NEW PERSPECTIVES ON INCOME MOBILITY AND INEQUALITY

Gerald Auten, Geoffrey Gee, and Nicholas Turner

This study examines several dimensions of income mobility and inequality — mobility of individuals through their peak earnings years, intergenerational mobility, and persistence in the top 1 percent. Its main findings can be summarized as follows. Half of those age 35–40 in the bottom quintile of their cohort moved to higher quintiles 20 years later; over 60 percent moved up relative to the full population. About 70 percent of dependents from low-income households were themselves in higher quintiles 20 years later. Younger generations gradually replaced those that dominated the top percentile in 1987. The results show the importance of life cycle effects and the changing composition of top income groups.

S tudies of income distribution generally show an increasing share of income going to the top 1 percent of the income distribution in the United States for the past several decades. For example, Atkinson, Piketty, and Saez (2011) reported that the share of market income going to the top 1 percent of tax units increased from 9–10 percent in the 1950s through the 1970s to nearly 24 percent by 2007. The Congressional Budget Office (CBO, 2012) reported that the share of pre-tax income (including transfers) of the top 1 percent of individuals increased from 8.9 percent in 1979 to 19.0 percent in 2007, before declining to 13.6 percent in 2009. However, such studies tell only part of the story. Because they use annual cross-section data, these studies are unable to consider

Gerald Auten: Office of Tax Analysis, U.S. Treasury Department, Washington, DC, USA (gerald.auten@treasury.gov)

Geoffrey Gee: Office of Tax Analysis, U.S. Treasury Department, Washington, DC, USA (geoffrey.gee@treasury.gov)

Nicholas Turner: Office of Tax Analysis, U.S. Treasury Department, Washington, DC, USA (nicholas.turner@treasury.gov)

the composition of high-income groups over time.[1] Are individuals in the top 1 percent in one year the same individuals that are still in the top 1 percent 10 years later? Or is the composition of this group changing because of new entrants? How much do the relative income positions of individuals change from their 30s to their 50s? How much mobility is achieved by children from low-income households? This paper addresses these questions by using panels and cross-sections of income tax returns and administrative tax records. We examine long-term mobility over the life cycle, intergenerational mobility, and persistence at the top of the income distribution.

Auten and Gee (2009) examined 10-year income mobility over the periods 1987–1996 and 1996–2005 using large panels of tax returns. That paper found that more than half of individuals age 25 and over changed income quintiles, with about half of those initially in the bottom quintile moving up one or more quintiles in both time periods. It also found that relative mobility was virtually identical in the two periods in spite of wider income gaps.[2]

In order to examine additional dimensions of income mobility, in this paper we create taxpayer-based panels by linking individuals found on tax returns in IRS Statistics of Income (SOI) cross section files to population files of tax returns and administrative records for later years. This approach allows us to focus on the experience of narrower age groups and examine questions about long-term income mobility and persistence and turnover at the top of the income distribution. In addition, using SOI cross-section files, we examine how succeeding generations have moved through the top income percentile and also illustrate the importance of life cycle considerations in thinking about mobility and inequality.

To preview the results, some of the key findings are:

- About half of primary and secondary taypayers who were age 35–40 in 1987 and in the lowest (highest) income quintile of this age cohort moved up (down) relative to those age 55–60 in 2007, while the other half were in the same income quintile. Median income of this age cohort rose 19 percent over this period, with those initially in the lowest income quintile of their peers experiencing the largest increases in median incomes.

- About 30 percent of the dependents of families in the bottom income quintile in 1987 were themselves in the bottom quintile of their peers 20 years later, while about one-fifth rose to each of the three middle quintiles and 11 percent to the top quintile. In other words, most low-income children were in higher relative positions than their parents.

---

[1] Burkhauser, Larrimore, and Simon (2012) showed that the choice of unit of observation, adjustments for household size, and inclusion of cash and in-kind transfers and health insurance benefits have important effects on measurement of long-term trends in the income distribution.

[2] While the wider income gaps in the more recent period might have been expected to reduce relative income mobility, they were offset by larger changes in absolute income, i.e., greater absolute income mobility, in the more recent period.

- Analysis of short-term persistence in the top 1 percent over five-year periods from 2000 through 2010 shows that from 37 to 47 percent dropped out after one year. After five years, from 41 to 49 percent were in the top 1 percent, and from 23 to 31 percent had been there in all six years.
- The "Greatest Generation" and "Silent Generation" that dominated the top 1 percent in 1987 were gradually replaced by the early and later Boomer Generations.

I. LONG TERM MOBILITY

Our long-term mobility analysis starts with primary and secondary taxpayers and dependents in the large Statistics of Income (SOI) individual income tax cross-section sample for tax year 1987. Use of 1987 has several advantages, including being the first year under the broadened income tax base enacted in the Tax Reform Act of 1986 and the first year taxpayers were required to report the Social Security numbers of dependents and tax-exempt interest. We found information on these individuals twenty years later using tax return data available from the IRS Compliance Data Warehouse (CDW). We supplemented the tax return data with Social Security Administration records on birth and death dates. For non-filers, we estimated the individual's income using IRS information returns for wages and miscellaneous labor compensation, Social Security and other retirement and disability income, unemployment compensation, partnership and S corporation income, and dividend and interest income.[3] For most non-filers, this provides a good measure of income, although it does not include capital gains, tax-exempt interest, or income from sole proprietorships.

We use a broad measure of pre-tax income, referred to as "cash income," that includes tax-exempt interest and taxable and non-taxable Social Security benefits in addition to wages, investment income, business income, capital gains and other types of income subject to tax (Appendix A provides additional details). The CDW files allow us to track primary and secondary taxpayers separately and follow them even when they change marital status or become part of a different tax unit. To account for changes in family structure and household returns to scale, incomes are adjusted by dividing by the square root of family size.[4]

---

[3] This paper extends our earlier paper (Auten, Gee, and Turner, 2013), which used four types of information returns, by using five additional information returns that capture most sources of income reported to the IRS for significant numbers of taxpayers. Since the CDW files are largely unedited outside of automated processing checks, we cleaned the data by checking outliers and inconsistencies relative to the tax code.

[4] This family size adjustment is used by CBO (2011) and for official U.S. Department of the Treasury distribution tables and produces results similar to other commonly used adjustments. It especially improves income measurement in the cases of married individuals who later file separately and single individuals who are married in the ending year. Since primary and secondary taxpayers are followed separately, they are counted separately in determining the income quintiles. Thus, a married couple filing jointly is counted as two observations.

