.[15] In fact, simulating the rebate for Tax Year 2000 results in the largest difference (0.037) over all the years. If this would have been the only change in marginal rates of the new tax law, the results would be to increase the redistributive effects of Federal taxes. However, for Tax Year 2001 and beyond, the marginal rates of higher income classes will also be reduced over time until the highest rate will be reduced from its current value of 39.6 percent to 35 percent for 2006.

To investigate further, the percentage differences between before and after tax Gini values were computed and are shown as the fourth column in the figure. These percentage changes in the Gini coefficient values, a "redistributive effect," show a decline ranging from 5.3 to 6.9 percent. As for the differences, the largest percentage changes are for the earliest and latest years, periods when the marginal tax rates were high.[15] The largest percentage reduction was for 1979, but the size of the reduction generally declined until 1986, fluctuated at relatively low levels between 1986 and 1992, and then increased from 1993 to 1996. However, coinciding with the capital gains tax reduction for 1997, the percentage change again declined for 1997 through 1999. Nevertheless, it increased for 2000, with and without the rebate included.

So what does this all mean? First, the high marginal tax rates prior to 1982 appear to have had a significant redistributive effect. But, beginning with the tax rate reductions for 1982, this redistributive effect began to decline up to the period immediately prior to the 1986 Tax Reform Act (TRA). Although TRA became effective for 1987, a surge in late 1986 capital gains realizations (to take advantage of the 60-percent long-term capital gains exclusion) effectively lowered the average tax rate for the highest income groups thereby lessening the redistributive effect.

For the post-TRA period, the redistributive effect was relatively low, and it didn't begin to increase until the initiation of the 39.6-percent tax bracket for 1993. But since 1997, with continuation of the 39.6-percent rate but with a lowering of the maximum tax rate on capital gains, the redistributive effect again declined. Overall, it appears that the redistributive effect was higher in years that had relatively high marginal tax rates for both ordinary and capital gain income.

To further examine the Gini coefficients over time, we began to survey the literature for other estimates of Gini values. While this work is clearly in its infancy, one finding was that our estimates generally exceed those of other researchers, particularly those based primarily on Census income concepts.[16] If each of these is a valid measure of its respective population, the questions that arise are "What are the reason or reasons for the differences?" and "Which Gini coefficient series is most valid?"

As stated earlier, distributional studies based on Census CPS and SIPP data clearly have more complete coverage of transfer income, which is primarily received at the lower end of the income distribution. So from this standpoint, the Census-based data have a clear advantage. However, the tax data are based on substantially more complete sampling at the highest income levels and, as our data show, much of the increased inequality is attributable to changes to the income shares of these groups. Further, the tax data have one other important difference that primarily affects the incomes of the upper income groups — the inclusion of realized capital gains.

Another "enhancement" to this work would be to estimate the Gini coefficients directly from microdata instead of using estimates derived from using the retrospective thresholds as essentially as plotting points to fit a nonlinear model. While we believe that this would be an improvement, we maintain that our application of a relatively consistent methodology for the 22 years in this study would not appreciably change any of our findings or conclusions.

Economists generally agree that an ideal measure of income would consist of consumption plus any change in net worth.[17] Implementing such a concept on a current study of income distribution would be very difficult, since changes in asset values are neither widely compiled nor easily measured. So, while the Census-based studies often exclude all capital gains, our study and most others based on tax return data generally include "realized" capital gains, a less-than-ideal proxy for all capital gains. However, despite its shortcomings, some estimate of capital income is essential in measuring the income of high income-size groups. And, since capital gains are so highly concentrated at the upper end of the income distribution, it is not surprising that our income distribution measures more concentration at higher income values, which result in higher estimated Gini coefficient values.

Another issue in Gini estimation concerns the unit of measurement—that is, whether the unit is an individual, family, or household, for example. The tax data are not really any of the above, *per se*. They are a combination of individual and family, based on the filing status elected by the taxpayer. Beginning with 1987, a primary taxpayer was required to list the name and Social Security Number of any dependents claimed as personal exemptions, even if those dependents had to file their own tax returns. So, even though it would be possible to link such tax returns and aggregate their "family income," the retrospective income concept does not currently include this, treating such dependents as separate taxpayers. As a result, such dependent taxpayers would appear to be low-income, unrelated individuals, thereby giving rise to more inequality and higher Gini coefficient values, *ceteris paribus*.

To attempt to ascertain some measure of this effect, we excluded the returns of dependents claimed on a tax return who also filed their own tax returns. And while this comparison was only for one year, we believe it gives a reasonable first look at the degree to which this phenomenon affects estimated Gini coefficient values. For 1997, by excluding these dependents, we calculated a decrease in the Gini coefficient value of 0.03, a 5-percent decrease in inequality. So clearly, the inclusion of the tax returns of these dependents does raise the Gini values, but our initial examination of this effect seems to indicate that it is quite small.

DATA SOURCES, LIMITATIONS, AND CONCLUSIONS

The Statistics of Income (SOI) Division of IRS produces annual studies of individual income and taxes by sampling and compiling data from Forms 1040, *Individual Income Tax Return*.[6] Returns were selected as part of random, stratified cross-sectional samples. For this study, returns from these samples were then tabulated into size classes of retrospective income, and the percentile thresholds are determined by estimation or interpolation.[10]

Although the retrospective income concept is a consistent measure for inter-year income comparisons, it has shortcomings. First, persons with incomes below the filing thresholds are not required to file tax returns and are excluded from the database. To the extent that the size of the nonfiling population changes from year-to-year, such comparisons can be a cause for concern. However, for the period of this study, we feel that this is not a major shortcoming, but one that still needs further investigation. Since the focus of this study has been on the upper tail of the income distribution, minor changes in the lowest end of the filing population would not be expected to influence the top income-size classes by much.

