The Very Small Risk Shift: Trends in Family Income Changes

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Abstract

Research on income volatility trends has boomed in recent years, largely as a response to Jacob Hacker's *Great Risk Shift*. The research to date, however, has been plagued by methodological differences that make comparability across studies difficult, inappropriately applied models, and by blurring of concepts related to income instability and volatility. Furthermore, estimates from the PSID generally show rising volatility, while estimates using administrative data do not. This paper examines trends in family income instability and volatility using a wide range of measures from the PSID. I first show how Hacker's initial work was flawed. I then turn to my own analyses. I find very little evidence for the hypothesis that there has been a sizable shift for the worse in the risk of negative family income shocks or volatility faced by working-age adults. Consistent with findings based on administrative data, the risk of an income drop increased little if at all from the early 1970s to the early 2000s, and volatility rose only modestly, by 10 to 35 percent. Other evidence on trends in economic risk suggests that income instability and volatility was higher prior to 1960 and no higher in 2008 than in 2002 or 2004. Hacker's original claim was that volatility had risen 200 percent over thirty years, later revised downward to 100 percent. I find that the typical family's income reversals—up over two years then down, or vice versa—within a nine-year window have increased from 15 or 16 percent of income, up and down, to 17 or 18 percent.

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Chapter 3
The Very Small Risk Shift: Trends in Family Income Changes

Scott Winship, Doctoral Dissertation

Our main finding is that family incomes are lot less stable than they used to be. In particular, the chance that families will experience catastrophic drops in their income has risen dramatically over the last generation.
– Jacob S. Hacker and Elisabeth Jacobs, April 2009.[1]

Introduction

Few academic topics have attracted as much recent attention in political and policy circles as the question of whether family incomes are less stable today than in the past. There are clear reasons why trends in family income volatility and instability might differ from the earnings trends from Chapter Two. First, families are usually aggregations of individuals, some of whom have earnings and some of whom do not.[2] Income volatility within a family can change not only because the earnings of individual workers become more or less volatile, but because the number of workers changes more often, because their hours of work are interdependent, or, if income is adjusted for the fact that families of different sizes have different economic needs, because the number of non-workers changes. Changes in how closely the economic situations of individual family members resemble each other will also affect income volatility trends. If husbands and wives, for example, work in increasingly similar jobs over time, then to the extent that volatility hits some occupations harder than others, family incomes will be more unstable than when husbands and wives performed less similar work.[3]

Second, earnings are only one type of income. The streams of income from other sources, such as from investments, family and friends, and public programs, can also become more or less volatile, compensating or exacerbating earnings volatility.

Furthermore, changes in the flow of income out of a family – to relatives or friends and in the form of taxes – can affect volatility trends if income is measured net of these transfers.

In this chapter, I provide a range of trend estimates describing income instability and volatility over the past 35 years. The goal throughout is to determine what consistent findings recur and how income volatility trends should be characterized. I find that neither the risk of income drops nor volatility per se increased much from the early 1970s to the early 2000s.

Before presenting my results, however, it is worth providing some context for the boomlet of recent research in this area, and that begins with the influential but flawed work of political scientist Jacob Hacker.

Jacob Hacker and *The Great Risk Shift*

While not the first to examine trends in income instability, the recent wave of research on the subject undoubtedly began with and proceeded from Hacker's work. Beginning in early 2004, mostly in outlets aimed at a general audience, Hacker promoted the view that income volatility had increased dramatically in recent years. This was the primary evidence for what he called a "Great Risk Shift" that heralded a world in which Americans were increasingly vulnerable to economic calamity. Hacker's very visible findings created an impression among political and policy observers and participants that income volatility constituted a neglected economic problem that indicated and explained widespread economic anxiety. However, the bleak impression Hacker created was the result of a combination of questionable data presentation decisions and inadequate attention to how sensitive his results were to potential data problems.

Hacker's first published volatility estimates came in a *New York Times* op-ed in January of 2004, in which he announced that according to the Panel Study of Income Dynamics (PSID), "the instability of family incomes was roughly five times greater at its peak in the 1990's than in 1972."[4] This finding, shown in a dramatic chart accompanying the piece, was Exhibit A of his argument that "the economy has become more uncertain and anxiety producing for most of us—not just over the past three years, but over the past 30."

To measure volatility, Hacker used the Gottschalk-Moffitt variance decomposition model discussed in Chapter Two and below. In displaying his results, he presented averages of five years of volatility estimates, centered on the year in question.[5] Hacker's estimates showed pre-tax family income volatility increasing from 1972 to the mid-1980s, with a relatively flat trend in the second half of the 1980s and a sharp increase from 1989 to 1994. Volatility then declined sharply from 1994 to 1996 and continued to decline from 1996 to 1998. These estimates are reproduced in Figure 1 below.[6]

Comparing the 1972 estimate in Hacker's chart to the peak volatility level in the early 1990s shows volatility 3.7 times higher in the latter period. The basis for stating that volatility was 5 times higher lay in comparing the raw 1974 and 1993 levels; volatility in 1993 was 4.75 times the 1974 level. However, as Figure 1 shows, had Hacker displayed the raw transitory variance levels, rather than five-year moving averages, what would have stood out would have been not just the unprecedented rise in volatility between 1991 and 1993, but the fact that it was completely reversed from 1993 to 1998. Such a dramatic decline would have severely weakened the argument that family income was growing more volatile, raising economic "risk" in America.

The large decline in volatility from its early 1990s peak led Hacker to characterize the overall trend in volatility over the 24 years, alternatively, as having "more than doubled between 1974 and 1998", as having "become two to three times more unstable in the past three decades", and as having "never fallen below twice its starting level" after it peaked, all of which were more or less accurate ways of describing the 110 percent increase in the raw transitory variances.[7] As it turns out, however, Hacker's op-ed and his subsequent estimates greatly exaggerated how volatile volatility was after 1990.

By early 2005, Hacker had added the 2001 PSID to his database, allowing him to produce a volatility estimate for 2000. The raw figure indicated no change since 1998, leaving volatility below its 1991 level. However, Hacker continued presenting his results as moving averages, which continued to show volatility well above its early 1990s levels.[8]

In 2006, Hacker incorporated newly-available data from the 2003 PSID. As quoted in a June 2006 *U.S. News and World Report* article just a few months before his book, *The Great Risk Shift*, was published, Hacker indicated that he had, "just analyzed the 2002 data. Family income volatility increased by 50 percent over the past two years, so it is now three times its early-1970s level."[9] With the PSID trend line now indicating that volatility had tripled since 1974 and was once again climbing skyward, Hacker switched from showing moving averages to reporting the raw volatility estimates in *The Great Risk Shift* (henceforth, *GRS*).

Figure 2 shows Hacker's pre-tax family income volatility estimates, as reported in *GRS*.[10] In all, volatility increased by 360 percent from 1974 to 1994, declined by 57 percent from 1994 to 1998, and increased 50 percent from 2000 to 2002. Volatility more than doubled from 1991 to 1993 alone according to these results. Post-tax income volatility showed similar patterns and grew 130 percent over the entire 1974-2002 period.

For comparison, Figure 2 also shows what Hacker's results would have looked like if he had stayed with his prior decision and shown the results as moving averages. Notably, volatility declines below its 1991 level and does not turn upward.

Sticking with Hacker's presented estimates, however, the large volatility changes after 1990 stand in stark contrast to the smaller year-to-year changes in earlier decades. It was the starkness of the post-1990 increase in volatility that Hacker presented in his *New York Times* op-ed that led me to begin efforts to replicate Hacker's results prior to the publication of *GRS*. These efforts culminated in a concession from Hacker that his figures were inaccurate and publication of a revised paperback edition of *GRS*, after I was able to show that the large post-1990 swings were driven by Hacker's failure to address year-to-year changes in the number of families reporting very small incomes.[11]

I have since updated my replication attempts based on (incomplete) information provided by Hacker. Figure 3 again shows Hacker's pre-tax family income volatility figures from *GRS*, along with my best replication attempt working with the information that I was able to obtain from him.[12] While I could not replicate the full extent of the post-1990 swings in *GRS*, my trend line follows the same broad patterns as Hacker's.

As discussed in the previous chapter, when incomes are transformed by taking their natural logs, volatility estimates relying on the Gottschalk-Moffitt variance decomposition model are strongly influenced by year-to-year changes in the number of very small reported incomes. Taking natural logs drops cases with non-positive incomes, since their natural logs are undefined, and it also makes differences between very small positive incomes very large. I demonstrate this in Figure 3 by showing how the volatility trend changes if one either bottom codes all incomes—positive or not—at $4,000 (or $333 per month) before taking natural logs or trims the bottom three percent of incomes in each year.[13] Rather than the roughly 150 percent increase in volatility from 1989 to 1993 that Hacker found, or the doubling that my replication attempt shows, I find an increase of about one-fourth using the bottom-coded estimates, or two-thirds using the trimmed estimates.

Hacker's family income measure does not include retirement income, but even among individuals between the ages of 25 and 61, the retirement income of family members has an important moderating influence. Hacker's measure also effectively double-counted alimony payments from 1994 onward.[14] Figure 3 shows the volatility trend when the basic pre-tax family income measure in the PSID is used (after trimming), which corrects these problems.[15] I find an increase in volatility of 65 percent over the 1974-2002 period, rather than the 200 percent implied by Hacker's estimates. Similarly, volatility increases by about 75 percent if the sample is confined to the nationally representative subsample of the PSID, which I found to more closely track CPS trends in income variance than the full core sample that Hacker used. This latter trend line also shows a smaller bulge in volatility in the early 1990s.

As discussed in the previous chapter, presenting volatility estimates as variances leaves the scale in units of *squared* logged income, which exaggerates year-to-year differences. When the estimates are presented as standard deviations rather than variances, as shown in Figure 3, the increase in volatility over the period is 28 percent over the 1974-2002 period, rather than the 200 percent increase implied by Hacker's *GRS* figures.

The next iteration of results from Hacker arrived in the "Revised and Expanded Edition" of *Great Risk Shift*, published in early 2008.[16] This time, rather than volatility increasing over 360 percent between the early 1970s and its 1990s peak, Hacker showed a rise one-third that (less than 125 percent). The new pre-1990s trend was noisier than Hacker's original estimates, with a sizable decline in volatility during most of the 1980s after the run-up in the first years of the decade. The trend from the early 1990s onward showed a large increase in volatility followed by a large decline in the mid-1990s, with another notable increase from 1998 to 2002. From 1973 to 2004, Hacker showed an increase in volatility of about 95 percent (presented as variances), consistent with my corrected estimates from Figure 3.

Once again, Hacker changed the presentation of his data, this time using a chart that treated the 1973 volatility level as a baseline and showing the percent increase in volatility since 1973 on the vertical axis. Figure 4 carries over my nationally-representative-subsample trend (measured as variances—the bottom line of the figure) from Figure 3, presenting it in two different scales.[17] In the first scale, I show the trend in units of squared logged income on the left axis, as Hacker did in the first edition of *GRS*. The second scale, on the right axis, is the same as that in the revised edition of *GRS*. Both scales extend from 0 to (roughly) the maximum volatility level observed. My estimates resemble the broad Hacker trend, though there are year-to-year differences.

The point of Figure 4 is to show that Hacker's presentation change has the effect of visually exaggerating the increase in volatility over time. The adjusted scale makes the vertical distance between 1973 and 2004 volatility appear larger than it does using the unadjusted scale.[18]

Just months after the revised edition of *GRS*, Hacker and his new collaborator, Elisabeth Jacobs, produced yet another set of estimates, for an Economic Policy Institute research brief.[19] In this most recent version of Hacker's figures, volatility is shown rising 150 percent from 1973 to 1993, falling by more than half between 1993 and 1998, then increasing between 2000 and 2002. Over the entire 1973-2004 period, volatility essentially doubled. The early-1980s increase in volatility is not as sharp as in the revised edition of *GRS*, but the latest figures still imply that volatility increased by something like 75 percent just between 1991 and 1993.[20] Hacker and Jacobs acknowledge that "[e]xpressed in terms of standard deviations, the 99% rise in transitory variance found from 1973 to 2004 would be around 40%—very close to what is found using [an alternative approach]."[21] Nonetheless, they focus on the variance estimates, showing trends by education group and trends in men's earnings volatility in terms of variances. The exception—again convenient to Hacker's argument—is that when they compare overall income dispersion in the PSID to income dispersion in the CPS, they use standard deviations, which reduces differences between the two datasets during the early 1990s. Presenting variances would make the disparity between the CPS and the PSID look larger and reduce confidence in the large increase in volatility they find during that period.[22]

All of these methodological problems and presentation decisions aside, there is a broader reason that Hacker's estimates relying on the Gottschalk-Moffitt model may be problematic, namely that there are good theoretical reasons for believing the model is inadequate for measuring the volatility of household- or family-level income. I return to this question below.

Other Research on Income Instability Trends

As in the previous chapter, I summarize my review of the literature on income instability trends here and provide a longer review in Appendix Two.

Short-Term Directional Mobility

A number of studies have looked at either relative or absolute family income mobility, upward or downward, over short periods. Gottschalk and Danziger (1998) found declines in downward relative mobility from the top quintile in the 1970s and 1980s, and Carroll et al. (2007) confirmed the 1980s decline. Slemrod (1992), however, generally found increasing downward mobility from the top decile, ventile, and centile from the early 1970s through the mid 1980s. Carroll et al. found no change in downward mobility in the early 1990s. Finally, upward relative mobility from the bottom quintile was either unchanged or declined in the 1970s and 1980s, and in the first half of the 1980s in particular.[23] Carroll et al. again found no change in the early 1990s.

There is little consistency across studies in estimated trends in absolute income mobility. The one point on which the research agrees is that upward and downward absolute mobility increased in the 1970s.[24] Estimates from SSA-based data consistently show only small changes in mobility, generally in contrast to the results from the PSID-based studies.[25] But the PSID-based studies often disagree among themselves. Most of the evidence from the PSID indicates an increase in both upward and downward absolute mobility over the 1980s and an increase in downward mobility during the late 1980s. The PSID-based studies all agree that mobility was higher in 2000 than in 1970, and several find clear counter-cyclical patterns in directional mobility, in contrast to the findings for relative directional income mobility.[26] Little else can be said comparing the relative and absolute income mobility results.

Short-Term Non-Directional Mobility

Non-directional relative mobility either declined or was stable in the 1970s and declined in the 1980s.[27] Carroll and his colleagues found an increase in mobility over the first half of the 1990s, though mobility remained below its 1980 level. Non-directional absolute mobility increased in the 1970s. Dynan et al. (2008) and Hertz (2006, 2007) found rising mobility thereafter, but Dahl et al. (2008) did not.

I found just one study that examined trends in short-term intertemporal income associations. Tom Hertz examined household income mobility using matched CPS files.[28] He found that mobility (measured by one minus the correlation over adjacent years) increased from 1991 to 1998. It then declined slightly in 2004, though the change was not statistically significant. The 1990s trend is the opposite of what Bhashkar Mazumder (2001) found for men's earnings and what Kopczuk et al. (2009) found for commerce and industry workers' earnings, but these are the only comparable studies between the earnings and income literatures using correlations.

Dispersion of Income Changes

The few studies on dispersion in income changes agree that income volatility increased in the 1970s and changed little in the 1980s.[29] The research based on the PSID finds increases in volatility in the 1990s, but Dahl et al.'s declining trend from the mid-1980s to the early 2000s using Social Security Administration data linked to the SIPP is inconsistent with the PSID results.[30] Finally, the trend in volatility in the early 2000s is inconsistent across studies. These general findings are consistent with the analogous literatures on trends in absolute income mobility and trends in male earnings dispersion in that all find increases in volatility in the 1970s and all find higher volatility in the early 2000s than in 1970 or 1980 in the PSID. On the other hand, the Dahl et al. research implies declining volatility for both earnings and family income since the mid-1980s.

Within-Person Income Dispersion

Research on trends in within-person family income dispersion shows a secular rise in mean volatility from the early 1970s to the early 2000s, with the increase (expressed as variances) ranging from roughly two-thirds to 100 percent.[31] Median volatility increased less dramatically according to Nichols and Zimmerman (2008), but Gosselin and Zimmerman (2008) report a sizeable increase. While not entirely consistent, the studies generally find volatility increasing in the 1970s, 1980s, and 1990s, but flat or declining in the early 2000s. This rise is much clearer than the probable increase in within-person earnings dispersion among men found in the previous chapter, and it is more consistent across time than the increase in income-change dispersion.

