

Knowledge questions.

Q 1. What is the difference between interest rate risk and default risk? How do ARMs affect the allocation of interest rate risk and default risk between borrowers and lenders? (15pt)

Interest rate risk is the risk that the interest rate will change at some time during the life of the loan so that prepayments are likely to take place when market interest rate falls. In such case, lenders will stand to lose because the initial high yield cannot be realized in a low interest rate environment. Default risk is the risk to the lender that the borrower will not carry out the full terms of the loan agreement. The fact that ARMs shift all or part of the interest rate risk to the borrower, the risk of default will generally increase to the lender, thereby reducing some of the benefits gained from shifting interest rate risk to borrowers.

Q 2. How do you think expense stops and CPI adjustments in leases affect the riskiness of the lease from the lessor's point of view? Please elaborate. (15pt)

There is less risk for the lessor with expense stops and CPI adjustments in leases.

CPI Adjustments: The risk of unexpected inflation is shifted to the lessee.

Expense Stops: The risk of increases in expenses is shifted to the lessee while allowing the lessor to retain the benefit of any decrease in expenses.

Calculation questions

Q 1. A partially amortizing loan for €90,000 for 10 years is made at 6 percent interest. The lender and borrower agree that payments will be monthly and that a balance of €20,000 will remain and be repaid at the end of year 10. Assuming 2 points are charged by the lender, what will be the yield to the lender if the loan is repaid at the end of year 4?

Monthly Payments $PMT(n, i, PV, FV) = €877.14$

Solution: $n = 10 \times 12$ or 120
 $i = 6\%/12$ or 0.50
 $PV = €90,000$
 $FV = -€20,000$

Solve for monthly payments:

$PMT = €877.14$

Step 1, Solve the loan balance if repaid in four years:

Solution:

$n = 4 \times 12$ or 48

$$i = 6\%/12 \text{ or } 0.50$$

$$PV = -€90,000$$

$$PMT = €877.14$$

Solve for the loan balance:

$$FV = €66,892.65$$

Step 2, Solve for the yield:

Solution:

$$n = 12 \times 4 \text{ or } 48$$

$$PMT = €877.14$$

$$PV = -€88,200^*$$

$$FV = €66,892.65$$

Solve for the *annual* yield:

$$i = i(n, PV, PMT, FV)$$

$$i = 6.64\%$$

$$* -€90,000 \times (100 - 2)\% = -€88,200$$

Q2. A building owner is evaluating the following alternatives for leasing space in an office building for the next five years:

Alternative 1. Net lease with steps. Rent will be €15 per square foot the first year and will increase by €1.50 per square foot each year until the end of the lease. All operating expenses will be paid by the tenant.

Alternative 2. Net lease with CPI adjustments. The rent will be €16 per square foot the first year. After the first year, the rent will be increased by the amount of any increase in the CPI. The CPI is expected to increase 3 percent per year.

Alternative 3. Gross lease. Rent will be €30 per square foot each year with the lessor responsible for payment of all operating expenses. Expenses are estimated to be €9 during the first year and increase by €1 per year thereafter.

Calculate the effective rent to the owner (after expenses) for each lease alternative using a 10 percent discount rate and determine which lease offer is the most attractive.

Discount rate

10.00%

I. Net Lease with Steps:

Year	1	2	3	4	5
Net Rent	€15.00	16.50	18.00	19.50	21.00
Present value		€67.15			
Effective rent		€17.72			

II. Net Lease with 100% CPI Adjustment:

Year	1	2	3	4	5
Exp. CPI		3.00%	3.00%	3.00%	3.00%
Net Rent	€16.00	16.48	16.97	17.48	18.01
Present value		€64.04			
Effective rent		€16.89			

III. Gross Lease

Year	1	2	3	4	5
Gross rent	€30.00	€30.00	€30.00	€30.00	€30.00
Less: expenses	€9.00	10.00	11.00	12.00	13.00
Net rent	21.00	20.00	19.00	18.00	17.00
Present value		€72.74			
Effective rent		€19.19			

III is the most attractive due to its high effective rent.

Q3. The NOI for a small income property is expected to be €150,000 for the first year. Financing will be based on a 1.2 DCR applied to the first year NOI, will have a 10 percent interest rate, and will be amortized over 20 years with monthly payments. The NOI will increase 3 percent per year after the first year. The investor expects to hold the property for five years. The resale price is estimated by applying a 9 percent terminal capitalization rate to the sixth-year NOI. Investors require a 12 percent rate of return on equity (equity yield rate) for this type of property.

- What is the present value of the equity interest in the property?
- What is the total present value of the property (mortgage and equity interests)?
- Based on your answer to part (b), what is the implied overall capitalization rate?

(a) Loan payment (PMT) = NOI / DCR = €150,000 / 1.2 = €125,000

Loan amount:

$PMT = €125,000/12; i = 10/12\%, n = 20 \times 12; FV = 0;$

Solve for PV

$PV = €1,079,423$

Solve for loan balance after 5 years:

$PMT = €125,000; i = 10/12\%, n = 5 \times 12; PV = €1,079,423;$

Solve for FV

$FV = €969,348$

Project NOI

<u>Year</u>	<u>NOI</u>	<u>PMT</u>	<u>Cash flow to equity</u>
1	€150,000	€125,000	€25,000
2	154,500	125,000	29,500
3	159,135	125,000	34,135
4	163,909	125,000	38,909
5	168,826	125,000	43,825
6	173,891		

Resale = $173,891 / .09 = €1,932,123$

Loan balance = 969,348

Cash flow from sale € 962,775

<u>Year</u>	<u>Cash flow to equity</u>
1	€25,000
2	29,500
3	34,135
4	38,909

5

43,825 + € 962,775

PV of Cash flow to equity at 12% = €666,035

(b) Total value = PV of cash flow to equity + loan amount
 Total value = €666,035 + €1,079,423
 Total value = €1,745,458

(c) Cap rate = NOI / Value
 = €150,000 / €1,745,458 = 8.59%

Q4. You are an employee of University Consultants, Ltd., and have been given the following assignment. You are to present an investment analysis of a new small residential income-producing property for sale to a potential investor. The asking price for the property is €1,250,000; rents are estimated at €200,000 during the first year and are expected to grow at 3 percent per year thereafter. Vacancies and collection losses are expected to be 10 percent of rents. Operating expenses will be 35 percent of effective gross income. A 70 percent loan can be obtained at 11 percent interest for 30 years. The property is expected to appreciate in value at 3 percent per year and is expected to be owned for five years and then sold.

What is the investor's expected before-tax internal rate of return on equity invested (BTIRR)?

See solution to problem 11-2.