

1. Draw a budget-constraint/indifference-curve diagram to illustrate each of the following situations with current consumption (C_1) on the horizontal axis and future consumption (C_2) on the vertical axis. You should assume that the person is approximately a consumption smoother, so that whether she is initially a saver or dissaver is determined mainly by her endowment point. Be sure to identify clearly the endowment point, the budget constraints before and after the change, and the amounts saved or dissaved before and after the change.

- a. A person who is initially a saver in period 1 and who responds to an increase in the real interest rate by decreasing saving.
- b. A person who is initially a saver in period 1 and who responds to an increase in the real interest rate by increasing saving.
- c. A person who is initially a dissaver in period 1 and who responds to an increase in the real interest rate by increasing saving (reducing dissaving).
- d. Explain (based on substitution and income effects) why the fourth case (dissaver who increases dissaving when the real interest rate rises) is impossible.

2. Explain why the real interest rate rather than the nominal interest rate is used in the budget constraint for consumers. Explain why the real interest rate rather than the nominal interest rate is relevant for firms deciding whether to invest in real capital.

3. Consider a model in which individuals live for three periods, earning income of Y_1 , Y_2 , and Y_3 and consuming C_1 , C_2 , and C_3 . You may assume that they receive and leave no bequests.

- a. Show the equation for the individual's lifetime budget constraint.
- b. Solve for permanent income using an extension of equation (8.2) in the textbook.
- c. Assuming for simplicity that the real interest rate is zero and that the consumer smooths consumption perfectly, what consumption level will she choose in each year if $Y_1 = \$20,000$, $Y_2 = \$100,000$, and $Y_3 = \$0$ and she has access to perfect capital markets? In an economy comprising many such consumers, what pattern of borrowing and lending will emerge among individuals of various ages?
- d. How would her consumption in each period be different if the government had a program giving a \$30,000 transfer payment to all young people, paid for by a \$30,000 tax on all middle-aged people?
- e. How would her consumption in each period be affected if the government had a Social Security program that paid old people \$30,000 and taxed middle-aged people \$30,000 to pay for it?
- f. Re-do parts c through e under the assumption that young individuals are unable to borrow due to imperfections in the capital market.
- g. What implications does your analysis have for government transfer policies?

4. Read the article “Did the 2008 Tax Rebates Stimulate Spending?” *American Economic Review* 99 (2):374–379 (May 2009). (This is available through the Reed Library Web site. Search for the journal under “Print and E-Journals”, then look up the issue under the “Atypon Link” selection.) What are the authors’ results? Are they consistent with modern consumption theory? Are they consistent with Keynes’s consumption theory? Explain your conclusions.

5. Consider the theories of investment described in the text.

- a. Explain why an increase in the real interest rate would affect the desirability of investment in capital by a firm that borrows to finance its investment.
- b. Explain why (assuming perfect capital markets) the cost of capital for a firm that finances its investment y using retained earnings would be affected in the same way as if it borrowed.
- c. Explain why the increase in the real interest rate would affect Tobin’s q and, therefore, the desirability of investment for a firm that finances its investment through issuing new stock.

6. Using U.S. aggregate annual data from 1979 to 2001, the correlation between real investment and the real corporate-bond interest rate is -0.35 , whereas the correlation between real investment and real GDP is 0.96 . How, if at all, does this information help you assess the relative merits of the various investment theories we have considered. Can you be confident of the direction of causality between these pairs of variables? What difficulties does ambiguity of causality present in understanding and testing investment theory?