Across-Person Dispersion of Earnings Shocks

The existing studies in this area all use the PSID and are generally consistent.[32] Volatility increased in the 1970s (except in Gottschalk and Moffitt, 2007), in the 1980s, in the 1990s (except in Nichols and Zimmerman, 2008), and from 1998 to 2002. These results are consistent with the trends in within-person income dispersion and in the dispersion of earnings shocks noted in the previous chapter. The increase from the early 1970s to the early 2000s was somewhere between 20 and 50 percent expressed as standard deviations, according to these studies. That is comparable to the range found in the literature on male earnings volatility that use the same methods, summarized in Appendix One as running from 15 to 65 percent.

Summary of Previous Literature

The research on family income instability and volatility trends is much more consistent than that on trends for earnings. This fact is largely due to the dominance of PSID-based studies in the research on family income instability and volatility trends, and the relatively small number of studies thus far conducted. The research generally finds that short-term relative income mobility was largely unchanged or declined during the 1970s and the 1980s. However, research on absolute mobility and on income dispersion show that family income instability and volatility increased in the 1970s, 1980s, and 1990s. There is conflicting evidence for the early 2000s, with research on dispersion of transitory shocks showing an increase and that on within-person income dispersion showing a flat or declining trend.

The big exception to these conclusions is the CBO research, which uses the SIPP linked to Social Security records to correct for measurement error in labor income. The CBO research indicates that income instability was basically flat from the mid-1980s forward. Otherwise, the increases in income volatility since 1970, 1980, or 1990 are consistent with the increases in male earnings volatility over these same periods in the research discussed in Appendix One. Where quantitative estimates of volatility can be compared between the income and male earnings literatures (studies using dispersion-based measures) the two show increases of similar magnitudes.

In short, while the rise in income volatility has not been nearly as large as Hacker's initial estimates implied, the evidence from previous studies using the PSID does support his Great Risk Shift hypothesis in that it generally finds steadily increasing income volatility and instability over the past thirty-five years. Some dispersion-based estimates imply a steady rise in volatility of as much as 50 percent over the entire period, although the CBO figures suggest that it did not change at all after the early 1980s. This range is uniformly much lower than the doubling of volatility that Hacker has reported, but it implies potentially high volatility nonetheless. The rest of this chapter attempts to make more sense of the size and timing of any rise in income instability.

Methods and Data

To determine whether income volatility and instability trends are consistent using a variety of measures, a single dataset, and a standard set of carefully thought-through methodological decisions, and to see whether these trends are similar to volatility trends for earnings, I estimated several trends using the Panel Study of Income Dynamics

(PSID). To the extent possible, I made the same methodological decisions as in Chapter Two. I also build gradually from the earnings volatility estimates by beginning with aggregated family earnings volatility trends and working up toward alternative family income concepts. Below I briefly review the key methodological points for understanding the estimates that follow. See the Methods and Data section of Chapter Two for a full discussion of the considerations involved.

Data

As in Chapter Two, I use only the nationally-representative "SRC sample" of the PSID, excluding both the disadvantaged SEO sample and the Latino and immigrant samples of the 1990s. The unweighted SRC sample consistently produced income variance trends and levels that were closer than estimates from the weighted "core" PSID sample (SRC plus SEO) to the Annual Social and Economic Supplement to the Current Population Survey.[33] Figure 5 shows the SRC vs. CPS comparisons. I also ran my variance decomposition models using the weighted core sample, and the differences were not large.

One important change that I make in this chapter is to include "non-sample" members if they are in a family unit that has at least one sample member and they otherwise meet the sample restrictions. I do so because my unit of analysis consists of persons rather than families. If non-sample members are excluded, that will disproportionately remove partners of sample members in more recent years of the PSID. In the 1968 wave, both partners in a sample family unit are defined as sample members. But in subsequent years, people with no blood ties to an earlier sample member are not designated as sample members. In particular, when the children of the first PSID generation marry or cohabit with someone outside the PSID sample, the partner is deemed non-sample.

If families were my unit of analysis, this would not be a problem because the ratio of families with partners to single-person family units would be unaffected by the exclusion of non-sample partners. But since persons are the unit of analysis, excluding non-sample members will reduce the ratio of adults in families with partners to adults without partners. Note that non-sample members are assigned weights of zero, so that analysts who simply use the PSID sample weights exclude these individuals automatically. This probably explains some of the differences in results discussed in Appendix Two, since excluding these non-sample members makes trends look worse than they were by overstating the fraction of adults without partners. Including non-sample adults in family units with a sample member produces variance trends that more closely match CPS variance trends (results not shown).

Chapter Two details the changing definition and coding of several earnings variables. For this chapter, I created three different measures of combined head and spouse earnings, each of which allocates income from self-employment into labor and asset components differently to deal with changes in the way the PSID coded these variables.

Chapter Two also discusses changes in the PSID since 1990. These changes include:

- The switch to more detailed questions for certain income components in 1993;

- Updated data collection, editing, and processing procedures in 1993, 1994, 1995, and 2003;
- Cuts to the editing budget beginning in 1993;
- Doubling of the interview length between 1995 and 1999;
- Efforts to recontact attriters in 1990, 1992, 1993, and 1994;
- Changes in the rules for following family members who move out, which occur in 1990, 1993, 1994, 1996, 1997, and 2005; and
- A change in the sample definition to include more children in 1994.

These changes appear to have affected the PSID estimates. Research by the Institute for Social Research has shown that the introduction of computer-assisted telephone interviewing (CATI) and income processing software in 1993 increased income variances, and income variance in the 1993 PSID survey is not only greater than in the 1992 or 1994 PSID, it is suspiciously large compared with the 1993 CPS. Percentiles below the median show one-time declines, and those above the mean show increases.[34] The PSID income estimates at the first, third, and fifth percentiles are below those from the CPS from 1992 to 1996, even though the opposite is true in all other years between 1967 and 2004 and for all but the lowest percentiles even between 1992 and 1996.[35] At the very bottom of the income distribution (below the tenth percentile), the PSID and CPS income trends do not match up very well between the mid-1980s and the early 1990s, with the PSID percentiles declining anomalously. There is an up-tick in income for these percentiles in the 2004 PSID but not in the CPS. Hacker and Jacobs (2008) show an increase in the dispersion of income in the PSID in the early 1990s that is not reflected in the CPS. So does my Figure 5.[36] Dynan et al. (2008) discovered a sizable jump beginning in the early 1990s in the frequency of heads who report working more than 120 hours but report $0 in earnings. Nichols and Zimmerman (2008) report a similar jump in the early 1990s.

I take several precautions that help mitigate the effects of these changes. First, I trim the top and bottom 2 percent of positive family incomes in each year, which reduces the impact of changes in bottom codes. [37] I minimize the influence of very high incomes by using the natural log transformation in most analyses, making my results less sensitive to large incomes and large changes in high incomes. I address the changes in recontact rules and sample definitions, by re-running my variance decompositions restricting the sample to exclude the added respondents. The results were not meaningfully affected. Nor were the results affected when I excluded individuals with incomes that included imputed components.

One way to assess how important these changes to the PSID are is to compare trends for income measures that aggregate fewer and greater numbers of variables. Measures that aggregate a relatively large number of variables are more likely to be affected by data inconsistencies. The measures I examine below provide a range of aggregation to consider this issue.

I adjust all incomes for inflation using the CPI-U-RS, linking it to the CPI-U for earlier years.[38] In most analyses I transform income by taking its natural log. Using natural logs has the advantage of transforming income to a scale that is mean-independent. An across-the-board 10 percent change in logged income will not produce a change in the logged income variance. But a problem with the log transformation is that it has the effect of increasing the influence of very small incomes and very small absolute changes in low incomes, as discussed in regard to Jacob Hacker's analyses above. Because a non-negligible number of PSID respondents report very low family incomes, year-to-year changes in measured volatility can be strongly influenced by changes in the proportion of individuals reporting very low incomes. In the PSID, there is enough year-to-year variation in low reported incomes to drive estimated changes in volatility over time. Trimming very low incomes before estimating volatility reduces this problem.

My analyses include only persons with positive income in the years considered. This restriction is partly for methodological reasons – the logs of zero and negative numbers are undefined. But persons who report going an entire year without any family income are also likely either to have special circumstances that make their inclusion in these analyses inappropriate or to be under-reporting their income.[39] Chapter Two shows that just one in twenty people with no earnings in an entire calendar year report that they want a job and are having trouble finding work. Since several of my income measures include public transfers, it is likely that a large proportion of $0 income reports are simply wrong. However, individuals with business losses can and do report zero or negative income. As a fraction of the sample, though, adults with asset income losses who report low incomes are a tiny group.

I attempt to minimize the number of retirees and students by restricting my sample to persons between the ages of 21 and 60 in the survey year (which makes most of them 20 to 59 years old in the year for which income is reported). I chose this range as a compromise between being more inclusive and keeping sample sizes large, and wanting to exclude students and retirees. Since labor force status is reported for the current week while income is reported for the previous year, identifying individuals who were students and retirees during the income year is impossible after 1997, when the PSID became biennial. Furthermore, wives' labor force status is unavailable in the PSID before 1976 (and also in 1977 and 1978). However, I ran the variance decomposition models excluding people who were students or retired in both the current survey and two years earlier, bracketing the year for which income is reported. I also ran all variance decomposition models restricting the sample to individuals 18 to 64 years old. The results were negligibly affected.[40]

The PSID asks about current family unit members' income during the previous year. If family composition has changed, the sum of these amounts may not equal the total income *for the previous year's family unit members*. In particular, if a couple divorces or gets married, there will be a mismatch between the previous and the current year's family members. The two groups will be the same only for those families that neither gained nor lost earners. As a result family incomes are usually mis-measured when adult family composition changes.

In order to test the sensitivity of my results to this issue, I repeated selected analyses for a restricted sample confined to adults in families where the head was married or single and there was no marriage or divorce in either the previous or current calendar year.[41] This restriction is not ideal. Limiting family composition change removes an important source of volatility. Furthermore, the sample restriction introduces selection into the results in two different ways. First, family composition may be affected by income volatility rather than the other way around. Second, measures of family structure and marital history based on calendar years—and collected retrospectively for the "off years" even after the PSID became biennial—are obtainable only using the supplemental

PSID Family History files, which did not assess family and marital histories until 1985. Respondents lost before 1985 never provided their histories, so they are excluded. These qualifications aside, the results of these sensitivity analyses can be informative as to whether mismatches related to measuring family composition changes are potentially important. Note that if the mismatch problem has a constant effect on volatility estimates across all the years in the PSID, the trend will be unaffected (although the percent changes could be). In the analyses below, none of my conclusions are much affected by this additional sample restriction.

Income Measures

I examined several income measures, four of which are included in the analyses below. I begin by combining the labor income of heads and partners. This measure includes "labor" income from self-employment, and excludes the share of self-employment income that the PSID labels "asset" income. I then re-estimated my results using a measure that assigned all self-employment income to labor. The results were unaffected.[42]

I also show results for pre-tax family income and post-tax family income. Pre-tax income in the PSID is a composite variable that includes all labor, asset, and transfer income of all family unit members age 16 or older living in the household. It does not include capital gains, lump sum payments such as lottery winnings, or in-kind transfers. However, I also computed a measure that included lump-sum income and one that included the value of food stamps, public energy subsidies, and free housing. The results were unaffected. I omit them here because these additional variables are available in fewer years.[43]

To estimate post-tax income, I relied on an enhanced version of the PSID created by Cornell University's Department of Policy Analysis and Management, the Cross-National Equivalent File (CNEF).[44] The CNEF includes estimates of federal and state income and payroll taxes, based on the National Bureau of Economic Research's TAXSIM model.[45] I also created a comprehensive post-tax-and-transfer measure that included food stamps, energy subsidies, and the value of free rent. Once again, the results were unaffected.[46]

Finally, I include estimates using pre-tax income adjusted for family size. To adjust incomes, I divide them by the square root of family size (prior to logging income for those analyses in which logged income is used). Reported family size in the PSID refers to the current year's family, while reported income is that received by current family members in the previous year. Since the adjustment of last year's income should be based on last year's average family size, changes in marital status, births, deaths, and changes due to family members moving out (or back in) all introduce error into the family size adjustment. Nearly all other annual household surveys—as well as the decennial census—suffer from this problem.

To check the sensitivity of my results to these issues, I estimated trends in adjusted pre-tax income using a second approach—dividing income by needs, based on food budgets prepared by the U.S. Department of Agriculture. The benefit of this measure is that it accounts for family composition in the previous year (the same year income is measured) rather than simply reflecting the current year's family size.[47] The downside is that for some measures of income instability, using a ratio of income to needs rather than some version of per-capita income may be inappropriate. Dividing by the square root of family size leaves the units in dollars, but dividing by income needs produces a unit-less ratio.

I conducted a second sensitivity test to see whether my results hold when I adjust by the square root of family size but confine the analyses to adults in families with continuously married or single heads over the previous and current year who had no births to the head or partner. The results of these tests indicated that none of my conclusions are affected by the different adjustment or sample selection.

Measures of Volatility and Instability

The measures used in this chapter parallel the earnings volatility and instability measures from Chapter Two.

Relative Mobility. I examine the probability of rising into or falling out of a quintile over two years.[48] I compute quintiles from positive trimmed income for each sample and each income measure, in every year. That is, quintiles are constructed after excluding persons outside the sample of interest (e.g., persons under age 20, persons with no income), but without regard to whether a person's income is observed in any other year (e.g., the second year over which mobility is measured when constructing quintiles for the first year). This approach means that quintile definitions are not fixed across analyses. It also means that upward mobility from a quintile need not be exactly matched by someone moving downward into it.

Absolute Mobility. I compute two measures of absolute mobility: the probability of experiencing a loss or gain of 25 percent or more over two years, and the probability of experiencing a loss or gain of $10,000 or more (in 2007 dollars). I do not log income for these analyses. Because I exclude those with non-positive income, I avoid the methodological problem of how to calculate the percentage increase when income rises from zero to a positive amount. Because I trim the bottom and top two percent of observations, I also avoid treating small increases from very low initial incomes as large percent changes (e.g., treating a change in income from $100 to $200 as equivalent to a change from $100,000 to $200,000).

Non-directional Mobility. I proceed from the directional mobility results to trends in the likelihood of moving *either* up *or* down (in terms of quintiles or in terms of a 25 percent change in absolute income). I also include two measures of intertemporal income association: the Pearson product-moment correlation coefficient of logged income separated by two years, and Spearman's rank correlation coefficient.

Dispersion of Income Changes. Following several previous studies, I compute the standard deviation of two-year changes in logged income. This operationalization of instability essentially extends the absolute mobility analysis by looking at the full distribution of income changes. I use the difference in logged incomes rather than looking at percent changes because of the asymmetry involved in converting income increases and drops to percentages. Imagine a group of three workers making $20,000, $30,000, and $40,000 in one year who each see their incomes rise by $10,000 the next. The percent changes are 50%, 33%, and 25%. The next year their earnings each fall by $10,000 – constituting percent changes of -33%, -25%, and -20%. The standard deviation of percent changes has declined, even though incomes simply returned to their original levels.[49] This problem does not arise with changes in log income.

Within-Person Income Dispersion. For every sample member, I estimate the standard deviation of their logged income across five years in a nine-year window. I then treat the mean of these individual standard deviations as a summary of volatility in the year on which the nine-year window is centered. Specifically, I follow Gosselin and Zimmerman (2008) in using income in years t-4, t-2, t, t+2, and t+4 and report volatility in year t as the average standard deviation of income over these five years. The incomes are separated by two years because the PSID switched to biennial surveys after 1997. Like Gosselin and Zimmerman, I require a person to have at least three years of income out of the five years.

Dispersion of Transitory Income Shocks. As discussed in Chapter Two, I include two different model-driven measures of the dispersion of transitory income shocks. These measures depend on assumptions about income dynamics that hold imperfectly at best.