Our data are based on successive cross-sectional samples and are not a panel. In the underlying microdata, individuals can move in and out of annual studies, as well as across the thresholds of income-size classes. Also, as previously noted, the database is derived from individual tax return filings and is not a family income concept. No attempt was made to link the income of dependents to their parents' returns. Cash and in-kind public assistance, as well as earned income tax credit refunds,

are also excluded from retrospective income. Further, while Federal individual income taxes are included, Social Security (FICA) taxes, corporation income taxes, and excise taxes are not. Overall, we believe that retrospective income is an outstanding measure even though it does have limitations in coverage and scope.

Some conclusions can be drawn from examination of these data. Both the income and tax shares of the top 0.1 and 1-percent size classes increased substantially in this period. The income share of the 1-to-10 percent group increased modestly, as did its share of the taxes. The income share of the top quintile increased from 50 percent to over 62 percent of the total, and its share of taxes increased from two-thirds to nearly four-fifths of the total.

The bottom four quintiles all had declining shares of total income between 1979 and 2000. Further, while the declines in the percentage shares of total income decreased with decreasing income size, the percentage changes in the shares were actually largest with the lowest quintiles. Clearly, the pre-tax income shares have shifted upward. However, the declining shares of pre-tax income of the bottom quintiles were somewhat mitigated by their declining shares of taxes.

Concerning average tax rates, most income-size classes had declining average rates between 1979 and 2000. These declines halted in the period 1990 through 1995 (depending on percentile class) and have been generally increasing ever since. Overall, the levels of average taxes clearly increase with increasing income size, which is conclusive evidence of tax progressivity.

In summary, the upper tail of the income distribution has increased its share of total income at the expense of the lower income-size classes. However, this rise in inequality in pre-tax income has been somewhat offset by increases in taxes paid by the top income-size classes, particularly from the tax rate increases for 1993 through 1995. However, starting with 1996, even with these higher tax rates, the tremendous growth in capital gains further increased inequality. This has been compounded by the lowering of tax rates on long-term capital gains starting in 1997.

Notes

[1] Petska, Tom; Strudler, Mike; and Petska, Ryan, Further Examination of Individual Income and Taxes Using a Consistent and Comprehensive Measure of Income, 1999 Proceedings of the American Statistical Association, Social Statistics Section, 2000.

[2] Petska, Tom and Strudler, Mike, The Distribution of Individual Income and Taxes: A New Look at an Old Issue, presented at the annual meetings of the American Economic Association, New York, NY, January 1999, and published in Turning Administrative Systems Into Information Systems: 1998-1999.

[3] Petska, Tom, and Strudler, Mike, Income, Taxes, and Tax Progressivity: An Examination of Recent Trends in the Distribution of Individual Income and Taxes, 1998 Proceedings of the American Statistical Association, Social Statistics Section, 1999.

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[5] Hostetter, Susan, Measuring Income for Developing and Reviewing Individual Tax Law Changes: Exploration of Alternative Concepts, 1987 Proceedings of the American Statistical Association, Survey Research Methods Section, 1988.

[6] Internal Revenue Service, Statistics of Income—Individual Income Tax Returns, Publication 1304, (selected years).

[7] Parisi, Michael and Campbell, Dave, Individual Income Tax Rates and Tax Shares, 1999, Statistics of Income (SOI) Bulletin, Winter 2001-2002, Volume 21, Number 3.

[8] For the years 1979 through 1992, the percentile threshold size classes were estimated by osculatory interpolation as described in Oh and Oh and Scheuren.[9,10] In this procedure, the data were tabulated into size classes and the percentile thresholds were interpolated. For 1993 through 2000, the SOI individual tax return data files were sorted from highest to lowest, and the percentile thresholds were determined by cumulating the applicable percent of records from the top down.

[9] *Oh, H. Lock, Osculatory Interpolations with a Monotonicity Constraint,* 1977 Proceedings of the American Statistical Association, Statistical Computing Section, *1978*.

[10] Oh, H. Lock and Scheuren, Fritz, Osculatory Interpolations Revisited, 1987 Proceedings of the American Statistical Association, Statistical Computing Section, 1988.

[11] The CPI-U from the U.S. Department of Labor, Monthly Labor Review, was used for deflation of the income thresholds.

[12] Taxes, taxes paid, tax liabilities, tax shares, and average or effective tax rates are based on income tax, defined as income tax after credits plus alternative minimum tax less the nonrefundable portion of the earned income credit.

[13] The one exception is for the lowest quintile for Tax Year 1979. The Revenue Act of 1978 increased both exemption and zero-bracket amounts so that many low income tax returns became nontaxable. For 1979, many low-income taxpayers still had to file a return in order to receive refunds. Once they had been nontaxable for 1 year, these individuals could file Forms W-4 instructing their employers to stop withholding income taxes. Thus, after 1979, many taxpayers with low incomes were no longer part of the individual taxpayer filing population.

[14] A comparison of the before- and after-tax Gini coefficient values does not exclusively measure the effects of the tax system in that the tax laws can also affect before-tax income. For example, capital gain realizations have been shown to be sensitive to the tax rates so the tax system affects both the before- and after-tax income distributions.

[15] The period 1982-86 also had relatively high tax rates for ordinary income although it was lower than the preceding years.

[16] See, for example, Plotnick, Robert D.; Smolensky, Eugene; Evenhouse, Eirik; and Reilly, Siobhan, The Twentieth Century Record of Inequality and Poverty in the United States, Institute for Research on Poverty Discussion Paper No. 1166-98, 1998.

