**Vrije Universiteit Amsterdam**
**Faculty Economics and**
**Business Administration**

**Exam Corporate Finance 4.2**
**20 December 2006, 12:00 – 14:45**

Grades will be announced on: Wednesday 17 January 2006

Review opportunity next day: Thursday 18 January 2006, 16.00

1. This re-exam will take 2 hours and 45 minutes

2. This exam consists of 14 pages (including this front page). Please check!

3. Write your name and student number on the top of this page.

4. Answer the questions in the designated area below the questions.

5. All answers need to be motivated.

6. Only the use of a calculator *without computer memory !* is permitted

7. Maximum credits per exercise, out of a total of 100 (provided unexpected circumstances)

| Exercise: | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| Credits: | 25 | 25 | 30 | 20 |

**Exercise 1**

Berend Inc is a publicly-listed company. The capital structure exists of 10,000,000 shares and 600,000 convertibles. No dividends or coupons are paid. There is no other debt or equity.

The shares have a face value of € 10.

The convertibles have a face value of € 1,000 each.
The maturity date of this loan is January,1 2007.
Bond holders will have the right to convert one bond into 50 shares Berend Inc. until January 1 2007.

**Question 1a**
Graph the value of the shares of Berend Inc. as a function of the value of the firm at January 1st 2007, the end of the time to maturity of the convertible.

**Question 1b**
Graph the value of the convertibles of Berend Inc. as a function of the value of the firm at January 1st 2007, the end of the time to maturity of the convertible.

Use the following symbols
E = the value of the equity;
CO = the value of the convertible loan;
N(CO) = the face value of the convertible loan;
V = the value of the company.

**Question 1c**
Use a mathematical equation to express the value of the equity in terms of the value of the firm and/or the value of one or more call options.

**Question 1d**
Use a mathematical equation to express the value of the convertible loan in terms of the value of the firm and/or the value of one or more call options.

In contrast of the information above assume that Berend Inc has not only the above mentioned shares and convertibles, but also 500,000 non-convertible bonds. These non-convertible bonds have a face value of € 1,000 each. The maturity date of these non-convertible bonds is January,1 2007. The non-convertible bonds are zero-coupon bonds.

**Question 1e**
Graph the value of the shares of Berend Inc. as a function of the value of the firm at January 1st 2007, the end of the time to maturity of the convertible.

**Question 1f**
Graph the value of the convertibles of Berend Inc. as a function of the value of the firm at January 1st 2007, the end of the time to maturity of the convertible in the case the convertibles are *not* subordinated to the non-convertble bonds.

**Question 1g**

Graph the value of the convertibles of Berend Inc. as a function of the value of the firm at January 1st 2007, the end of the time to maturity of the convertible in the case the convertibles are subordinated to the non-convertble bonds.

**Question 2**

On Jan 1, 2006 an investor bought a bond, issued by Jones Ltd. The bond has a face value of € 1,000 and a coupon interest rate of 6%. Interest rate payments will take place at the beginning of every year. The bond is of the bullet type and will be redeemed in one go at Jan 1, 2011.
Suppose that the market interest rate as of Jan 1, 2006 is 5%.

**Question 2a**

Compute the value of a Jones bond as of Jan 1, 2006.

**Question 2b**

Compute the duration of this bond loan.

Assume now that the market interest rate decreases from 5% to 4.4% as of Jan 1, 2006.

**Question 2c**

Give an indication of the change in market value of the bond (as a result of the change in market interest rates) using the duration computed in question 2b.

**Question 2d**

Give an indication of the change in market value of the bond (as a result of the change in market interest rates) using the *modified* duration.

**Exercise 3 Capital structure**

**Question 3a**

Prove that the value of a company equals $V^U + TB$ in a Modigliani and Miller framework with corporate tax ($V^U$ is the value of the company if it is financed with 100% equity, corporate tax rate is T and B is the market value of debt).

**Question 3b**

This question is a follow up question of 3a. If an investors faces interest rate tax and capital gain tax the value of a company V equals

$$V = V^U + (1 - \frac{(1-T)(1-T_g)}{(1-T_I)})B$$

T = corporate tax rate, $T_I$ = interest tax rate for the investor, $T_g$ is capital gain tax rate for the investor.

In which situation is the debt equity ratio irrelevant? Explain in words what happens in this special situation.

**Question 3c**

Sketch in a graph the cost of equity, cost of debt and WACC as a function of debt/equity ratio for three situations

I when all MM assumptions hold.

II when all MM assumptions hold and the company pays corporate tax.

III when companies both faces corporate tax costs and distress costs (no income tax).

**Question 3d**

- What is the fundamental difference between the static trade off theory and the pecking order theory?

- Which of these two theories is more closely linked to the Modigliani en Miller capital structure theories?

**Question 3e**

Mention three ways how corporate credit risk of a company is assessed in practice.

**Question 3f**

Two opposite views can be formulated on the impact of the debt-holder – equity holder conflict on the level of corporate investment. Describe these two views.

**Question 3g**

How can firms minimize debt-holder – equity holder incentive problems? Describe five ways.

**Question 3h**

How can the capital structure choice influence the level of competition in the business?

## Exercise 4 Risk Management and executive compensation

### Question 4a

How can corporate risk management add value for the shareholder?

### Question 4b

How can a company create value by management of risk? Give an answer for each of these five risk types: hazard, treasury, finance, operational and strategic risk.

**Question 4c**

How can hedging of corporate treasury risks reduce the agency costs resulting from a conflict between the shareholder and the debt holder?

**Question 4d**

Discuss the choice between stock-based compensation and earnings-based compensation.

**Question 4e**

Discuss the relationship between company performance and executive compensation.