

The Rising Instability of U.S. Earnings: Addendum

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Abstract

“The Rising Instability of U.S. Earnings: Addendum”

This note reports an updated calculation of time trends in the percentile points of transitory income, first reported by Gottschalk and Moffitt (2009). The new calculations are superior to those of the old. The new calculations show clearer evidence of a decline in the dispersion of female earnings from 1970 to 2004 but less evidence of a change in the dispersion of the transitory components of family income categories, although there continues to be some evidence of a decline in the dispersion of transitory labor income of the husband and wife, and an increase in the dispersion of transitory family nonlabor income.

Gottschalk and Moffitt (2009) documented trends in the transitory variance of earnings and family income in the U.S. over the period 1970-2004. One exercise in the Gottschalk and Moffitt (GM) paper reported estimates of trends in the percentile points of the distribution of transitory earnings of women and of transitory family income. Moffitt and Gottschalk (forthcoming) developed a superior method of measuring trends in the percentile points of transitory income and applied it to male earnings. This note applies this newer method to female earnings and family income, thereby updating the GM results.

Measuring Percentile Points in Transitory Variances

The issue that GM addressed was how to measure trends in the variance of an income measure which includes zeroes, as female earnings and family income components generally do. Virtually all models of income fit the distribution of the logarithm of income for two reasons. One is that, typically, regression models fit the log of income much better than of absolute income. The other is that, if the data include income from multiple years, log income removes the influence of scale and normal income growth. However, if the income component being examined has a significant fraction of zeroes, simple logarithmic measures cannot be used. The literature reporting estimates of the transitory variance of annual male earnings generally ignores this issue because relatively few prime-age men do not work for an entire year and hence observations with values of zero earnings can be omitted, but the issue cannot be ignored for

female earnings or for many family income components, which have a sizable fraction of zeroes. Simply deleting the zeroes from the data for these measures opens the door to potential selection bias, particularly if time trends are the object of interest and if that fraction has changed over time.

Rather than formally model the zeroes with some type of censored regression model, GM proposed that, for such income components, percentile points of the distribution of transitory income be computed by modifying their simple Window Averaging (WA) method to include zeroes. In their 2009 study, GM accomplished this using the following procedure. First, because the effects of year need to be taken out, GM regressed absolute income on year dummies on the sample of those with positive income, and then constructed the residuals for that sample. Second, residuals for years in which an income component was zero were calculated as the difference between zero and the individual's predicted income from the fitted regression in those years. Third, they used the method adapted from that developed by Gottschalk and Moffitt (1994) to generate a transitory absolute income component $e(i,t)$ for each individual i in each year t in a series of nine-year calendar-time windows, using the combined worker-nonworker sample. Fourth, they added $e(i,t)$ to mean absolute income in year t and then computed five percentile points of the distribution of this sum (10^{th} , 25^{th} , 50^{th} , 75^{th} , 90^{th}) over all individuals and years in each WA window. Fifth, this procedure was applied to female earnings and to four components of family income: for female earnings, GM took the ratios of the 10^{th} , 25^{th} , 75^{th} , and 90^{th} percentile points to the median in each year, normalized them to 1 in the first year, and plotted the results; and for the income components, they took the ratios of the 90^{th} to the 10^{th} percentile points in each year, normalized them to 1, and plotted the results (see GM (2009), Table 4 and Table 6).

This method has a significant drawback related to the use of mean income in each year to benchmark transitory income. Using mean income in year t to construct relative, scale-free transitory income is problematic because the transitory income for an individual i should be relative to that individual's own mean income, not that of the population as a whole (indeed, the derivative of the residual log income implicitly measures percent changes from an individual's own income and hence does not have this problem). If mean income is growing at different rates in different portions of the population distribution, the GM method could result in incorrect trends in the true transitory percentile point.

The improved method developed by Moffitt and Gottschalk (forthcoming) followed a different method to address both of these problems. First, the first-stage model regressed log income rather than absolute income on year dummies, necessarily utilizing the sample of those with positive income. Second, the WA method was used to generate a transitory log income residual for each individual i in each year t of each window.¹ Third, the antilog of these transitory residuals was constructed. These antilog residuals are scale-free and constitute the factor by which individual mean income (defined as including the permanent component) must be multiplied to obtain income in each year including the transitory component; that is, they equal the ratio of income in each year to the individual's mean income over all years in the window, including the mean permanent component. For working men in the data, the central 80 percent of the distribution of these antilogs ranges from .60 to 1.4 (see below). Fourth, those with zero income in year t were added to the sample with a transitory antilog residual, or factor,

¹ That is, residuals from the log income regressions for each year were computed for each individual. These residuals were then unlogged and averaged over all years in the window for each person. The person-specific mean unlogged residual was then subtracted from the residual in each year for each person.

of zero.² Fifth, the percentile points of the distribution of the resulting set of factors, positives and zeros included, were computed, separately for each of the WA windows. The resulting percentile points were normalized to 1 in the initial WA window and plotted.