My first set of transitory income dispersion measures is based on the variance decomposition model of Peter Gottschalk and Robert Moffitt (see the discussions in Chapter Two and Appendix Two).[50] The variance decomposition model—which Gottschalk and Moffitt now reject but which has remained fairly popular—relies on a simple model of earnings dynamics that allows the total variance in earnings to be expressed in terms of permanent and transitory variance. The model essentially specifies earnings to be static in the short-run, except for random annual shocks that completely dissipate over the short-run. Volatility is operationalized as dispersion of the shocks.

When applied to *family income* dynamics, the model's assumptions are even less realistic than they are for earnings. As discussed in Chapter Two, the Gottschalk-Moffitt model of individual earnings dynamics begins with a model of earnings in dollars, not yet logged:

$$z_{it} = \pi_i \omega_{it} , \qquad (1)$$

Total earnings z_{it} are expressed as the product of a permanent component π_i and a transitory component ω_{it} that is a random shock to permanent earnings. Taking the natural log of both sides of Equation (1) leads to the transformed equation:

$$\log(z_{it}) = \log(\pi_i \omega_{it}) = \log(\pi_i) + \log(\omega_{it}) , \qquad (2)$$

which can be rewritten as

$$y_{it} = \mu_i + v_{it} \ . \qquad (3)$$

To estimate the variance of the transitory component, one takes advantage of the fact that if the v_{it}'s are random shocks, then the overall earnings variance is

$$Var(y_{it}) = Var(\mu_i + v_{it}) = Var(\mu_i) + Var(v_{it}) \,. \tag{4}$$

Furthermore, the covariance of overall earnings measured *k* years apart is

$$\begin{aligned} &Cov(y_{it}, y_{it-k}) = Cov(\mu_i + v_{it}, \mu_i + v_{it-k}) = \\ &Var(\mu_i) + Cov(\mu_i, v_{it}) + Cov(\mu_i, v_{it-k}) + Cov(v_{it}, v_{it-k}) = Var(\mu_i). \end{aligned} \tag{5}$$

Because one can estimate $Var(y_{it})$ and $Cov(y_{it}, y_{it-k}),$ one can estimate the transitory variance $Var(v_{it})$.

Now consider what happens when one attempts to apply the model to family-level economic volatility analyses. For simplicity, assume that all income consists of earnings, and that all families consist of male-female couples and no other earners. Now *i* indexes couples rather than individuals, and *h* and *w* denote the husband and wife, respectively. The model in Equation (1) now becomes

$$z_{it}^h + z_{it}^w = \pi_i^h \omega_{it}^h + \pi_i^w \omega_{it}^w \,. \tag{1b}$$

But now the log transformation gives

$$\log(z_{it}^h + z_{it}^w) = \log(\pi_i^h \omega_{it}^h + \pi_i^w \omega_{it}^w) \neq \log(\pi_i^h + \pi_i^w) + \log(\omega_{it}^h + \omega_{it}^w). \tag{2b}$$

Equation (2b) does not allow us to use a neat model in which permanent and transitory components are separate and additive. What does one end up with if one subtracts $Cov(y_{it}, y_{it-k})$ from $Var(y_{it})$? It is straightforward to see if we express wives' permanent earnings in terms of their husbands', so that

$$\pi_i^w = \theta_i \pi_i^h \,. \tag{6}$$

Equation (1b) can now be rewritten as

$$z_{it}^h + z_{it}^w = \pi_i^h \omega_{it}^h + \theta_i \pi_i^h \omega_{it}^w = \pi_i^h (\omega_{it}^h + \theta_i \omega_{it}^w), \tag{1c}$$

and now we can take the natural log of both sides to get $y_{it} = \mu_i + v_{it}$, where all three variables are logs, with

$$\mu_i = \log(\pi_i^h), \text{ and} \tag{7}$$

$$v_{it} = \log(\omega_{it}^h + \theta_i \omega_{it}^w) = \log(\omega_{it}^h + (\pi_i^w / \pi_i^h)\omega_{it}^w). \tag{8}$$

But now v_{it} and μ_i may be correlated and the v_{it}'s may also be due to the θ_i term. The variance of y_{it} becomes

$$\begin{aligned} &Var(y_{it}) = Var(\mu_i + v_{it}) = \\ &Var(\log(\pi_i^h)) + Var(\log(\omega_{it}^h + (\pi_i^w / \pi_i^h)\omega_{it}^w)) \\ &+2Cov(\log(\pi_i^h), \log(\omega_{it}^h + (\pi_i^w / \pi_i^h)\omega_{it}^w)). \end{aligned} \tag{4c}$$

The covariance term becomes

$$\begin{aligned} &Cov(y_{it}, y_{it-k}) = Var(\log(\pi_i^h)) + Cov(\log(\pi_i^h), \log(\omega_{it}^h + (\pi_i^w / \pi_i^h)\omega_{it}^w)) \\ &+Cov(\log(\pi_i^h), \log(\omega_{it-k}^h + (\pi_i^w / \pi_i^h)\omega_{it-k}^w)) \\ &+Cov(\log(\omega_{it}^h + (\pi_i^w / \pi_i^h)\omega_{it}^w), \log(\omega_{it-k}^h + (\pi_i^w / \pi_i^h)\omega_{it-k}^w)) \\ &\neq Var(\log(\pi_i^h + \pi_i^w)). \end{aligned} \tag{5c}$$

And the difference between the variance and covariance terms is

$$\begin{aligned} &Var(y_{it}) - Cov(y_{it}, y_{it-k}) = Var(\log(\omega_{it}^h + (\pi_i^w / \pi_i^h)\omega_{it}^w)) \\ &+Cov(\log(\pi_i^h), \log(\omega_{it}^h + (\pi_i^w / \pi_i^h)\omega_{it}^w)) \\ &-Cov(\log(\pi_i^h), \log(\omega_{it-k}^h + (\pi_i^w / \pi_i^h)\omega_{it-k}^w)) \\ &-Cov(\log(\omega_{it}^h + (\pi_i^w / \pi_i^h)\omega_{it}^w), \log(\omega_{it-k}^h + (\pi_i^w / \pi_i^h)\omega_{it-k}^w)) \\ &= Var(\log(\omega_{it}^h + (\pi_i^w / \pi_i^h)\omega_{it}^w)) \\ &-Cov(\log(\omega_{it}^h + (\pi_i^w / \pi_i^h)\omega_{it}^w), \log(\omega_{it-k}^h + (\pi_i^w / \pi_i^h)\omega_{it-k}^w)) \\ &\neq Var(\log(\omega_{it}^h + \omega_{it}^w)). \end{aligned} \tag{9}$$

Equation (9) implies that the estimated transitory variance of husbands' and wives' logged combined income depends on the joint distribution of the ratio of wives' to husbands' permanent income (assortative mating) and of husbands' and wives' transitory logged earnings. The direction of bias is indeterminate.

Only if both husbands' and wives' earnings are subject to identical shocks in every year will the variance decomposition model for earnings apply to family-level earnings. In that case, Equation (1b) becomes

$$z_{it}^{h} + z_{it}^{w} = \pi_i^{h}\omega_{it} + \pi_i^{w}\omega_{it} = \omega_{it}(\pi_i^{h} + \pi_i^{w}) \qquad (1d)$$

and Equation (2b) becomes

$$\log(z_{it}^{h} + z_{it}^{w}) = \log(\omega_{it}(\pi_i^{h} + \pi_i^{w})) = \log(\pi_i^{h} + \pi_i^{w}) + \log(\omega_{it}). \qquad (2d)$$

An alternative to formulating the variance decomposition model in terms of shocks to earnings is to formulate it in terms of shocks to family income, in which case Equations (1d) and (2d) also apply. But then one must assume that all income components are static—the earnings of both partners, transfers, and capital income—or continually adjusted to be static in the aggregate within the window from which covariances are estimated, except that the family is subject to annual random shocks that do not persist from year to year. That rules out any coordination between husbands and wives in terms of hours or the type of work each does. For example, temporary departures from the labor force—say, to raise children—are ruled out.

What if the Gottschalk-Moffitt model does not describe the actual income dynamics of families? As noted in Chapter Two, Shin and Solon (2009) and Moffitt and Gottschalk themselves have argued that the model may be too simple to be useful even in the context of individual earnings dynamics.[51] If the true model of earnings dynamics is only slightly more complicated than the Gottschalk-Moffitt model, then estimates based on the model may be substantially biased—and the bias is likely to be even larger when the model is applied to family-level income.

Shin and Solon outline an alternative model that is only slightly more complex than Gottschalk and Moffitt's and show that it implies their model may be inadequate. Assume that the analyst proceeds to estimate earnings volatility as if Equation (1) were the true model but that the actual true model is

$$z_{it} = (\pi_i)^{\rho_t}\,\omega_{it}\,. \tag{1e}$$

Taking the log of both sides yields

$$\log(z_{it}) = \log((\pi_i)^{\rho_t}\,\omega_{it}) = \log((\pi_i)^{\rho_t}) + \log(\omega_{it}) = \rho_t \log(\pi_i) + \log(\omega_{it})\text{, or} \tag{2e}$$

$$y_{it} = \rho_t \mu_i + v_{it}\,. \tag{3e}$$

This time, the individual effect is subject to changing economic returns over time. Estimating the variance of overall earnings now gives

$$Var(y_{it}) = Var(\rho_t \mu_i + v_{it}) = \rho_t^2 Var(\mu_i) + Var(v_{it})\,, \tag{4e}$$

and the estimated covariance is

$$\begin{aligned} &Cov(y_{it}, y_{it-k}) = Cov(\rho_t \mu_i + v_{it}, \rho_{t-k}\mu_i + v_{it-k}) = \\ &\rho_t \rho_{t-k} Var(\mu_i) + Cov(\rho_t \mu_i, v_{it-k}) + Cov(\rho_{t-k}\mu_i, v_{it}) + Cov(v_{it}, v_{it-k}) = \\ &\rho_t \rho_{t-k} Var(\mu_i). \end{aligned} \tag{5e}$$

Subtracting Equation (5e) from Equation (4e) results in an estimate of transitory variance equal to

$$\widehat{Var(v_{it})} = Var(v_{it}) + \rho_t(\rho_t - \rho_{t-k}) Var(\mu_i). \tag{10}$$

The estimate will be biased by the second term unless $\rho_t = \rho_{t-k}$. And if volatility estimates from two adjacent years are compared, the bias in the change estimate is

$[\rho_t(\rho_t - \rho_{t-k}) - \rho_{t-1}(\rho_{t-1} - \rho_{t-1-k})]\ Var(\mu_i)$.

One can repeat this exercise for family-level volatility estimates. The true model is

$$\begin{aligned} z_{it}^h + z_{it}^w &= (\pi_i^h)^{\rho_t^h}\,\omega_{it}^h + (\pi_i^w)^{\rho_t^w}\,\omega_{it}^w = (\pi_i^h)^{\rho_t^h}\,\omega_{it}^h + \theta_{it}(\pi_i^h)^{\rho_t^h}\,\omega_{it}^w \\ &= (\pi_i^h)^{\rho_t^h}(\omega_{it}^h + \theta_{it}\omega_{it}^w) \end{aligned}, \qquad (1f)$$

where this time

$$\theta_{it} = (\pi_i^w)^{\rho_t^w} \;/\; (\pi_i^h)^{\rho_t^h} \qquad (6f)$$

and is subscripted by time, since the returns to fixed effects are time-varying .Once again, taking the log of both sides yields

$$\begin{aligned} &\log(z_{it}^h + z_{it}^w) = \log((\pi_i^h)^{\rho_t^h}(\omega_{it}^h + \theta_{it}\omega_{it}^w)) = \log((\pi_i^h)^{\rho_t^h}) + \log(\omega_{it}^h + \theta_{it}\omega_{it}^w) = \\ &\rho_t^h \log(\pi_i^h) + \log(\omega_{it}^h + \theta_{it}\omega_{it}^w) \end{aligned}, \qquad (2f)$$

which can again be expressed as

$$y_{it} = \rho_t \mu_i + v_{it} \qquad (3f)$$

where

$$y_{it} = \log(z_{it}^h + z_{it}^w) \qquad (11)$$

$$\mu_i = \log(\pi_i^h), \qquad (12)$$

$$v_{it} = \log(\omega_{it}^h + \theta_{it}\omega_{it}^w), \text{ and} \qquad (13)$$

$$\rho_t = \rho_t^h. \qquad (14)$$

Subtracting the covariance of incomes *k* years apart from the variance of income in year *t* results in an estimate of transitory variance equal to

$$\begin{aligned}
&\widehat{Var}(\log(\omega_{it}^{h}+\omega_{it}^{w})) = Var(\rho_t^h \log(\pi_i^h) + \log(\omega_{it}^h + \theta_{it}\omega_{it}^w)) \\
&-Cov(\rho_t^h \log(\pi_i^h) + \log(\omega_{it}^h + \theta_{it}\omega_{it}^w), \rho_{t-k}^h \log(\pi_i^h) + \log(\omega_{it-k}^h + \theta_{it-k}\omega_{it-k}^w)) = \\
&Var(\log(\omega_{it}^h + \theta_{it}\omega_{it}^w)) + \rho_t^h(\rho_t^h - \rho_{t-k}^h)Var(\log(\pi_i^h)) \qquad (15) \\
&+(2\rho_t^h - \rho_{t-k}^h)Cov(\log(\pi_i^h), \log(\omega_{it}^h + \theta_{it}\omega_{it}^w)) - Cov(\rho_t^h \log(\pi_i^h), \log(\omega_{it-k}^h + \theta_{it-k}\omega_{it-k}^w)) \\
&-Cov(\log(\omega_{it}^h + \theta_{it}\omega_{it}^w), \log(\omega_{it-k}^h + \theta_{it-k}\omega_{it-k}^w))
\end{aligned}$$

Note that there are now three additional bias terms compared with Equation 10. Note too that the above discussion actually understates the potential for bias in applying the variance decomposition model of earnings dynamics to income dynamics, because it does not even take into account sources of income other than earnings.

Finally, nothing in the above discussion incorporates income adjusted for family size. Thinking about random, non-persistent shocks as applying to family-size-adjusted income makes even less sense than applying the model to non-adjusted family income. The model requires that family income adjusted for size is static within the relevant window, save for the annual shocks. If family size changes in a way that is not simply random, then income must recalibrate so that adjusted income remains constant. If it changes in a way that is random, then the change must reverse itself in the short-term.

Ultimately, whether these modeling issues are important or not is an open question. The point-in-time estimates might all be biased, but unless the bias changes systematically, the trends might still be valid. However, estimated percent changes in volatility depend on baseline levels as well as the size of change, so such estimates should be viewed cautiously.

As in Chapter Two, I present results using four-year lags to estimate the covariance term in Equation (5). I also adjust incomes to remove the effect of the head's age by pooling heads across all PSID waves and regressing trimmed logged income on a quartic in age, year indicators, and individual fixed effects (stratified by sex in analyses that combine men and women). I use the age coefficients to age-residualize income for the heads, and I assign this income to all family members who meet the other sample restrictions.

