

Module 8: Consumption, Saving, and Investment

Practice problems and illustrative test questions for the final exam

(The attached PDF file has better formatting.)

This posting gives sample final exam problems. Other topics from the textbook are asked as well; these problems are just examples. All final exam problems are multiple choice; some practice problems are not multiple choice so that the solutions can be better explained.

** Exercise 8.1: Price level, real interest rate, bonds, and consumption

A household has a two year budget constraint.

- A. If the real interest rate rises unexpectedly at the beginning of year 1, how does consumption change in years 1 and 2 (C_1 and C_2)?
- B. If the price level rises unexpectedly at the beginning of year 1, how does consumption change in years 1 and 2 (C_1 and C_2)?

Part A: If the real interest rate rises unexpectedly, it is worth more to save in year 1 and consume in year 2, so consumption falls in year 1 and rises in year 2. This is the intertemporal substitution effect.

Jacob: If the real interest rate rises, shouldn't one save more in each year, and consume more toward the end of one's life, or perhaps even save more for one's children?

Rachel: For a lifetime budget constraint, that is correct. This exercise has a two year budget constraint, as if the world ends in two years. Everything is consumed in these two years; the real interest rate affects how much is consumed in the first year vs the second year.

Jacob: For the effects on the demand for money, Barro uses the nominal interest rate. Why do we use the real interest rate for the budget constraint?

Rachel: Suppose the real interest rate is 2% per annum, expected inflation is 6%, and the nominal interest rate is 8%. Saving \$100 in year 1 gives an extra \$108 in year 2, but a good costing \$100 in year 1 costs \$106 in year 2. The relative value of consumption vs saving depends on the real interest rate. But the demand for money depends on the real return on currency, which is the negative of the nominal interest rate. If the real interest rate is 2% per annum, expected inflation is 6%, and the nominal interest rate is 8%, a bond yields 8% per annum, but currency yields 0% per annum.

Part B: If the price level rises unexpectedly, the bonds are not worth as much. The income effect raises or reduces consumption in all years:

- If the household is a net borrower, consumption rises in all year.
- If the household is a net lender, consumption falls in all year.

This is not the intertemporal substitution effect: there is no difference in the change in the value of the bonds for year 1 vs year 2.

Jacob: Doesn't Barro say that $B = 0$?

Rachel: For the economy as a whole, the private bonds held in aggregate are zero. For any household, bonds may be positive or negative.

Jacob: Some countries are net creditors and some countries are net debtors. Why does Barro say $B = 0$ for the economy as a whole?

Rachel: In this part of the textbook, Barro assumes a closed economy (except for national income accounts). In chapters 17 and 18 (not in the printed edition of the textbook, but in the book's web site), Barro expands the theory to open economies.

See Barro, Macroeconomics, Chapter 7, consumption investment saving

**** Exercise 8.2: Effects on consumption**

How do each of the following affect consumption in the current year?

- A. An increase in the real interest rate
- B. A permanent increase in real wage income $(w/P) \times L$
- C. An increase in current real wage income $(w/P)_1 \times L$, but no change in future real wage incomes
- D. An increase in future real wage income $(w/P)_t \times L$, for $t = 2, 3, \dots$
- E. A one-time windfall that raises real assets, B_0/P

Part A: An increase in the real interest rate has an intertemporal substitution effect. Dollars can buy more real goods in the future, so the person has a greater incentive to save: that is, consume less now and consume more in the future. Current year consumption C_1 decreases, and consumption toward the end of life increases. We can't specify whether consumption at any intervening year rises or falls. If the person expects to consume for ten more years, consumption may fall in the first five years (fall the most in year 1 and the least in year 5) and rise in the last five years (rise the least in year 6 and the most in year 10).

Part B: A permanent increase in real wage income $(w/P) \times L$ increases income, with consumption in all years rising.

Part C: An increase in current real wage income $(w/P)_1 \times L$, but no change in future real wage incomes, has a much smaller effect. Consumption in all years rises (there is no intertemporal substitution effect), but the rise is smaller.

Part D: An increase in future real wage income $(w/P)_t \times L$, for $t = 2, 3, \dots$, has a slightly smaller effect than an increase in all years. Consumption in all years rises (there is no intertemporal substitution effect), but the rise is slightly smaller.

Part E: A one-time windfall that raises real assets, B_0/P , is like a temporary increase in the real wage rate. Consumption rises in all years, with the present value of consumption in all years equal to the one-time windfall.