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Using an Individual Income Tax Panel File To Measure Changes in Marginal Tax Rates: Opportunities and Limitations

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The Statistics of Income (SOI) Division's mission is to produce and publish impartial data on the operation of the Federal tax system. SOI microdata files, tabulations, and articles are widely accepted as the starting point for tax policy discussions by individuals with diverse political perspectives. But virtually all of the tabulations and articles produced by SOI are derived from cross-sectional samples. Recently, SOI released a longitudinal or panel sample of individual income tax returns covering the years 1999 to 2003 to the Office of Tax Analysis at the Treasury Department (OTA) and to the Joint Committee on Taxation (JCT). The dilemma facing SOI, however, is that, while it has produced a longitudinal microdata file, thus fulfilling the first part of its mission, the publication of unbiased and meaningful income tax tabulations using a longitudinal or panel sample is unchartered territory. To that end, SOI formed a Panel Data Users Group to assist SOI in developing ways to publicly release longitudinal individual income tax return data.[1] This paper describes initial efforts by members of the Panel Group, in cooperation with SOI, to produce output from the 1999-2003 panel file.

The Panel Data Users Group has a threefold mission. First, it will attempt to document issues that make the use of a longitudinal file more of a challenge than a cross-sectional file. Weber (2006) discusses the potential complications that arise when summarizing panel data as compared to cross-sectional information. For example, the marital status of an individual can change from married to single or single to married in a panel data set. Such life changes must be taken into account if data tabulations are to avoid either missing or double-counting individual tax filers. One solution to the changing marital status problem is to track only the primary tax filer and consider this person as the sole unit of analysis. However, 95 percent of all primary tax filers listed on jointly filed returns are male. Thus, a significant gender bias would be introduced with such an approach. An alternative solution would be to follow the two individuals separately. The primary problem with this solution is determining an appropriate method for dividing assets and tax liability. But even if assets and tax liability were accurately divided by some method, the model could be challenged on the grounds that the two individuals make joint economic decisions while married. Another possible approach is to limit the tabulations to those panel units where the filing unit (married couple or separate individual) has not changed. However, such a limitation raises issues of potential bias since the results would not be representative of tax filing units where marital status changes. These and other possible concerns need to be addressed when considering how panel data should be tabulated and described. For purposes of this paper, the last method, selecting returns with a constant marital status, was used to construct the data set, hereafter referred to as the Modified Panel.[2]

A second mission of the Panel Data Users Group is to help SOI develop standard impartial tabulations that can be published by SOI. For example, tabulations that show average tax rates, marginal tax rates, and tax shares by some measure of permanent, average, or lifetime income may be of interest. Other researchers may be interested in data that show how certain tax provisions affect measures of horizontal equity (the equal treatment of equals). Developing standards for summarizing longitudinal tax data remains an ongoing

[1] When the Panel Users Group began, one author, Ralph Rector, was also a member of the SOI Advisory Panel. Rector is now at the U.S. Treasury Department. The views expressed in this paper are solely those of the authors and should not be interpreted as reflecting the views of the Treasury Department.

[2] For purposes of this paper, a filing status of Married Filing Separately is considered unmarried.

effort. This paper includes some tables that may help SOI eventually produce a standard set of tabulations.

A third mission is to develop ways for outside researchers to conduct studies based on longitudinal files without the use of a public-use file. Data for this paper were produced using computer programs that Data Users Group members submitted to SOI. In particular, the Panel Group submitted to SOI a simple marginal tax rate (MTR) program to calculate the average marginal tax rate on wage and salary income for tax returns in the longitudinal file. Members of the Data Users Group wanted to produce tabular information that might otherwise not be available but also wanted to minimize SOI's commitment of resources to the effort. All the programs were run by an SOI employee who reviewed the tabular output before making the results available to members of the Data Users Group.

This paper describes output from the programs submitted by the Panel Group. It also raises the question of whether the SOI can use a longitudinal file to calculate and present tabulations on marginal tax rates (or other variables of interest) in a manner that is consistent with its mission. For example, can SOI tabulations and articles sufficiently deal with issues related to income mobility, changes in income over an individual's life cycle, transitory fluctuations in income, and returns that have a change in filing status over the sample in a way that is viewed as impartial? While the programs used to construct the underlying file were developed by SOI, the computer programs used to produce the various tabulations in this paper were created by data users. In keeping with the mission of promoting researcher access to longitudinal data, these programs will be posted online for future use, and perhaps alteration, by other researchers.

▶ Data

The source of the data used in this paper is the 1999-2003 SOI Individual Income Tax Return Edited Panel. Each year, SOI produces a cross-sectional sample of individual tax returns. For Tax Year 1999, the cross-sectional sample included 176,966 returns sampled from 92 stratifications. The 1999-Based Edited Panel is primarily a subset of the 1999 cross-sectional sample and contains 83,434 returns. The stratifications were collapsed from 92 to 21.

The 1999-Based Edited Panel represents a weighted population total of 127.0 million Tax Year 1999 returns. As mentioned above, the dataset used in this paper was modified to include only those panel units that were present in all years (1999-2003) and for which there was no change in marital status. The weighted number of panel units (or base-year returns) removed due to this modification is approximately 39.5 million returns. In addition, all base-year dependent returns (7.1 million) were removed as well. The final weighted total of Tax Year 1999 returns or panel units in the Modified Panel used for this paper is 80.5 million.

The advantage of a panel file to tax researchers is the ability to analyze changes for the same tax return filer over the sample period. Tracking taxpayers on a multiyear basis is particularly important if changes in income are large enough to place taxpayers in different income classes over time. As shown in Table 1, 46 percent of taxpayers in the panel file had a change in wage and salary income sufficient to place them in a different income class over a 5-year period.[3] With the exception of the smallest class, roughly half of the returns moved out of the 1999 income class. For example, after adjusting incomes for inflation, only 41 percent of returns with 1999 wages that ranged from $75,000 to $100,000 remained in that class in 2003. About 22 percent of the returns moved up to the $100,000 to $200,000 class, and about 20 percent of the returns moved down to the $50,000 to $75,000 class. Such movements make it difficult to use a series of single-year samples to gauge the multiyear effects of tax changes.

▶ Marginal Tax Rate Calculator

In an attempt to provide additional information about the multiyear effects of tax policy, this paper uses the 1999-Based Edited Panel in combination with a program that calculates marginal tax rates. The program is structured as a series of logical statements that deter-

[3] The changes in Table 1 are intended to convey a general sense of movement between income classes. Any measure of movement between income classes depends on the extent of mobility and the choice of widths for the income brackets.