My second measure of transitory dispersion is based on an error components model that is similar to that of Haider (2001).[52] As in Chapter Two, I model income as a function of the head's age, individual fixed effects, a random growth component (individual-specific slopes), and a time-varying transitory component that follows an ARMA (1,1) process:

$$\begin{aligned} y_{it} &= f(a_{it}, t) + \mu_i + \gamma_i t + \nu_{it} \\ \nu_{it} &= \rho \nu_{it-1} + \theta \varepsilon_{it-1} + \varepsilon_{it} \end{aligned} \tag{6}$$

This model implies that once incomes are age- and year-residualized[53], which removes the first term on the right-hand side in the equation for y_{it}, the covariance of incomes in any two years t and s is given by

$$\begin{aligned} Cov(y_{it}, y_{is}) &= Var(\mu_i) + tsVar(\gamma_i) + (t+s)Cov(\mu_i, \gamma_i) \\ &\quad + Var(\varepsilon_{it})\rho^{|t-s|}[1 + \theta/\rho + (\rho+\theta)^2/(1-\rho^2)] \end{aligned} \quad . \tag{7}$$

This model may be estimated by stacking the elements m of the empirical covariance matrix (including the diagonal and above), creating variables t and s to designate rows and columns, and using nonlinear least squares to estimate the model

$$\begin{aligned} m_c &= b_0 + tsb_1 + (t+s)b_2 \\ &\quad + \{b_3^{|t-s|}[1 + b_4/b_3 + (b_3+b_4)^2/(1-b_3^{\,2})]\}(b_5 + \sum_{j=2}^{C} d_{t=j} b_{j+4}) \end{aligned} \tag{8}$$

where the vector of dummy variables d indicate whether $t= j$. The coefficients b_5 to b_{C+4} provide the estimates of each year's transitory variance, of which I then take the square root to get the transitory standard deviation.[54]

Pivot Volatility. Once again, I close with trends in what I term "pivot volatility", which addresses the problem, noted in the introduction, that the existing measures of volatility have in that they may interpret secular increases in income as volatility. As discussed in Chapter Two, the conceptual basis for pivot volatility is that volatility occurs when individuals experience a reversal of their income trajectory. To construct my measure of pivot volatility, I look at the points within a nine-year window where income can reverse its two-year trajectory across five years. Over nine years, there are three such points. At each potential pivot, individuals are assigned the average of their pre- and post-pivot two-year income changes (each expressed as the absolute value of the percentage change) or zero if a pivot did not occur. They are then assigned the average of their three pivot values, and I estimate trends in the mean of this within-person average across individuals. Pivot volatility indicates, roughly, the typical pre- and post-pivot percentage change experienced by individuals. For more details, see Chapter Two.[55]

Results

Short-Term Downward Mobility

I follow the organization of Chapter Two and first present trends in downward mobility before moving to non-directional measures of instability and volatility. Figure 6 is a first step at connecting the earnings results from Chapter Two with the family income results. It shows trends in downward relative and absolute mobility for combined head and partner labor income. Figures 7, 8, and 9 present analogous trends for pre-tax and post-tax family income and for pre-tax income adjusted for family size. Looking first at relative mobility, the probability of combined labor income falling one or more quintiles over two years declined steadily between the late 1960s and the early 2000s. The decline in mobility for the other measures of family income is confined to the late 1970s and 1980s.

These results are broadly consistent with the declines in relative earnings mobility I found for both men and women in Chapter Two. They are also consistent with those of Peter Gottschalk and Sheldon Danziger (1998) in that we both find less downward mobility in the early 1990s than in the late 1960s using family-size-adjusted income, but the trend along the way is rather different. The decline also agrees with Robert Carroll et al. (2007). The results are inconsistent with Joel Slemrod's (1992) results for the top of the income distribution in the 1970s and early 1980s.

Figures 6 through 9 also reveal that absolute downward mobility follows a countercyclical pattern, rising during downturns and falling during recoveries (except for the recession of 1990-1991. The risk of a 25 percent drop in combined earnings is higher than that for male labor income (see Chapter Two) but lower than that for female labor income until the mid- to late 1980s. This pattern probably reflects the effect of some wives' taking time out of the labor force for childbearing. Such interruptions increase the likelihood of a large family income drop relative to the likelihood that a man will experience a large drop in his earnings, but the continuity of male earnings keeps the likelihood of a large income drop low relative to the likelihood a woman will experience a large drop in her earnings. At the same time, the secular increase in the number of female-headed households means that these dynamics should be less consequential over time, which is consistent with the convergence of combined head/partner downward mobility and female downward mobility levels.[56]

Somewhat surprisingly, levels of downward mobility in total pre-tax family income unadjusted for family size are if anything slightly higher than in combined head/partner earnings. In results not shown, I found that pre-tax family income downward mobility was more prevalent than combined head/partner *taxable* income, which adds asset income to labor income. The implication is that transfer income and the income of other family members make family incomes *less* stable rather than providing insurance against shocks to the head's and partner's earnings and asset income.

Similarly, progressive taxation should also mitigate the effects of shocks to pre-tax income, since income reductions can be expected to result in a proportionally lower tax burden (Orszag, 2007). However, the pre- and post-tax risk of a 25 percent loss is very similar, implying that the tax system provides only modest insurance against large income drops. On the other hand, the risk of a $10,000 loss in income is generally lower when looking at post-tax income, but that is probably just because post-tax incomes are lower than pre-tax incomes.

The *trends* in absolute downward mobility are similar to the trend in downward mobility in male earnings. The likelihood of a 25 percent drop in combined labor income rose from 12 percent in the early 1970s to 17 percent in the early 2000s, while the increase for pre-tax income was from 12 to 18 percent.[57] On the other hand, comparing cyclical troughs implies little increase since the mid-1970s, and the most recent cyclical rise in downward mobility is only somewhat higher than those in the downturns of the mid-1970s and the early 1980s. The risk of a $10,000-drop in combined labor income rose from 15 percent to 25 percent and the risk of a $10,000 drop in pre-tax income rose from 18 to 28 percent.

Comparing my downward absolute mobility results with previous research relying on the PSID, the cyclical patterns that I find dominate any secular rise in downward mobility, contrary to the work of Hacker and Jacobs (2008), of Jacobs (2008), and of Dynan et al. (2008). My trends are basically consistent with the less-detailed results of Peter Gosselin (2008) and Gosselin and Zimmerman (2008). The general trend I find resembles what Molly Dahl et al. (2008) found in the Survey of Income and Program Participation after 1993, though I show a bigger increase and our 1980s trends are inconsistent. Finally, my results agree with those of Tom Hertz (2007), who found a rise in downward mobility over the late 1980s and early 1990s in the CPS. But while Hertz finds no change between the early 1990s and early 2000s in the CPS, I show an increase in the PSID.

For comparison, Figures 10 and 11 show trends in upward pre-tax income mobility, both unadjusted and adjusted for family size, which illustrate trends in upward mobility for the other income measures. Relative mobility changed little over the period, declining through the 1980s, and hovering between a 25 and 30 percent chance of an income increase of 25 percent or more. As in Gottschalk and Danziger (1998) and Gottschalk, McLanahan, and Sandefur (1994), upward mobility was relatively flat in the 1970s and declining in the 1980s. These trends are also consistent with Duncan, Smeeding, and Rodgers (1993). My results are consistent with Carroll et al.'s (2007) for the 1990s but not for the 1980s. They agree with my results on upward mobility in male earnings from Chapter Two.

Absolute upward mobility again follows a clear cyclical pattern, with levels in the early 2000s lower than in the early 1970s. There is a downward trend from the late 1960s to the early 1980s, followed by an upward trend. These trends are basically consistent with those of Dynan et al. (2008) and Gosselin (2008), and those of Dahl et al. (2008). They also follow the trend from the early 1990s to the early 2000s of Hertz (2007), but they are inconsistent with the Hertz results from the late 1980s and early 1990s. Finally, they are consistent with the trends in upward absolute earnings mobility I found among men in Chapter Two.

Summarizing these results, then, short-term *relative* mobility (upward or downward) changed little over the last thirty five years. The chance of a large *absolute* income drop or gain rose and fell with business cycles. Large drops may have become somewhat more common, but the trend is shallow enough that it is difficult even to determine when secular declines or increases begin or end.

Non-Directional Short-Term Mobility

I now shift to mobility measures that do not distinguish between upward and downward mobility. These trends reflect the mix of movements in either direction that characterize volatility.

Probability of Income Change in Either Direction. The top two lines of Figures 12 through 15 show how the likelihood of mobility in either direction has evolved over time. The chance of moving up or down one quintile declined over the second half of the 1970s and through the 1980s but increased slightly thereafter, finishing at mid-1980s levels.

For combined labor income the likelihood of a 25 percent gain or loss rose during the 1970s, and fell by a comparable amount over the 1980s. For pre-tax family income, absolute mobility changed little over the 1970s and the first half of the 1980s but fell in the second half of the 1980s. For post-tax income, absolute mobility increased from 1981 through the mid-1980s and decreased in the late 1980s. It jumped in the early 1990s—through the mid-1990s for pre-tax and post-tax income—then changed little from the mid-1990s to 2004.

The shift in nondirectional mobility in the pre-tax income measures in the early 1990s is due to downward mobility not falling after that recession. Figures 6 through 9 indicate that the risk of a large income drop failed to rise as much during the late 1980s or to fall as much after the early-1990s recession as during past business cycles. However, by 1998, the downward and upward mobility levels and trend mirror each other again, and the downward mobility levels appear consistent with the pre-1990 cyclical patterns.

My estimates of trends in absolute mobility for family income and male labor income align reasonably well after 1984, but absolute mobility appears lower prior to 1984 for male earnings than it does for family income. Relative mobility also appears lower during this period for male earnings than for family income. My relative mobility findings agree with those of Gottschalk and Danziger (1998) in that we both find little change in mobility over the 1970s and declining mobility from the mid-1970s through the 1980s. The decline that I find in the 1980s and the increase that I find in the early 1990s also align with Carroll et al.'s (2007) results based on tax data. My results conflict with

Maury Gittleman and Mary Joyce's (1999) findings that relative mobility in the CPS rose during the 1970s and was higher in the early 1990s than in the late 1960s.

Dahl et al. (2008) reported that non-directional absolute mobility declined between 1985 and 1991 but was stable thereafter. I find the decline but then show an equivalent increase. In contrast, Dynan et al. (2008) report a fairly steady increase from the early 1970s to 2000.

Intertemporal Income Association. Figures 12 through 15 also show trends in intertemporal income association. Whether measured in terms of the Pearson correlation coefficient or the Spearman rank coefficient, intertemporal association declined over the second half of the 1970s and the 1980s, increased during the early 1990s, and was flat thereafter. The net effect was to change little over the whole period. The trend for combined head and partner earnings resembles that for male earnings in Chapter Two through the early 1990s, but then male earnings mobility increases. Through most of the early 1980s, nondirectional mobility was higher for family-level income measures than for male earnings, but over time this pattern reversed itself.

My estimates are consistent with Tom Hertz's (2006) finding that income mobility based on the Pearson correlation coefficient rose in the CPS from 1991 to 1998 and then was unchanged in 2004.

Overall then, the four measures of non-directional mobility that I examine indicate declining mobility in the late 1970s and 1980s, increases in the early 1990s, and little change thereafter. Over the whole period, levels of mobility did not change much. There is some evidence that additional sources of income provide insurance against volatility risk. The Pearson correlation coefficient shows lower mobility in terms of pre-tax family income than in terms of combined head and partner earnings, and the risk of a 25 percent drop in post-tax income is lower than the risk of a drop in pre-tax income.

Dispersion of Income

Turning to measures based on income dispersion, either within or across people, we move further from measures of mobility and toward measures of volatility. Figures 16 through 19 display my trend estimates.

Dispersion of Income Changes. The line marked by open triangles in Figure 16 indicates that the standard deviation of logged head and partner labor income changes rose steadily from 1969 through the mid-1980s, but shows no consistent trend from 1984 to 2004. For pre-tax family income, volatility rose slightly in the early 1970s, then flattened out until the early 1990s when it shifted upward permanently. The post-1992 trends are basically flat. Comparing the early 1970s and early 2000s, combined head/partner earnings volatility increased by less than 25 percent, family pre-tax income volatility rose by under one-third, and adjusted income volatility rose by about 30 percent. Volatility levels are lower than for male labor income from 1980 onwards and are significantly lower than for female labor income. Pre-tax income volatility levels are notably lower than combined labor income volatility levels, indicating that additional sources of income beyond the head's and partner's earnings do provide insurance against volatility. Similarly, post-tax volatility is a bit lower than pre-tax volatility.

My results are consistent with those of Dynan et al. (2008), Jacobs (2008), and Hacker and Jacobs (2008). They are also consistent with Orszag's (2008) post-1994 findings, though not with his finding of declining volatility from 1985 to 1994, nor with

Nichols and Zimmerman's (2008) finding that volatility declined after the late 1990s. My trend resembles that of Blundell et al. (2008) in the early 1990s but not in the 1980s. All of these studies except Orszag's use the PSID.

Within-Person Income Dispersion. The trend in the average person's standard deviation of income over a series of years is shown in the middle line of Figures 16 through 19. The change between the comparable years of 1973 and 2000 was just under one-fifth for combined head and partner earnings and family pre-tax income. It was just 15 percent for adjusted family income. The only increase common to all four income measures occurs in the 1990s.

These trends are roughly similar to my corresponding male earnings volatility estimates, though income volatility levels are higher. The levels are much lower than for female labor earnings. This time it appears that the progressivity of taxes provides more insurance against volatility than either the income provided by family members or unearned income.

The increase in within-person dispersion corresponds with similar rises in practically every previous study using this concept of volatility. Gottschalk and Moffitt (2007) and Gosselin and Zimmerman (2008) each find an increase in volatility, but the timing of their increases differs somewhat from mine. Nichols and Zimmerman (2008) find that the timing of the increase depends on whether income levels or logs are examined. The less precise trends of Benjamin Keys (2008) and Craig Gundersen and James Ziliak (2008) are also consistent with my findings.

Transitory Income Dispersion. My last two sets of dispersion-based volatility estimates are both model-driven, and for the reasons outlined above I discount them relative to the other results in this paper. The lines marked by filled circles in Figures 16 through 19 show trends in transitory standard deviations estimated from Gottschalk and Moffitt's variance decomposition model. According to this measure, volatility changed little between the early 1970s and the early 2000s, though the trend for combined head and partner earnings fell before rising in the early 2000s. Pre-tax income shows the biggest increase, at just 9 percent over the period.

The finding of flat income volatility runs counter to the results of Hacker and Jacobs (2008), Jacobs (2008, 2007), Gottschalk and Moffitt (2007), and Nichols and Zimmerman (2008), who all find increases. It is also contrary to my own results for male earnings volatility. My estimates of volatility are higher for combined labor income than for male earnings, and while my volatility estimates for combined earnings start out lower than those for female earnings, the levels are similar from the mid-1980s onward. Levels of pre-tax family income volatility are, however, lower than those for either male earnings, female earnings, or combined head and partner earnings.

The trend lines marked by open circles at the bottom of the charts show estimates for transitory standard deviations from my error components model. These estimates indicate very little change from the late 1960s to the early 2000s. Only two previous studies (Blundell et al., 2008, and Blundell and Pistaferri, 2003) use error components modeling, and they feature permanent shocks in addition to transitory shocks, making them difficult to compare with my findings. The results are consistent with my male earnings volatility trends.

Summarizing the results of the dispersion-based studies, volatility appears to have risen by at most 10 percent to one third from the early 1970s to the early 2000s. In terms of levels of volatility, income from sources other than the earnings of the head and partner has a very modest insurance effect, and the progressivity of the tax system has an additional modest insurance effect.

Pivot Volatility

Finally, I present trends in "pivot volatility"—the mean of the percentage change in income, up and then down, for the points in a nine-year window where a reversal in trajectory may occur, averaged across individuals. Since I observe every other year in a nine-year window and need two years of data both before and after a potential pivot to detect a change in trajectory, there are three years in which a pivot may occur. When a reversal of trajectory does not occur at one of these pivot points, the percent change up and then down is coded as zero. Each estimate on the lines marked by filled-in squares at the bottom of Figures 16 through 19 shows the average adult's pre- and post-pivot percent change in income averaged across those three potential pivot points centered on the estimate.[58]

For example, pivot volatility of combined head and partner earnings rose from 0.16 to 0.17 between 1973 and 2000, both of which were business cycle peaks. A rough interpretation is that the change in income over the two years before or the two years after an opportunity for a pivot was typically 16 percent of income for the window centered on 1973 compared with 17 percent for the window centered on 2000. For pre-tax family income, the figures were 15 percent and 18 percent, adjusted or unadjusted for family size.

This interpretation provides important context to the increases seen in the other measures of volatility. Comparing the 1973 and 2000 values, the increase is between 10 and 20 percent, which is consistent with the increase for within-person income dispersion. But this increase translates into minimal additional risk of volatility over thirty years. In the early 1970s, adults could expect that a typical chance for income to reverse trajectory would involve a rise and then a fall (or a fall and then a rise) of 15 percent over any five-year period. By the early 2000s, the typical trajectory reversal would involve 18 percent of income. The levels and trends in pivot volatility were very similar for male labor income and for family income. Levels of pivot volatility were higher for female labor income and declined over time.

