Chapter 4

Fixed Rate Mortgage Loans

Mortgage Interest Rates

- Demand for mortgages is essentially derived demand; without a demand for real estate, the demand for mortgages would not exist.
- What will borrowers pay for the use of funds?
- What are lenders willing to accept for the use of funds?
- What alternative investments are available for the lender?

Components of the Mortgage Interest Rate

- Real Rate of Interest
  - Time Preference for Consumption
    - All things being equal, we would rather consume now.
    - Interest is compensation to delay a purchase
  - Production Opportunities in the Economy
    - Competition for funds when there are other investment opportunities
- Inflation Expectation
  - Directly impacts interest rates

Components of the Mortgage Interest Rate

- Default Risk
- Interest Rate Risk
  - Anticipated Inflation and Unanticipated Inflation
- Prepayment Risk
- Liquidity Risk
- Legislative Risk
  - Governments periodically change the “rules of the game”. As a lender, you take on the very real risk that the government may change the laws that permit you to collect on a legitimate debt after you have made the loan.

Components of the Mortgage Interest Rate

$$i_t = r_1 + p_1 + f_1$$

r_1 = Real Rate

p_1 = Risk Premiums

f_1 = Inflation Rate

Mortgage Loan Terms

- Loan amount
- Loan maturity date
- Interest rate
  - Nominal vs. real
- Periodic payments
  - Effective annual rate of interest
- Constant Payment Mortgage (CPM)

Loan Amortization Patterns

- Accrued Interest and Loan Payments
  - Accrual rate vs. pay rate

Type of CPM Loan	**Pay Rate**	**Loan Balance at Maturity**
Fully Amortizing	> Accrual rate	Fully repaid
Partially Amortizing	> Accrual rate	Not fully repaid
Interest Only	= Accrual rate	= Amount Borrowed
Negative Amortizing	< Accrual rate	> Amount Borrowed

Mortgage Payment Patterns

- Example 4-1
- Calculating the Payment for a CPM
  - $100,00 Mortgage
  - 7% Interest
  - 30 Years
  - Monthly Payments

Mortgage Payment Patterns

PV = $100,000

n = 30 x 12 = 360

FV = $0

i = 7/12 = .58333

(or change P/Y to 12 and enter 7)

CPT **PMT** = $665.30

Mortgage Payment Patterns

- Interest paid in the first month
  - (.07/12) x $100,000 = $583.33
- Principal paid in the first month
  - $665.30 - $583.33 = $81.96
- Every month, interest portion declines
- Every month, principal portion increases.

Computing a Loan Balance

- Essentially “removing” the interest that was built into the payment.
- Two mathematical methods
  - Compute the present value of the remaining payments.
  - Compute the future value of the amortized loan amount.

Computing a Loan Balance

- There are 3 methods to do this with a financial calculator
  - From Example 4-1, what is the future expected loan balance in 8 years?

Computing a Loan Balance
Present Value Method

PMT = $665.30

n = 22 x 12 = 264

FV = $0

i = 7/12 = .58333

CPT **PV** = $89,491

Computing a Loan Balance
Future Value Method

PV = $100,000

n = 8 x 12 = 96

PMT = $665.30

i = 7/12 = .58333

CPT **FV** = $89,491

Computing a Loan Balance
Amortization Function Method

- Step 1: Compute Payment = $665.30
- Step 2: Press **AMORT**

= P1 = 1 **ENTER** ↓

= P2 = 96 **ENTER** ↓

Balance = $89,491

Loan Closing Costs

- Loan Closing Costs
- Additional Finance Charges
  - Loan Origination Fees
    - Cover origination expenses
  - Loan Discount Fees – “Points”
    - Used to raise the yield on the loan
    - Borrower trade-off: points vs. contract rate
    - 1 Point = 1% of the loan amount

Loan Closing Costs

- Why Points?
  - Sticky mortgage rates
  - It's a way to price in the risk of a borrower
  - Early repayment of a loan does not allow recovery of origination costs. It's a way to cover the lender for the overhead of running its business.
  - Earn a profit on loans sold to investors at a yield equal to the loan interest rate.

Loan Fees & Borrowing Costs

- Calculating the effective interest cost
- Example 4-2:
  - $250,000 home
  - 80% LTV Loan
  - 8% Interest
  - 4 Points
  - 30 Years

Loan Fees & Borrowing Costs

- Step 1: Compute payment using the face value of the loan.

PV	= $200,000
n	= 360
i	= 8
PMT	= $1467.53

But, with points paid up front, the borrower actually receives less than the face value.

Loan Fees & Borrowing Costs

- Step 2:

Loan Amount = $200,000

- Points Paid = (.04 x $200,000)

Amount Received = $192,000

- Compute effective interest cost, using the Amount Received from Step 2 & Payment from Step 1.

Loan Fees & Borrowing Costs

- Compute effective interest cost:

PV $192,000

PMT $1467.53

n 360

CPT **i** 8.44%

Loan Fees & Borrowing Costs

- What is the effective cost if we think this loan might be repaid after 8 years?
  - Step 1: Compute PMT = $1467.53
  - Step 2: Compute Future Loan Balance

AMORT 1 = 1 **ENTER** ↓

P2 = 96 **ENTER** ↓

Balance = $182,035.40

Loan Fees & Borrowing Costs

– Step 3: Compute effective interest cost.

PV = ($192,000)

FV = $182,035.40

PMT = $1467.53

n = 96

CPT **i** = 8.72%

Truth-in-Lending

- Truth-in-Lending Act
- Annual Percentage Rate (“APR”)

Pricing FRMs

- By adjusting the fees that are charged, different effective rates of interest may be achieved.