Results

We present the percentile points for male earnings, female earnings, and family income components. Percentile point results for males were not presented in GM but are included here for completeness.

Figure 1(a) shows the results for male earnings excluding zeroes, for comparison with the log earnings transitory variances presented in GM, which also excluded nonworking years for men. The percentile points are normalized to 1 in the initial window year, 1974 (which denotes the 1970-1979 years). Consistent with Figure 1 in GM, the percentile points spread out from the 1970s to the 1980s, were approximately constant from the mid-1980s to the late 1990s, and then spread out again. Thus the results for percentile points and for variance calculations are the same. Note that this figure also adds a new substantive finding, which is that the increases in the transitory variance in the early period and the late period occurred at all points in the distribution, not just some of them.

Figure 1(b) shows the results for males after including the zeroes, which ranged from 10 percent to 14 percent of all male observations in different years over the 1970-2004 period

² Individuals or families with zeroes for all nine years in the window were assigned a zero for all nine years. Note that no residual permanent component need be calculated for these observations because their factors would be zero regardless of the value of their permanent income. However, for individuals or families with zeros in some years but not others, the transitory components in their working years were defined relative to the permanent component as calculated over only their working years, not including their nonworking years.

(although the percent with zeroes followed a quadratic pattern, rising through the early 1990s then falling slightly). Adding these negative transitory shocks into the distribution results in a stronger decline in the 10th percentile of the transitory earnings distribution than before. But the dispersion then rose back starting in the early 1990s, thus approximately mirroring the pattern of male nonemployment rates. While this results in a slightly nuanced finding relative to the finding for transitory variances of workers--of increasing transitory variances from the 1970s to the 1980s, a flattening through the late 1990s, and then another rise--it does not substantially alter that finding.

Figure 2 shows the results for females. In the GM paper, no consistent results were found for females, with some percentile points showing no trends, others showing increased dispersion, and others showing decreased dispersion. The new results show more consistent evidence of decreased dispersion of transitory earnings. The 10th percentile is zero and remained so over the entire period. The median did not trend but the 25th percentile rose relative to the median and the 75th and 90th percentile points fell relative to the median, albeit not by a great deal for the 75th point. Thus the new evidence shows stronger evidence of decreased dispersion of transitory earnings for women.

Figures 3(a)-3(b) show the results for the four components of family income also studied by GM. GM found a slight decline in the dispersion of transitory husband and wife total labor income, no change in that of other family members' labor income, but an increase in the dispersion of the transitory components of transfer income and family other nonlabor income. The new results are somewhat different. While transitory husband and wife labor income (3a) continues to show a decline in dispersion, mainly driven by an increase in the 10th percentile point relative to the median (as GM noted, this implies that the male trend is being offset), and

very little trend in the dispersion of transitory labor income of other family members (3d)-- although somewhat of an increase in the final years--there is less evidence of a long-term trend in the other components. The 90th and 75th percentile points of transitory transfer income rose, but so did the median (3b), with only slight differences in the growth rates of these three percentile points. The fact that the median rose implies that it was rising relative to the mean, probably because of a decrease in the number of positive transitory shocks or an increase in the number of negative ones (although the 10th and 25th percentile points remained at zero for the entire period). For family other nonlabor income, its transitory component became more dispersed through the early 1990s, but then its dispersion fell, with most percentile points ending up about where they began, with the exception of the 10th percentile point, which fell relative to the median. Thus there is slight evidence of increased dispersion of other nonlabor income.

Decomposing the trend in the transitory variance of total family income into its components is beyond the scope of this note, and will be pursued in future research.

Summary

This note reports an updated calculation of time trends in the percentile points of transitory income, first reported by Gottschalk and Moffitt (2009). The new calculations are superior to those of the old. The new calculations show clearer evidence of a decline in the dispersion of female earnings from 1970 to 2004 but less evidence of a change in the dispersion of the transitory components of family income categories, although there continues to be some evidence of a decline in the dispersion of transitory labor income of the husband and wife and an increase in the dispersion of transitory family nonlabor income

References

Gottschalk, P. and R. Moffitt. 1994. "The Growth of Earnings Instability in the U.S. Labor Market." Brookings Papers on Economic Activity 2: 217-272.