Discussion and Conclusion

This chapter reveals a number of important facts about income instability and mobility trends. First, the various types of volatility measures yield similar results from the early 1970s to the early 2000s, ranging from a modest decline in relative mobility to little discernable change in absolute mobility and intertemporal association, to a modest increase in several dispersion-based measures of volatility and pivot volatility. A reasonable conclusion from the various trends I examine is that volatility rose by no more than a third over the thirty-year period examined. In concrete terms, this increase translates into a very small change in the magnitude of potential income trajectory reversals—the difference between income rising and falling 15 or 16 percent and income rising and falling 17 or 18 percent over five years.

These findings are similar to those for male earnings in Chapter Two, with as much or more volatility in family income as in male wages. In recent years, however, there has been more volatility in men's total earnings, including self-employment earnings, than in family income. Family income volatility increases less than male labor income volatility does.

Measured trends are relatively insensitive to whether one looks at combined head and partner earnings, pre-tax income, or post-tax income, and adjusting incomes for family size makes little difference. Comparing levels of downward mobility and volatility across these income definitions reveals that the income of other family members, progressive taxation, and public safety nets provide inconsistent and modest insurance against downward mobility and volatility.

Taken as a whole, the results of this chapter and of Chapter Two reveal little evidence in favor of Jacob Hacker's "Great Risk Shift" hypothesis. Families face roughly the same risk of an income drop and the same volatility as they did in the past. The contrast with Hacker's conclusions can be illustrated most dramatically by comparing his primary volatility estimates to mine. Hacker's original claim was that volatility had tripled over thirty years, which he has since revised downward to a 100 percent increase.[59] I find that the typical family's income reversals—up over two years then down, or vice versa—within a nine-year window have increased only from 15 or 16 percent of income to 17 or 18 percent.

Furthermore, evidence on earnings instability from Kopczuk et al. (2009) suggests that volatility was probably higher prior to 1960 than after 1970. Trends in various measures of joblessness and other indicators of risk also imply that volatility was probably no higher in 2008 than in 2002 or 2004.

To be sure, income instability and volatility levels may be too high even if they are not increasing. But an incorrect characterization of a problem can lead to inappropriate policy responses and ineffective political strategies by those who seek to help workers buffeted by economic forces. An agenda organized around a "great risk shift" may overstate the shortcomings of existing policies and may not resonate with the middle-class voters whose political support is necessary for an expansion of public safety nets.[60] I return to this theme in the concluding chapter, after exploring trends in economic instability by subgroup in Chapter Four.

Figure 1. Jacob Hacker Trends in Family Income Volatility,
***New York Times* Op-Ed, January 2004**

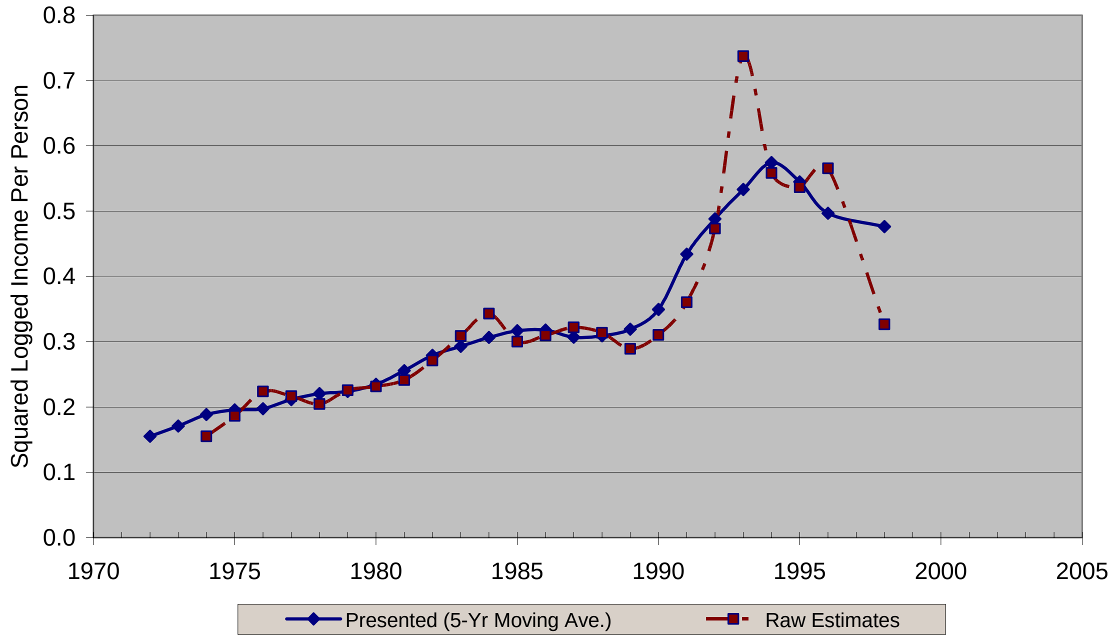


Figure 2. Jacob Hacker Trends in Family Income Volatility,
***Great Risk Shift*, October 2006**

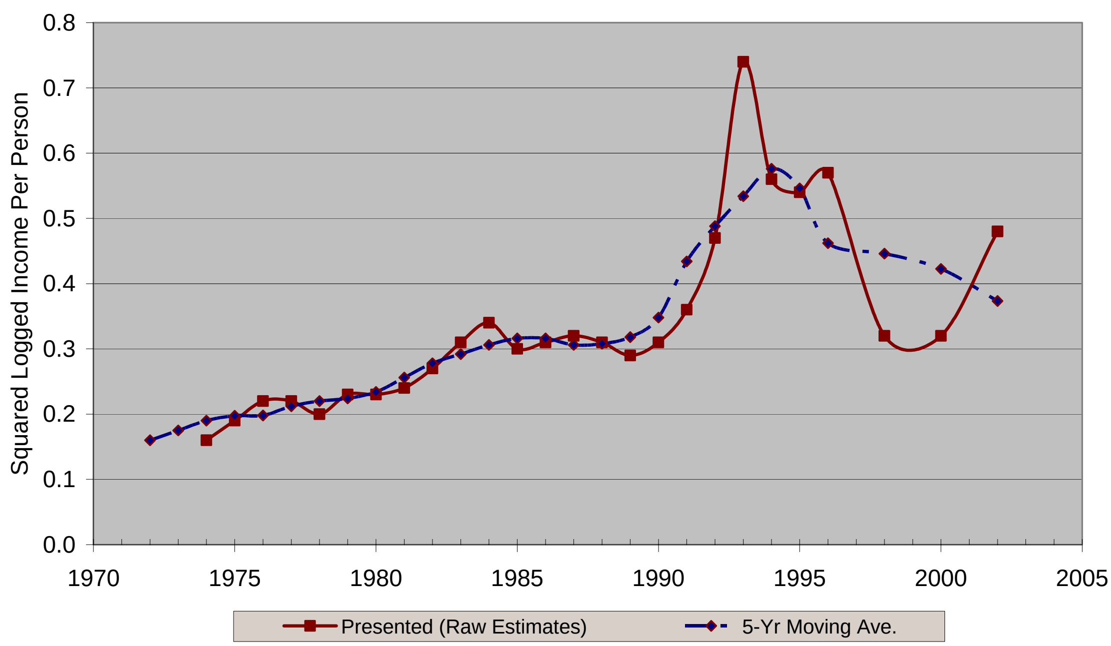


Figure 3. *Great Risk Shift* Replication and Adjustments

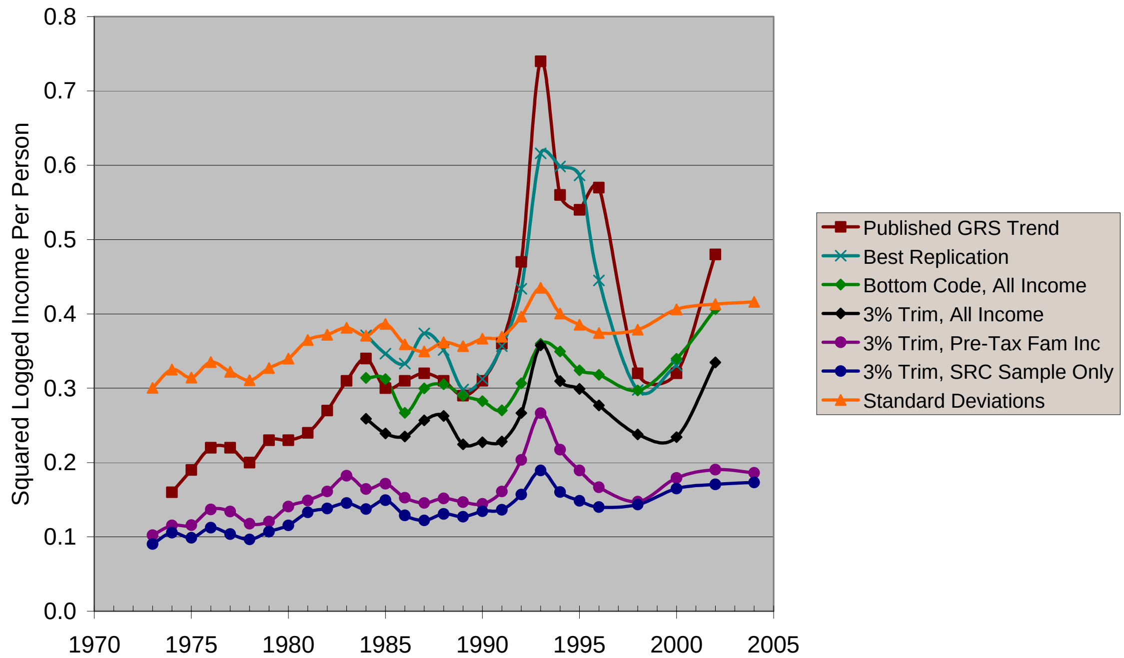


Figure 4. *Great Risk Shift* -- Replication of Revised Estimates

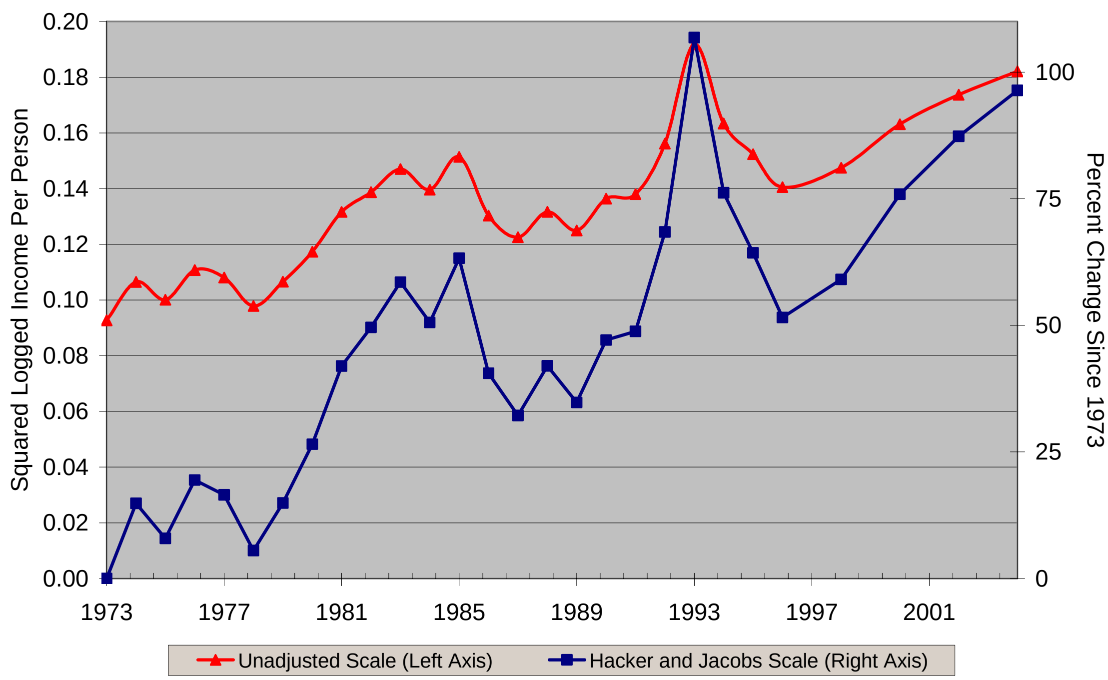
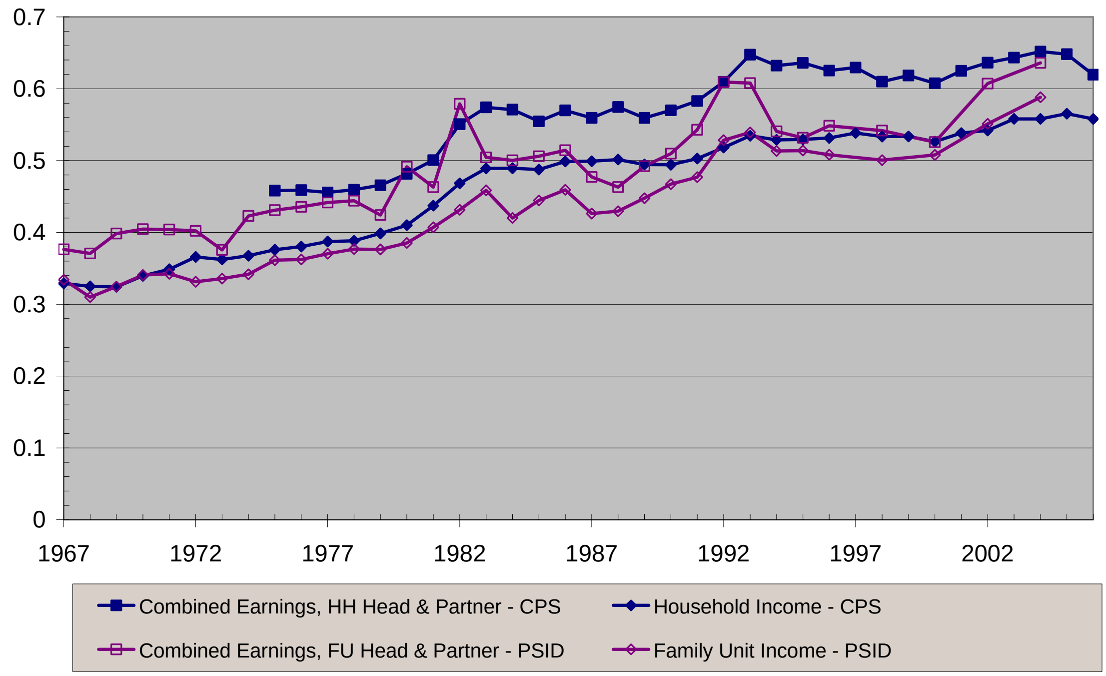


Figure 5. Total Household Income Variance, CPS vs. PSID



Source: Author's computations using PSID data and data from the March CPS (purchased from Unicon). CPS data is for household heads and their spouses, PSID data is for family unit heads and spouses.

