MacroEconomia Avanzata
Esercitazione 5
Consumo.

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1 Question 1.

1. Briefly describe the Permanent-Income theory;
2. Discuss the empirical evidence.
3. The average income of farmers is less than the average income of non-farmers, but fluctuates more from year to year. Given this, how does the permanent-income hypothesis predict that estimated consumption functions for farmers and non-farmers differ?
4. Actual data give not consumption at a point in time, but average consumption over an extended period, such as a quarter.

   Suppose that consumption follows a random walk and that data provide average consumption over two-periods intervals; that is, one observes $(c_t + c_{t+1})/2$.

   (a) Find an expression for the change in measured consumption from one two-period interval to the next in terms of the error ε's.

   (b) Is the change in measured consumption uncorrelated with the previous value of the change in measured consumption? In light of this, is measured consumption a random walk?

   (c) Given your result in part (a), is the change in consumption from one two-period interval to the next necessarily uncorrelated with anything known as of the first of these two-period intervals? Is it necessarily uncorrelated with anything known as of the two-period interval immediately preceding the first of the two-period intervals?

   (d) Suppose that measured consumption for a two-period interval is not the average over the interval, but consumption in the second of the two periods. That is, one observes c_{t+1}, c_{t+3} and so on. In this case, is measured consumption a random walk?

2 Question 2.

1. Let us add uncertainty to the framework. Describe the implications in the case of quadratic utility:

$$U(c_t) = c_t - \frac{a}{2}c_t^2; \qquad a > 0. \tag{1}$$

2. Summarise empirical evidence about the Random-Walk hypothesis.

3. Discuss the main theories that try to join up the Permanent-Income theory with empirical evidence.

4. **(Optional)** Consider the two-period setup analysed in Section 8.4 of the textbook. Suppose that the government initially raises revenue only by raising interest income. Thus the individual's budget constraint is

$$c_1 + \frac{c_2}{1+(1-\tau)r} \leq y_1 + \frac{y_2}{1+(1-\tau)r}, \tag{2}$$

where τ is the tax rate. The government's revenue is 0 in period $t = 1$ and $\tau r(y_1 - c_1^0)$ in period $t = 2$, where c_1^0 is the individual's choice of c_1 given this tax rate.

Now suppose the government eliminates the taxation and substitutes it with lump-sum taxes of amounts T_1 and T_2 in the two periods, so that the individual's budget constraint is now

$$c_1 + \frac{c_2}{1+r} \leq y_1 - T_1 + \frac{y_2 - T_2}{1+(1-\tau)r}. \tag{3}$$

Assume y_1, y_2, r exogenous.

(a) What condition must the new taxes satisfy so that the change does not affect the present value of government revenues?

(b) If the new taxes satisfy the condition in part (a), is the old consumption choice (c_1^0, c_2^0), not affordable, just affordable, or affordable with room to spare?

(c) If the new taxes satisfy the condition in part (a), does first-period consumption rise, fall or stay the same?

3 Question 3.

1. Derive the C-CAPM model.

2. Discuss the "Equity Premium Puzzle".

3. **(Optional)** Suppose the only asset in the economy are infinitely-lived trees. Output Y_t equals the fruit of the trees, which is exogenous and cannot be stored; thus $c_t = y_t$ (lower case indicates per capita quantities). Assume that initially each consumer owns the same number of trees. Since all consumers are assumed to be the same, this means that, in equilibrium, the behaviour of the price of trees must be such that, each period, the representative consumer does not want to either increase or decrease his holding of trees.

Let p_t denote the price of a tree in period t. Assume logarithmic utility, so that the representative consumer maximises

$$E\left[\sum_{t=0}^{\infty} \frac{\ln c_t}{(1+\rho)^t}\right]. \tag{4}$$

(a) Suppose the representative consumer reduces his consumption in period t by an infinitesimal amount, uses the resulting saving to increase his holding of trees, and then sells these additional holdings in period $t+1$ (the sale occurs after the existing owner receives that period's output). Find the condition that c_t and expectations involving y_{t+1}, p_{t+1} and c_{t+1} must satisfy for this change not to affect expected utility.

(b) Assume that

$$\lim_{s \to \infty} E_t \left[\frac{p_{t+s}/y_{t+s}}{(1+\rho)^t} \right] = 0. \tag{5}$$

Given this assumption, iterate your answer to part (a) forward to solve for p_t (hint: use the fact that $c_{t+s} = y_{t+s} \ \forall \ s$.)

(c) Explain intuitively why an increase in expectations of future dividends does not affect the price of the asset.

(d) Does consumption follow a random walk in this model?