

Summary: The Great Moderation In Micro Labor Earnings

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One of the apparent mysteries associated with the so-called “Great Moderation” literature is a lack of evidence that individual earnings growth has become less variable in recent decades (Davis and Kahn, 2008). Although there is significant evidence that aggregate earnings growth became more stable and major labor market shocks like involuntary unemployment became less frequent, some studies have concluded that individual labor earnings growth rates actually became more variable during the last several decades (Gottschalk and Moffitt, 1994 and 2009; Moffitt and Gottschalk, 2002 and 2008; Dynan, Elmendorf, and Sichel, 2007; a notable exception generally consistent with the results in this paper is Congressional Budget Office, 2008). However, Social Security earnings data show that (1) the average variance of earnings growth rates fell in line with the aggregate volatility measures, (2) the profile of earnings growth variability shifted uniformly for the entire working-age population, and (3) different approaches to decomposing earnings growth into permanent and transitory components agree that the decline in variability involved moderation in both types of shocks.

There are both positive and normative reasons to investigate changes in the stochastic process underlying individual labor earnings growth. On the positive front, predictions from models of household saving behavior with labor income uncertainty are very sensitive to the presumed level and nature of the uncertainty about future earnings growth. If labor income becomes more volatile than one would expect consumption to become more volatile, though different types of shocks to labor earnings have different implications for consumption. In particular, transitory earnings shocks affect the level of

precautionary savings generally because consumers can accumulate wealth to insure against those fluctuations, while permanent shocks impact the target wealth to income ratios in “buffer-stock” consumption models.

The normative basis for investigating changes in earnings growth variability is also important. As Davis and Kahn (2008) point out, there is evidence of moderating fluctuations in aggregate output and income growth, firm-level gross employment flows, unwanted job loss, and inventories. If it is true that person- or household-level incomes actually became more volatile during this period while these other volatility measures fell, then the Great Moderation may have come with an important downside. Indeed, one could speculate that some forms of risk were simply shifted onto workers, which raises the important normative question about which economic environment is preferable.

The divergence between the general decline in volatility associated with the Great Moderation and individual earnings growth is intuitively difficult to explain, but the analysis here suggests that there is no great mystery to be explained in any event. The purported divergence between macro and micro earnings volatility may leave one wondering how direct inputs to individual labor earning outcomes such as overall unemployment and unwanted job loss could decrease, while earnings growth variability increased. The evidence presented here shows that there is no discrepancy, because the measures of earnings growth variability all show that the decline at the micro level is consistent with the aggregate patterns. Further, the finding that some of the decrease in earnings growth variability occurred at longer (permanent) frequencies could actually help explain other trends observed during the Great Moderation, such as the decline in personal saving.

The data used here to analyze earnings growth variability over time is a one percent sample of Social Security Administration earnings records for ages 25 to 55 between 1980 and 2005. Focusing first on annual changes in log earnings, the average variance of log changes fell by about one-third over the time period, and most of the decline occurred before 1992. One important feature of the one-year variance measures is that conditioning on a positive earnings threshold when computing person-level changes matters a great deal for the estimated level of the variance of log changes, but not the time pattern. In particular, limiting the sample to people with enough earnings to qualify for credit towards Social Security benefit eligibility—a fairly modest amount—lowers the log change variance by half in every year. However, the pattern of decline over time is the same whether or not the threshold is applied.

The second set of results—again based on simple one-year earnings growth rates—focuses on variability across age groups and time. The administrative earnings data show a negative relationship between age and the variance of log-changes in earnings at any point in time, and the U.S population did get older over this period as the Baby Boom entered and moved through their prime working years. However, a comparison of the age-variance profile for the first half of the sample (1980 to 1992) with the second half (1993 to 2005) also indicates a uniform drop in the variability of growth rates at all ages, and the magnitude of the decline at every age is similar to the overall change. This suggests that the simple combination of population aging and declining earnings growth variability with age cannot explain the overall trend.

The observed patterns in earnings growth variability by time and age is in some ways just the starting point for this analysis. The main issue explored here is whether the

decline in earnings growth variability occurred at all frequencies, or just in the annual measures. Analyzing variances of changes across multiple frequencies is the key to separating transitory from permanent earnings shocks, and the empirical strategy for making that distinction involves first measuring the variance of log earnings changes at multiple frequencies and then investigating whether there is a systematic change in the variance as the time-gap over which earnings growth is measured is increased. If the variance rises with the length of the gap, the increased component of earnings growth variance is permanent. Using a few different approaches, the data show a very clear and systematic decline over time in the variance of log earnings change at all observed frequencies, which suggests that both transitory and permanent variances changed.

The first approach to discerning permanent and transitory components is basically visual and intuitive, and very much in the spirit of seminal work by Carroll (1992) and Carroll and Samwick (1997). The idea is to look at variances across multiple periods—generally 1 to 12 year gaps—and the slope of the change in variance as the gap increases as the key to identifying the permanent component. The innovation here involves splitting the sample several different ways to show how the stochastic process evolved over time and across groups. The approach is to compare the first and second half of the time periods for the entire sample, and then again for the younger- and older-half subsamples. In all cases there is a clear decline in both the levels and slope of the variance across year-gap frequencies. Because the slope is the key to identifying permanent shocks, and the levels the key to transitory shocks, there is evidence of a decline in both.