[17] See, for example, the following for discussions on measuring economic income: Haig, Robert Murray, The Concept of Income—Economic and Legal Aspects, The Federal Income Tax, Columbia University Press, 1921; and Simons, Henry C., Personal Income Taxation: The Definition of Income as a Problem of Fiscal Policy, Chicago University Press, 1938.

Figure A.—Components of the 1979 Retrospective Income Concept for 2000

Retrospective Income =

Salaries and wages[1]

Plus (+):

Interest[1]
Dividends[1]
Taxable refunds[1]
Alimony received[1]
Capital gains minus allowable losses reported on Schedule D[1]
Capital gains and losses not reported on Schedule D[1]
Other gains and losses (Form 4797)[1]
Business net income or loss[1]
Farm net income or loss[1]
Rent net income or loss[1]
Royalty net income or loss[1]
Partnership net income or loss[1]
S Corporation net income or loss[1]
Farm rental net income or loss[1]
Estate or trust net income or loss[1]
Unemployment compensation[1]
Depreciation in excess of straight-line depreciation[2]
Total pension income[3]
Other net income or loss[1]
Net operating loss[1]

Minus (-):

Disallowed passive losses (Form 8582)[4]
Moving expenses[1]
Alimony paid[1]
Unreimbursed business expenses[4]

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[1] Included in adjusted gross income (AGI) for Tax Year 2000.
[2] Adjustment to add back excess depreciation (accelerated over straight-line depreciation) deducted in the course of a trade or business and included in net income (loss) amounts.
[3] Includes taxable and tax-exempt pension and retirement distributions, including IRA distributions.
[4] Not included in AGI for Tax Year 2000.