Figure 6. Percent of Adults Experiencing Two-Year Declines in Combined Head/Partner Labor Income

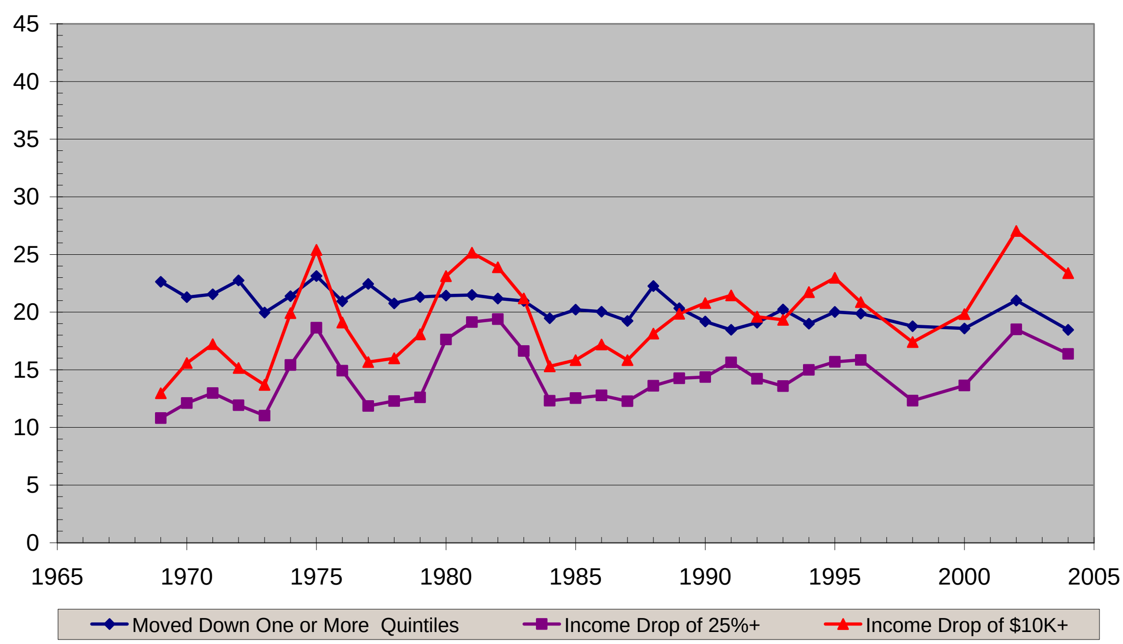


Figure 7. Percent of Adults Experiencing Two-Year Declines in Pre-Tax Household Income

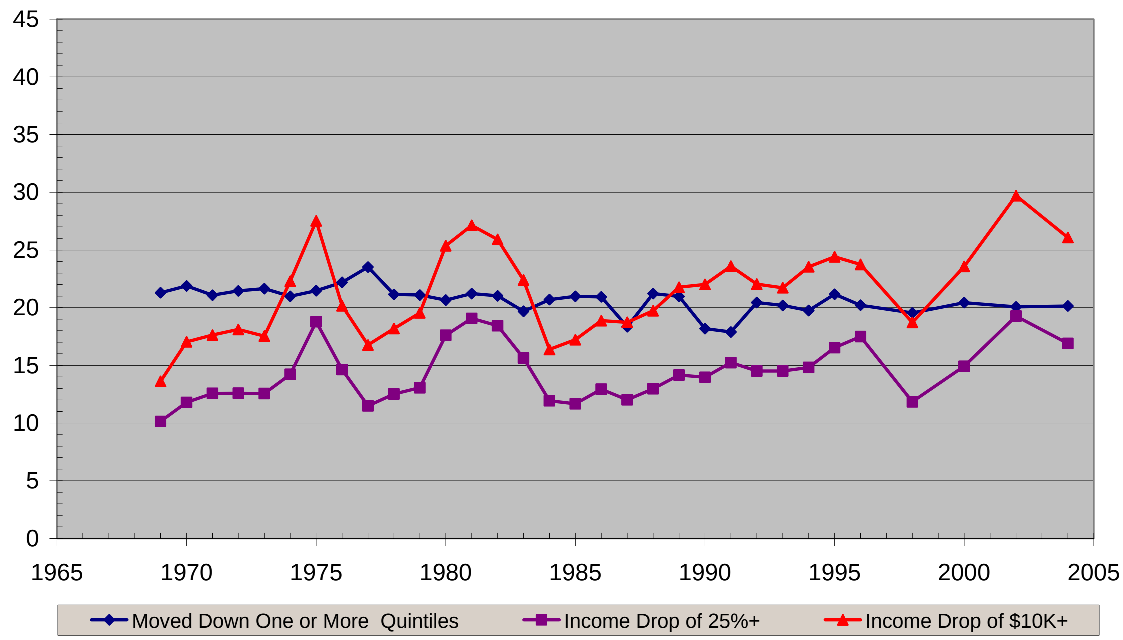


Figure 8. Percent of Adults Experiencing Two-Year Declines in Post-Tax Household Income

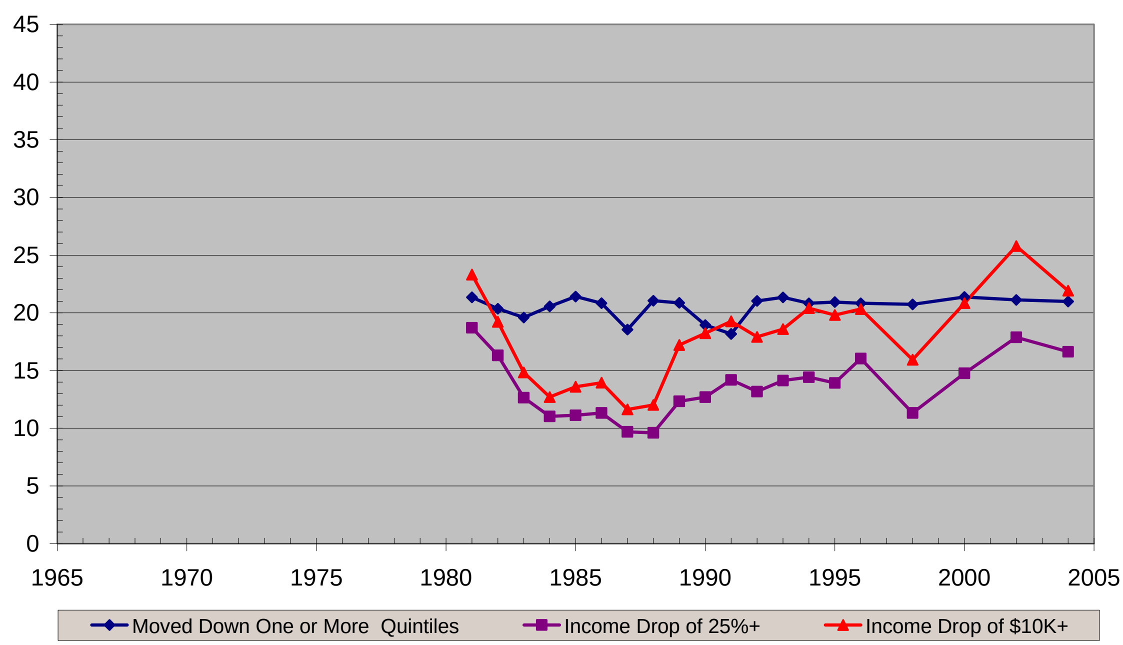


Figure 9. Percent of Adults Experiencing Two-Year Declines in Adjusted Pre-Tax Household Income

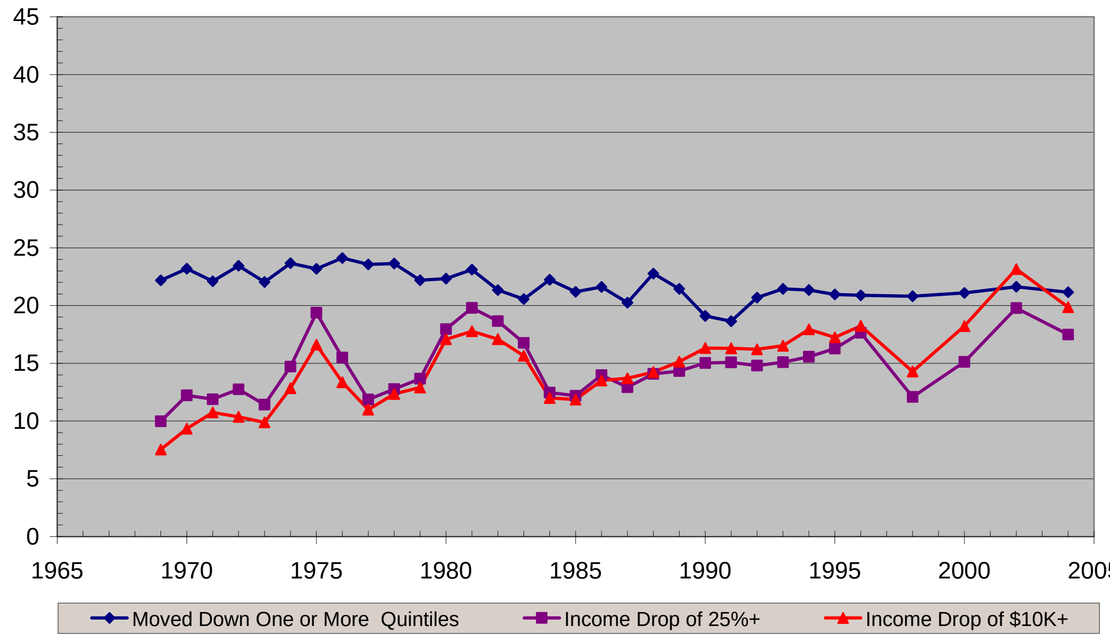


Figure 10. Percent of Adults Experiencing Two-Year Increases in Pre-Tax Household Income

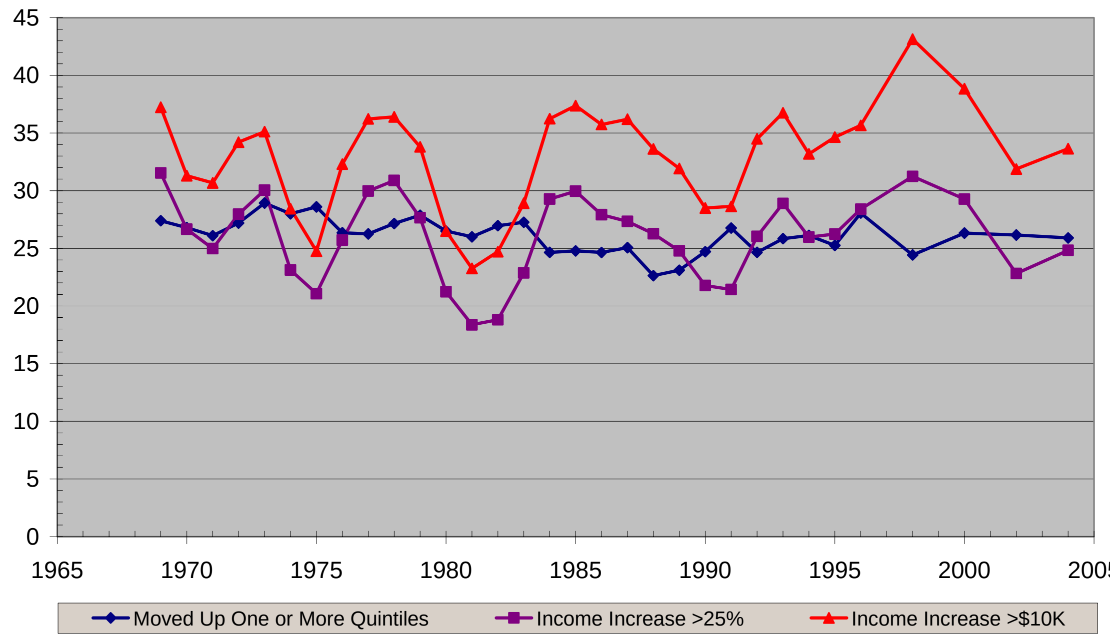


Figure 11. Percent of Adults Experiencing Two-Year Increases in Adjusted Pre-Tax Household Income

