Class 24
“Last Day of Classes”
Econ 402
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Class 24 Outline

- More on Aggregate Consumption
- Real Business Cycle Theory
- Mankiw’s Ten Principles of Economics
FIG. 1. U.S. per Capita Real GDP, U.S. per Capita Real Consumption of Non-Durables and Services, and Deviations from an Estimated Long-Run Equilibrium Relationship.
Aggregate Consumption

- Aggregate Consumption is smoother than Aggregate Income
- Under the random walk hypothesis (PIH + rational expectations), Y/C should reflect transitory fluctuations in output due to the business cycle
Deaton's Paradox

- Aggregate Income appears to be unpredictable, yet aggregate consumption is smooth
- It is too smooth for the PIH!
Possible explanations for “Excess” Smoothness

- Habit Formation: Consumers’ utility depends on level of consumption relative to recent levels (habit stock)
- Precautionary Saving: Consumers want “buffer stock” of wealth in case movements in permanent income are reversed
Deviations from PIH

Both habit formation and precautionary saving imply partial adjustment of consumption to permanent income shocks
Figure 4 presents the results for the first simulation. Taking the negative correlations in Table 3 as reflecting the causal effects of shocks to permanent income on the transitory components of income and consumption, I find that both income and consumption take many quarters to fully adjust to a one-time increase in permanent income. Of the two series, income adjusts relatively quickly, although the lack of complete immediate adjustment is suggestive of "time-to-build" dynamics. Consumption eventually responds on a one-to-one basis to the change, but it undergoes a slow and monotonic adjustment that is consistent with a slowly adjusting habit stock or precautionary savings given high uncertainty over whether the shock to permanent income will be reversed in the future. The different speeds of adjustment of income and consumption are simply the counterparts to the dynamics for the transitory components presented in Figure 3. However, the simulation in Figure 4 makes the typical context of those dynamics clearer, especially in terms of how they relate to the negative correlations between permanent and transitory movements. Specifically, it is the fact that income and consumption remain temporarily below their new permanent levels that generates negative innovations to their transitory components following a positive shock to permanent income.

Fig. 4. The Paths of Income and Consumption Given a One-Time Shock to Permanent Income Based on the Estimated Correlated UC Model.
Findings in Morley (2007)

- Aggregate consumption has partial adjustment dynamic consistent with habit formation and precautionary saving.
- Consumption adjusts slower than income to permanent income shocks.
- Permanent income is highly volatile.
While Figure 4 is somewhat revealing about the dynamics of income and consumption implied by the estimated UC model, it is highly deceptive in one key respect. In particular, the simulation abstracts from the implication of the estimated model that permanent income is highly volatile from period to period. Figure 5 presents results from a simulation that captures this implication. Specifically, I generate an artificial sample of consumption and its components based on the estimates in Table 3. As can be seen, consumption is much smoother than its permanent component. It is also easy to see the negative correlation between the permanent and transitory movements in consumption. When the permanent component moves below consumption, the transitory component is positive and vice versa. Meanwhile, it might appear that consumption traces out a meaningful trend for the permanent component, but it is only an illusion. By construction of the simulation, the permanent component of consumption follows a random walk and does not predictably revert back to consumption. Instead, at any given point of time, consumption is slowly adjusting toward the permanent component. While the volatility of the permanent component means that it sometimes crosses over consumption ex post, it is not expected to do so.
Real Business Cycle Theory

- Permanent Income is volatile because most shocks to GDP are productivity shocks (i.e., real shocks) rather than aggregate demand shocks (e.g., monetary policy or fiscal policy).
- Essentially a Solow Growth Model for the short-run, with frequent productivity shocks.
Productivity Shocks

- A positive/negative productivity shock increases/decreases labour demand
- Real wage and employment rise/fall
Can productivity shocks explain fluctuations in the Unemployment Rate?

- Requires highly elastic labour supply
- “Intertemporal substitution of labour”
The labor market

- **Intertemporal substitution of labor:** In RBC theory, workers are willing to reallocate labor over time in response to changes in the reward to working now versus later.

- The intertemporal relative wage equals \( \frac{(1 + r)W_1}{W_2} \)

where \( W_1 \) is the wage in period 1 (the present) and \( W_2 \) is the wage in period 2 (the future).
Can productivity shocks explain recessions?

What exactly is a negative technology shock?
A Partial Resolution?

Perhaps RBC models explain economies in expansions, while Keynesian models explain economies in recessions

I.e., aggregate demand shocks are infrequent, large, and negative

Morley and Piger (2008)
Fig. 6
U.S. real GDP and steady-state estimates of trend (NBER recessions shaded)
Model-Free Measure of the U.S. Business Cycle (NBER recessions shaded)

Fig. 4
Model-Free Measure Based on AIC

Measure Based on AIC
Material also covered in Chapter 4 of Romer in the reading package

Solutions to HW#3 posted

Practice Questions posted

Final exam is Tuesday, May 6 from 6:00pm to 8:00pm
Mankiw’s Ten Principles of Economics

... according to Yoram Bauman