Table 1. Frequency of 1999 Wage Income, by 2003 Wage Income[1]

1999 Wage Income	2003 Wage Income (Adjusted for Inflation)								Total
	0-10,000	10,000-20,000	20,000-30,000	30,000-50,000	50,000-75,000	75,000-100,000	100,000-200,000	More than 200,000	
0-10,000	15,500 77	2,620 13	1,080 5	623 3	170 1	35 0	34 0	9 0	20,071
10,000-20,000	2,870 24	4,980 41	2,900 24	1,090 9	184 2	23 0	16 0	2 0	12,065
20,000-30,000	1,380 13	1,690 15	4,440 40	3,030 28	382 3	70 1	25 0	4 0	11,021
30,000-50,000	1,470 9	837 5	1,810 12	8,010 51	3,000 19	349 2	117 1	11 0	15,605
50,000-75,000	730 6	263 2	413 4	1,880 17	5,690 50	1,920 17	376 3	21 0	11,293
75,000-100,000	266 5	89 2	111 2	349 7	1,010 20	2,120 41	1,130 22	36 1	5,111
100,000-200,000	251 6	63 1	90 2	178 4	339 8	648 15	2,380 56	309 7	4,257
More than 200,000	63 6	9 1	26 2	24 2	35 3	35 3	268 26	574 56	1,034
Total	22,530 28	10,551 13	10,869 14	15,183 19	10,810 13	5,199 6	4,347 5	966 1	80,456 100

1. Shown by frequency and row percent.

mine the marginal tax rate for each return in the sample. The marginal tax rates take into account the effects of various income floors and phaseouts. For example, the program tests whether a return is subject to the AMT; if so, the program tests which AMT rate bracket the return is in, and, if the return is in the 26-percent AMT rate bracket, the program tests if the return is in the phaseout range. If the return is not subject to the AMT, then the regular tax rate is assumed to determine the individual's MTR, and a number of other conditions are examined. Note that this methodology is very different from that of standard tax calculators used by JCT and OTA. Most importantly, the program is not useful in examining questions about how changes in a tax provision would affect the number of people who are subject to that provision or the change in revenue because it does not account for potential changes in an individual's tax return data in response to tax policy changes. For example, the MTR program would not be useful in examining how many more taxpayers would have been subject to the AMT if the 2003 AMT exemption amount were reduced because it does not recalculate the return data under the new rules, and, thus, the number of returns subject to the AMT would not change.

The marginal tax rate program accounts for the following provisions: the inclusion of Social Security income in taxable income, the alternative minimum tax, the personal exemption phaseout, the limitation on itemized deductions (ignoring the 80-percent maximum phaseout rule), the child care credit, the education credit, the child credit, and the earned income tax

credit. A number of provisions are not included in the current marginal tax rate program, such as credits for adoption expenses or for the elderly and permanently disabled. The calculator should produce reliable marginal tax rate calculations for the vast majority of filers in the sample.

▶ Comparison of Cross-Sectional and Panel Files

As noted above, examining the problems of using panel files and developing potential solutions is not the primary focus of this paper. Nonetheless, these are extremely important issues that deserve at least a brief discussion and must be addressed in future research. As a first step, we compare the number of returns and average marginal tax rates in the cross-sectional sample to those in the 1999-Based Edited Panel. We then compare the number of returns and average marginal tax rates in the 1999-Based Edited Panel and the Modified Panel.

After selecting tax returns that are for the same tax year and removing returns for individuals claimed as a dependent on another tax return, population estimates from the cross-sectional sample indicate that 49.2 million married joint returns were filed in Tax Year 1999. The comparable number for the 1999-Based Edited Panel is 50 million. The edited panel has a slightly larger number of weighted records because it includes tax returns that are filed after the cutoff date for including records in the cross-sectional sample produced by SOI. However, for reasons discussed in Weber (2006), the sample size for the edited panel falls over time. In addition, some married individuals change their filing statuses over time because they file separately in later years or because their marriages end. Figure 1 shows changes in the weighted number of married joint returns between 1999 and 2003. Approximately the same number of tax returns is represented in the two files in 2001. By 2003, the population estimate for the edited panel is only about 1 million (about 2 percent) below the cross-sectional file.

Figure 2 compares the weighted record counts for nonmarried filers (and married individuals filing separately). As is the case for married returns, the weighted number of nonmarried returns is slightly larger in the edited panel in 1999. The number falls steadily as tax returns drop out of the sample. The weighted count in the edited panel is almost 10 million (about 15 percent) below the number of cross-sectional records in Tax Year 2003.

Figure 1. Comparison of Weighted Number of Married Joint Returns for Cross-Sectional and 1999 Panel

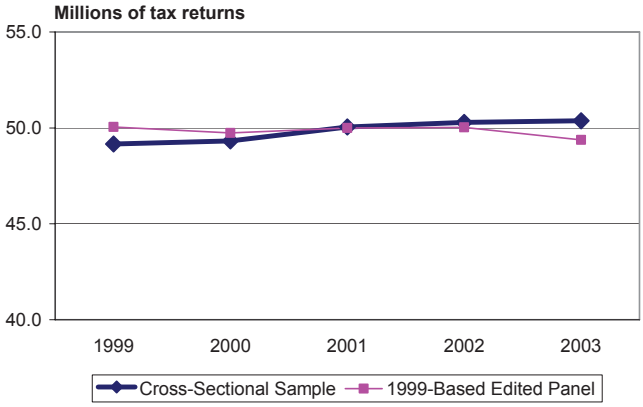
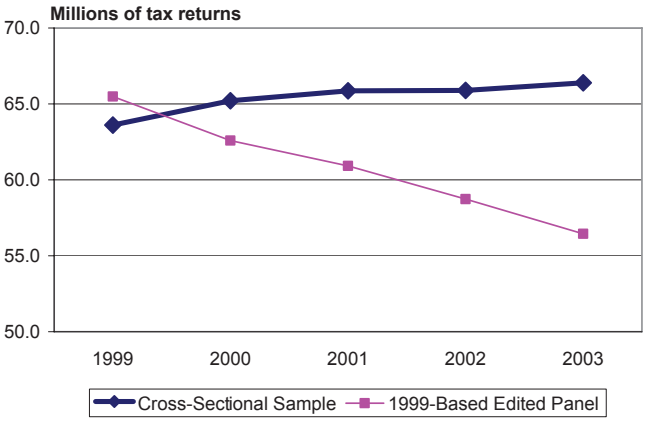