II. MOBILITY OVER THE LIFE CYCLE FROM AGES 35–40 TO 55–60

This section examines the long-term income mobility of individual primary and secondary taxpayers age 35–40 in 1987 (i.e., those born from 1947 through 1952 who were part of the early Baby Boom generation) as they move through their peak earning years both relative to their peers and to the full population. Table 1 shows relative income mobility over the 20-year period from 1987 to 2007 for this age group relative to their peers, that is, those who were age 55–60 in 2007. Focusing on this narrow age group and comparing them only to those in their same birth cohort abstracts from life cycle effects. The sample includes about 29,000 taxpayers representing approximately 19 million individuals. The 1987 quintiles on the vertical axis are based on nondependent taxpayers ages 35 through 40 in the 1987 SOI sample. Similarly, 2007 quintiles are calculated using the 2007 SOI sample of nondependent taxpayers ages 55 through 60. Taxpayers in these age ranges typically have high filing rates: approximately 92 percent for those age 35–40 in 1987 and 98 percent for those age 55–60 in 2007.[5] Taxpayers with negative cash income are reported separately from other taxpayers in the lowest income quintile, so the sum of the negative income taxpayers and lowest quintile represents 20 percent of the 1987 sample. Taxpayers with negative incomes are generally wealthier individuals with reported business losses. For individuals in each income quintile in 1987, Table 1 shows the percentages in each quintile in 2007. For example, 25.8 percent of those age 35–40 in the middle quintile of this age group in 1987 were in the middle quintile of those age 55–60 in 2007.

Considering those whose information was found in both years, approximately half of taxpayers in the lowest and highest income quintiles remained in the same quintiles 20 years later. Nearly one-fourth of those in the bottom quintile moved up one quintile, while 4.7 percent moved to the top quintile. About one-fourth of those in the top 1 percent were also in the top 1 percent 20 years later, but nearly 70 percent remained in the top income decile. The overall results suggest that, while there is considerable persistence among observed taxpayers, there is also meaningful movement even within this narrow age cohort. Some taxpayers start from the bottom and move to the top and vice versa.[6]

Since Table 1 compares taxpayers age 35–40 only with their age cohort 20 years later, it is not clear how this group fares in the overall distribution of income. We address this in Table 2, which compares these individuals to the total population age 25 and over. As compared to Table 1, the distribution is shifted to the right (higher percentages in the higher income groups). For example, 29.4 percent are in the top quintile and 52

---

[5] The filing rate for 2007 was unusually high as a result of tax rebates based on filing of 2007 tax returns enacted in February 2008 as part of the early response to the recession. Some non-filers are institutionalized, including prisoners. Comparison of income centiles over time is complicated by the gradual rise in the filing rate over time.

[6] The reported point estimates of those reaching the top 1 percent from the bottom three quintiles should be interpreted with caution due to the small number of observations. The results seem reasonable, however, and these estimates are similar to those in unreported transition tables for this age group for 1990 through 2010 and for those age 30–39 for 1987 through 2007.

Table 1

Income Mobility of Taxpayers Age 35–40 in 1987 Relative to Their Peers

| 1987 Income Quintile or Centile Class | 2007 Income Quintile or Top Centile Class | | | | | | | |
| | Income Quintiles | | | | | | Top Centiles | |
	Negative	Lowest	Second	Middle	Fourth	Highest	Top 10	Top 1
Negative	4.0	32.1	26.4	6.3	10.4	20.8	10.6	3.6
Lowest	1.2	50.8	23.0	14.3	6.1	4.7	2.4	0.3
Second	0.6	24.7	28.4	23.1	15.5	7.7	2.6	0.1
Middle	0.4	14.8	19.8	25.8	25.0	14.0	4.4	0.3
Fourth	0.4	10.4	15.1	20.7	29.0	24.3	8.1	0.4
Highest	0.9	6.3	7.6	13.5	23.4	48.3	28.8	3.7
Total	0.7	18.4	19.0	20.1	20.8	21.1	9.9	1.1
Top 10%	1.2	5.8	6.2	9.8	18.5	58.6	39.8	6.3
Top 1%	1.5	5.2	3.5	3.9	7.3	78.6	69.4	23.9

Notes: Centiles in 1987 are based on taxpayers age 35 to 40. Centiles in 2007 are based on taxpayers age 55–60 in 2007. Taxpayers with negative incomes are shown separately from other taxpayers in the lowest income quintile. The five quintiles plus negative incomes sum to 100 percent. Taxpayers not found in 2007 are omitted (see discussion in Appendix A).

Table 2

Income Mobility of Taxpayers Age 35–40 in 1987 Relative to 2007 Population Age 25 and Over

| 1987 Income Quintile or Centile Class | 2007 Income Quintile or Top Centile Class | | | | | | | |
| | Income Quintiles | | | | | | Top Centiles | |
	Negative	Lowest	Second	Middle	Fourth	Highest	Top 10	Top 1
Negative	4.0	19.6	26.4	14.3	10.7	24.9	15.6	4.5
Lowest	1.1	38.1	26.3	17.2	9.9	7.2	3.4	0.5
Second	0.6	18.1	23.5	24.4	21.4	12.1	4.2	0.2
Middle	0.6	9.5	15.4	21.2	29.9	23.4	8.0	0.3
Fourth	0.4	6.2	10.7	16.4	27.8	38.5	16.8	0.8
Highest	1.0	4.3	5.3	8.7	20.4	60.4	40.8	6.1
Total	0.7	14.0	15.7	17.6	22.6	29.4	15.0	1.6
Top 10%	1.3	3.8	4.1	6.9	14.8	69.1	52.1	10.7
Top 1%	1.8	3.9	2.4	3.5	6.7	81.7	74.2	36.5

Notes: Both 1987 and 2007 centiles are based on taxpayers age 25 and over. Taxpayers with negative incomes are shown separately from other taxpayers in the lowest income quintile. The five quintiles plus negative incomes sum to 100 percent. Taxpayers not found in 2007 are omitted (see discussion in Appendix A).

percent are in the top two quintiles compared to 21.1 and 41.9 percent in Table 1. At ages 55–60 in 2007, these individuals have a 60 percent higher chance of getting into the top 1 percent than does the general population. This upward shift of this cohort in the overall income distribution reflects the life cycle of income and the fact that peak real incomes are generally reached in the early 50s.

A related question is how the absolute level of real income (adjusted for household size) of this group changed over this period. As shown in Table 3, median real incomes of individuals age 35–40 in 1987 increased by 19 percent over this 20-year period. This is to be expected because these individuals are moving to the part of their life cycles where individuals typically achieve their highest earnings. Individuals in the lowest income quintile in 1987 experienced the largest increase in real median income (100 percent), while the real median income of those in the middle income quintile increased 27 percent. Yet not all individuals experienced real income growth over this 20-year period as real incomes decreased for about 31 percent of individuals in this age cohort. Real incomes of individuals decreased for 58 percent of those in the top 1 percent in 1987, and the real median income of this group declined 29 percent. This result suggests regression toward the mean and that 1987 incomes may have been unusually high for many in the top income group.

