



LISBON  
SCHOOL OF  
ECONOMICS &  
MANAGEMENT  
UNIVERSIDADE DE LISBOA

## Corporate Investment Appraisal

Masters in Finance

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### Problem Set 6: Cost of Capital & Capital Structure I

#### TO SOLVE IN CLASS

**1. Estimate the Equity Cost of Capital ( $r_E$ )**

Suppose that MCDONALD'S stock has a beta of 0.35. If the riskless interest rate is 4% and the expected return of the market portfolio is 9%, what is MCDONALD'S's cost of equity?

**2. Estimate the Cost of Debt ( $r_D$ )**

In mid-2009, Company XYZ had 5-year bonds outstanding in the market, with BBB rating and yield to maturity of 4.25%. If the annual probability of these bonds defaulting is 1.5%, and the expected loss in case of default is 40%, what is your estimate of the expected return for these bondholders?

**3. Estimate the Cost of Debt ( $r_D$ )**

In mid-2009, Company ZZZ had issued 5-year bonds, with rating CCC and yield to maturity of 17.5%. In the same period, US Treasury bonds with the same maturity had a yield of 3%. Suppose that the risk premium of the market portfolio is 5%, and that you are convinced that ZZZ's bonds have a beta of 0.3. If the expected loss in these bonds in case of default is 60%, what is the annual default probability consistent with the presented yield to maturity?

**4. Modigliani-Miller Proposition I and Homemade Leverage**

Suppose MM’s scenario of the 1958 article. Company ABC has no debt, and company XYZ has debt of 4000, for which it pays interest of 10% per year. Both companies have identical projects that generate annual free cash flows (FCFF) of 600 or of 1000. Both companies pay out all their net income as dividends.

- a) Fill the table showing how much shareholders and bondholders would receive in each scenario.

FCF	ABC		XYZ	
	Debt Payments	Equity Dividends	Debt Payments	Equity Dividends
\$600				
\$1,000				

- b) Suppose you hold 10% of ABC’s shares. What alternative portfolio could you hold in order to obtain the exact same cash flows?
- c) Suppose now that you hold 10% of XYZ’s shares. If you could get a loan at an annual rate of 10%, what alternative investment would deliver the same cash flows?

**5. Modigliani-Miller Proposition II**

HHH Enterprises is currently an unlevered firm, with an expected return of 10%. It considers a recapitalization through which the firm would get a loan to repurchase its own stock.

- a) Suppose HHH borrows so that its debt-equity ratio is 0.75. With this level of debt, the cost of debt would be 7%. What is the expected return for shareholders after this transaction?
- b) If however the debt-equity ratio reaches 1.50, debt will involve more risk and creditors will demand an annual return of 8%. What is the expected return to shareholders, in this case?

**6. Modigliani-Miller Proposition II**

Suppose that Microsoft has no debt and that its equity cost of capital is 9.5%. The average debt-to-value ratio in the software industry is 14%. What would Microsoft’s equity cost of capital be if it chose a level of debt similar to the industry average, with a cost of debt of 6%?

## 7. Modigliani-Miller Propositions I and II

MMM Corp. is a company with 10 million shares outstanding and debt with a market value of \$100 million. The current stock price is \$70. MMM's equity cost of capital is 8%. The company has just announced that it will issue \$300 million new debt. This amount will be used to retire current debt, and the remaining \$200 million will be spent in an immediate dividend. Assume perfect capital markets.

- a) Estimate the price of a share immediately after the announcement, but before the transaction is completed.
- b) What share price do you expect at the end of the transaction?
- c) Suppose that the current debt is risky, with an expected return of 4.5%, but that the new debt is riskier and involves an expected return of 5.25%. Estimate the equity cost of capital of MMM after the transaction.