Figure B--Constant Dollar Income Thresholds, 1979-2000

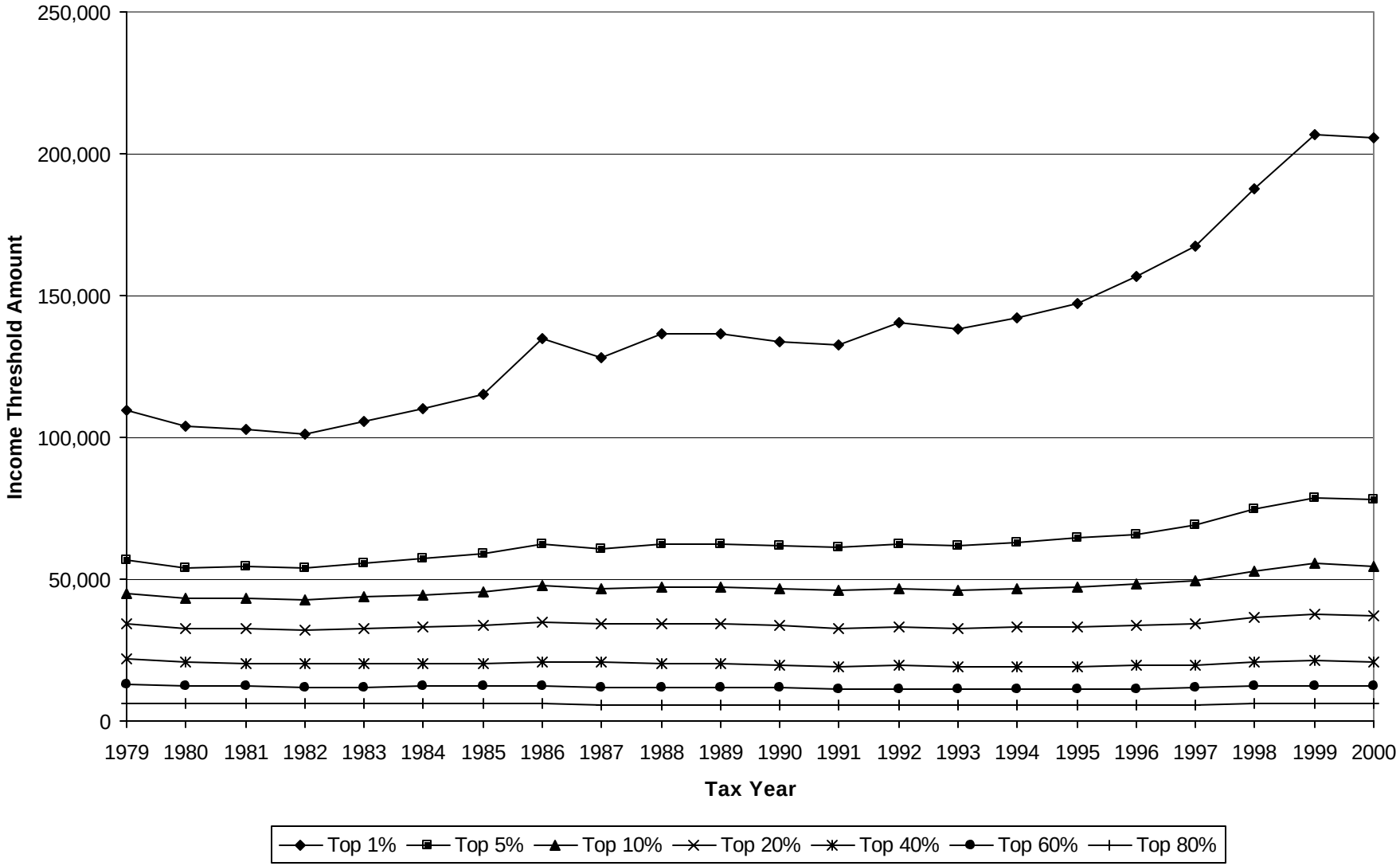


Figure C--Income Shares by Income Percentile Size-Classes, 1979-2000