Figure 2. Comparison of Weighted Number of Non-Married Returns for Cross-Sectional and 1999 Panel



The declining number of tax returns can affect the ability of the panel to produce estimates that accurately reflect the population of tax return filers. Detailed tests for the presence of bias are beyond the scope of this paper. However, one simple measure is to compare estimates of marginal tax rates using a series of

[1] The imputation was produced through the SRMI technique

cross-sectional files with estimates from the edited panel across different tax years and different income classes. Figure 3 shows the percentage point difference in the average marginal tax rates for all returns. In 1999, the absolute value of the percentage point differences are relatively small, ranging from 0.24 for those with AGI greater than $200,000 to only 0.03 for those with incomes between $0 and $10,000. By 2003, these differences increase especially for those with incomes below $20,000. However, they still do not exceed 0.3 percentage points.

Although average marginal tax rates in the 1999-Based Edited Panel are relatively close to those produced from the cross-sectional files, the method used to construct the Modified Panel is likely to amplify the existing differences and add new discrepancies. The Modified Panel is created by selecting records from the 1999-Based Edited Panel that are present in each year and do not change marital status. This selection criterion reduces the size of the panel file and increases the risk of producing results that are not representative for the population as a whole. Figure 4 shows the effect the selection criterion has by income class in Tax Year 2003. The weighted number of returns in the 1999-Based Edited Panel is within 10 percent of the population estimate from the 2003 cross-sectional sample after selecting records for the same tax year and excluding dependent returns. About 70 percent of the population estimate is represented in the Modified Panel after the selection filters are applied. However, the proportion of the population represented in the Modified Panel varies across income classes. About 70 percent of the population with incomes between $0 and $10,000 is represented in the 1999-Based Edited Panel. However, this percentage falls to about 45 percent for the Modified Panel. In contrast, returns with incomes over $30,000 have a population estimate that differs from the cross-sectional estimate by 25 percent or less. As a result, calculations for returns in the Modified Panel with incomes over $30,000 are less likely to be affected by the selection criterion.

An additional complication is caused by the fact that the method of record selection used to create the Modified Panel can produce biased results even when the population estimates remain relatively unchanged. As previously indicated, it is not possible in this paper to produce a detailed analysis of such biases. However, as was the case with the cross-sectional and edited panel files, it is possible to compare estimates of average marginal tax rates between the 1999-Based Edited Panel and the Modified Panel.

Figure 5 shows the percentage point differences in average marginal tax rates between the 1999-Based Edited Panel and the Modified Panel by income class for Tax Year 1999. For example, single records in the $0 to $10,000 income class have an average marginal tax rate that is about 1 percentage point higher in the

Figure 3. Percentage Point Difference Between MTRs in Cross-Sectional and 1999 Panel, for All Filing Types, in Tax Years 1999 and 2002

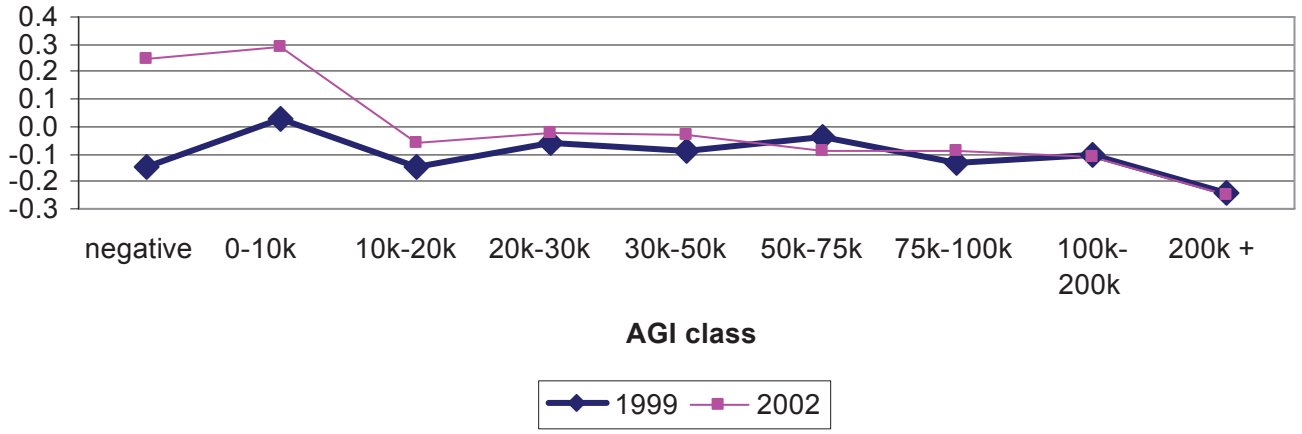


Figure 4. Weighted Number of Records in 1999 Panel and Modified Panel as a Percentage of the Cross-Sectional File, Tax Year 2003