The results in Tables 1–3 are based on individuals that could be found in both 1987 and 2007. Although overall attrition was only 7.6 percent, it was 14.7 percent in the lowest income quintile as compared to 3.9 percent in the highest quintile.[7] Taxpayers in the lowest quintile were much more likely to have died or have no 2007 tax record than taxpayers in the highest quintile. While most of those having no tax record in 2007 are likely to have had little income that year, there are other possible explanations, such as filing under an invalid or incorrect SSN in 1987, having left the country, incarceration, or being part of the informal economy.

III. INTERGENERATIONAL MOBILITY

Discussions of economic opportunity often focus on whether children from lower income households achieve greater economic success than their parents. Table 4 examines the income mobility of 11.2 million dependents born from 1969 through 1972 and age 15–18 when claimed on 1987 tax returns. This group corresponds roughly to those of high school age in 1987.[8] The income positions of these dependents are based on the family size-adjusted cash income on the tax return of the parent/guardian on which they were claimed. The 1987 quintiles on the vertical axis are based on nondependent taxpayers age 25 through 65 on the 1987 SOI file. While the median age of primary

[7] These attrition rates compare favorably to attrition in other studies. For example, attrition for 20-year panels in the PSID was as much as 50 percent. See Appendix A and Table A1 for more details on attrition.

[8] Those age 15 in 1987 are age 35 in 2007, corresponding to the lower age limit in the group examined in the previous section. The upper age limit is 18 because children age 19 through 23 can generally only be claimed as a dependent if they are full-time students.

Table 3

Change in Real Income of Taxpayers Age 35–40 in 1987
from 1987 to 2007

Percent Changes in Real Income from 1987 to 2007	1987 Income Quintile or Top Centile Class								
	Income Quintiles							Top Centiles	
	Negative	Lowest	Second	Middle	Fourth	Highest	Total	10%	1%
Decreased:									
Negative	4.0	1.1	0.6	0.6	0.4	1.0	0.7	1.3	1.8
Over 50%	0.9	6.7	8.9	8.7	10.2	15.2	10.0	19.3	35.9
25–50%	0.0	4.2	7.2	8.3	11.3	13.6	9.1	14.9	10.8
Up to 25%	0.0	6.6	9.8	11.4	13.0	16.8	11.7	15.4	9.4
Increased:									
Up to 25%	0.0	6.3	10.0	11.5	14.0	13.4	11.2	11.2	6.9
25–50%	0.0	5.6	10.5	13.6	14.0	10.0	11.0	8.2	6.1
50–100%	0.0	11.8	18.0	20.8	19.5	12.8	16.8	11.2	7.2
Over 100%	95.1	57.6	34.9	25.1	17.7	17.3	29.5	18.4	21.8
Percent that:									
Decreased	4.9	18.7	26.5	29.0	34.9	46.5	31.4	50.9	57.9
Increased	95.1	81.3	73.5	71.0	65.1	53.5	68.6	49.1	42.1
Percent change in:									
Median income	n.m.	100	42	27	11	–5	19	–14	–29
Mean income	n.m.	226	69	46	35	51	59	61	70

Notes: Centiles in 1987 are based on taxpayers age 35–40. Taxpayers with negative incomes in 1987 are shown separately from other taxpayers in the lowest income quintile. Taxpayers with negative incomes in 2007 are shown in the row labeled negative. The percentage changes sum to 100 percent for each income quintile and top centile. Taxpayers not found in 2007 are omitted (see discussion in Appendix A).

taxpayers claiming the dependents is 43, the wider age range compares them with most families with dependents in the population.[9] The income positions of the dependents relative to others the same age in 2007 are shown on the horizontal axis. Because of the fairly steep age-income profile in this age range, the 2007 quintiles are based on taxpayers at each age 35 through 38 in the 2007 SOI cross section file.

About 30 percent of the dependents from families in the bottom income quintile in 1987 were themselves in the bottom quintile of their peers 20 years later. Approximately one-fifth rose to each of the three middle quintiles and 11 percent to the top quintile.

---

[9] Based on suggestions to the authors, it may be possible to better control for the age of the parents in future work.

Table 4

2007 Status of Dependents Age 15–18 in 1987 Relative to Their Peers

1987 Income Quintile or Centile Class	2007 Income Quintile or Top Centile Class							
	Income Quintiles						Top Centiles	
	Negative	Lowest	Second	Middle	Fourth	Highest	Top 10	Top 1
Negative	0.6	10.6	16.3	26.7	22.3	23.5	16.8	1.7
Lowest	0.6	30.0	19.2	20.6	18.8	10.9	4.7	0.4
Second	0.7	18.5	20.3	22.1	22.9	15.5	6.3	0.5
Middle	0.4	14.3	15.9	22.1	25.3	22.0	10.6	0.9
Fourth	0.8	11.1	13.8	19.8	25.4	29.1	14.4	1.4
Highest	0.5	8.2	9.5	16.4	24.9	40.5	26.0	4.4
Total	0.6	17.0	16.3	20.5	23.3	22.2	11.3	1.3
Top 10%	0.8	8.6	7.8	12.9	22.4	47.5	31.0	5.7
Top 1%	1.4	6.5	7.8	11.0	16.0	57.2	44.5	14.0

Notes: Dependents age 15–18 are classified in 1987 using the income on the tax return on which they were claimed as a dependent. The 1987 centiles are based on taxpayers age 25–65. The 2007 centiles are based on taxpayers at each age 35–38. Taxpayers with negative incomes are shown separately from other taxpayers in the lowest income quintile. The five quintiles plus negative incomes sum to 100 percent. Dependents not found in 2007 are omitted (see discussion in Appendix A).

Thus, about 70 percent experienced upward mobility relative to those the same age.[10] The probability that dependents from the lowest income families would reach the top quintile was more than half of that of the average individual in their age cohort, but less than half of the typical probability of reaching the top 10 percent or 1 percent. Among those from families in the top 1 percent, about 57 percent were in the top quintile and 14 percent were themselves in the top 1 percent. These results could reflect the children of those at the top choosing occupations that offer more non-pecuniary satisfaction rather than pursuing the highest paying occupations. Overall, these dependents experienced more upward and downward mobility relative to their birth cohorts than taxpayers age 35–40 in 1987.