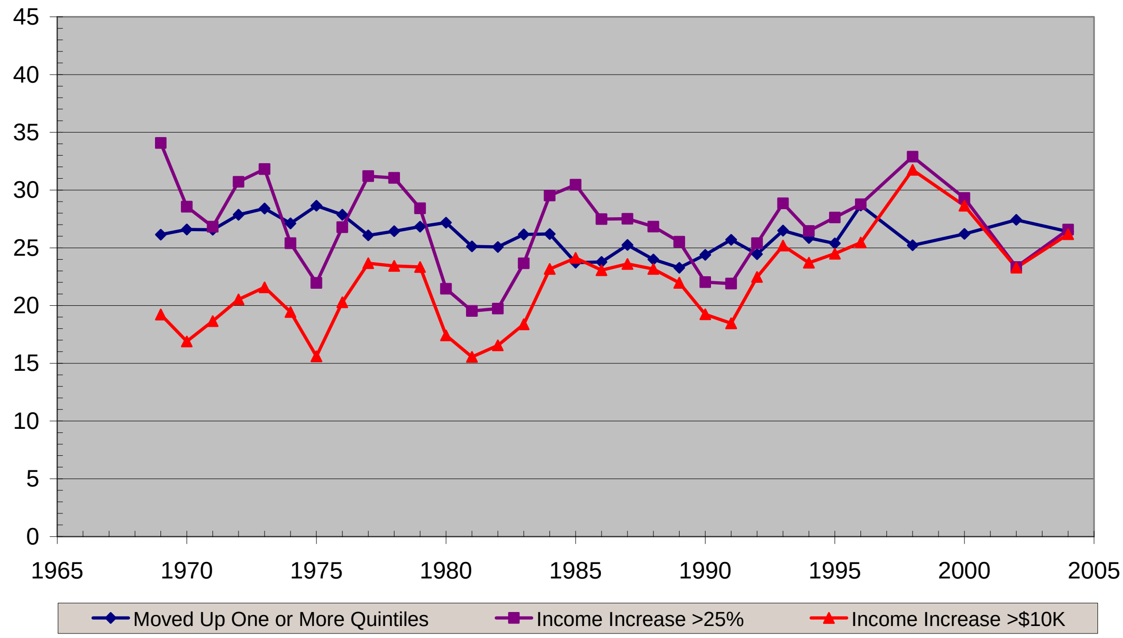


Figure 12. Non-Directional Combined Head/Partner Labor Income Mobility Trends

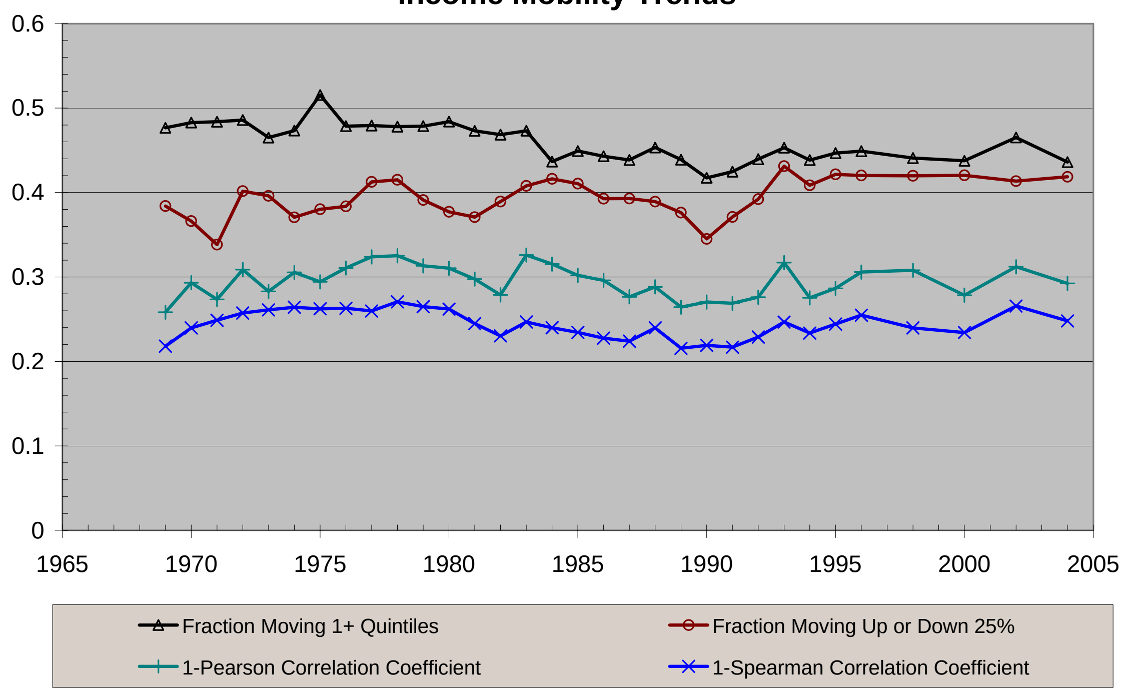


Figure 13. Non-Directional Pre-Tax Income Mobility Trends

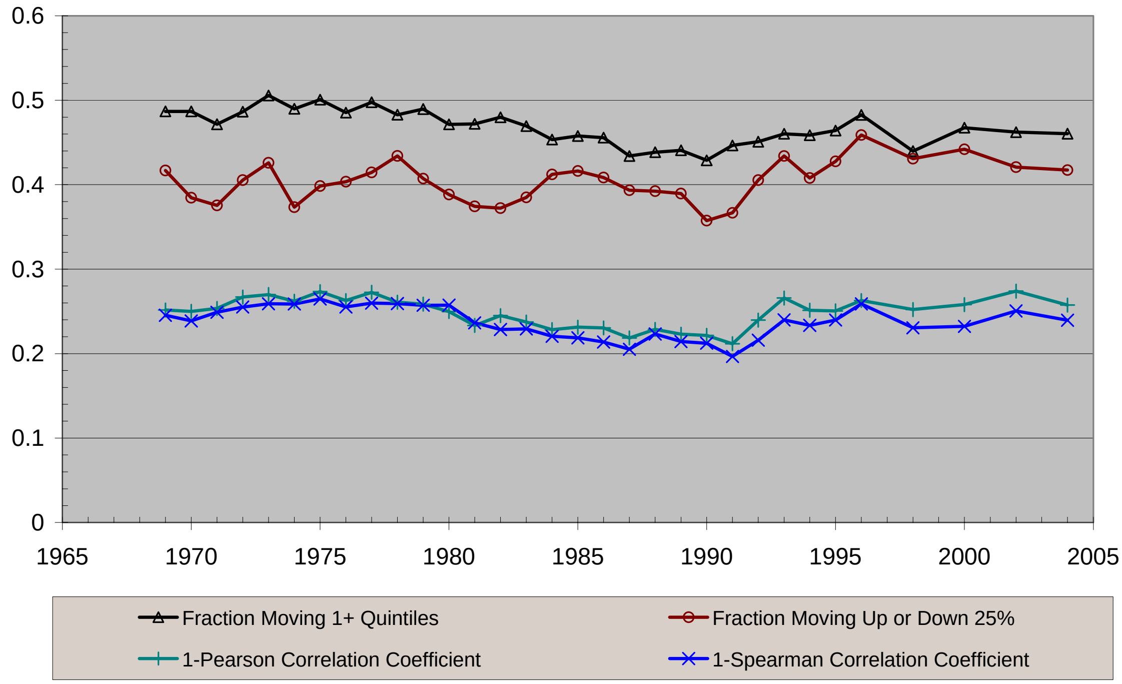


Figure 14. Non-Directional Post-Tax Income Mobility Trends

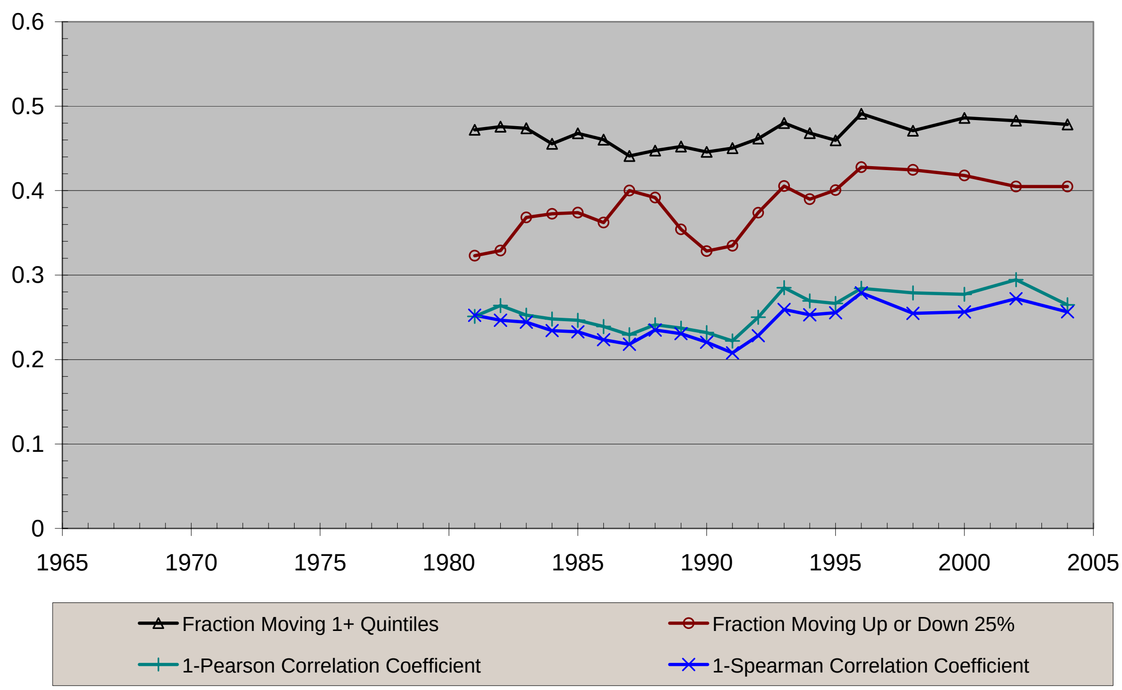


Figure 15. Non-Directional Adjusted Pre-Tax Income Mobility Trends

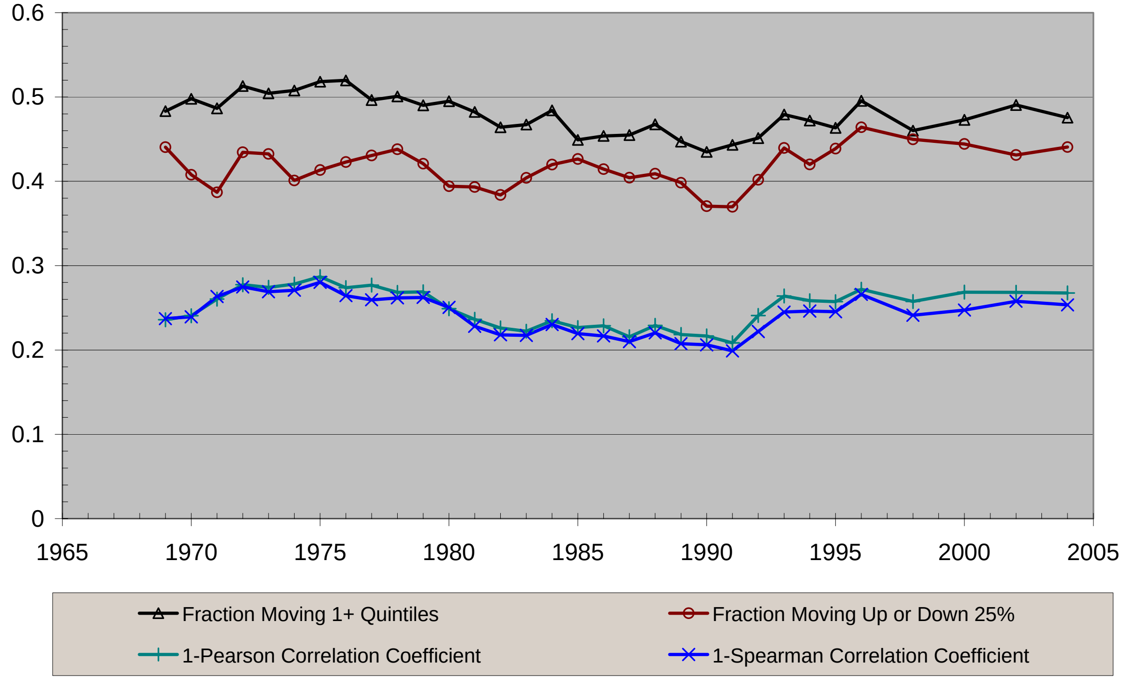


Figure 16. Combined Head/Partner Labor Income Dispersion and Pivot Volatility Trends

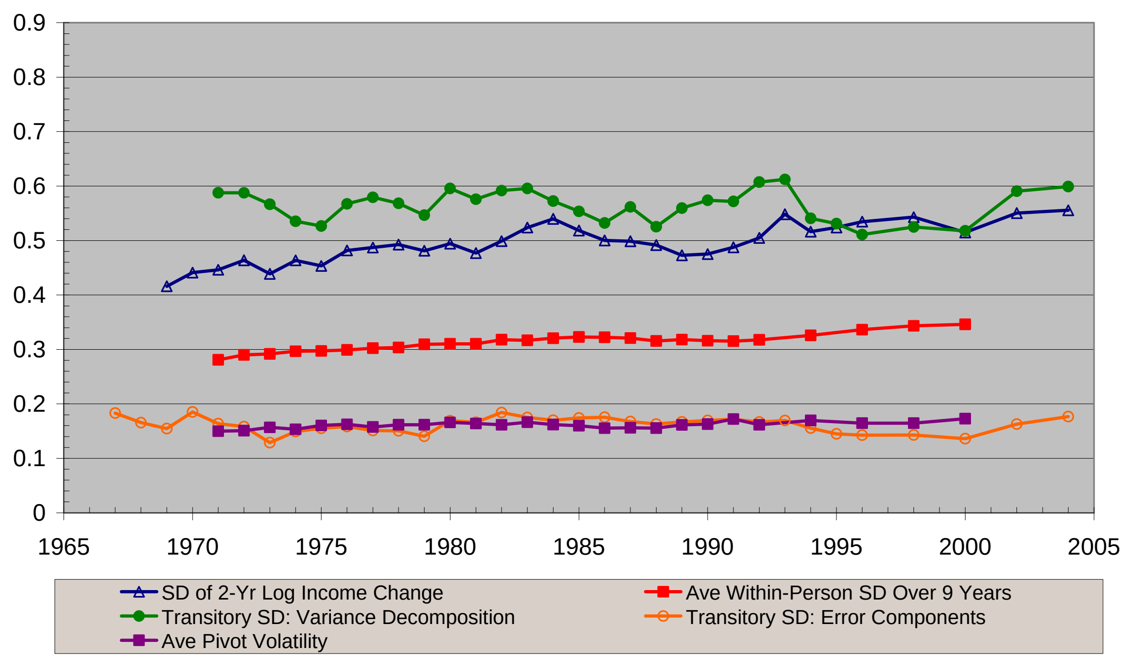


Figure 17. Pre-Tax Income Dispersion and Pivot Volatility Trends

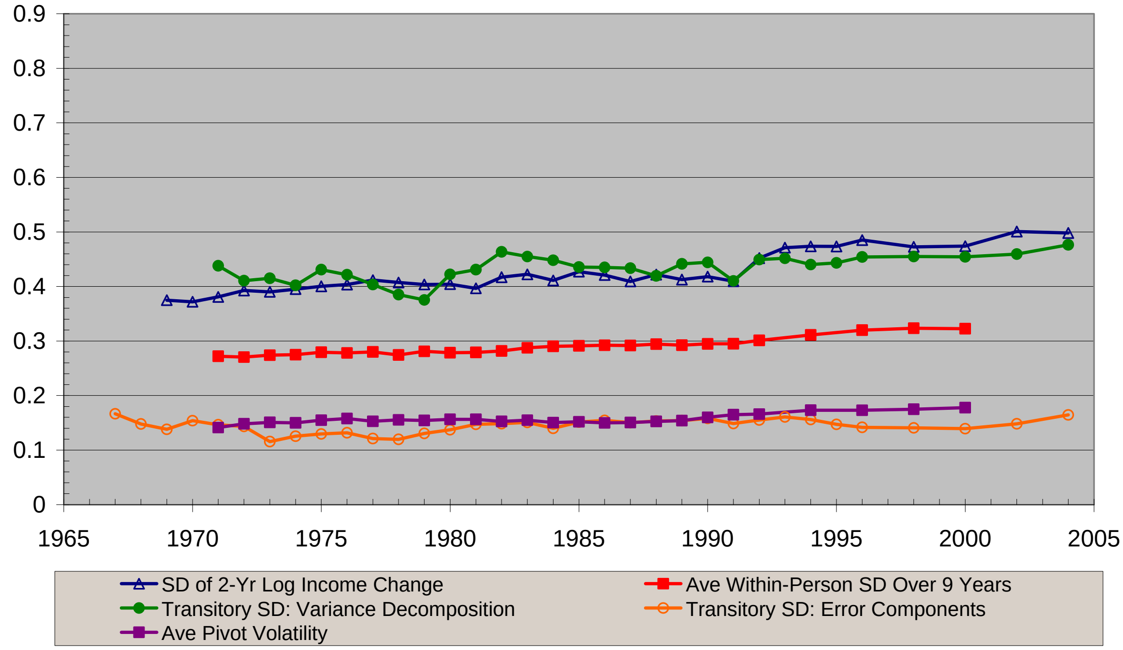


Figure 18. Post-Tax Income Dispersion and Pivot Volatility Trends

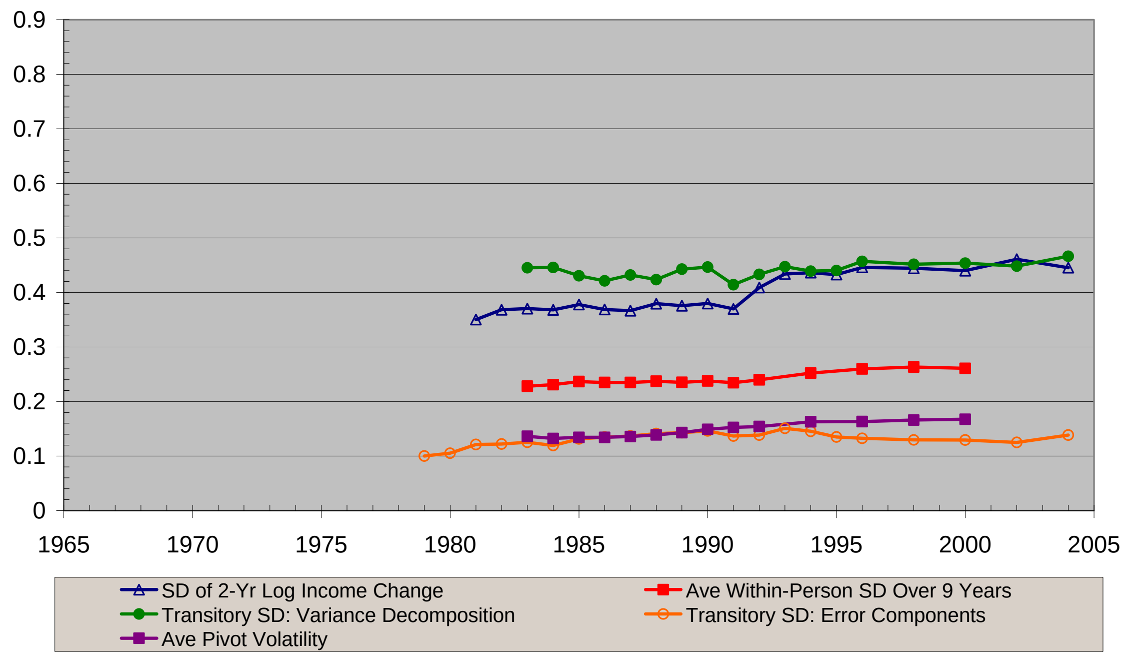
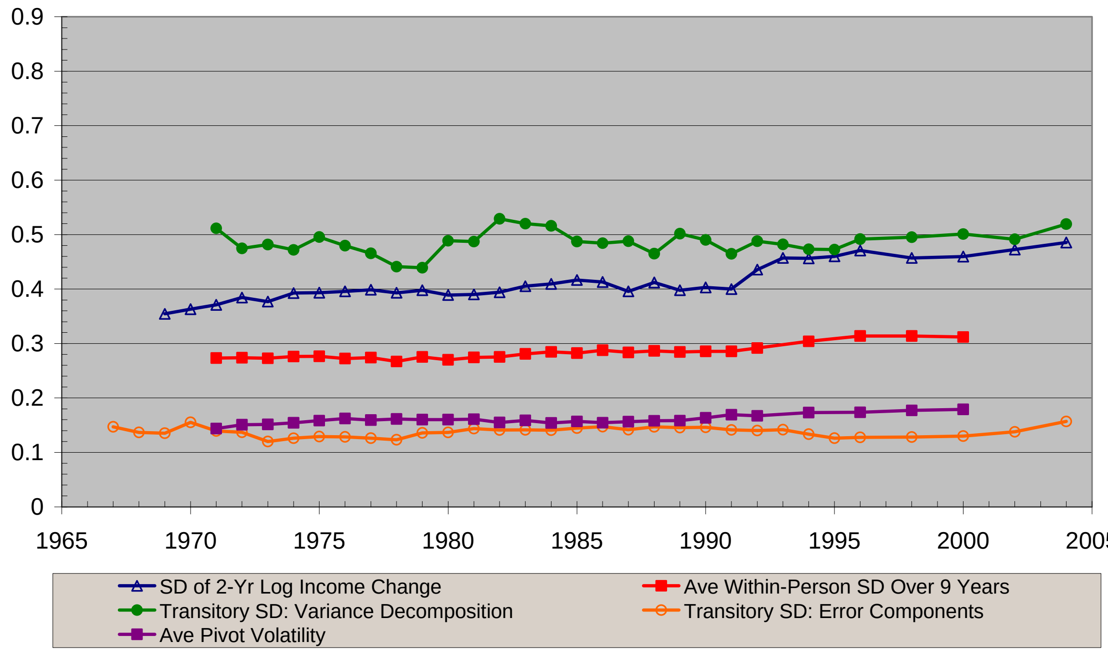