Gottschalk, P. and R. Moffitt. 2009. "The Rising Instability of U.S. Earnings." Journal of Economic Perspectives 23 (Fall): 3-24.

Moffitt, R. and P. Gottschalk. Forthcoming. "Trends in the Transitory Variance of Male Earnings: Methods and Evidence." Journal of Human Resources.

Figure 1(a): Transitory Earnings Percentile Points for Males with Positive Earnings

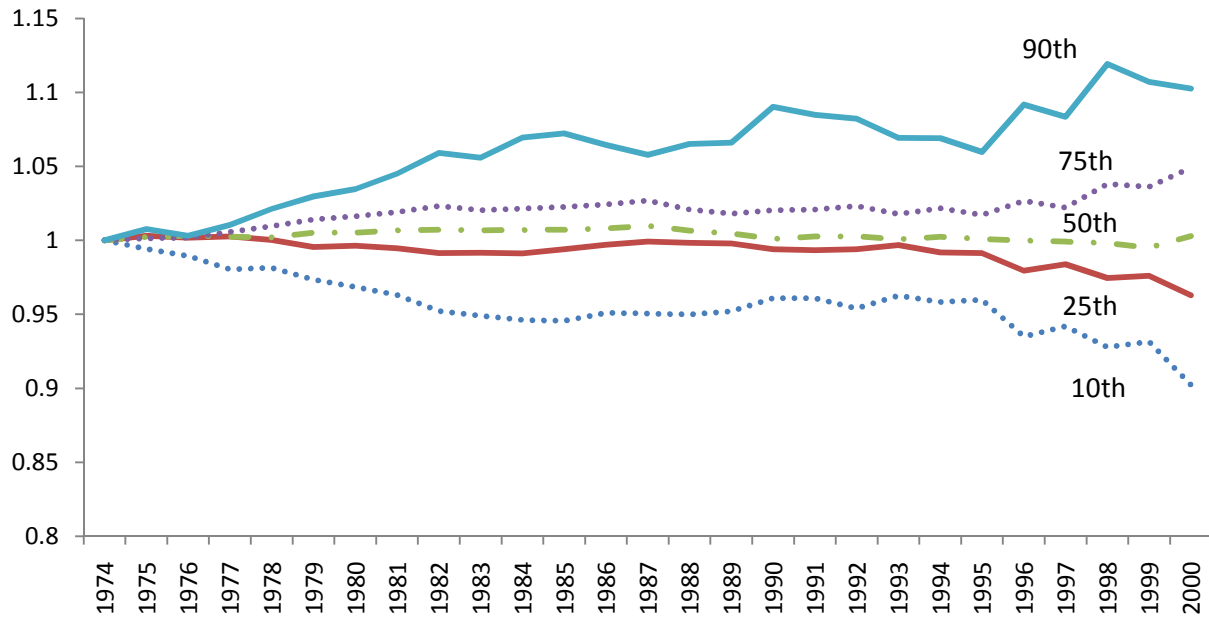


Figure 1(b): Transitory Earnings Percentile Points for All Males

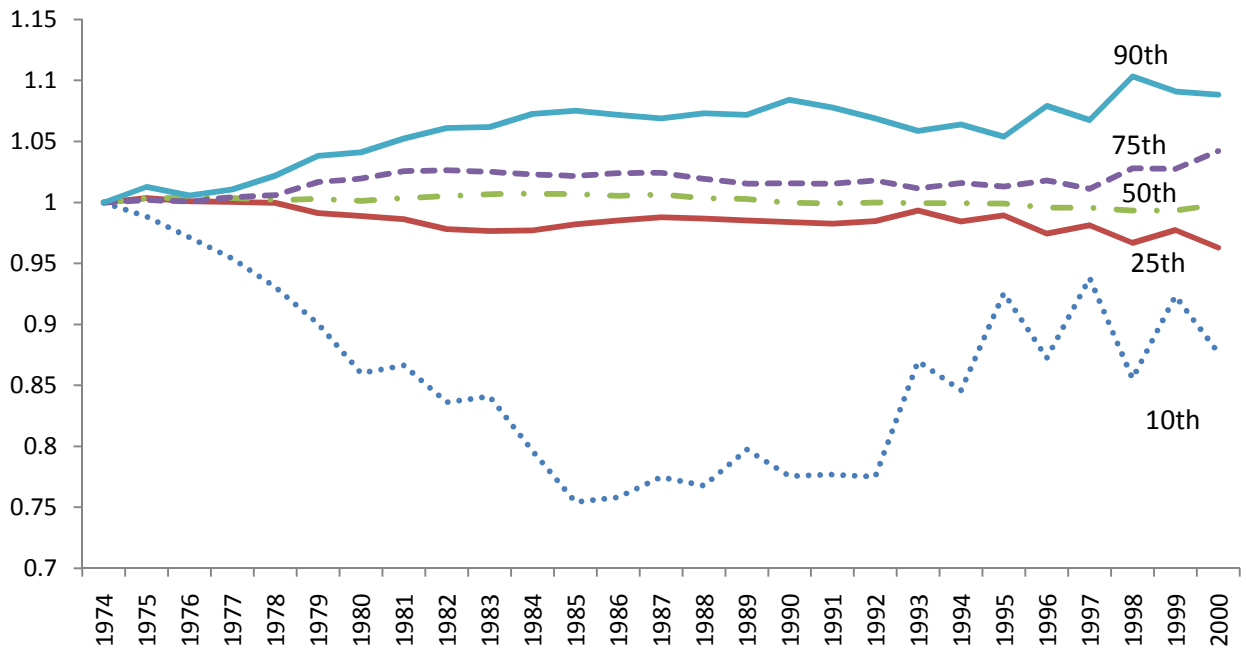


Figure 2: Transitory Earnings Percentile Points for All Females

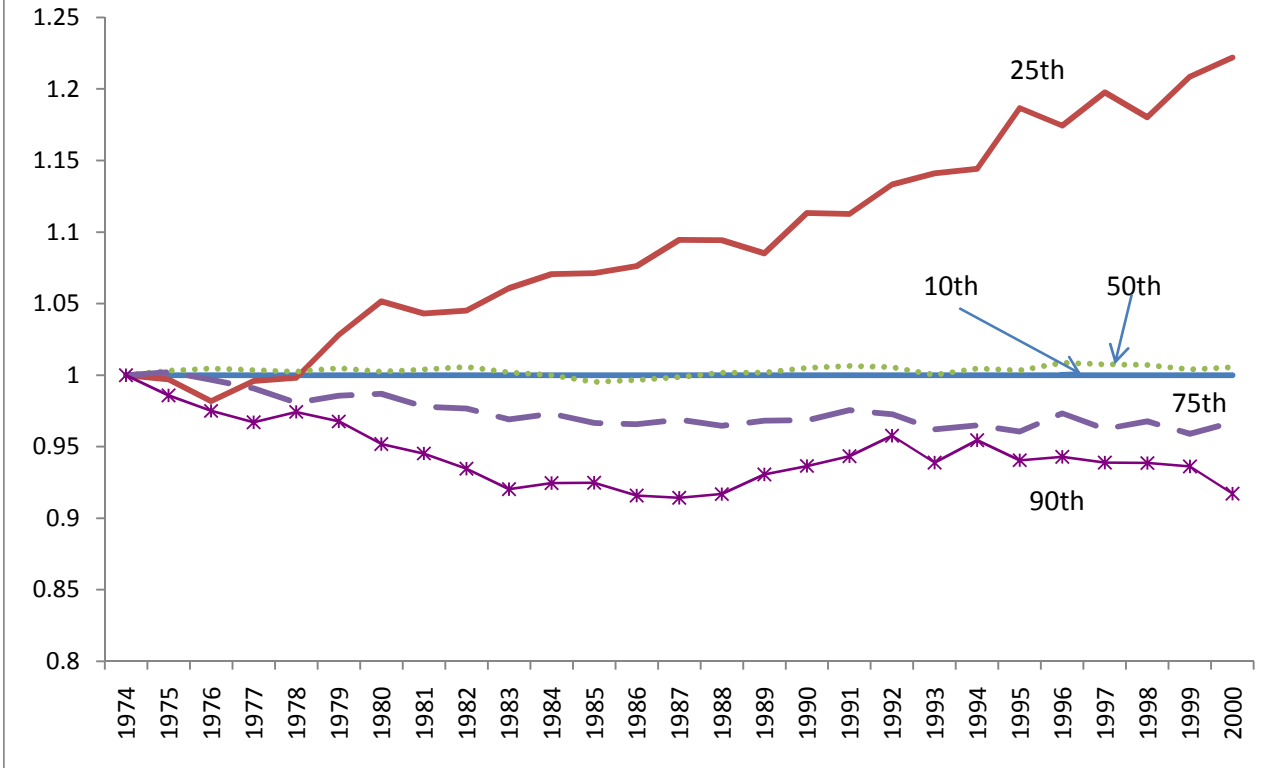


Figure 3(a): Percentile Points of Transitory Labor Income of Husband and Wife