Although attrition is lower for these dependents (5.1 percent), the pattern mirrors that for individuals age 35–40 in 1987: dependents from the bottom quintiles have a higher likelihood of not being found on a tax return or administrative record or to be reported

---

[10] By comparison, a Pew Foundation report (2012) using PSID data reported that 43 percent of children from families in the lowest income quintile remained in the lowest income quintile as adults; however, these results are not directly comparable to those in this paper. The Pew study follows all children under age 18 roughly 36 years later as adults (based on the center years for their income measure) and compares their economic status to the full population. Our study compares individuals to those the same age 20 years later. Leonard Lopoo and Thomas DeLeire prepared the analysis for the Pew study.

as having died by 2007. Research on the effects of the increasing incarceration rates in the 1990s (Western, 2002) may offer a partial explanation for both the higher attrition rates and the lower mobility of children from low-income households.[11]

IV. OLD NEIGHBORS OR NEW FRIENDS? TURNOVER OF THE TOP 1 PERCENT

Relatively little is known about the short-term persistence of individuals in the top 1 percent of the income distribution. Do high-income individuals have consistently high income, so that these individuals are "old neighbors"? Or are there many persons at the top of the income distribution temporarily because of transitory high-earning periods, so that there are many "new friends" in the top percentile? One of the few papers to examine this question (Auten and Gee, 2009) found that less than half of taxpayers in the top 1 percent were still in the top percentile 10 years later. We extend this analysis by examining turnover at the top of the income distribution over shorter periods.[12] We focus on primary and secondary taxpayers in the top percentile based on cash income using five-year windows around each year from 2000 to 2010. Both the sample and the income cutoffs for the top 1 percent each year are based on all taxpayers age 25 and over.

The persistence rates for 2000 through 2010 shown in Table 5 illustrate that there are both "new neighbors" and "old friends" in the top 1 percent of the income distribution over five-year periods. Panel A shows reoccurrence in the top percentile in each the following five years, while Panel B shows consecutive reoccurrence in the following five years. For example, Column T+4 for the 2000 row in Panel A shows that 42 percent of individuals who were in the top 1 percent in 2000 were also in the top 1 percent in 2004. The same cell in Panel B shows that 26 percent of individuals in the top percentile of cash income in 2000 remained in the top 1 percent in every year from through 2004. Not surprisingly, the shares are higher for each cell in Panel A compared to Panel B, reflecting the fact that some individuals transition into and out of the top 1 percent.

One-year persistence (T+1) rates range from 53 percent in 2000 to 61 percent in 2005. Thus 39 to 47 percent of individuals exit the top percentile the following year. The relative likelihood of remaining at the top of the distribution for the year T+1 varies across the 2000–2005 period. Lower one-year persistence in 2000 and 2001 likely results from the recession as capital gains and other business and financial income contracted and altered the composition of the top 1 percent. The patterns of one to four year persistence

---

[11] Western (2002) found that at least 12.9 percent of men with high school or less education in the National Longitudinal Survey of Youth had been incarcerated before age 34–41 and that the percentages were higher for young black men (23.3 percent) and Hispanics (14.2 percent). He estimated that incarceration reduced wage levels by 10 to 20 percent and nominal wage growth by 30 percent, but that most of the effect on wage growth was from the general decline in wages among workers with little education.

[12] Kopczuk, Saez, and Song (2010) examined the probability of staying in the top 1 percent of the earnings distribution and found that during the period 1978 to 2003, 21 to 28 percent dropped out after one year, 30 to 35 percent after 3 years and 35 to 40 percent after 5 years.

Table 5

### Persistence in the Top 1 Percent over Five-Year Periods, 2000–2010

Base Year	T+1	T+2	T+3	T+4	T+5
Panel A: Reoccurrence					
2000	0.53	0.45	0.42	0.42	0.41
2001	0.57	0.53	0.50	0.48	0.47
2002	0.63	0.57	0.53	0.51	0.49
2003	0.63	0.57	0.54	0.52	0.45
2004	0.60	0.57	0.54	0.46	0.41
2005	0.61	0.56	0.47	0.41	0.41
Panel B: Continuous Reoccurrence					
2000	0.53	0.38	0.31	0.26	0.23
2001	0.57	0.44	0.36	0.31	0.27
2002	0.63	0.49	0.40	0.35	0.31
2003	0.63	0.49	0.41	0.36	0.29
2004	0.60	0.48	0.40	0.31	0.25
2005	0.61	0.48	0.36	0.28	0.25

Notes: Panel A (Panel B) shows the probability that individuals in the top percentile of cash income in the base year reappear in a later year unconditional (conditional) on appearing in the top percentile during intervening years. Income percentiles are defined by cash income in each year.

rates suggest that the stability of the top 1 percent increased significantly in 2002 and 2003, but declined by 7–9 percentage points at beginning of the recession in 2008.

The five-year persistence rates in Panel A show that from 41 to 49 percent of individuals in the top percentile of cash income are also there five years later. Some taxpayers leave the top percentile due to life-cycle effects, including retirement. Additional computations not included in Table 5 show that when the sample is restricted to individuals age 60 or younger, the reoccurrence rate for T+5 exceeds 50 percent in several years. This is consistent with the idea that some of the turnover in the top 1 percent is related to retirement decisions. The results in Panel B show that 25 to 31 percent are consistent members of the top percentile for five years and perhaps longer.

Figure 1 further examines short-term income dynamics by showing the share of the top 1 percent in 2005 that appears at the top of the income distribution in the preceding five years as well as the following five years. The grey bars show the fraction of the top 1 percent in 2005 that appear in consecutive years before and after 2005. For example, the grey bar is equal to 0.48 in 2007, indicating that 48 percent of individuals in the top 1 percent in 2005 were also in the top 1 percent every year from 2005 through