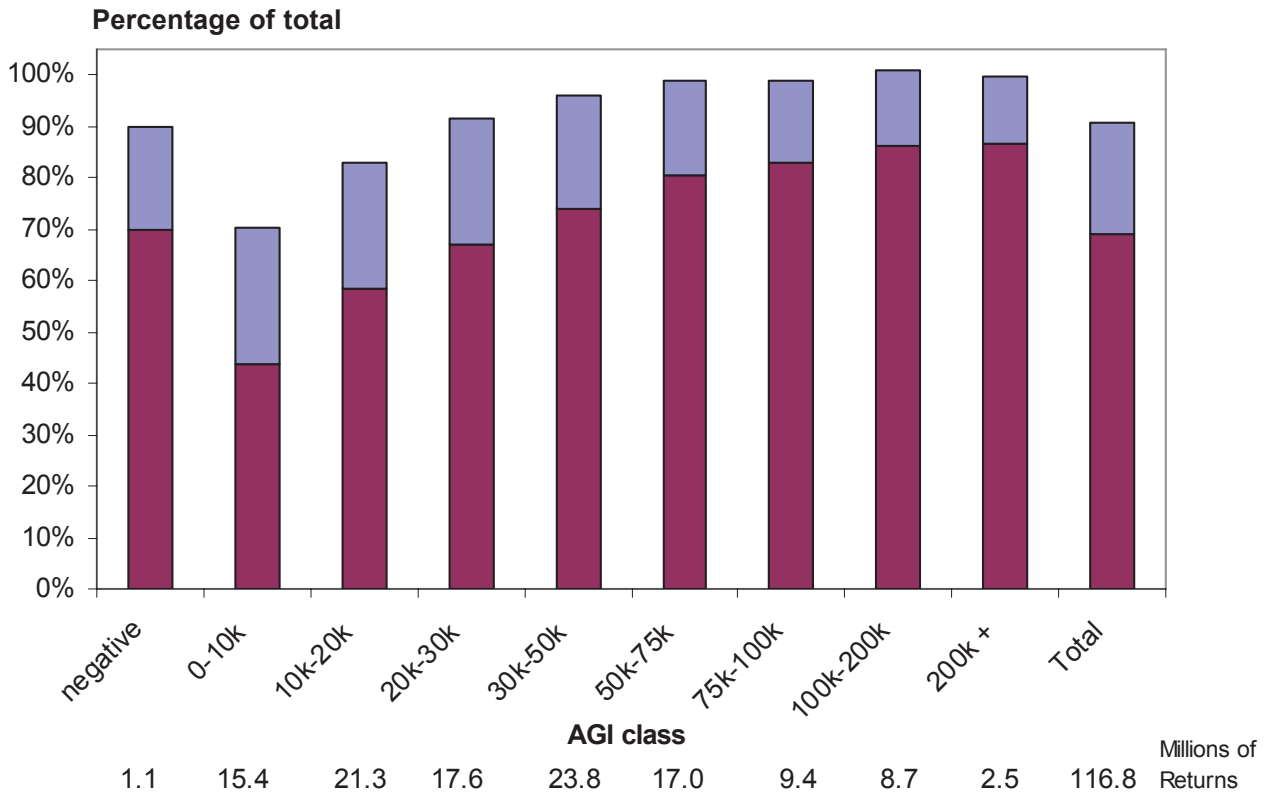
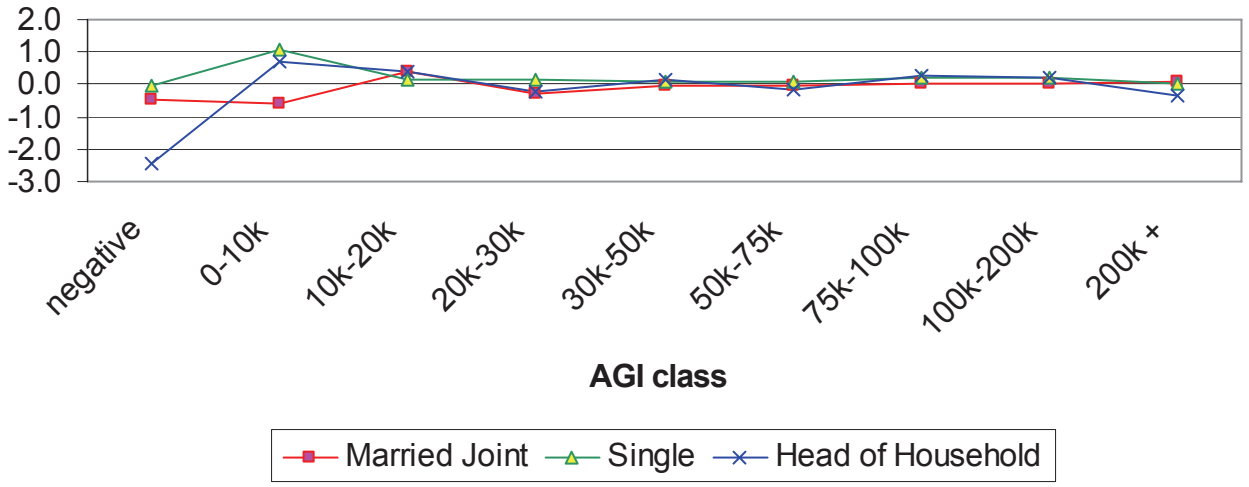


Figure 5. Percentage Point Difference between MTRs in the 1999 Panel and Modified Panel, by Filing Type and Income Class, in Tax Year 1999



Modified Panel than they are in the 1999-Based Edited Panel. By contrast, the average marginal tax rate for married joint returns in this class is over half a percentage point lower in the Modified Panel than in the 1999-Based Edited Panel. The figure indicates that average marginal tax rates for the other income classes are much closer.

In light of the difference in the population estimates for the $0-10,000 income class in 2003 shown in Figure 4, it is not surprising that the average marginal tax rates for this class are also different. Figure 6 shows that, for some filing types in this income class, estimates of average marginal tax rates from the 1999-Based Edited Panel and the Modified Panel are farther apart in 2003 than in 1999. Average marginal rates for married joint returns with incomes between $0 and $10,000 were 1.8 percentage points higher in the Modified Panel than in the 1999-Based Edited Panel. The estimate for head of household returns in this income class is about 0.7 percentage points higher. However, the singles in this income class were almost identical. Larger differences also emerged for returns with incomes between $20,000 and $30,000. However, none of the differences for the other income classes exceeded half a percent, and most were within 0.15 percentage points. Thus, while some caution is still in order when using estimates from the Modified Panel file, particularly for returns in the lowest income class, it seems reasonable to assume that the file produces useful estimates for most income classes and each filing type.

▶ Results from the Data Users Group Marginal Tax Rate Program

As a first step in this process of using the panel files, we present marginal tax rates on wage income calculated from the Data Users Group marginal tax rate program. In this section, we use the Modified Panel described above to estimate changes in marginal tax rates from 1999 to 2003 by income and filing status. The income classifier is either annual adjusted gross income or average adjusted gross income. Returns are grouped into four filing status categories: single, joint, head of household, and married filing separately.