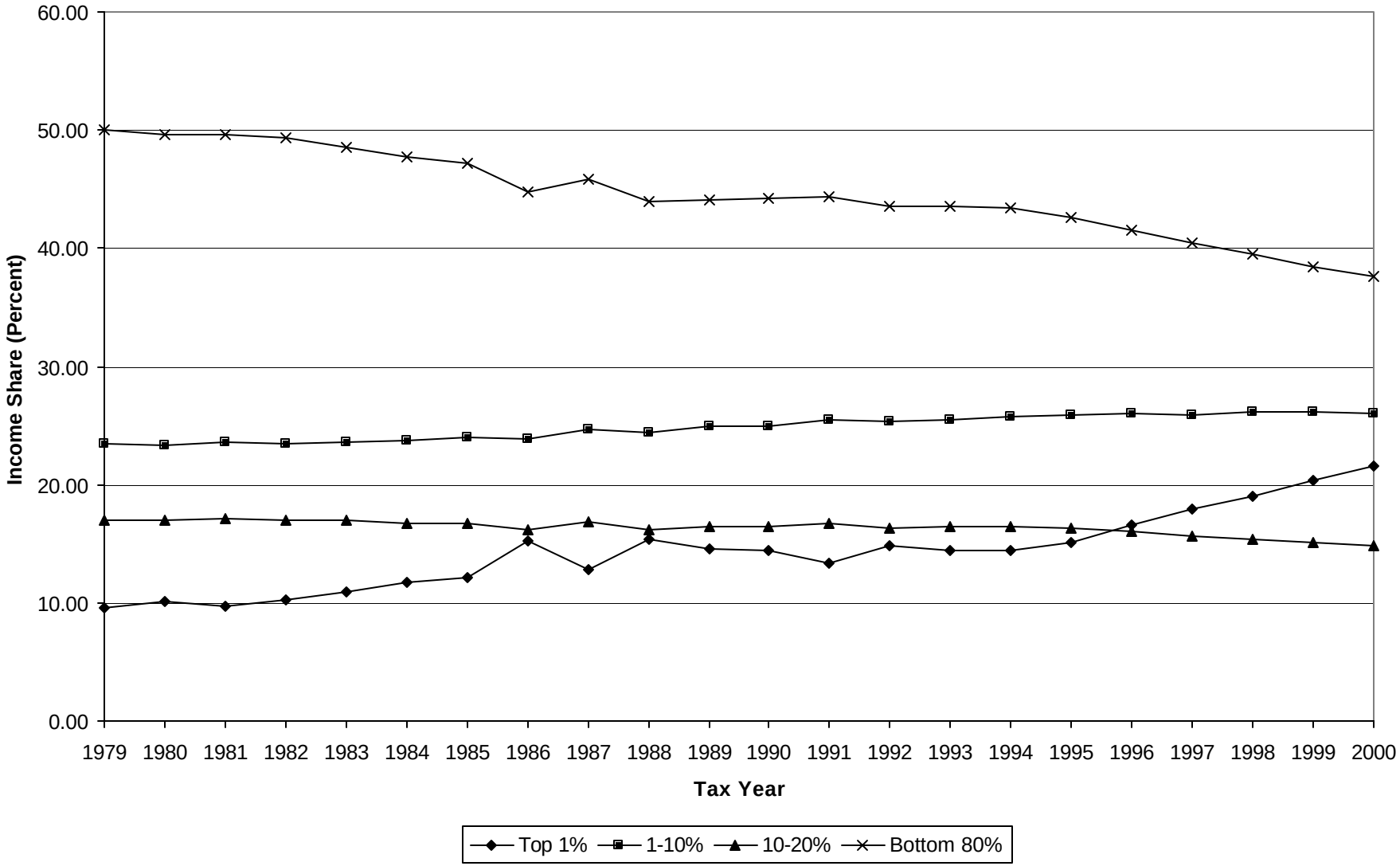


Figure D--Tax Shares by Income Percentile Size-Classes, 1979-2000

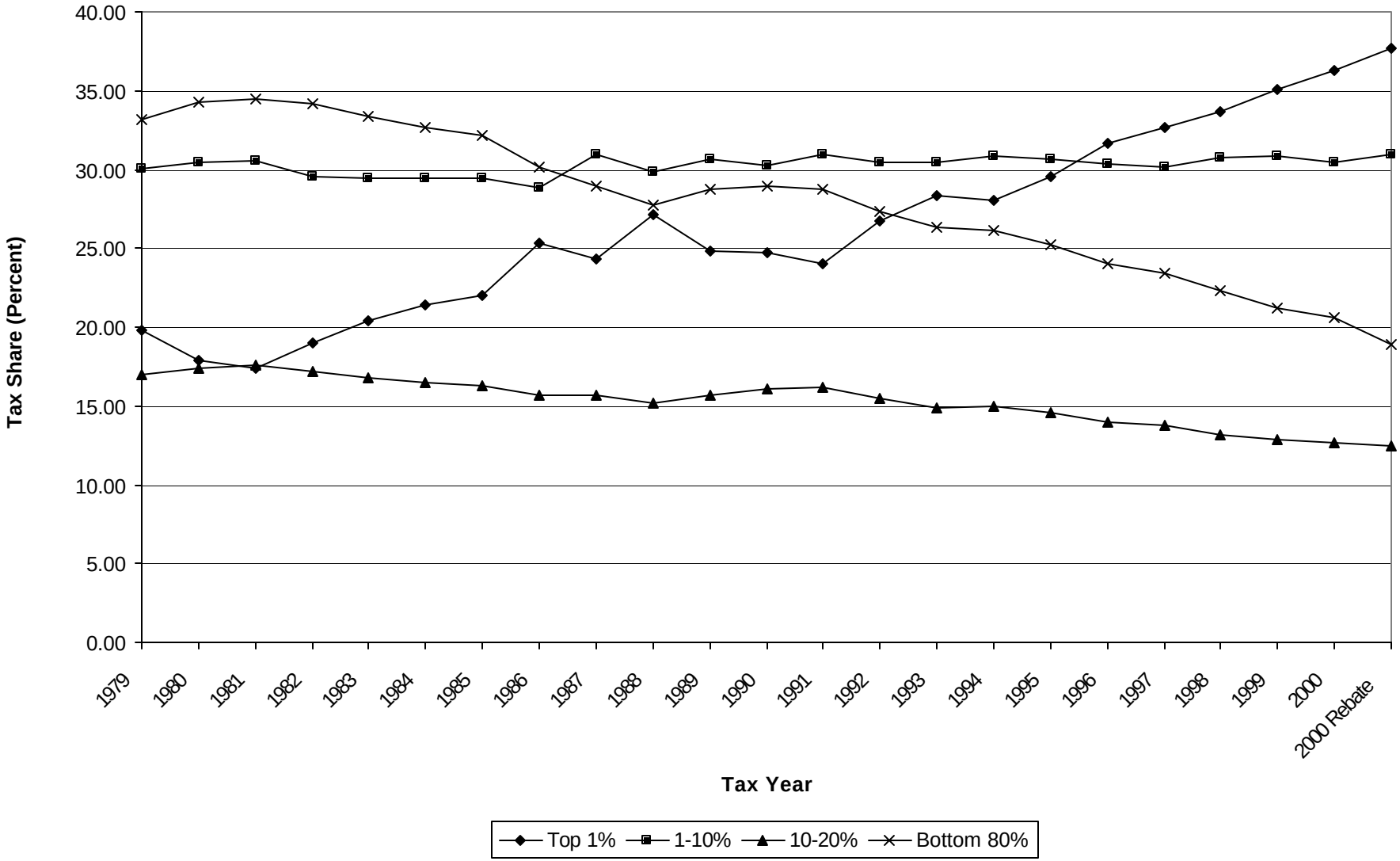
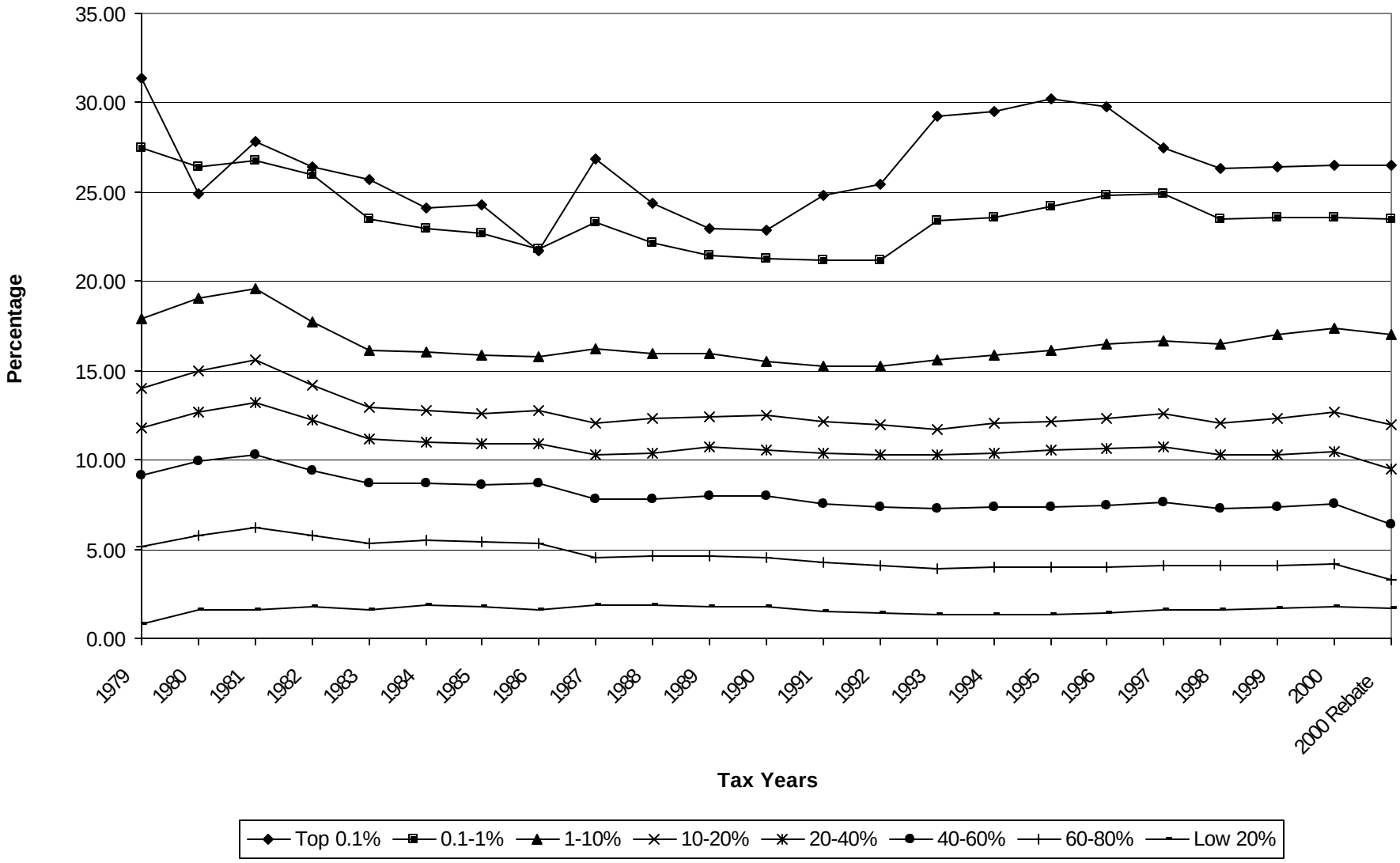