The second approach involves imposing just enough structure on the stochastic process to identify age and cohort effects. The structure adopted identifies point

estimates for permanent and transitory shock variances at every age, while imposing the same shift at every age across cohorts. One advantage of this approach is that it generates values for permanent and transitory shocks by age that are consistent with basic intuition about life cycle earnings uncertainty and useful for modeling. For example, while both types of shocks decline with age, the patterns are somewhat different. The second outcome is that the residual cohort effects confirm the findings of the visual sample-splitting exercise that focused directly on the levels and slopes of the variances across multiple year-gaps. That is, the stochastic process for earnings changed in a way that is basically consistent with the Great Moderation.

In addition to providing evidence of consistency between micro labor earnings variability and other features of the Great Moderation, there is new information in the estimated patterns of earnings growth variability by age that may also help reconcile some outstanding issues in life cycle modeling. First, there is evidence in the literature that a model of heterogeneous earnings profiles (Guisar, 2007A, 2007B) fits the data better than a more traditional model of fixed permanent and transitory shocks around expected earnings over the life cycle. However, the benchmark for that evidence is a model with fixed permanent and transitory shocks, which the results here seem to repudiate, because permanent shocks are much larger earlier in the life cycle. Second, there is also evidence that the relationship between earnings and consumption growth varies systematically over the life cycle (Deaton and Paxson, 1991; Carroll, 1992, 1997; Gourinchas and Parker, 2002; Scholz and Seshadri, 2007). The estimates of earnings growth variability by age presented here are consistent with these observations, because the data suggest that permanent shocks drop dramatically with age. Essentially, the data

confirm the (perhaps obvious) intuition that much of the uncertainty about potential lifetime earnings is resolved fairly early in the life cycle.

Taken together, the findings here suggest that earnings growth variability per se is not a new or increasing problem in public policy, and that the changes in micro earnings variability are consistent with the macro Great Moderation. This is not meant to suggest that earnings inequality is not an important problem; indeed, one way to interpret the numbers is that low earners are now simply more certain that their earnings are going to stay that way (Kopczuk, Saez, and Song, 2007).

The approach implemented here for separating age and cohort effects can and should be generalized to estimate more complicated stochastic processes for micro labor earnings growth (see, for example, Meghir and Pistaferri, 2004 and Low, Meghir, and Pistaferri, 2008). The approach here was focused on isolating changes over time using the most parsimonious specifications. However, the results here also suggest that the stochastic processes being used to calibrate consumption models can and should be improved by introducing age effects. Those models can be used to evaluate the quantitative implications (for both consumption and economic well-being) of the sorts of shifts in variances over time that the data suggest took place.

References

- Carroll, Christopher D., 1992. "The Buffer Stock Theory of Saving: Some Macroeconomic Evidence," *Brookings Papers on Economic Activity*, 2, 61–135 (Fall).
- Carroll, Christopher D., 1997. "Buffer Stock Saving and the Life Cycle/Permanent Income Hypothesis," *Quarterly Journal of Economics*, 107, 1–56 (February).
- Carroll, Christopher D., and Andrew A. Samwick, 1997. "The Nature of Precautionary Wealth," *Journal of Monetary Economics*, 40, 41–71 (September).

- Congressional Budget Office, 2008. *Recent Trends in the Variability of Individual Earnings and Family Income*. Washington, DC: U.S. Congress (June).
- Davis, Steven J., and James A. Kahn, 2008. "Interpreting the Great Moderation: Changes in the Volatility of Economic Activity at the Macro and Micro Levels." *Journal of Economic Perspectives*, 22, 155-180 (Fall).
- Deaton, Angus, and Christina Paxson, 1994. "Intertemporal Choice and Inequality," *Journal of Political Economy*, 102, 437-67 (June).
- Dynan, Karen E., Douglas W. Elmendorf, and Daniel E. Sichel, 2007. "The Evolution of Household Income Volatility," Federal Reserve Board Finance and Economics Discussion Paper Series, Working paper 2007-62 (October).
- Gottschalk, Peter, and Robert Moffitt, 1994. "The Growth of Earnings Instability in the U.S. Labor Market," *Brookings Papers on Economic Activity*, 2, 217-272 (Fall).
- Gottschalk, Peter, and Robert Moffitt, 2009. "The Rising Instability of U.S. Earnings," *Journal of Economic Perspectives*, 23:4, 3-24 (Fall).
- Guvenen, Fatih, 2007A. "An Empirical Investigation of Labor Income Processes", NBER Working Paper 13394. Forthcoming *Review of Economic Dynamics*.
- Guvenen, Fatih, 2007B. "Learning Your Earning: Are Labor Income Shocks Really Very Persistent?" *American Economic Review*, 97:3, 687-712 (June).
- Kopczuk, Wojciech, Emmanuel Saez, and Jae Song, 2007. "Uncovering the American Dream: Inequality and Mobility in Social Security Earnings Data Since 1937." NBER Working Paper No. 13345 (August).
- Low, Hamish, Costas Meghir, and Luigi Pistaferri, 2008. "Wage Risk and Employment Risk Over the Life Cycle," IZA Discussion Paper No. 3700 (September).
- Meghir, Costas, and Luigi Pistaferri, 2004: "Income Variance Dynamics and Heterogeneity," *Econometrica*, 72, 1-32 (January).
- Moffitt, Robert A., and Peter Gottschalk, 2008. "Trends in the Transitory Variance of Male Earnings in the U.S., 1970-2004." Johns Hopkins University and Boston College (December).
- Moffitt, Robert A., and Peter Gottschalk, 2002. "Trends in the Transitory Variance of Earnings in the United States," *The Economic Journal*, 112, 68-73 (March).
- Scholz, John Karl, and Ananth Seshadri, 2007. "Children and Household Wealth," University of Wisconsin, Department of Economics (September).