Changes in Marginal Tax Rates by Annual and Average Income

Table 2 reports return counts and average marginal tax rates for each year from 1999 to 2003 by annual adjusted gross income and filing status. The table shows that the average marginal tax rate for all returns in the

Figure 6. Percentage Point Difference between MTRs in the 1999 Panel and Modified Panel, by Filing Type and Income Class, in Tax Year 2003

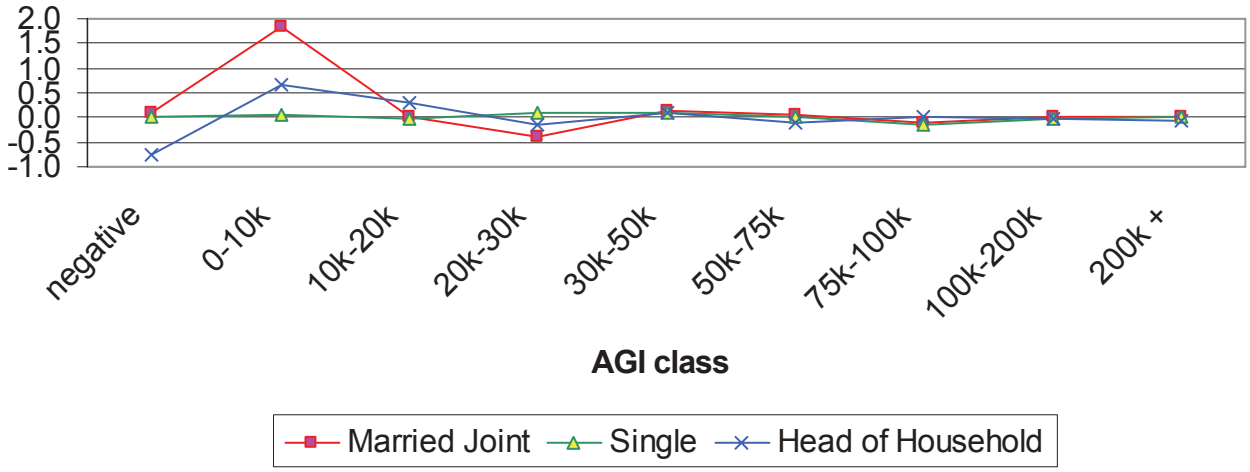


Table 2. Returns Counts and Average Marginal Tax Rates, by Annual AGI and Filing Status

Tax Year 1999, Inflation-Adjusted AGI in 1999

	Return counts					AMTR				
	Single	Joint	HH	MFS	Total	Single	Joint	HH	MFS	Total
Negative	172	223	16	14	425	-0.3	-1.4	-6.7	0.1	-1.1
0-10k	4238	1143	1884	97	7361	3.9	-9.1	-23.9	5.8	-5.2
10k-20k	6999	3120	3859	158	14137	14.5	10.8	16.4	14.1	14.2
20k-30k	5695	3928	2539	240	12401	15.8	18.5	25.7	16.0	18.7
30k-50k	6104	8617	2239	272	17231	24.2	16.0	16.6	25.7	19.1
50k-75k	2529	10506	751	81	13867	27.7	20.6	25.3	28.2	22.2
75k-100k	735	5705	175	32	6647	29.5	28.1	28.7	27.9	28.2
100k-200k	659	5467	108	28	6261	31.5	29.9	31.0	31.1	30.1
200k +	206	1869	28	22	2126	35.7	37.8	36.4	34.2	37.6
Total	27337	40577	11599	943	80456	17.4	20.8	12.9	19.5	18.5

Tax Year 2000, Inflation-Adjusted AGI in 2000

	Return counts					AMTR				
	Single	Joint	HH	MFS	Total	Single	Joint	HH	MFS	Total
Negative	185	255	26	8	474	-0.3	-0.3	0.0	0.2	-0.2
0-10k	3225	965	1595	74	5860	3.7	-7.9	-22.4	5.5	-5.3
10k-20k	6548	2905	3770	116	13340	14.6	10.5	16.0	13.6	14.1
20k-30k	5804	3723	2689	194	12409	15.9	18.8	26.2	16.2	19.0
30k-50k	6831	8304	2428	225	17787	23.9	16.2	16.4	24.7	19.3
50k-75k	2844	9966	907	107	13824	27.4	20.3	25.2	28.0	22.1
75k-100k	910	6132	212	17	7271	29.3	27.9	29.0	30.9	28.1
100k-200k	752	6176	101	33	7062	31.0	29.7	30.1	32.5	29.8
200k +	272	2103	32	13	2420	36.0	37.5	36.8	35.9	37.3
Total	27371	40528	11761	787	80447	18.3	21.3	14.3	20.0	19.2

Tax Year 2001, Inflation-Adjusted AGI in 2001

	Return counts					AMTR				
	Single	Joint	HH	MFS	Total	Single	Joint	HH	MFS	Total
Negative	215	267	31	12	525	-0.7	-1.2	-3.3	0.0	-1.1
0-10k	3172	1065	1426	70	5733	3.1	-7.8	-25.8	2.9	-6.2
10k-20k	6213	3014	3592	116	12935	14.4	7.7	13.6	13.5	12.6
20k-30k	5699	3592	2907	178	12376	16.0	19.3	27.3	15.3	19.6
30k-50k	7098	7906	2549	239	17792	22.9	16.5	16.6	24.0	19.2
50k-75k	3037	10056	962	82	14136	27.3	19.5	24.1	27.4	21.5
75k-100k	957	6247	208	35	7447	28.7	27.1	28.9	30.1	27.3
100k-200k	718	6386	154	14	7271	31.0	29.1	28.3	35.0	29.3
200k +	215	1970	27	12	2224	35.8	37.4	37.7	31.4	37.2
Total	27323	40503	11855	758	80440	18.0	20.7	14.2	19.0	18.8

sample increased from 18.5 percent in 1999 to 19.2 percent in 2000. From 2000 to 2003, the average marginal tax rate for all returns declined from 19.2 percent to 15.3 percent. The increase in the average marginal tax rate for all returns from 1999 to 2000 resulted from an increase in average marginal tax rates for returns with negative adjusted gross income, adjusted gross income from $20,000 to $30,000, and adjusted gross income from $30,000 to $50,000, while marginal tax rates decreased slightly for returns in the remaining income cohorts. By 2002, the average marginal tax rate for every income cohort except the lowest was lower than in 1999.

