

CHAPTER 15. EXPECTATIONS, CONSUMPTION, AND INVESTMENT (7e)

15.1 Consumption

- In earlier chapters, consumption is described as a function solely of current disposable income. $C=C(Y-T)$
- In fact, however, people plan over longer horizons and are willing to borrow to finance current consumption when current disposable income is temporarily low.
- Assume that a person wants a constant flow of consumption over her lifetime.
- In this case, a perfectly rational person would develop a consumption plan in two steps.
 - First, she would calculate her total wealth—assets on hand (financial and housing wealth) plus the present value of future labor income (so-called human wealth).
 - Then, she would calculate the proportion of this wealth that should be spent each year to maintain a constant consumption level over her lifetime.
 - If it happened that this level of consumption fell short of current income, the difference would be borrowed.

Human wealth = present value of expected after-tax labor income

Nonhuman wealth = financial wealth + housing wealth

Total wealth = Human wealth + nonhuman wealth

$C=C(\text{Total wealth}_t)$

- In practice, most consumers following such a plan would end up borrowing large sums of money early in life, because income during college and early working years is likely to be very low relative to income later in life.

- In fact, however, most young adults do not borrow the relatively large sums suggested by simple calculations, for several reasons.
 - First, they may not intend to maintain constant consumption over their lifetimes.
Some expensive leisure activities will be deferred, and plans will be made for higher expenditures while raising a family.
 - Second, the computations involved in planning for constant consumption may be too complicated.
 - Third, human wealth is based on forecasts of future earnings, which may turn out to be less than expected. Consumers may wish to protect against this possibility by borrowing smaller amounts than would be implied by expected present value calculations.
 - Fourth, banks may be unwilling to extend much credit to young adults on the expectation of future earnings.
- consumption is likely to depend on two factors:
 - wealth—because consumers are to some degree forward looking
 - current disposable income—because consumers may be unwilling or unable to calculate and implement a spending plan expected to maintain constant consumption over their lifetimes.

$C = C(\text{Total wealth}_t, Y_{Lt} - T_t)$
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- The fact that consumption depends upon wealth (which in turn depends upon expectations about the future) has two empirical implications.
 - First, fluctuations in current income are likely to generate less than proportional fluctuations in consumption.

- Unless a fluctuation in current income is permanent, human wealth (the expected present value of future labor income) will change less than proportionally, which implies that consumption will probably change less than proportionally as well.
- Second, consumption can be affected by changing expectations about the future, even when current income does not change.

15.2 Investment

- When deciding whether to purchase a new machine or to build a new plant, firms compare the expected present value of profit from the machine or plant to the cost.
- If the present value of profit exceeds the cost, they invest; if not, they do not invest.
- The calculation of the expected present value of profits requires not only a forecast of profit, but also a consideration of the wear and tear on the machine or plant from use.
- Wear and tear is called depreciation.

- The financial value of a firm (its stock market value plus the value of bonds outstanding) measures the value financial investors place on capital (plant and equipment) already in place.
- Firms should invest when the financial value of a unit of their capital exceeds the cost of an additional unit of capital.

- A convenient special case of the investment decision is described by the following scenario: the real interest rate is constant, a new machine begins producing a constant annual (real) profit stream in one year, and a new machine begins to depreciate at a constant

rate in two years. Static expectations: expectations that the future will be like the present.

- In this case, in real terms, the present value of expected profit, denoted by $V(\Pi_t^e)$, is given by

$$V(\Pi_t^e) = \Pi_t / (r_t + \delta)$$

where r is the real interest rate and δ is the depreciation rate. The quantity $r + \delta$ is called the user cost or the rental cost of capital, since it represents the cost of renting a machine.

- The owner of a rented machine would require the same real return available on alternative assets—i.e., the real interest rate—plus compensation for depreciation.
- Theory implies that investment should depend upon expected future profit, but there is also evidence that investment increases when current profit increases, even after controlling for expected future profit.

$$I_t = I[V(\Pi_t^e), \Pi_t]$$

- Investment depends on current and expected future profit, but what determines profit? The level of profit per unit of capital is likely to be closely related to the level of sales per unit of capital.
- Ignoring the distinction between sales and output, sales per unit of capital can be proxied by output per unit of capital.
- In fact, there is a close relationship between changes in profit per unit of capital and changes in the output-capital ratio.

15.3 The Volatility of Consumption and Investment

- Although the consumption and investment decisions have some similarities, the theory developed above suggests that investment should be much more volatile than consumption.
 - After an increase in income perceived as permanent, consumers respond with at most an equal increase in consumption.
 - After an increase in sales perceived as permanent, however, firms may respond by investing in projects many times larger than the increase in sales.
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- In the absence of adjustment costs, firms have no reason to maintain a smooth flow of investment.
 - Once projects become profitable, firms invest immediately.
 - Consumers, on the other hand, desire to maintain a relatively constant level of consumption.
 - In response to a permanent increase in income, it makes no sense for them to borrow to try to consume the entire future increase today.
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- In fact, although investment and consumption tend to move in the same direction, the movements of investment are much higher in percentage terms.
 - In absolute terms, however, movements of investment and consumption are similar in magnitude, since total consumption is much larger than total investment.
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Exercises

Q1 (16.1, 6e)

A pretzel manufacturer is considering buying another pretzel-making machine that costs \$100,000. The machine will depreciate by 8% per year. It will generate real profits equal to \$18,000 next year, \$18,000 $(1 - 8\%)$ two years from now (that is, the same real profits but adjusted for depreciation), \$18,000 $(1 - 8\%)^2$ three years from now, and so on. Determine whether the manufacturer should buy the machine if the real interest rate is assumed to remain constant at each rate in (a) through (c).

- a. 5%
 - b. 10%
 - c. 15%
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Q2 (16.3, 6e)

A consumer has nonhuman wealth equal to \$100,000. She earns \$40,000 this year and expects her salary to increase by 5% in real terms each year for the following two years. She will then retire. The real interest rate is equal to 0% and is expected to remain at 0% in the future. Labor income is taxed at a rate of 25%.

- a. What is this consumer's human wealth?
 - b. What is her total wealth?
 - c. If she expects to live for seven more years after retiring, and wants her consumption to remain the same (in real terms) every year from now on, how much can she consume this year?
 - d. If she received a bonus of \$20,000 in the current year only, with all future salary payments remaining as stated earlier, by how much could this consumer increase consumption now and in the future?
 - e. Suppose now that at retirement, Social Security will start paying benefits each year equal to 60% of this consumer's earnings during her last working year. Assume that benefits are not taxed. How much can she consume this year and still maintain constant consumption over her lifetime?
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Solution

1.

The EPDV of purchasing the machine is $\pi/(r + \delta) = \$18,000/(r + 0.08)$

- a. Buy. EPDV = $\$138,462 > \$100,000$
- b. Break-even. EPDV = $\$100,000$
- c. Do not buy. EPDV = $\$78,261 < \$100,000$

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- a. $(1 - 0.25)(1 + 1.05 + 1.05^2)\$40,000 = \$94,575$
- b. $\$194,575$
- c. The consumer works for three more years and will be retired for seven years, so there are 10 more years of consumption. So, since the real interest rate is zero, the consumer can consume one-tenth of her total wealth, or 19,457.50, this year.
- d. Consumption could increase by $\$2,000$ annually.
- e. Benefits imply extra annual consumption of $0.6 * (1.05^2) * \$40,000 * (7/10) = \$18,5$