Figure E--Average Tax Rates for Income Percentile Size-Classes, 1979-2000



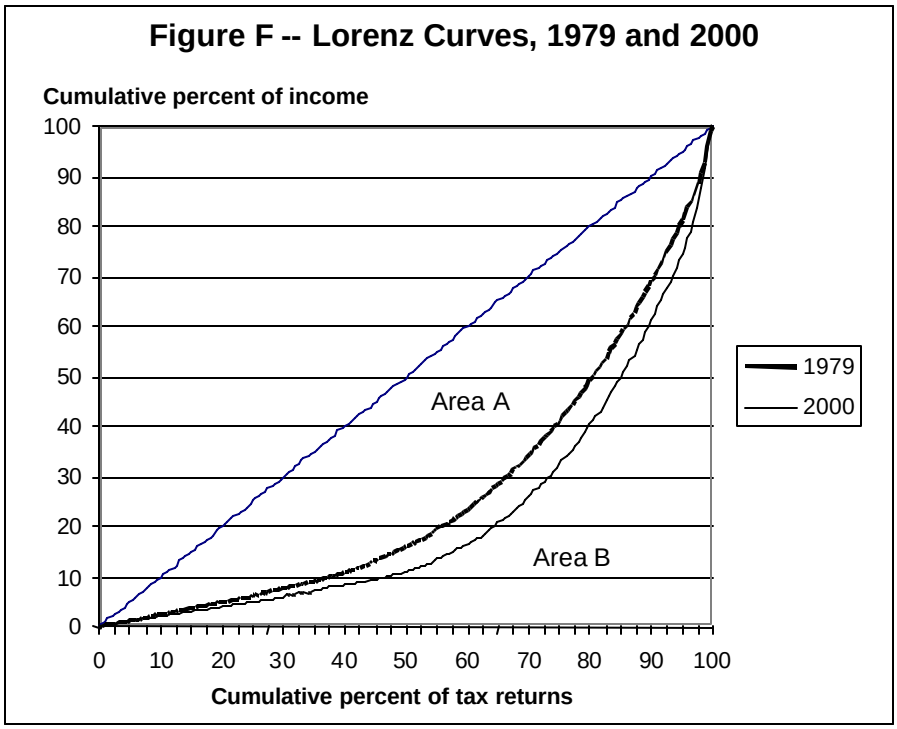


Figure G—Gini Coefficients for Retrospective Income, Before and After Taxes, 1979 - 2000

Year	Gini Before Tax	Gini After Tax	Difference	Percent Difference
1979	0.469	0.436	0.032	6.9
1980	0.473	0.442	0.031	6.6
1981	0.471	0.439	0.032	6.8
1982	0.474	0.444	0.030	6.3
1983	0.482	0.455	0.028	5.8
1984	0.490	0.463	0.027	5.6
1985	0.496	0.468	0.027	5.5
1986	0.520	0.492	0.028	5.3
1987	0.511	0.482	0.030	5.8
1988	0.530	0.500	0.030	5.6
1989	0.528	0.500	0.028	5.4
1990	0.527	0.499	0.028	5.3
1991	0.523	0.495	0.028	5.3
1992	0.532	0.503	0.029	5.5
1993	0.531	0.499	0.032	6.0
1994	0.532	0.499	0.032	6.1
1995	0.540	0.506	0.033	6.2
1996	0.551	0.516	0.035	6.3
1997	0.560	0.526	0.035	6.2
1998	0.570	0.536	0.034	6.0
1999	0.580	0.545	0.035	6.1
2000	0.588	0.552	0.036	6.2
2000 Rebate	0.588	0.551	0.037	6.3

Table 1.-- Income Thresholds for Percentile Size-Classes, 1979-2000 (Whole dollars)

Year	0.10%	0.25%	0.50%	Top 1%	Top 5%	Top 10%	Top 20%	Top 40%	Top 60%	Top 80%
1979	233,539	150,152	109,134	79,679	41,167	32,586	24,721	15,721	9,356	4,676
1980	278,456	171,202	119,955	85,498	44,570	35,496	26,862	17,002	10,106	5,008
1981	288,339	179,771	129,142	93,679	49,483	39,143	29,451	18,577	11,055	5,504
1982	317,728	191,470	134,595	97,376	51,914	41,237	31,016	19,342	11,637	5,857
1983	363,445	213,885	148,627	105,038	55,429	43,596	32,639	20,127	11,970	6,003
1984	411,066	235,191	161,954	114,370	59,420	46,258	34,543	21,179	12,607	6,306
1985	474,814	265,728	179,536	124,120	63,460	48,923	36,217	22,025	13,201	6,552
1986	609,216	342,917	216,071	147,688	68,347	52,034	38,131	23,059	13,605	6,673
1987	545,319	314,630	212,848	145,646	69,216	53,092	39,050	23,318	13,600	6,358
1988	701,904	387,814	250,835	161,795	73,442	55,524	40,405	24,072	14,104	6,589
1989	705,817	393,483	259,975	169,588	77,552	58,436	42,168	24,906	14,514	6,854
1990	722,864	416,116	269,015	174,721	80,408	60,630	43,689	25,929	15,090	7,095
1991	666,809	396,115	267,079	180,316	83,317	62,421	44,600	26,336	15,349	7,281
1992	786,865	455,489	302,436	197,080	87,389	65,295	46,339	27,380	15,970	7,612
1993	759,407	449,741	301,110	199,399	89,119	66,534	47,206	27,651	16,125	7,785
1994	791,410	468,447	311,544	210,742	93,186	69,118	48,979	28,429	16,658	8,051
1995	863,680	507,161	338,955	224,523	98,420	72,210	50,807	29,339	17,151	8,248
1996	1,005,314	563,882	371,158	246,277	103,489	75,574	52,915	30,443	17,749	8,421
1997	1,192,727	647,477	414,814	268,889	110,949	79,598	55,265	31,962	18,682	8,998
1998	1,343,653	723,767	469,602	301,513	120,262	84,904	58,228	33,373	19,603	9,569
1999	1,517,265	815,106	513,424	332,253	126,643	89,172	60,781	34,537	20,194	9,714
2000	1,696,322	902,317	554,335	354,035	134,134	93,715	63,451	36,014	21,065	10,200