Table 2. Returns Counts and Average Marginal Tax Rates, by Annual AGI and Filing Status—Continued

Tax Year 2002, Inflation-Adjusted AGI in 2002

	Return counts					AMTR				
	Single	Joint	HH	MFS	Total	Single	Joint	HH	MFS	Total
Negative	276	373	36	15	699	-0.3	-0.9	-3.3	0.1	-0.7
0-10k	3398	1229	1325	74	6027	0.7	-6.5	-26.1	2.6	-6.6
10k-20k	5901	3126	3553	124	12704	12.0	3.6	8.0	10.7	8.8
20k-30k	5433	3671	2985	158	12247	15.9	15.2	25.2	14.8	17.9
30k-50k	7164	7660	2619	261	17704	21.7	16.8	16.8	23.5	18.9
50k-75k	3157	9761	963	74	13955	26.7	18.5	22.9	26.6	20.7
75k-100k	971	6474	249	29	7724	28.2	26.0	27.9	29.6	26.4
100k-200k	777	6361	120	15	7273	30.0	28.4	28.7	33.7	28.6
200k +	211	1842	35	12	2100	34.4	35.9	33.6	36.5	35.8
Total	27288	40497	11885	762	80433	16.7	19.3	12.3	18.1	17.4

Tax Year 2003, Inflation-Adjusted AGI in 2003

	Return counts					AMTR				
	Single	Joint	HH	MFS	Total	Single	Joint	HH	MFS	Total
Negative	326	375	30	14	745	-0.6	-1.9	-5.6	0.2	-1.4
0-10k	3865	1407	1352	95	6718	0.2	-6.6	-25.7	1.8	-6.4
10k-20k	5711	3318	3274	120	12423	10.8	1.7	5.8	9.0	7.0
20k-30k	5119	3563	2973	171	11826	15.6	12.1	21.8	13.7	16.1
30k-50k	6982	7592	2699	288	17561	20.3	14.6	16.2	18.6	17.1
50k-75k	3318	9218	1011	98	13644	24.6	15.6	20.6	25.2	18.2
75k-100k	1015	6528	246	41	7830	25.6	21.4	26.8	26.7	22.2
100k-200k	759	6600	144	19	7523	27.5	26.3	27.2	30.7	26.5
200k +	217	1889	38	14	2158	31.5	33.0	31.3	27.9	32.8
Total	27312	40491	11766	860	80429	15.4	16.5	10.6	15.7	15.3

Table 3 shows the percentage change in average marginal tax rates by adjusted gross income and filing status from 1999 to 2003. The percentage changes in average marginal tax rates were different across income cohorts. The largest percentage decrease in average marginal tax rates occurred in the bottom three income cohorts. However, for every income cohort, the marginal tax rate decreased by at least 10 percent over this period. From 1999 to 2003, the decrease in the average marginal tax rate for all returns was 18 percent. The percentage changes in average marginal tax rates also differed by filing status. The percentage decrease in the marginal tax rate for joint returns (21 percent) is almost twice as large as for single returns (12 percent). Average marginal tax rates declined for every income and filing status category except for joint returns in the zero to $10,000 income cohort, head of household returns in the negative income cohort, and married filing separate returns in the negative income cohort.

Table 3. Percentage Change in Average Marginal Tax Rates, by AGI Class and Filing Status from 1999 to 2003

Inflation-Adjusted AGI	Single	Joint	HH	MFS	Total
Negative	-112	-38	17	138	-31
0-10k	-95	27	-7	-68	-22
10k-20k	-25	-84	-65	-36	-50
20k-30k	-1	-35	-15	-14	-14
30k-50k	-16	-9	-3	-27	-10
50k-75k	-11	-25	-18	-11	-18
75k-100k	-13	-24	-6	-4	-21
100k-200k	-13	-12	-12	-1	-12
200k +	-12	-13	-14	-19	-13
Total	-12	-21	-17	-19	-18

Table 4 reports return counts and marginal tax rates for each year from 1999 to 2003 by average adjusted gross income (a 5-year average of adjusted gross income) and filing status. Averaging income across the 5-year period mitigates the influence of transitory fluctuations in income by reducing the number of returns in the extreme income cohorts. For example, using average adjusted gross income to classify returns rather than annual adjusted gross income decreased the number of returns with less than $10,000 and more than $100,000 in AGI. Using average AGI as the income classifier also reduced the dispersion in average marginal tax rates across the income cohorts. The average marginal tax rates for returns with less than $10,000 in AGI increased, and the average marginal tax rates for returns with more than $200,000 in AGI decreased. This relationship also holds across filing status except for head of household returns in the lowest income cohort. Heads

Table 4. Returns Counts and Average Marginal Tax Rates, by Average AGI and Filing Status

Tax Year 1999, Inflation-Adjusted Average AGI 1999-2003

	Return counts					AMTR				
	Single	Joint	HH	MFS	Total	Single	Joint	HH	MFS	Total
Negative	148	188	7	12	355	2.2	2.3	-1.6	7.7	2.3
0-10k	2870	792	1357	77	5096	4.5	-3.5	-16.4	7.0	-2.3
10k-20k	7282	3123	4109	160	14673	13.0	9.7	10.0	13.0	11.5
20k-30k	6309	4020	2685	254	13267	16.2	16.4	22.1	17.7	17.5
30k-50k	6623	8999	2353	279	18253	22.5	16.8	18.4	23.2	19.2
50k-75k	2608	10379	790	102	13878	27.1	20.7	24.0	27.5	22.1
75k-100k	750	5818	186	27	6780	28.9	26.9	27.5	31.8	27.2
100k-200k	559	5500	80	18	6157	31.6	29.8	30.9	32.7	30.0
200k +	189	1759	34	15	1997	34.5	36.8	33.8	32.6	36.5
Total	27337	40577	11599	943	80456	17.4	20.8	12.9	19.5	18.5

Tax Year 2000, Inflation-Adjusted Average AGI 1999-2003

	Return counts					AMTR				
	Single	Joint	HH	MFS	Total	Single	Joint	HH	MFS	Total
Negative	142	186	13	14	355	0.4	1.6	-2.8	3.9	1.1
0-10k	2831	790	1416	59	5096	5.3	-3.2	-16.0	5.9	-1.9
10k-20k	7244	3114	4177	136	14672	14.0	10.3	13.8	13.6	13.1
20k-30k	6345	4014	2691	216	13265	16.7	17.1	23.2	17.5	18.2
30k-50k	6654	8983	2399	215	18251	23.8	16.8	17.9	24.6	19.6
50k-75k	2632	10370	784	90	13875	27.4	21.3	24.7	28.0	22.7
75k-100k	766	5815	174	25	6779	29.4	27.6	28.4	31.9	27.8
100k-200k	561	5497	76	22	6157	32.2	30.3	31.3	35.3	30.5
200k +	196	1759	31	11	1997	35.3	36.9	34.8	29.1	36.7
Total	27371	40528	11761	787	80447	18.3	21.3	14.3	20.0	19.2

