

## 20029: Corporate Finance (Prof. Dr. Reichling)

**Please read the following instructions before you start to work on the exam.**

1. The exam consists of **four** problems. **All** have to be solved.
2. Please explain and justify your answers in a comprehensive manner.
3. Only a non-programmable calculator and unmarked English dictionaries are allowed.
4. You have 60 min. to work on the exam.

**Good luck!**

**Problem 1 (Performance Measurement) 25 points**

Consider the following (excess return) index-model regression results for stock *A* and *B*. The risk-free rate over the period was 6%, and the market's average return during the observation period was 14%. Annual data for 14 years is used.

	Stock A	Stock B
Index-model regression estimates	$1\% + 1.2(r_m - r_f)$	$2\% + 0.8(r_m - r_f)$
$R^2$	0.576	0.436
Standard deviation of the residual, $\sigma(\varepsilon_i)$	10.3%	19.1%
Standard deviation of excess return	21.6%	24.9%

- a) Compute the following statistics for each stock:
  - i) Jensen's alpha.
  - ii) Appraisal ratio.
  - iii) Sharpe measure.
  - iv) Treynor measure.
- b) Which stock is the best choice under the following circumstances? Only one stock can be chosen.
  - i) This is the only risky asset to be held by investor.
  - ii) This is one of many stocks that the investor is analyzing to form an actively managed stock portfolio.
  - iii) This stock will be mixed with the rest of investor's portfolio, currently composed solely of holdings in the market index fund.
- c) What does the term  $R^2$  mentioned in the regression results mean?
- d) Conventional wisdom says that one should measure a manager's investment performance over an entire market cycle. How should the term market cycle be interpreted in this context? Do you agree or disagree? Please comment.

**Problem 2 (Company Valuation - DCF Method) 10 points**

In 1985, General Motors (GM), the world's second-largest automaker after Toyota, was evaluating the acquisition of Hughes Aircraft Corporation, a major aerospace and defense company. GM was planning to make a cash tender offer for all of the outstanding shares of Hughes Aircraft Corp and needed to determine the maximum price it could offer for the

shares of Hughes Aircraft Corp. Compute the fair value of Hughes Aircraft Corp equity using the free cash flow approach.

(Hint: Future cash flows are expected to grow at a constant rate forever  $PV_0 = CF_1/(r - g)$ ).

	GM	Hughes Aircraft Corp
Leverage ratio ( $D/E$ )	0.4	1
Equity beta	1.2	0.95
Assets beta	0.8	0.57
Unlevered cash flows	\$2,500 mill	\$300 mill
Growth rate of unlevered cash flows	2%	5%
Corporate tax rate ( $T_C$ )	34%	34%
Return on debt	6.8%	9.14%
Risk-free rate = 8%		
Return on the market portfolio = 14%		

**Problem 3 (Company Valuation - MM Proposition) 9 points**

The firms U and L belong to the same risk category and produce the same EBIT. Assume a perfect capital market with no taxes.

	Firm U	Firm L
EBIT	150,000€	150,000€
Debt (market value)	0	700,000€
Interest rate		10%
Equity (market value)	1,000,000€	500,000€

- Show how you can generate arbitrage profit today.
- What can you conclude regarding the importance of financial decisions?

**Problem 4 (General Questions) 16 points**

- The CAPM implies that the most efficient way to take risk is to borrow money and invest it in the market portfolio. Why, if you want to take a lot of risk, is it not efficient to invest in a portfolio of the riskiest stocks in the market?
- Two classic CAPM tests are the study by Black et al. (1972) and the study by Fama & MacBeth (1973). They used the following equations

$$r_{it} = \alpha_i + \beta_i \cdot r_{Mt} + \varepsilon_{it}$$

$$\hat{r}_i = \gamma_0 + \gamma_1 \cdot \hat{\beta}_i + \eta_i$$

Discuss the basic research designs of the two studies.

- Show graphically on the security market line (SML) the selectivity, the diversification component and
  - the positive net selectivity,
  - the negative net selectivity.
- When it is necessary to use after-tax WACC for company/project valuation? Why?
- How can you find the optimal level of leverage? Consider the advantages and disadvantages of debt.