Table 2.--Constant Dollar Income Thresholds for Percentile Size-Classes, 1979-2000 (Whole 1982-84 = 100 dollars)

Year	0.10%	0.25%	0.50%	Top 1%	Top 5%	Top 10%	Top 20%	Top 40%	Top 60%	Top 80%
1979	321,679	206,821	150,322	109,751	56,704	44,884	34,051	21,654	12,887	6,441
1980	337,932	207,769	145,576	103,760	54,090	43,078	32,600	20,633	12,265	6,078
1981	317,205	197,768	142,070	103,057	54,437	43,062	32,399	20,437	12,162	6,055
1982	329,252	198,415	139,477	100,908	53,797	42,733	32,141	20,044	12,059	6,069
1983	364,905	214,744	149,224	105,460	55,652	43,771	32,770	20,208	12,018	6,027
1984	395,636	226,363	155,875	110,077	57,190	44,522	33,246	20,384	12,134	6,069
1985	441,277	246,959	166,855	115,353	58,978	45,467	33,659	20,469	12,269	6,089
1986	555,854	312,880	197,145	134,752	62,360	47,476	34,791	21,039	12,413	6,089
1987	480,034	276,963	187,366	128,210	60,930	46,736	34,375	20,526	11,972	5,597
1988	593,325	327,822	212,033	136,767	62,081	46,935	34,155	20,348	11,922	5,570
1989	569,207	317,325	209,657	136,765	62,542	47,126	34,006	20,085	11,705	5,527
1990	553,071	318,375	205,826	133,681	61,521	46,389	33,427	19,839	11,546	5,428
1991	489,581	290,833	196,093	132,391	61,173	45,830	32,746	19,336	11,269	5,346
1992	560,845	324,654	215,564	140,470	62,287	46,540	33,029	19,515	11,383	5,426
1993	525,541	311,239	208,381	137,992	61,674	46,044	32,669	19,136	11,159	5,388
1994	534,015	316,091	210,219	142,201	62,879	46,638	33,049	19,183	11,240	5,433
1995	566,719	332,783	222,411	147,325	64,580	47,382	33,338	19,251	11,254	5,412
1996	640,736	359,389	236,557	156,964	65,959	48,167	33,725	19,403	11,312	5,367
1997	743,132	403,412	258,451	167,532	69,127	49,594	34,433	19,914	11,640	5,606
1998	824,327	444,029	288,099	187,859	74,930	52,900	36,279	20,793	12,214	5,962
1999	910,723	489,259	308,178	207,011	78,905	55,559	37,870	21,518	12,582	6,052
2000	985,088	523,994	321,913	205,595	77,894	54,422	36,847	20,914	12,233	5,923

Table 3.--Income Shares by Percentile Size-Classes, 1979-2000 (Percentages)

Year	Top 0.1%	0.1-1%	1-5%	5-10%	10-20%	20-40%	40-60%	60-80%	Low 20%
1979	3.28	6.30	12.60	10.89	16.94	23.91	14.82	8.37	2.89
1980	3.64	6.45	12.46	10.88	16.94	23.83	14.71	8.28	2.83
1981	3.41	6.29	12.59	10.99	17.07	23.79	14.68	8.28	2.90
1982	3.91	6.28	12.46	10.94	17.00	23.71	14.49	8.29	2.91
1983	4.30	6.58	12.68	10.98	16.93	23.38	14.24	8.06	2.84
1984	5.05	6.74	12.78	10.93	16.76	23.04	14.02	7.90	2.77
1985	5.05	7.13	12.96	10.99	16.71	22.81	13.82	7.80	2.73
1986	7.22	8.03	13.16	10.72	16.13	21.79	13.12	7.30	2.56
1987	4.92	7.83	13.49	11.14	16.82	22.62	13.47	7.34	2.38
1988	6.69	8.68	13.53	10.91	16.22	21.75	12.93	7.07	2.22
1989	5.98	8.62	13.80	11.10	16.43	21.85	12.91	7.09	2.24
1990	5.77	8.67	13.81	11.11	16.48	21.86	12.98	7.08	2.26
1991	5.02	8.37	14.17	11.33	16.70	21.97	13.02	7.13	2.29
1992	5.86	8.94	14.18	11.15	16.37	21.50	12.72	6.97	2.30
1993	5.66	8.73	14.31	11.22	16.50	21.52	12.75	6.99	2.31
1994	5.59	8.77	14.44	11.29	16.48	21.45	12.66	6.99	2.32
1995	6.03	9.11	14.62	11.31	16.33	21.11	12.41	6.84	2.24
1996	7.04	9.51	14.78	11.18	16.00	20.62	12.09	6.64	2.14
1997	8.01	9.94	14.90	11.00	15.63	20.07	11.80	6.50	2.14
1998	8.69	10.38	15.15	10.97	15.37	19.54	11.41	6.36	2.14
1999	9.48	10.84	15.29	10.84	15.10	19.13	11.12	6.16	2.04
2000	10.49	11.09	15.25	10.72	14.85	18.69	10.87	6.03	2.02