Tax Year 2001, Inflation-Adjusted Average AGI 1999-2003

	Return counts					AMTR				
	Single	Joint	HH	MFS	Total	Single	Joint	HH	MFS	Total
Negative	146	186	13	10	355	-0.1	0.1	-13.0	0.1	-0.5
0-10k	2832	788	1415	61	5096	4.3	-3.9	-20.0	4.0	-3.7
10k-20k	7131	3109	4297	134	14671	13.9	7.8	14.6	12.5	12.8
20k-30k	6372	4008	2672	213	13265	16.4	17.2	24.3	17.0	18.2
30k-50k	6676	8982	2389	203	18250	23.9	16.6	17.3	23.9	19.5
50k-75k	2638	10364	781	90	13873	26.9	21.0	24.2	27.3	22.3
75k-100k	774	5812	174	19	6778	28.5	26.9	28.3	32.8	27.1
100k-200k	558	5495	83	18	6155	31.2	29.5	30.1	33.2	29.7
200k +	195	1759	31	11	1997	33.5	36.1	33.2	28.8	35.8
Total	27323	40503	11855	758	80440	18.0	20.7	14.2	19.0	18.8

Table 4. Returns Counts and Average Marginal Tax Rates, by Average AGI and Filing Status—Continued

Tax Year 2002, Inflation-Adjusted Average AGI 1999-2003

	Return counts					AMTR				
	Single	Joint	HH	MFS	Total	Single	Joint	HH	MFS	Total
Negative	142	186	17	10	355	0.4	0.1	-3.7	0.2	0.0
0-10k	2820	787	1439	49	5095	1.4	-5.0	-19.3	2.3	-5.4
10k-20k	7020	3110	4388	152	14670	11.9	4.6	11.3	11.0	10.2
20k-30k	6351	4005	2705	203	13264	15.8	14.1	22.3	16.5	16.6
30k-50k	6745	8983	2314	207	18249	23.0	15.8	16.9	22.8	18.7
50k-75k	2680	10361	735	94	13870	26.2	20.2	23.4	25.5	21.5
75k-100k	768	5812	180	19	6778	27.6	25.8	27.3	31.4	26.1
100k-200k	565	5495	77	18	6155	29.9	28.3	27.9	31.0	28.5
200k +	197	1759	30	11	1997	31.7	34.0	31.5	34.8	33.7
Total	27288	40497	11885	762	80433	16.7	19.3	12.3	18.1	17.4

Tax Year 2003, Inflation-Adjusted Average AGI 1999-2003

	Return counts					AMTR				
	Single	Joint	HH	MFS	Total	Single	Joint	HH	MFS	Total
Negative	146	186	15	7	355	0.5	1.0	-6.9	0.4	0.4
0-10k	2832	785	1419	59	5095	2.0	-4.1	-17.7	1.3	-4.4
10k-20k	7069	3110	4329	162	14670	10.5	2.4	9.1	10.1	8.4
20k-30k	6332	4003	2705	222	13262	15.1	10.5	18.4	13.3	14.3
30k-50k	6743	8983	2284	240	18249	20.9	13.6	16.5	19.3	16.7
50k-75k	2656	10359	737	116	13868	23.7	16.9	21.2	23.6	18.4
75k-100k	773	5812	170	23	6778	25.1	22.3	25.9	28.4	22.8
100k-200k	565	5494	76	18	6154	26.7	25.8	27.5	26.6	25.9
200k +	195	1759	29	13	1997	27.8	30.7	27.2	27.2	30.4
Total	27312	40491	11766	860	80429	15.4	16.5	10.6	15.7	15.3

of households in the lowest income cohort had a lower average marginal tax rate using average AGI calculations for all years except 1999.

Table 5 shows the percentage change in average marginal tax rates by average adjusted gross income and filing status from 1999 to 2003. Using average income as the income classifier reduces the percentage changes in marginal tax rates for the lowest two income cohorts by at least 50 percentage points relative to using annual income as the income classifier. In this case, the magnitude of the percentage change decreases by 23 percentage points for the cohort with incomes ranging from $10,000 to $20,000, while there are only minor differences across the remaining cohorts.

Distribution of Returns by the Percentage Change in Marginal Tax Rates and Income

Table 6 reports return counts and the share of returns by 1999 adjusted gross income and the distribution of returns by the magnitude of the percentage change in marginal tax rates. The percentage changes are reported as absolute values so that the direction of changes is irrelevant for this table. The marginal tax rate did not change for 22 percent of the returns from

Table 5. Percentage in Average Marginal Tax Rates, by Average AGI and Filing Status from 1999 to 2003

Inflation-Adjusted Average AGI 1999-2003	Single	Joint	HH	MFS	Total
negative	-76	-57	-340	-94	-81
0-10k	-56	-18	-8	-81	-95
10k-20k	-19	-75	-9	-22	-27
20k-30k	-7	-36	-17	-25	-18
30k-50k	-7	-19	-10	-17	-13
50k-75k	-13	-18	-11	-14	-17
75k-100k	-13	-17	-6	-11	-16
100k-200k	-16	-14	-11	-19	-14
200k+	-19	-16	-19	-17	-17
TOTAL	-12	-21	-17	-19	-18

Table 6. Return Counts and Share, by Income and the Magnitude of the Percentage Change in Marginal Tax Rates

	Return counts					Share				
	0%	0%-2%	2%-5%	5%-10%	> 10%	0%	0%-2%	2%-5%	5%-10%	> 10%
AGI in 1999										
Negative	6	0	0	0	418	0.01	0	0	0	0.99
0-10k	864	6	12	30	6447	0.12	0	0	0	0.88
10k-20k	3361	128	168	339	10134	0.24	0.01	0.01	0.02	0.72
20k-30k	4059	275	307	439	7316	0.33	0.02	0.02	0.04	0.59
30k-50k	5255	474	575	1038	9886	0.31	0.03	0.03	0.06	0.57
50k-75k	3484	453	440	902	8583	0.25	0.03	0.03	0.07	0.62
75k-100k	188	124	258	814	5263	0.03	0.02	0.04	0.12	0.79
100k-200k	198	250	442	1210	4157	0.03	0.04	0.07	0.19	0.66
200k +	58	19	62	207	1780	0.03	0.01	0.03	0.1	0.84
Total	17473	1728	2265	4979	53983	0.22	0.02	0.03	0.06	0.67

1999 to 2003. The marginal tax rate either increased or decreased by more than 10 percent for 67 percent of all returns from 1999 to 2003. The results by income are also striking. As expected, 99 percent of the returns in the income cohort with negative adjusted gross income in 1999 experienced a marginal tax rate change greater than 10 percent. This is a purely mechanical result caused by the fact that marginal tax rates for most returns in this group are zero, and, thus, any change in the marginal tax rate implies a very large percentage change in the marginal tax rate. In the highest income cohort, marginal tax rates changed by more than 10 percent from 1999 to 2003 for 84 percent of the returns. For returns with more than $75,000 in AGI, the marginal tax rate was constant from 1999 to 2003 for only 3 percent of the returns. For income cohorts with $10,000 to $75,000 of adjusted gross income, the marginal tax rates changed by at least 10 percent for 57 to 72 percent of the returns. There was no change in marginal tax rates for 24 percent to 31 percent of the returns in the $10,000 to $75,000 range of adjusted gross income.