Figure 1

Persistence for Individuals in the Top Percentile in 2005:
Five Years Earlier and Five Years Later
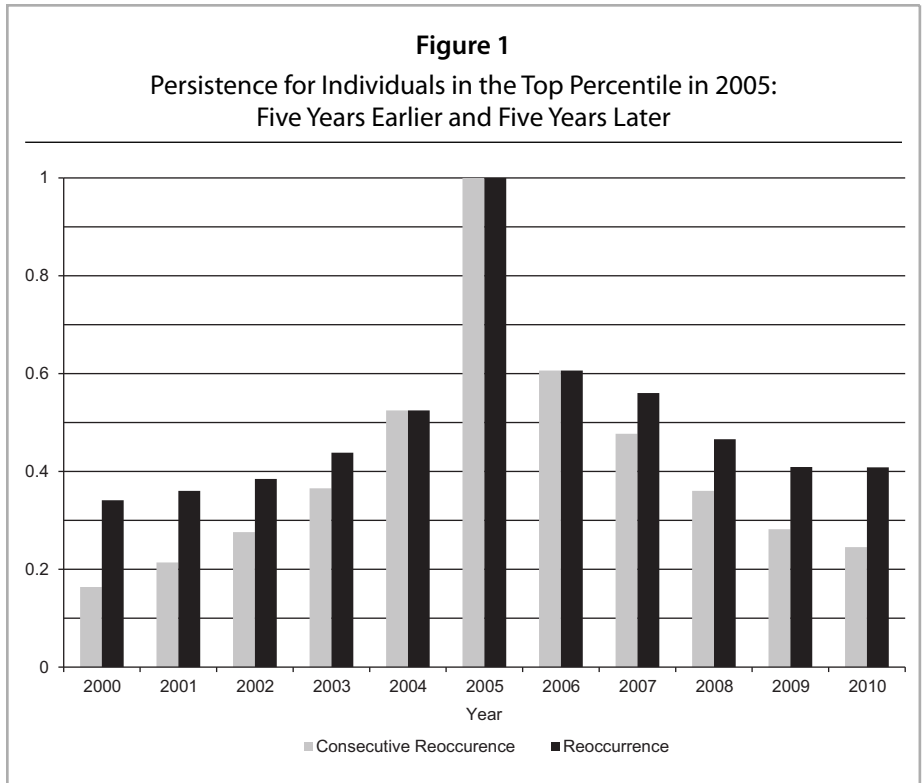
2007. The black bars show the share of individuals that are back in the top 1 percent in a given year regardless of whether they were in the top 1 percent during intervening years. The black bar in 2007 indicates that 56 percent of individuals that were in the top 1 percent in 2005 were also in there in 2007, but not in 2006. The difference between the black and grey bars reflects the extent to which individuals move into and out of the top percentile over time. Thus 8 percent of individuals in the top 1 percent in 2005 dropped out in 2006, but were back in the top group in 2007.

Looking back in time for those in the top 1 percent in 2005, about 52 percent were also in the top 1 percent in 2004, and this percentage declined to 34 percent in 2000. The percentages there in all years declined more rapidly, and only about 16 percent were there every year from 2000 through 2005. The pattern is similar looking forward, but persistence rates are somewhat higher. In 2010, for example, 41 percent were again found in the top 1 percent, and about 25 percent were there in every year from 2005–2010. The reasons for the asymmetry moving forward and backward from 2005 are not entirely clear. Some of the higher post-2005 persistence may reflect individuals moving up into the top 1 percent due to job promotions resulting in an ongoing

presence. The persistence patterns in this period were also affected by the 2001–2002 and 2008–2009 recession periods, which altered the composition of the top income groups.

V. CHANGING GENERATIONS AT THE TOP: TAXPAYERS BY BIRTH COHORT AND THE LIFE CYCLE OF INCOME

Another perspective on the changing composition of the top 1 percent is obtained by tracking the generations of taxpayers over time in cross section files according to their birth cohorts. Figure 2 shows the percentages of the top 1 percent born prior to 1946, from 1946 to 1955 (the early boomers), 1956 to 1965 (later boomers), 1966 to 1976 (Gen X), and from 1977 to 1994 (Gen Y).[13] In 1987, the pre-boomer Greatest Generation accounted for 31 percent of those at the top and the Silent Generation accounted for 48 percent. Together, these pre-boomer generations accounted for 79 percent of the

Figure 2
The Changing Occupation of the Top 1% by New Generations
(Shares of the Top 1% by Birth Cohorts)

---
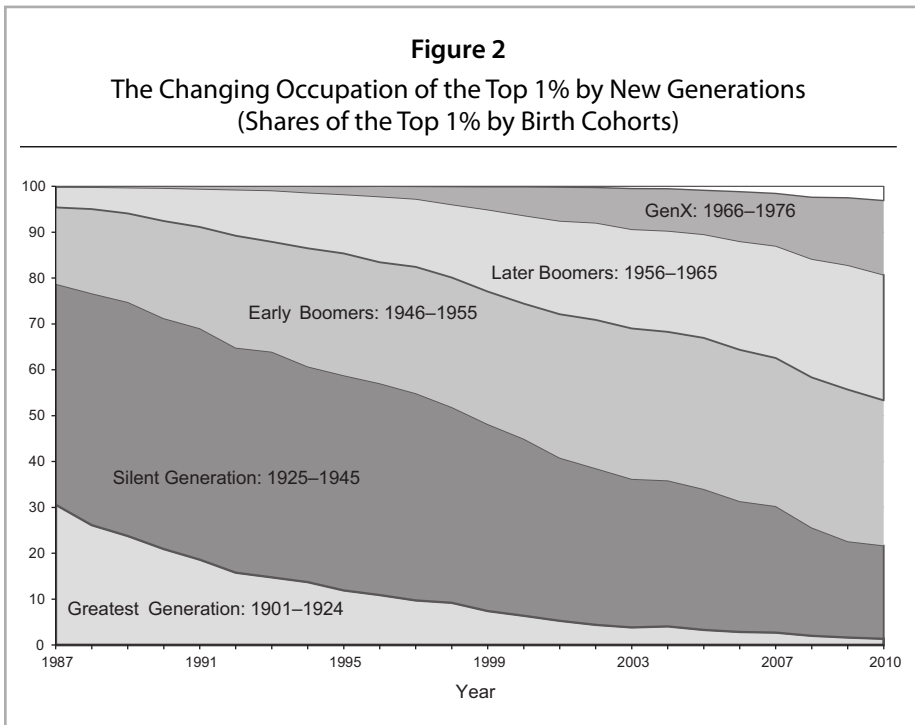
[13] The definition of "generations" is imprecise as the names and precise dates vary depending on the source. The authors offer their apologies if any readers would have preferred a different name for their generation or to be included in a different generation.

top 1 percent, but by 2010 their combined share had declined to 22 percent. In 1987, the early boomers, then age 32–41, accounted for 16 percent of the top 1 percent. They reached their peak share of 33 percent in 2005–2009 when they were in their 50s, before declining slightly to 32 percent in 2010. The later boomers reached a 27 percent share at ages 44–53 in 2009. By 2010, the combined Baby Boom generations dominated the top 1 percent, rising to a 59 percent share from 21 percent in 1987. At ages 34–43, Gen X accounted for 16 percent of the top 1 percent in 2010, nearly the same share the early boomers held in 1987. Gen Y was only beginning to be seen in the top 1 percent with a 3 percent share in 2010. While these cohort shares do not track the movement of specific individuals in and out of the top 1 percent, they provide another illustration of the turnover of the top 1 percent.

