RE 410: Real Estate Finance

Spring 2017

Homework 2 – Fixed Rate Mortgages

Due Date: Feb. 2nd, 2017

Problem 1

You get a fully amortizing $100,000 CPM loan at 6% annual interest rate for 25 years. The loan calls for monthly repayments in arrears – remember mortgage payments are due at the end of the period.

1. Compute the monthly debt service.
2. What are the interest and principal amortization components of the 1st payment?
3. What are the total amounts of principal and interest to be paid over the life of the loan if it is not prepaid?
4. What is the outstanding loan balance at the end of year 5?
5. What are the total amounts of interest and principal paid by the end of year 5?
6. Split the payment at the end of year 5 into interest expense and principal amortization.

Problem 2

A fully amortizing CPM loan is made for $150,000 at 5% interest rate for 20 years with monthly repayments.

1. Calculate the monthly debt service.
2. What will be the outstanding loan balance at the end of year 10 and how much total interest will have been paid on the loan by then?
3. If the borrower chooses to reduce the loan balance by $20,000 at the end of year 10, when will the loan be fully repaid if the borrower keeps paying the same amount every month as previously agreed?

Problem 3

A mortgage lender and a borrower agree on a $3,000,000 partially amortizing commercial mortgage loan for 10 years requiring equal annual repayments and a $1,500,000 balloon payment at loan maturity.

1. If the interest rate on the loan is 8% annually, what will be the periodic amount of debt service due?

2. If the borrower chooses to prepay the loan after 5 years, what will be the total payment due at the end of year 5?

Problem 4

A real estate investor wants to buy a property for $300,000 using an 80% LTV first-lien mortgage loan. A lender offers a 30-year fully amortizing CPM loan at 6% with monthly repayments. The loan requires the borrower to pay an origination fee of $5,000 upfront.
1. How much would the lender actually disburse?
2. What is the effective interest rate on the loan if the mortgage is paid off as originally scheduled?
3. If the investor prepays the loan at the end of year 5, what will be the effective interest rate? What explains the rate difference between questions 2 and 3?
4. Assuming the lender charges a 2% prepayment penalty on the outstanding loan balance, what will be the effective interest rate if the investor prepays the loan at the end of year 10?

Problem 5

A lender approves a $400,000 reverse mortgage loan against a house valued at $800,000. The loan calls for monthly fixed annuity payments to the borrower over 10 years at an annual accrual interest rate of 8%.
1. What will be the monthly annuity payment?
2. What will be the loan balance at the end of year 5?
3. Assuming that the borrower, with the bank's approval, draws $3,000 every month for the first 5 years, what will be the maximum fixed monthly amount he can draw during the remaining 5 years of the loan if the total loan amount is kept unchanged?

Problem 6

A borrower gets a fully amortizing constant amortization mortgage (CAM) for $200,000 at 12% annual interest rate for 15 years with monthly repayments.
1. Compute the first 6-month repayments, principal amortizations, and interest payments.
2. Redo the same calculations assuming the loan is a fully amortizing CPM, all else the same.
3. Which of the two amortization structures (CAM or CPM) would be riskier for the lender?
4. Which the two loan structures would provide a higher effective yield to the lender?

NB: Show calculations for partial credit.