Table 7 reports the distribution of returns by average adjusted gross income and the percentage point change in marginal tax rates. The marginal tax rate declined by more than 2 percentage points for 49 percent of the returns and was unchanged for 25 percent of the returns from 1999 to 2003. Overall, marginal tax rates decreased for 52 percent of the returns and increased for 22 percent of the returns from 1999 to 2003. In the lowest income cohort, the marginal tax rate was unchanged for 60 percent of the returns, decreased for 23 percent of the returns, and increased for 17 percent of the returns from 1999 to 2003. In the highest income cohort, marginal tax rates decreased by at least two percentage points for 75 percent of the returns and increased by two percentage points for 13 percent of the returns from 1999 to 2003. Clearly, the highest-income taxpayers were more likely to experience a decrease in their marginal tax rates, and the lowest income class was more likely to experience no change or an increase in the marginal tax rate. This general trend also holds across all high and low income groups.

A word of caution is necessary. Changes in marginal tax rates are not an indicator of changes in income tax liability. In addition, changes in marginal tax rates can be associated with provisions designed to increase or decrease the income tax liability for certain individuals. Table 7 reports a jump in the share of returns with more than a 2-percentage point decrease in marginal tax rates compared to the two surrounding brackets (from 40 percent to 50 percent and then back to 30 percent). This jump in the share of returns is most likely attributable to the creation of the 10-per-

Table 7. Percentage Point Change in MTR 1999 to 2003, by Average AGI

Average AGI 1999 to 2003	Return Count (1,000s)							Share of Returns						
	Less than -0.02	-0.02 to -0.01	-0.01 to 0.0	equal to zero	0.0 to 0.01	0.01 to 0.02	More than 0.02	Total	Less than -0.02	-0.02 to -0.01	-0.01 to 0.0	equal to zero	0.0 to 0.01	0.01 to 0.02	More than 0.02
Negative	83	0	0	211	0	0	60	355	0.23	0.00	0.00	0.60	0.00	0.00	0.17
0-10	2050	6	2	1,700	2	0	1,340	5,100	0.40	0.00	0.00	0.33	0.00	0.00	0.26
10-20	7,290	26	68	3,660	176	74	3,380	14,675	0.50	0.00	0.00	0.25	0.01	0.01	0.23
20-30	5,180	121	211	4,740	378	290	2,340	13,260	0.39	0.01	0.02	0.36	0.03	0.02	0.18
30-50	7,350	339	501	5,420	660	575	3,400	18,245	0.40	0.02	0.03	0.30	0.04	0.03	0.19
50-75	7,100	237	405	3,860	405	335	1,530	13,871	0.51	0.02	0.03	0.28	0.03	0.02	0.11
75-100	5,040	141	126	321	110	324	715	6,777	0.74	0.02	0.02	0.05	0.02	0.05	0.11
100-200	4,120	231	149	268	412	338	635	6,152	0.67	0.04	0.02	0.04	0.07	0.05	0.10
More than 200	1,500	50	31	74	38	44	257	1,993	0.75	0.02	0.02	0.04	0.02	0.02	0.13
Total	39,713	1,152	1,492	20,254	2,181	1,980	13,657	80,428	0.49	0.01	0.02	0.25	0.03	0.02	0.17

cent bracket, which lowered marginal tax rates by 5 percentage points for some returns in this income cohort. In addition, the increase in the child tax credit from $500 to $1,000 affected returns in the $10,500 to $20,500 range in 2003 as an extra dollar in earned income in this range would increase the refund from the child credit by $0.10. There is also an increase in the share of low income returns with more than a 2-percentage point increase in the marginal tax rate. This may partly be caused by an increase in the dependent care credit rate and amount. However, this is probably a rather small factor. Differences in changes in marginal tax rates by income cohorts may also be a result of changes in income patterns as discussed above. For example, a college student who graduated during this period would be likely to experience an increase in his or her marginal tax rate. The impact of life-cycle changes will affect the distribution of marginal tax rate changes over time. Finally, income mobility will also affect the determination of marginal tax rate changes over time. Panel data provide the capability to explore questions about income mobility, life-cycle changes, and the effect of policy changes across different types of individuals.[4]

▶ Conclusion

In this paper we lay out the threefold mission of the Panel Data Users Group, which is (1) to document issues that make the use of a longitudinal file more of a challenge than a regular cross-sectional file, (2) to help SOI develop standard impartial tabulations that can be published by SOI, and (3) to develop ways for outside researchers to conduct studies based on longitudinal files. Our purpose is to begin a dialogue concerning whether and how the group could reach these goals.

We began by noting several of the most difficult issues that must be addressed, including income mobility, changes in income over an individual's life cycle, transitory fluctuations in income, and dealing with the problems created by returns that have a change in filing status over the sample period. Limiting the file to only records that have a constant filing status allowed us to

[4] For an example of the use of tax panel data to study income mobility, see Auten and Gee, 2007.

examine the effects of using one method for dealing with this issue. We present evidence that indicates that the Modified Panel produces useful estimates for most income classes and each filing type, except for returns in the lowest income class. However, we emphasize that more research needs to be done on this issue, including examining other methods for dealing with it, and that some caution is still in order when using estimates from the Modified Panel file. We also discuss the construction of a simple marginal tax rate (MTR) computer program that we believe will be a useful input for future projects. In addition, this exercise was helpful in thinking through some of the complications of calculating and presenting tabular evidence from a longitudinal file in a manner that is consistent with SOI's mission.

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