Important movements in the income distribution occur due to life-cycle effects. Individuals move up in the income distribution as they hit their peak earning years, then move down as they age out of the labor force.[14] Figure 3 shows the age-earnings

Figure 3
Income Centiles by Age, 2007

---
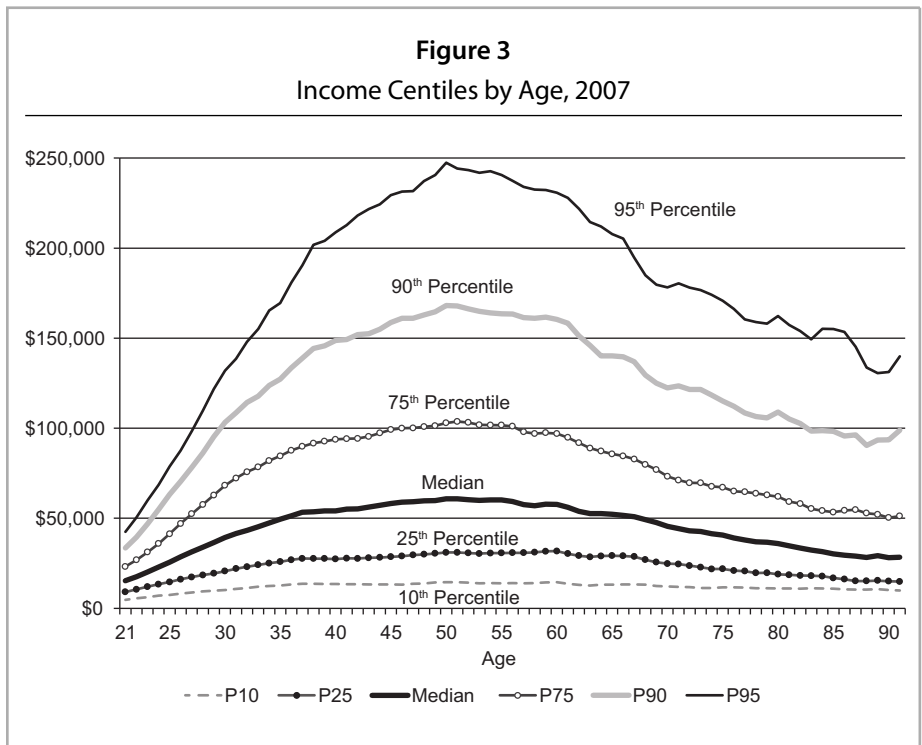
[14] Tables 1 and 4 net out life-cycle effects by limiting the comparison to individuals in relatively narrow birth cohort groups (primary and secondary taxpayers age 35–40 and dependents age 15–18 in 1987).

profile in 2007 for the incomes of taxpayers age 21 through 90 (with those above age 90 lumped at age 91). The cutoff for the top percent at each age rises dramatically from about $45,000 at age 21 to $250,000 at age 50 before declining more gradually to under $150,000 for those in their late 80s. The cutoffs for the top 10 and 25 percent peak in the early 50s before declining more gradually. The age-income profiles for median and the 10th and 25th percentiles are lower and somewhat flatter. While the 2007 cross-section includes only those who have filed tax returns, a larger share of the population filed tax returns because of tax rebates. The number of non-dependent tax returns filed increased by over 14 million (11.5 percent) in 2007 before declining by 10 million returns to a more normal level in 2008. The age-income profile also illustrates the gradual movement of individuals through the income distribution over time.

VI. CONCLUSIONS

This paper extends the literature on income mobility and inequality by providing new evidence on several dimensions of the dynamics of income over time: long-term (20-year) income changes over the primary working ages, intergenerational mobility of dependents, short-term persistence of taxpayers in the top 1 percent, and the movement of successive generations through the top 1 percent since 1987. The long-term changing of the guard at the top of the distribution is illustrated by the fact that the pre-boomer "Greatest Generation" and "Silent Generation" together accounted for 79 percent of the top 1 percent in 1987, but their share had fallen to 22 percent by 2010. Their places were taken by the Baby Boom generations whose combined share rose from 21 to 59 percent over this period. Analysis of short-term persistence in the top 1 percent found that 37 to 47 percent dropped out after one year. From 41 to 49 percent were again in the top 1 percent five years later, and from 23 to 31 percent had remained there for six consecutive years.

Analysis of the long-term mobility of individuals age 35–40 in the lowest income quintile of that age cohort in 1987 showed that 51 percent remained in the lowest income quintile 20 years later compared to those age 55–60 in 2007. Approximately 23, 14, and 6 percent of this group moved up one, two, and three quintiles, respectively. Nearly 5 percent moved to the top quintile. Compared to the full population age 25 and over, however, fewer remained in the bottom quintile (38 percent) and more made it to the top quintile (7 percent). This illustrates the effects of the typical pattern of household income over the life cycle on upward mobility. Those initially in the lowest income groups experienced the largest increases in incomes (adjusted for inflation and family size), while the median incomes of those initially in the top 1 percent declined (although mean incomes roughly doubled). The tables on intergenerational mobility suggest that while the outcomes for dependents from the lowest income households were not equal to those from higher income households, most low income children were in higher income quintiles than their parents.

These findings illustrate a few of the many dimensions of the dynamics of individual incomes over time. One implication is that it is important to keep in mind when think-

ing about trends in inequality that the incomes of individuals and families change over time. Incomes can change due to life cycle effects and because of hard work or luck. As a result, we cannot assume that the same individuals remain at the top of the income distribution from year to year.

ACKNOWLEDGMENTS

DISCLAIMERS

The views expressed in this paper are those of the authors and do not necessarily represent the views or policies of the U.S. Department of the Treasury.

REFERENCES

Atkinson, Anthony, Thomas Piketty, and Emmanuel Saez, 2011. "Top Incomes in the Long Run of History," *Journal of Economic Literature* 49 (1), 3–71.

Auten, Gerald, and Geoffrey Gee, 2007. "Income Mobility in the U.S.: Evidence from Income Tax Returns for 1987 and 1996." Office of Tax Analysis Paper No. 99. U.S. Department of the Treasury, Washington, DC.

Auten, Gerald, and Geoffrey Gee, 2009. "Income Mobility in the United States: New Evidence from Income Tax Data." *National Tax Journal* 57 (2), 301–328.

Auten, Gerald, Geoffrey Gee, and Nicholas Turner, 2013. "Income Inequality, Mobility, and Turnover at the Top in the US, 1987–2010" *American Economic Review* 103 (3), 168–172.

Burkhauser, Richard V., Jeff Larrimore, and Kolali I. Simon, 2012. "A 'Second Opinion' on the Economic Health of the Middle Class." *National Tax Journal* 65 (1), 7–32.

Congressional Budget Office, 2011. *Trends in the Distribution of Household Income Between 1979 and 2007.* Congressional Budget Office, Washington, DC.

Congressional Budget Office, 2012*. The Distribution of Household Income and Federal Taxes, 2008 and 2009.* Congressional Budget Office, Washington, DC.

