

Quantitative Macroeconomics
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Homework 3, due April 12

Question 1. Permanent-Transitory Decomposition of Income

1. Over time. Use the PSID annual income data provided in BPP (2008) to identify and estimate the variance of the permanent and transitory shocks of the following residual income process,

$$\begin{aligned}u_{i,t} &= z_{i,t} + \epsilon_{i,t}, \\z_{i,t} &= z_{i,t-1} + \eta_{i,t},\end{aligned}$$

with $\epsilon_{i,t} \sim iid(0, \sigma_{\epsilon_t}^2)$ and $\eta_{i,t} \sim iid(0, \sigma_{\eta_t}^2)$. Note that in this case we allow for the variances of our innovations to only depend on time. Report your results graphically and discuss them.

2. Over the life cycle. Now, allow for the variances of the innovations to only change with age. Report your results graphically and discuss them.
3. Assume BPP data are available only in the even years (i.e., every two years). Redo the previous two items. Compare your estimation results, including its accuracy.
4. Assume your data is only available for 1986, 1988 and 1990. Redo the first two items. Compare your estimation results, including its accuracy.