

**Econ 3070 Homework 2** (assigned March 5, Due March 12 at Noon). Total Points: 100  
You will be graded for stapling and for presentation (3 points)

1. Decide whether each of the following statements is true or false. Then explain your answer based on the Slutsky decomposition into income and substitution effects.
  - (a) “If both current and future consumption are normal goods, an increase in the interest rate will necessarily make the saver save more.” (7 points)
  - (b) “If both current and future consumption are normal goods, an increase in the interest rate will necessarily make the saver choose more consumption in the second period.” (7 points)
  
2. Nickelby has an income of \$ 2000 this year, and he expects an income of \$ 1100 next year. He can borrow and lend money at an interest rate of 10%. Consumption goods cost \$1 per unit this year and there is no inflation.
  - (a) What is the present value of Nickelby’s endowment? (3 points)
  - (b) What is the future value of his endowment? (3 points)
  - (c) Draw Nickelby’s budget line for consumption this year and next year. Label his endowment E on the budget line. (5 points)
  - (d) Nickelby’s utility function is  $U(c_1, c_2) = c_1 * c_2$ . At optimal choice, how much does he consume in each period? Label this point A on the budget line you drew in part (c). Is he a borrower or a saver? (7 points)
  - (e) Draw Nickelby’s new budget line on the same graph if the interest rate rises to 20%. Knowing that he chose point A at a 10% interest rate, even without knowing his utility function, you can determine that his new choice cannot be on certain parts of his new budget line. Draw a squiggly mark over the part of the new budget line where his choice *cannot* be. Clearly explain the intuition for the result. (6 points)
  
3. Larry has an income of \$20 in each period. He can borrow money at an interest rate of 200%, and he can lend money at an interest rate of 0%.
  - (a) Draw Larry’s budget set. (6 points)
  - (b) Larry could quit his job and take a different job that would leave him with  $m_1=30$  and  $m_2=15$ . He could still borrow or lend at the same rates of interest as above. Draw Larry’s budget set if he were to take the new job. (6 points)
  - (c) Would Larry be better off or worse off taking the new job? Or can’t one tell without knowing something about his preferences? Explain. (6 points)
  
4. Habit’s utility function is  $U(c_1, c_2) = \min\{c_1, c_2\}$  (i.e. the minimum of  $c_1$  or  $c_2$ ). The price of period 1 consumption is \$1 per unit. The interest rate is 21%. Habit earns \$2000 in period 1 and \$1100 in period 2.
  - (a) Write Habit’s budget constraint in terms of future value, assuming no inflation. (5 points)
  - (b) How many units does Harvey consume in the first period, and how much does he save? The answer could be a fraction. (7 points)
  - (c) Now suppose there’s 10% inflation between periods 1 and 2. Write down Habit’s budget equation given this new information. (7 points)

5. The Denver Broncos sign a new quarterback, Rudy. His contract is worth \$1,000,000, and will be paid in 5 installments of \$ 200,000 per year starting one installment today and the other four installments coming at the beginning of each year for the next four years.
  - (a) Rudy declares that he has become an “instant millionaire”. Rudy’s brother, a good economics student, explains to Rudy that this is incorrect – his contract is actually worth a lot less than a million dollars. Explain why his brother is correct. (4 points)
  - (b) If the interest rate is 10%, what is the present value of the million dollars Rudy will earn off of his contract? (6 points)
  - (c) Would Rudy prefer it if he were paid \$ 750,000 today instead of the five installments of \$ 200,000 each? (4 points)
  
6. The government is considering building a bridge at a cost of \$ 400,000 which will yield a stream of benefits to citizens valued at \$ 150,000 per year for the next four years (starting the same year that the cost is incurred to build the bridge). The interest rate is 5%. Does this bridge pass a benefit-cost test (i.e. are benefits greater than costs)? (8 points)