Fitzgerald, John, Peter Gottschalk, and Robert Moffitt, 1998a. "An Analysis of Sample Attrition in Panel Data: The Michigan Panel Study of Income Dynamics." *Journal of Human Resources* 33 (2), 251–299.

Fitzgerald, John, Peter Gottschalk, and Robert Moffitt, 1998b. "An Analysis of the Impact of Sample Attrition on the Second Generation of Respondents in the Michigan Panel Study of Income Dynamics." *Journal of Human Resources* 33 (2), 300–344.

Kopczuk, Wojciech, Emmanuel Saez, and Jae Song, 2010. "Earnings Inequality and Mobility in the United States: Evidence from Social Security Data Since 1937." *Quarterly Journal of Economics* 125 (1), 91–128.

Pew Charitable Trusts, Economic Mobility Project, 2012. *Pursuing the American Dream: Economic Mobility Across Generations*. Analysis prepared by Leonard Lopoo and Thomas DeLeire. Pew Charitable Trusts, Washington DC, http://www.pewstates.org/uploadedFiles/PCS_Assets/2012/Pursuing_American_Dream.pdf.

Piketty, Thomas, and Emmanual Saez, 2003. "Income Inequality in the United States, 1913–1998." *Quarterly Journal of Economics* 118 (1), 1–39.

Western, Bruce, 2002. "The Impact of Incarceration on Wage Mobility and Inequality." *American Sociological Review* 67 (4), 526–546.

APPENDIX A: DATA

The income data used in this study are based on income tax returns and information returns filed with the IRS, supplemented by Social Security Administration records on birth and death dates. The 1987 base year sample uses tax returns from the IRS Statistics of Income (SOI) cross-section samples with a 1987 filing period and late-filed 1987 tax returns through 1990. Consistent with most studies of income mobility, primary and secondary filers under age 25 are excluded because many individuals age 20–24 are completing their education and about 30 percent file as dependent filers as a result of being claimed on their parents' tax returns. All dependent filers are excluded since their reported income does not reflect the economic status of their family or household unit. The data for 2007 and for the analysis of five-year persistence in the top 1 percent come from tax returns in the IRS Compliance Data Warehouse (CDW). As discussed below, we use information returns to obtain an estimate of taxpayer income in cases where the taxpayer has not filed a tax return in a particular year.

The measure of cash income used in this paper starts with total income as reported on individual income tax returns and then adds known sources of non-taxable income and adjusts for several items where the tax treatment differs from what might be considered a better measure of the current income realized by a taxpayer. In particular, tax exempt interest, non-taxable Social Security benefits, non-taxed unemployment compensation (2009 only), excluded foreign wages and housing benefits, excluded capital gains on small business stock, and net operating loss carryovers reflecting prior year losses are added. State tax refunds, alimony paid, the itemized deduction for gambling losses (up to the amount of gambling income reported), and disallowed current year passive losses are deducted. Some taxpayers with apparently high incomes have much lower net incomes because of large gambling losses that are claimed as itemized deductions. The current definition differs slightly from Auten and Gee (2007, 2009) in that we no longer add excluded pension income on the advice of benefits attorneys. While some taxpayers have excluded pension payments that reflect modest amounts of basis recovery or housing allowances for ministers, we are unable to distinguish these cases from rollovers of employment related pension accounts that can be in the millions of dollars. Due to data limitations, we are unable to adjust for gambling losses and disallowed passive losses on tax returns from the CDW. So that income is consistently reported, these adjustments are not made for the panel analysis

that uses CDW data. While refundable tax credits are arguably a form of cash income, these are not included in our measure of cash income.

In cases where no tax return was found in the CDW, we estimated the individual's income using income reported to the IRS on information returns. In these cases, cash income is the sum of wages (W-2s), miscellaneous employment income (1099-MISC), unemployment compensation (1099-G), Social Security benefits (1000-SSA), partnership income (K1 for Form 1065), small business corporation income (K-1 for Form 1120S), and dividends and interest (Forms 1099-DIV and 1099-INT). These information returns capture most of the common sources of income of non-filers reported to the IRS. Sources of income not captured include sole proprietorships (Schedule C), tax exempt interest, and capital gains (information returns report only sales proceeds while basis reporting, which could be used to compute gain, is being phased in only for investments purchased in 2011 or later). Capital gains and tax exempt interest are not likely to be common among non-filers, however. In addition, the marital status of non-filers is not known. In future analysis, however, we may be able to address this issue by checking marital status and the identity of a spouse on tax returns in an adjacent year.

While the CDW data greatly facilitate our analysis, they are raw data as submitted by taxpayers and thus include various errors, especially for variables that do not enter directly into the computation of income and tax. For example, some variables have entries of 100 times the correct value when variables are reported in cents. In a few cases, a stray number has been entered so that a value is, say, $1 billion plus the correct value. Variables may also reflect reported values prior to imposing some legal maximum that is actually used in computing income. Thus, checking for extreme values is important as well as making sure that values do not exceed the maximum values allowed under tax laws. Nevertheless, even considering the various limitations, the use of information returns reduces the attrition rate and provides a good measure of the income of most non-filers.

Our analysis tracks individual primary and secondary taxpayers separately, but the unit of observation is the tax unit, which differs from the household unit in some cases. This drawback is partly addressed by adjusting income for family size. Income quintiles and centiles are based on individual primary and secondary taxpayers in the annual IRS Statistics of Income cross section samples of tax returns in the appropriate age ranges. Since primary and secondary taxpayers are followed separately, they are counted separately in determining the income quintiles of the taxpayer population. Thus, a married couple filing jointly is counted as two observations and there are equal numbers of primary and secondary taxpayers in each income quintile. Individuals are ranked by cash income of their tax unit adjusted for family size by dividing by the square root of the number of taxpayers and dependents reported on the tax return.

For comparison with other studies, CBO (2011, 2012) uses households as the unit of analysis (statistically matched to tax returns), ranks by income adjusted for family size, and counts all members of a household (including children) in computing centiles. CBO statistically matches the tax returns of dependent filers to tax units in the Current Population Survey (CPS) and then constructs household income by adding the income of the primary and dependent tax units. The CBO studies have equal numbers of individuals (including dependents) in each income quintile, whereas we have equal numbers of primary and secondary nondependent taxpayers. Piketty and Saez (2003) use tax returns as the unit of analysis, do not adjust for household size in ranking tax units, use tax returns (including estimated returns of individuals who are not primary or secondary taxpayers on a return) in determining income quintiles, and do not exclude dependent filers. Burkhauser, Larrimore, and Simon (2012) showed the importance of the unit of analysis,

Table A1

Sample Attrition in 2007 for 1987 Samples of Taxpayers and Dependents
(Percentage Distribution of Outcomes)

