EC3333 Tutorial 5

1. Your mortgage has 25 years left, and has an APR of 7.625% with monthly payments of $1449.

   a. What is the outstanding balance (the present value of the remaining mortgage payments)?

   b. Suppose you cannot make the mortgage payment and you are in danger of losing your house to foreclosure. The bank has offered to renegotiate your loan. The bank expects to get $150,000 for the house if it forecloses. They will lower your payment as long as they will receive at least this amount (in present value terms). If current 25-year mortgage interest rates have dropped to 5% (APR), what is the lowest monthly payment you could make for the remaining life of your loan that would be attractive to the bank (to avoid foreclosure)?

2. You have an outstanding student loan with required payments of $500 per month for the next four years. The interest rate on the monthly compounding loan is 9% APR.

   a. Calculate the present value of your student loan.

   You are considering making an extra payment of $100 today (that is, you will pay an extra $100 today that you are not required to pay, on top of the $500 per month that you are required to pay).

   b. How does that reduce the present value of your loan?

   With this prepayment of $100 today, your last monthly payment at the end of year 4 will be reduced by an amount X, with the interim payments remaining at $500 per month.

   c. Write down the present value of the revised cash flows and use that to solve for the amount X that you can get with this prepayment of $100 today.

   d. Finally, calculate the effective rate of return (expressed as an APR with monthly compounding) you have earned on the $100 prepayment.

3. You are 25 years old and decide to start saving for your retirement. You plan to save $5000 at the end of each year (so the first deposit will be one year from now), and will make the last deposit when you retire at age 65. Suppose you earn 8% per year on your retirement savings.

   a. How much will you have saved for retirement at age 65?

   b. How much will you have saved at age 65 if you wait until age 35 to start saving (again, with your first deposit at the end of the year)?

4. A rich relative has bequeathed you a growing perpetuity. The first payment will occur in a year and will be $1000. Each year after that, on the anniversary of the last payment you will receive a payment that is 8% larger than the last payment. This pattern of payments will go on forever. If the interest rate is 12% per year,

   a. What is today's value of the bequest?

   b. What is the value of the bequest immediately after the first payment is made?

5. You are thinking of purchasing a house. The house costs $350,000. You have $50,000 in cash that you can use as a down payment on the house, but you need to borrow the rest of the purchase price. The bank is offering a 30-year mortgage that requires annual payments and has an interest rate of 7% per year. What will your annual payment be if you sign up for this mortgage?