Table 4.--Tax Shares by Percentile Size-Classes, 1979-2000 (Percentages)

Year	Top 0.1%	0.1-1%	1-5%	5-10%	10-20%	20-40%	40-60%	60-80%	Low 20%
1979	7.38	12.37	17.53	12.54	17.00	20.25	9.71	3.07	0.16
1980	6.20	11.69	17.68	12.77	17.39	20.66	10.04	3.27	0.31
1981	6.28	11.14	17.59	12.92	17.62	20.76	9.99	3.39	0.31
1982	7.37	11.62	17.02	12.57	17.19	20.74	9.70	3.42	0.36
1983	8.51	11.88	16.91	12.51	16.82	20.18	9.52	3.31	0.35
1984	9.42	11.99	16.94	12.47	16.51	19.56	9.38	3.33	0.39
1985	9.50	12.55	16.97	12.51	16.32	19.28	9.22	3.28	0.37
1986	11.97	13.40	17.01	11.81	15.69	18.17	8.70	2.95	0.31
1987	10.20	14.13	18.59	12.35	15.71	17.92	8.13	2.59	0.35
1988	12.48	14.68	18.09	11.72	15.22	17.26	7.72	2.49	0.31
1989	10.57	14.25	18.73	11.93	15.71	18.02	7.92	2.53	0.30
1990	10.31	14.40	18.44	11.83	16.05	18.03	8.09	2.49	0.32
1991	9.94	14.11	18.88	12.09	16.19	18.23	7.84	2.40	0.28
1992	11.77	14.97	18.68	11.78	15.46	17.46	7.40	2.23	0.26
1993	12.67	15.65	18.53	11.95	14.84	16.92	7.12	2.09	0.23
1994	12.45	15.63	18.82	12.00	14.94	16.77	7.02	2.09	0.23
1995	13.39	16.17	18.73	11.97	14.55	16.27	6.70	2.00	0.23
1996	14.88	16.74	18.74	11.60	14.01	15.53	6.39	1.88	0.22
1997	15.39	17.30	18.75	11.44	13.72	15.00	6.30	1.86	0.24
1998	16.33	17.37	19.28	11.48	13.20	14.30	5.92	1.87	0.25
1999	17.33	17.71	19.62	11.21	12.88	13.60	5.66	1.74	0.23
2000	18.70	17.60	19.40	11.02	12.64	13.18	5.51	1.71	0.24
2000 Rebate	19.44	18.24	19.88	11.09	12.43	12.44	4.85	1.39	0.23

Table 5.--Average Tax Rates by Percentile Size-Classes, 1979-2000 (Percentages)

Year	Total	Top 0.1%	0.1 - 1%	1-5%	5-10%	10-20%	20-40%	40-60%	60-80%	Low 20%
1979	13.96	31.41	27.43	19.42	16.08	14.01	11.82	9.15	5.11	0.76
1980	14.58	24.86	26.42	20.70	17.12	14.97	12.64	9.95	5.75	1.61
1981	15.12	27.85	26.77	21.14	17.77	15.60	13.19	10.29	6.19	1.63
1982	14.01	26.41	25.93	19.14	16.09	14.16	12.26	9.38	5.78	1.73
1983	12.98	25.69	23.44	17.31	14.79	12.90	11.20	8.68	5.32	1.61
1984	12.93	24.11	22.98	17.14	14.75	12.74	10.98	8.65	5.46	1.82
1985	12.91	24.31	22.72	16.92	14.70	12.60	10.91	8.61	5.43	1.76
1986	13.08	21.69	21.83	16.91	14.41	12.72	10.91	8.67	5.29	1.59
1987	12.92	26.82	23.32	17.81	14.33	12.07	10.24	7.80	4.56	1.90
1988	13.09	24.41	22.13	17.50	14.06	12.28	10.38	7.82	4.62	1.82
1989	12.97	22.92	21.45	17.61	13.95	12.41	10.69	7.96	4.63	1.75
1990	12.79	22.83	21.25	17.08	13.61	12.46	10.55	7.97	4.50	1.80
1991	12.53	24.81	21.15	16.70	13.38	12.16	10.40	7.55	4.22	1.52
1992	12.66	25.44	21.21	16.67	13.37	11.95	10.28	7.36	4.04	1.41
1993	13.06	29.20	23.41	16.90	13.90	11.74	10.27	7.29	3.91	1.30
1994	13.26	29.50	23.61	17.28	14.09	12.02	10.40	7.35	3.95	1.33
1995	13.63	30.22	24.19	17.46	14.42	12.14	10.50	7.36	3.99	1.37
1996	14.09	29.77	24.81	17.87	14.62	12.34	10.61	7.45	3.99	1.44
1997	14.30	27.46	24.88	17.99	14.87	12.55	10.69	7.64	4.09	1.63
1998	14.01	26.34	23.45	17.84	14.67	12.03	10.26	7.27	4.11	1.61
1999	14.42	26.37	23.55	18.50	14.92	12.30	10.25	7.35	4.08	1.66
2000	14.85	26.48	23.57	18.90	15.28	12.65	10.47	7.52	4.20	1.78
2000 Rebate	14.28	26.47	23.49	18.62	14.78	11.96	9.50	6.37	3.30	1.64