1987 Income Quintile or Qentile	Born 1947–1952, Age 35–40 in 1987					Born 1969–1972, Age 15–18 in 1987		
	Died	No Tax Record	Total Attrition	Admin Record Only	Tax Return	Died	No Tax Record	Total Attrition
Negative	3.36	5.60	8.96	9.81	81.23	0.10	2.31	2.41
Lowest	8.81	5.85	14.66	6.38	78.96	2.12	7.28	9.40
Second	6.04	2.14	8.17	3.92	87.91	1.41	4.14	5.55
Middle	4.75	1.18	5.93	3.04	91.03	1.22	2.75	3.97
Fourth	4.38	0.85	5.23	3.07	91.70	0.93	1.60	2.53
Highest	3.08	0.84	3.92	2.68	93.39	1.14	1.83	2.96
Top 10%	2.84	0.65	3.49	2.40	94.11	1.09	1.55	2.65
Top 1%	2.13	0.50	2.62	2.34	95.04	1.00	1.86	2.86
Total	5.38	2.18	7.56	3.86	88.59	1.39	3.71	5.09

adjusting for household size, and the definition of income in measuring long-term trends in the income distribution.

As shown in Table A1, overall attrition between 1987 and 2007 was only 7.6 percent for those initially age 35–40 and 5.1 percent for dependents age 15–18. This attrition compares favorably to attrition of approximately 50 percent for PSID 20-year panels (Fitzgerald, Gottschalk, and Moffitt, 1998a, 1998b). While low-income individuals are not required to file, the filing thresholds are generally lower than Census poverty levels and additional low-income individuals have an incentive to file to claim tax refunds and refundable credits such as the Earned Income Tax Credit. Attrition was correlated with income, however, as it was 14.7 percent in the lowest income quintile of those age 35–40 decreasing to 3.9 percent in the highest quintile. Individuals in the lowest quintile were more than twice as likely to have died than taxpayers in the highest quintile (8.8 percent versus 3.1 percent). Attrition was lower for our sample of dependents age 15–18 in 1987, but the pattern by income class was similar.

Those found in 1987 who have no tax record in 2007 might be assumed to have had little or no income that year, but there are other possible explanations. Such individuals could have died without the death being recorded by SSA, have filed under an incorrect or stolen Social Security number (SSN) in 1987, have left the country, have been incarcerated, or been a participant in the informal economy with no income reported to the IRS. Only a few of the "not found" taxpayers had a high number taxpayer identification number given to certain resident aliens that may have been temporary residents. It is well known that there were many SSN problems in the 1980s. For example, the number of dependents claimed fell by more than 5 million in 1987 when taxpayers were first required to report SSNs for claimed dependents. Secondary SSNs were not checked carefully until the 1990s. Some fraudulent returns were filed in order to claim

tax refunds and some SSNs appeared in more than one tax unit. In addition, immigration reform legislation enacted in 1986 created an incentive for individuals to file tax returns in 1987, and this may have resulted in taxpayers using SSNs that were invalid or belonged to someone deceased or some other person. Such problems were more difficult to detect in the 1980s. Having a valid age increases the likelihood that a 1987 tax return is valid. The incorrect and missing data mean we may have excluded some individuals who belonged in the age groups examined. It may be possible to learn more about the economic and household situation of some of these individuals from records in other years.

As discussed above, dependent filers are dropped from our sample because their income is not reflective of their economic status. Table A2 presents previously unpublished data that show the importance of accounting for dependent filers when using income tax data for measuring inequality and mobility. In 1987, for example, there were 12.2 million dependent filers and an additional 2.8 million returns filed by taxpayers under age 20. Together they accounted for 11.4 percent of all income tax returns in 1987 and their share exceeded 10 percent for most years through 2000. Comparable numbers are shown for 1985 and 1986 to illustrate the effect of the kiddie tax and the tightening of rules for dependents in the Tax Reform Act of 1986.

The use of tax return data has both advantages and disadvantages for measuring income inequality and dynamics. Nevertheless, tax return information is valuable in examining income mobility and inequality issues since other data sets suffer from comparable problems.

Table A2

Individual Income Tax Returns by Dependent Status and Age, 1985–2010

		Income Tax Returns in 1000s			Percent of All Income Tax Returns		
Year	All Returns	Dependent Plus Under Age 20	Non-Dependent Under Age 20	Dependent Filer	Dependent Plus Under Age 20	Non-Dependent Under Age 20	Dependent Filer
1985	101,660	7,739	6,955	784	7.6	6.8	0.8
1986	103,045	7,733	7,058	675	7.5	6.8	0.7
1987	106,996	12,169	2,815	9,354	11.4	2.6	8.7
1988	109,708	12,619	2,617	10,001	11.5	2.4	9.1
1989	112,136	12,977	2,583	10,394	11.6	2.3	9.3
1990	113,717	12,580	2,230	10,349	11.1	2.0	9.1
1991	114,730	11,968	2,191	9,778	10.4	1.9	8.5
1992	113,605	11,366	2,062	9,305	10.0	1.8	8.2
1993	114,602	11,178	1,899	9,279	9.8	1.7	8.1
1994	115,943	11,492	1,927	9,566	9.9	1.7	8.3
1996	120,351	12,381	1,729	10,652	10.3	1.4	8.9
1997	122,422	13,089	1,797	11,292	10.7	1.5	9.2
1998	124,771	12,903	1,807	11,096	10.3	1.4	8.9
1999	127,075	13,565	2,031	11,534	10.7	1.6	9.1
2000	129,374	13,683	1,948	11,736	10.6	1.5	9.1
2001	130,255	12,756	1,872	10,884	9.8	1.4	8.4
2002	130,076	11,919	1,693	10,226	9.2	1.3	7.9
2003	130,424	11,379	1,715	9,665	8.7	1.3	7.4
2004	132,226	11,382	1,666	9,716	8.6	1.3	7.3
2005	134,373	11,563	1,863	9,700	8.6	1.4	7.2
2006	138,395	11,797	1,843	9,954	8.5	1.3	7.2
2007	153,560	12,337	1,940	10,397	8.0	1.3	6.8
2008	142,451	11,492	1,933	9,559	8.1	1.4	6.7
2009	140,494	9,516	1,643	7,873	6.8	1.2	5.6
2010	142,892	9,404	1,546	7,858	6.6	1.1	5.5

Notes: The data are from IRS Statistics of Income Individual Income Tax Returns. Each year's data include some late filed tax returns from prior years. The data for 2007 include returns apparently filed only to receive a tax rebate and not included in published IRS statistics. Dependent status is determined by the IRS based on information on the return; some taxpayers may not have elected the correct status. The definition of a dependent filer changed substantially in 1987. The age is that of the primary taxpayer on the return. These data are preliminary and may be updated if additional information is obtained about the age of tax filers.