Figure 19. Adjusted Pre-Tax Income Dispersion and Pivot Volatility Trends



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Notes

[1] Hacker and Jacobs (2009).
[2] I will generally use "family income" rather than "household income" to describe results. The PSID asks about the incomes of "family unit" members. Family units in the PSID include most cohabiting partners as well as relatives of the family unit head and his cohabiter ("heads" in the PSID are almost always men when the family unit includes a couple). There are only a small number of households in the PSID with multiple family units interviewed. Unlike Census Bureau use of "family", my use here is intended to include family units consisting of individuals living without relatives.
[3] Nichols and Zimmerman (2008).
[4] Hacker (2004a).
[5] In these initial results, Hacker used the covariance of current income and income lagged five years to estimate the permanent income variance. Since the data Hacker relied on only went as far back as 1970, the five-year lag meant that 1974 was the earliest year for which he could estimate a transitory variance (since the 1975 survey measures 1974 incomes). For the years 1976-1994, the figures in the chart are averages of five years' transitory variances, centered on the transitory variance of the year in question. This raises the question of how it is possible to have data points for 1972-1975 and for 1995-1998, since it is not possible to compute five-year moving averages centered on any of these data points. Though none of the many publications Hacker has written on his estimates includes an answer, I have determined that the figures for 1972-75 are the averages of the *available* transitory variances within a five-year window. For 1975, the four estimates for 1974-1977 are used; for 1972, only the 1974 estimate is used (that is, the 1972 data point is actually the 1974 estimate). The same holds for the figures for 1995-1998, except that because there was no 1998 survey wave, the 1999 survey wave (measuring 1998 income) is treated as part of the window—for 1995, the figure in the chart is the average across the years 1993-96 and 1998; for 1998, the figure in the chart is the average across the years 1995, 1996, and 1998.
[6] The figures behind these numbers come from Hacker's personal website at http://pantheon.yale.edu/~jhacker/PSID_Data_NYT.htm.
[7] Hacker (2004b, 2004c, 2004d).
[8] Hacker (2005, 2007). See also Gross (2005).
[9] Pethokoukis (2006).
[10] Hacker (2006). The figures are from a web page that was on Hacker's personal website for a time but is no longer available. Hacker used the PSID and a version of the PSID called the Cross National Equivalent File that includes modified income variables and tax estimates. His measure of pre-tax family income was a composite variable that included taxable income, public energy subsidies, and the rental value of free housing from the PSID, and public and private transfers from the CNEF. The post-tax measure subtracted federal and state income taxes, and payroll taxes taken from the CNEF, and property taxes taken from the PSID. Hacker adjusted income for family size by dividing by square root of family size, and he then logged the measures and adjusted them for inflation using the International Monetary Fund CPI (from the CNEF). His sample was confined to adults 25-61, including the entire core sample. He did not, however, apply the sample weights. Finally, in computing covariance terms, Hacker used 5-year lags, though to obtain the 2002 estimate, he used a 6-year lag, since there was no 1998 survey to provide 1997 income estimates. These details were obtained through personal communication with Hacker in 2006 and 2007.
[11] Winship (2007), and personal communication with Hacker (2007). Elisabeth Jacobs served as a useful sounding board and liaison to Hacker in the early months of my explorations, before joining Hacker's research team.
[12] My best replication combines household taxable income, energy subsidies, and free rent from the PSID, and private and public transfer income and windfall income from the CNEF. I have attempted to code these variables consistent with incomplete code provided by Hacker in early 2007. My replication also incorporates several uncorrected data problems that may have affected the results. See note 11 for additional methodological details. The replication is imperfect both because Hacker had access to non-public CNEF data for the years 1970-1979 and 2002 that he could not share and because he did not provide me the full code that would have allowed me to replicate his figures based on the 1980-2000 data. He did provide me with enough information to confirm that his trends in taxable family income were incorrect and conceded as much in spring of 2007.

[13] This trend line and subsequent ones include a number of improvements on the "best replication" figures that have small effects on the results (e.g., better inflation adjustment, and application of sample weights). I settled on a bottom code of $4,000 after comparing the effect on the trend of using bottom codes of $500, $1,000, $2,000, …, $9,000 and determining the lowest bottom code that had a meaningful effect on the estimated trend. Similarly, I tried trimming the bottom 1%, 2%, …, 9% of the data.

[14] Alimony income in the PSID was included in transfer income prior to 1994 but was included in taxable income thereafter. Because Hacker combined taxable income from the PSID to transfer income in the CNEF (which includes alimony), alimony is double-counted from 1994 onward. See Lillard (2008) and the documentation in the online PSID Data Center.

[15] Since the pre-tax family income variable is from the publicly-available PSID data, I can extend the trend back to 1974. For these estimates, I use a 4-year lag in computing covariances, rather than the 5-year lag in the estimates of mine intended to be consistent with Hacker's.

[16] Hacker (2008). Some information on the methods is available at http://pantheon.yale.edu/~jhacker/method.html. Hacker switched to the pre-tax family income variable in the PSID and did not rely on the CNEF at all in his revised analyses. He again adjusted income for family size by dividing by the square root of family size, and he then logged the measures and adjusted them for inflation (using the CPI-U this time). His sample was confined to adults 25-61, including the entire core sample. This time he applied the sample weights. He dropped all non-positive incomes, then he trimmed the top and bottom 1% of the remaining observations. Finally, in computing covariance terms, Hacker used 4-year lags.

[17] Footnote 1 in the introduction to the revised edition of *GRS*, as well as footnote 27 of Chapter 1, indicates that all code used to produce the estimates will be publicly available on the book's website (www.greatriskshift.com), but as of this writing, no code has appeared.

[18] The fundamental problem with the scale he uses is that it obscures the possibility of volatility falling below its initial level.

[19] Hacker and Jacobs (2008). Once again, Hacker's analyses rely on the PSID's pre-tax family income variable. Incomes are again adjusted for family size by dividing by the square root of family size, and they are once again logged and adjusted for inflation using the CPI-U. Again he looks at individuals age 25-61, including the entire core sample and using the sample weights. He dropped all incomes of $1 or less, then trimmed the top and bottom 1% of the remaining observations. Once again, four-year lags are used in computing covariance terms.

[20] I have requested the full code used to produce the results in Hacker and Jacobs (2008), as footnote 15 of their brief indicates it is available on request. Unfortunately, I have yet to receive a response after several months.

[21] Hacker and Jacobs (2008), page 8. This point is also acknowledged in a long footnote to Chapter 1 of the revised edition of *GRS*.

[22] For a preview of this CPS-PSID comparison, see Figure 5 below. A final deceptive presentation decision made by Hacker and Jacobs is to give the same horizontal distance in their charts to two-year differences at the end of the time series as they give to one-year differences over the rest of the time series, which compresses the horizontal space in the charts relative to the vertical space, thereby making volatility increases seem steeper.

[23] Gottschalk and Danziger (1998); Gottschalk, McLanahan, and Sandefur (1994); Carroll et al. (2007); Duncan, Smeeding, and Rodgers (1993).

[24] Hacker (2008); Jacobs (2007); Hacker and Jacobs (2008); Jacobs (2008); Gosselin (2008); Gosselin and Zimmerman (2008); Dynan et al. (2008).

[25] Dahl et al. (2008); Orszag (2008).

[26] Hacker (2008); Jacobs (2007); Hacker and Jacobs (2008); Jacobs (2008); Dynan et al. (2008).

[27] Gottschalk and Danziger (1998); Gittleman and Joyce (1999); Carroll et al. (2007).

[28] Hertz (2006). The data is from the March supplement to the CPS, using three pairs of years. The matched subsamples are re-weighted to be representative of the first year in each pair. Incomes are adjusted for inflation using the CPI-U-RS.

[29] Dynan et al. (2008); Orszag (2008); Hacker and Jacobs (2008); Jacobs (2008); Nichols and Zimmerman (2008).

[30] Ibid.; Gundersen and Ziliak (2003); Blundell et al. (2008).

[31] Hacker (2008); Gottschalk and Moffitt (2007); Keys (2008); Gosselin (2008); Nichols and Favreault (2009).
[32] Hacker (2008); Hacker and Jacobs (2008); Jacobs (2007); Jacobs (2008); Gottschalk and Moffitt (2007); Nichols and Zimmerman (2008); Blundell et al. (2008); Blundell and Pistaferri (2003).
[33] I obtained the CPS data from Unicon Research Corporation (www.unicon.com). I compared the PSID variances of logged family income for heads of family units and logged household income for heads of household units (age 20-59) with CPS variances of family income for heads of families and household income for heads of households (age 20-59). I also used different trims of the top and bottom of these income distributions. Figure 5 presents results trimming the top and bottom 2 percent of incomes. Full results available from the author upon request.
[34] Kim and Stafford (2000), Gouskova and Schoeni (2007).
[35] Gouskova and Schoeni (2007).
[36] See also http://pantheon.yale.edu/~jhacker/cps_psid.pdf for a version of Hacker and Jacob's chart with variances compared.
[37] That is, the top and bottom 2 percent of families – rather than individuals – are trimmed in each year. All individuals in families not trimmed are assigned the income of their family. This trimming occurs within age groups defined by the head's age, with the categories consisting of heads age 21-30 years, 31-40 years, 41-50 years, and 51-60 years. I relied on my comparisons with CPS income variances to determine what trims to use.
[38] See http://www.census.gov/hhes/www/income/income07/AA-CPI-U-RS.pdf. I also ran variance decomposition models using the CPI-U and ran all models using the CPI-U-RS linked to the CPI-U-X1, and the results were similar.
[39] Edin and Lein (1997). Including persons without income in the variance decomposition models is problematic, even if their incomes are recoded to $1 or some other value. The model requires permanent and transitory components to sum to total income. A person with $0 in income must have both $0 in permanent income and $0 in transitory income or must have a transitory component that exactly cancels out his or her permanent component. The distribution of transitory income, in expectation, should be the same among those who do not work as it is among those who do. When one attempts to estimate the variance decomposition model by including those with no income (after recoding their incomes to be positive), the transitory variance estimates balloon. There are similar theoretical problems with recoding $0 incomes when using error components models.
[40] Note that while I exclude persons under age 20 or older than age 59, the income measures that I use that include income from all family members include income from people under age 20 or older than age 59. Additional sample restrictions used include requiring individuals to be present in a family in the survey year (not necessarily the same family when comparing multiple years) and requiring them to be PSID sample members.
[41] I chose a relatively conservative restriction given that family composition can change in the previous calendar year either before or after PSID respondents report the composition of their family at the time of the interview and given that it can change in the current calendar year either before or after the PSID interview. This restriction does not take into consideration the possibility that cohabiters move in or out while the head's marital status remains single. Nor does it consider changes in the number of people receiving income other than the head or partner.
[42] I also examined two other versions of the measure. One excluded heads' non-wage labor income. Another dropped the labor part of income from taking in roomers and boarders and added the part of gardening income assigned to asset income, in order to take into account changes in the PSID definition of labor income over time. Neither alteration affected the results.
[43] I recoded all incomes of $1 or less to $0 to account for coding changes in the PSID (incomes were bottom-coded at $0 or $1 prior to 1994). In the 1999, 2001, and 2003 surveys, after the PSID switched to biennial surveys, families were asked about income received two years prior to the survey. I attempted using these income measures to fill in the gaps created by the switch to biennial surveys, but the results clearly showed that the variables were not comparable to the one-year-recall questions. I also tried a version of pre-tax income that simply added heads' and partners' combined taxable income, other family members' taxable income, heads' and partners' combined transfer income, and others' transfer income. The results were hardly affected.

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[44] See http://www.human.cornell.edu/che/PAM/Research/Centers-Programs/German-Panel/cnef.cfm and Lillard (2008). Data prior to 1980 is not publicly available.
[45] Butrica and Burkhauser (1997).
[46] While I omit the results for brevity, I also examined volatility trends in heads' and partners' combined taxable income (including labor and asset income) and total family taxable income. The trends mirrored those shown for the other income measures below. Results available from the author on request.
[47] University of Michigan Survey Research Center (1972), page 302.
[48] A window of two years is the smallest that can be considered over the entire course of the PSID because the survey switched to biennial interviews after 1997.
[49] Dynan et al. (2008) and Dahl et al. (2008) address this problem by using the average of the two years as the denominator in computing percent changes, though Dahl et al. also present results in an appendix using my approach.
[50] Moffitt and Gottschalk (1995, p. 4-5; 1998, p. 8-9; 2002, p. C69; 2008, p. 3-4).
[51] Shin and Solon (2009), Gottschalk and Moffitt (2006), Gottschalk and Moffitt (2007).
[52] I am indebted to Lorenzo Cappellari for sharing his STATA code with me, without which I could not have produced the error components trends below. I require sample members to have at least five non-missing observations in odd-numbered survey years from the time they first appear in the data, and I require them to have no more than 20 percent of observations in odd-numbered survey years missing from the time they first appear. Note that these criteria exclude people who enter the PSID sample in 1999 or later, since they cannot have five non-missing observations.
[53] Technically, I regress trimmed logged earnings on a quartic in age and year dummies. The regressions are also stratified on sex for the estimates that combine men and women. As with the variance decomposition estimates, this residualization is conducted on family heads, and the income is then assigned to all family members who meet the other sample restrictions.
[54] My model differs from that of Haider in that Haider allows the price of fixed effects and slopes to vary over time.
[55] The estimate for year y is technically the mean across people of the average of
$abs((y_{t-2}-y_{t-4})/(y_{t-2}+y_{t-4}))+abs((y_t-y_{t-2})/(y_t+y_{t-2}))$,
$abs((y_t-y_{t-2})/(y_t+y_{t-2}))+abs((y_{t+2}-y_t)/(y_{t+2}+y_t))$, and
$abs((y_{t+2}-y_t)/(y_{t+2}+y_t))+abs(y_{t+4}-y_{t+2})/(y_{t+4}+y_{t+2}))$, where any of these three terms equals 0 if the sign of the pre-pivot change is not different from the sign of the post-pivot change. Each of the three terms is an average of the pre- and post-pivot percent change, where the denominator in the percentage is the mean of the two years. Averaging the pre- and post-pivot percent changes is equivalent to summing the quantities—pre- and post-pivot—(difference/sum).
[56] When I restricted the sample to adults where the head was continuously married or single over the preceding and current calendar years, levels of downward mobility for combined head/partner earnings were very similar to levels for male labor income, but still higher than levels for female labor income.
[57] I average the 1970 and 1972 figures and the 2002 and 2004 figures. Both of these pairs of years bracket a cyclical peak in joblessness.
[58] The computation of this measure involves a number of averages. For a pre-pivot change of a given individual, the change is expressed as the difference in incomes divided by the average of the two incomes (so that increases and declines are treated symmetrically). The corresponding post-pivot change is computed the same way. The pre- and post-pivot percent changes are averaged (with each expressed in terms of its absolute value). This score is averaged with the scores corresponding to the individual's other two potential pivot points. Finally, each individual's score is averaged with those of other individuals.
[59] Hacker (2006, 2008), Hacker and Jacobs (2008).
[60] Winship (2007).