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**Corporate Finance**

**Final Exam – Spring 2010/2011**

**2 hours**

This exam consists of 4 problems. This is a closed book exam. You are allowed one double-sided page of notes. Calculators are permitted. Good luck!

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**Problem 1**

A bond has a coupon rate of 5% (annual frequency), face value of 100, and 1.75 years to maturity. The term structure of interest rates (effective annual rates) is as follows:

|  |  |
| --- | --- |
| Spot rate 0.75 years | 2.5% |
| Forward rate 0.75 years – 1 year | 3.0% |
| Forward rate 1 year – 1.75 year | 3.4% |

1. What are the spot rates for 1 year and 1.75 years maturity?
2. What is the dirty price of the bond?
3. What is the clean price of the bond? Assuming the bond was issued at face value, what do you think has happened to the yield to maturity since then? Explain.

**Problem 2**

Samuel Massas is a well known businessman and is planning a new investment project. The project requires an initial investment in fixed assets of €40,000, which has an expected life of 4 years with straight line depreciation. There are also Working Capital Requirements corresponding to 10% of next year’s forecasted EBITDA. EBITDA is forecasted to be €14,000 in the first year, €18,000 in the following two years and €22,000 in year 4. In year 4, the project will have a salvage value after taxes of €5,000. The corporate tax rate is 25%. The industry has a debt-to-equity ratio of 2/3 and a levered beta of 1.5. Industry incumbents are able to borrow at risk-free rate of 5%. The expected dividend yield on the stock market is 3% and the sustainable growth rate is 7%.

1. What is the NPV if the initial investment is entirely financed by Massas’ equity?
2. What is the NPV if the target debt-to-equity is 1/3 and the cost of debt equals the risk-free rate?
3. What is the NPV if the project is financed with a bank loan of €20,000 at the risk-free rate to be paid in yearly installments during 4 years?

**Problem 3**

Consider the following two stocks:

|  |  |  |  |
| --- | --- | --- | --- |
|  | Expected Return | Standard Deviation | Beta |
| Stock A | 8.5% | 14% | 0.9 |
| Stock B | 9.5% | 28% | 1.1 |

The covariance between the returns on the two stocks is 0.02. Assume these securities are correctly priced according to the CAPM. The market Sharpe ratio is 0.4.

1. What is the expected return on the market and the risk-free rate?
2. What is the risk aversion coefficient of an investor with a quadratic utility and efficient portfolio with an expected return of 6.5%?
3. What is the expected return and standard deviation of the minimum variance portfolio if the investor wants to invest only in stock A and B? What is the idiosyncratic risk of the minimum variance portfolio?

**Problem 4**

Castro Inc. has one-year coupon bonds in its balance sheet with a face value of €30 million with a coupon rate of 6%. Due to the current market conditions, the company estimates that in the case of a recession (with a 30% probability) the company will not be able to pay its obligations leaving the company in a difficult financial situation. The projections for next year are as follows:

|  |  |  |
| --- | --- | --- |
|  | Recession | Expansion |
| Free cash flow | €10 million | €75 million |

The company has now the possibility to invest €10 million today in a project that will generate free cash flows of €20 million in the next year independent of the state of the economy. Castro’s current relationship bank has not accepted to lend the money for the project, so the management team is considering issuing new stock only to current shareholders.

1. What is the balance sheet (in market values) before and after the announcement of the project? Assume that the discount rate is zero, the company current cash holdings are zero and a one-year horizon.
2. Will the shareholders agree to invest in the project? Please justify.