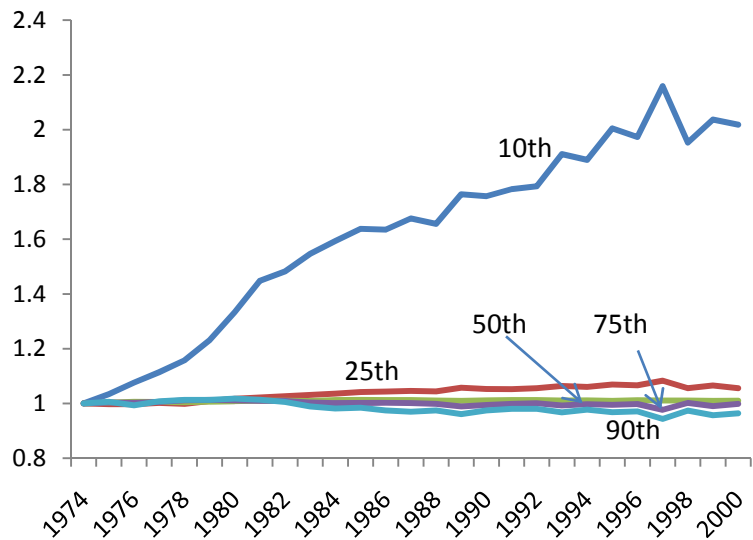


Figure 3(b): Percentile Points of Family Transitory Transfer Income

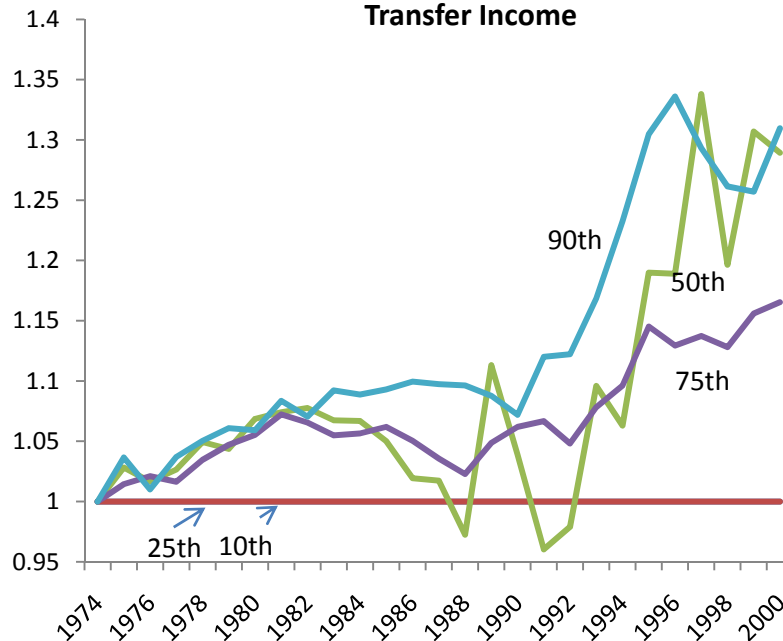


Figure 3(c): Percentile Points of Transitory Other Family Nonlabor Income

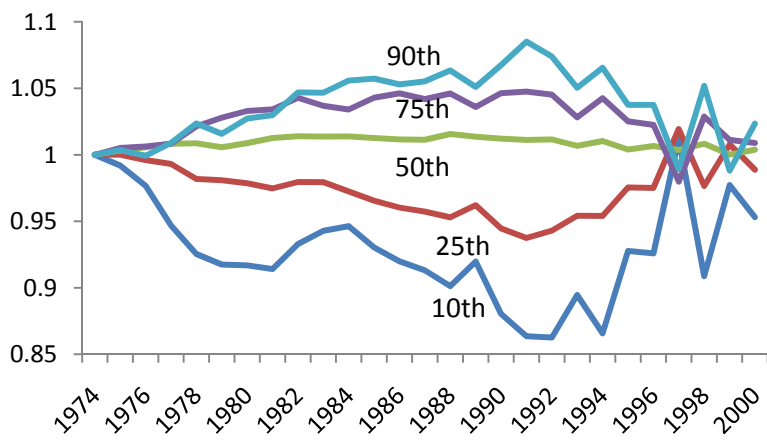


Figure 3(d): Percentile Points of Transitory Income of Other Family Members

