

Econ 154b
Yale University
Spring 2005
Prof. Tony Smith

HOMWORK #4

This homework assignment is due at the beginning of lecture on Wednesday, February 16.

1. Consider an economy that consists of a single consumer who lives for two time periods. The consumer's income in the current period is Y and the consumer's income in the future period is Y^f . The consumer pays taxes equal to T in the current period and pays taxes equal to T^f in the future period. The government uses these taxes to finance government expenditures, which are equal to G in the current period and equal to G^f in the future period. The consumer can freely borrow and lend at interest rate r , so that his budget constraint reads:

$$C + \frac{C^f}{1+r} = Y - T + \frac{Y^f - T^f}{1+r},$$

where C is the amount that the consumer consumes in the current period and C^f is the amount that he consumes in the future period. Assume throughout this problem that the government satisfies its budget constraint:

$$G + \frac{G^f}{1+r} = T + \frac{T^f}{1+r}.$$

In addition, assume that the consumer understands that the government's budget constraint always holds. Finally, to simplify the analysis, assume that the consumer's goal is to smooth consumption completely across the two time periods: that is, he sets $C = C^f$.

- (a) Let $Y = 2100$, $Y^f = 1050$, $G = T = 0.3Y$, $G^f = T^f = 0.3Y^f$, and $r = 0.1$. Find C and C^f . What is national saving in the current period, i.e., what is $S = Y - C - G$?
- (b) Suppose that T increases by 50 (but government expenditures in the two time periods remain unchanged). By how much must T^f decrease so that the government's budget constraint is satisfied? How does the increase in T (and accompanying decrease in T^f) affect C , C^f , and S ?
- (c) Suppose instead that there is a temporary increase in government spending: G increases by 50 but G^f remains unchanged. At the same time, T increases by 50, so that the government's budget constraint is still satisfied. How does the increase in G (and accompanying increase in T) affect C , C^f , and S ?

- (d) Suppose now that G increases by 50 but that the government finances this increase by increasing T^f (keeping T constant at its original value). By how much must T^f increase? How does the increase in G (and accompanying increase in T^f) affect C , C^f , and S ?
- (e) Finally, suppose that the increase in government spending is permanent: both G and G^f increase by 50. In addition, assume that the government finances these increases by increasing both T and T^f by 50. How do these changes affect C , C^f , and S ?
- (f) In parts (b)–(e), the interest rate r is held fixed at 10%. Your answers can, therefore, be viewed as determining how the desired national savings curve shifts in response to various changes in government spending and/or taxation. Holding government spending constant, how do changes in the timing of taxes shift the desired savings curve? Do temporary increases in government spending shift the desired savings curve by more or less than permanent increases in government spending?
- (g) Which of the scenarios described in part (f)—a shift in the timing of taxes, a temporary increase in government spending, or a permanent increase in government spending—has the largest effect on equilibrium interest rates? (Hint: Answer this question using an investment-savings diagram like the one in Figure 4.6 on p. 140 of the textbook.)
2. Do numerical problem #2 from Chapter 7 on p. 272 in the textbook.
3. Do numerical problem #5 from Chapter 7 on p. 273 in the textbook. (Hint: If the nominal money supply is growing at a constant rate and is expected to continue growing at a constant rate, and if all markets are in equilibrium, then expected and actual inflation coincide.)
4. Do analytical problem #4 from Chapter 7 on p. 273 in the textbook. Give careful explanations for each of your answers. (Hint: A temporary increase in labor supply shifts the labor supply curve out, or to the right. Because the increase is temporary rather than permanent, it affects current income but not future income.)