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of Economics and Management

Advanced Corporate Finance
Exercises Session 1
« Pre-requisites: a reminder»

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Organization

- Course Material:
  - http://homepages.ulb.ac.be/~koosterl/GESTS410.html (Theory + Exercises)
  - Reference Books:
    - **David Hillier, Stephen Ross, Jeffrey Jaffe, Randolph Westerfield, (2013), Corporate Finance European edition, 2nd edition.**
    - Berk, J. and P. DeMarzo, (2013), *Corporate Finance, 3rd ed.*
    - Pearson, Bodie Zvi, Kane Alex, Marcus Alan J., (2011), *Investments and Portfolio Management, Global Edition*, McGraw Hill,
    - Brealey, R., Myers, S. and Allen, F. (2008), *Principle Corporate Finance,* 9th ed., McGraw-Hill,

- Exercises Agenda:
  - 6 Sessions (5 Exercises + 1 Past Exam)

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Session 1: A reminder

« Time value of Money, annuities »

« Bond & Equity Valuation »

« CAPM & Beta »

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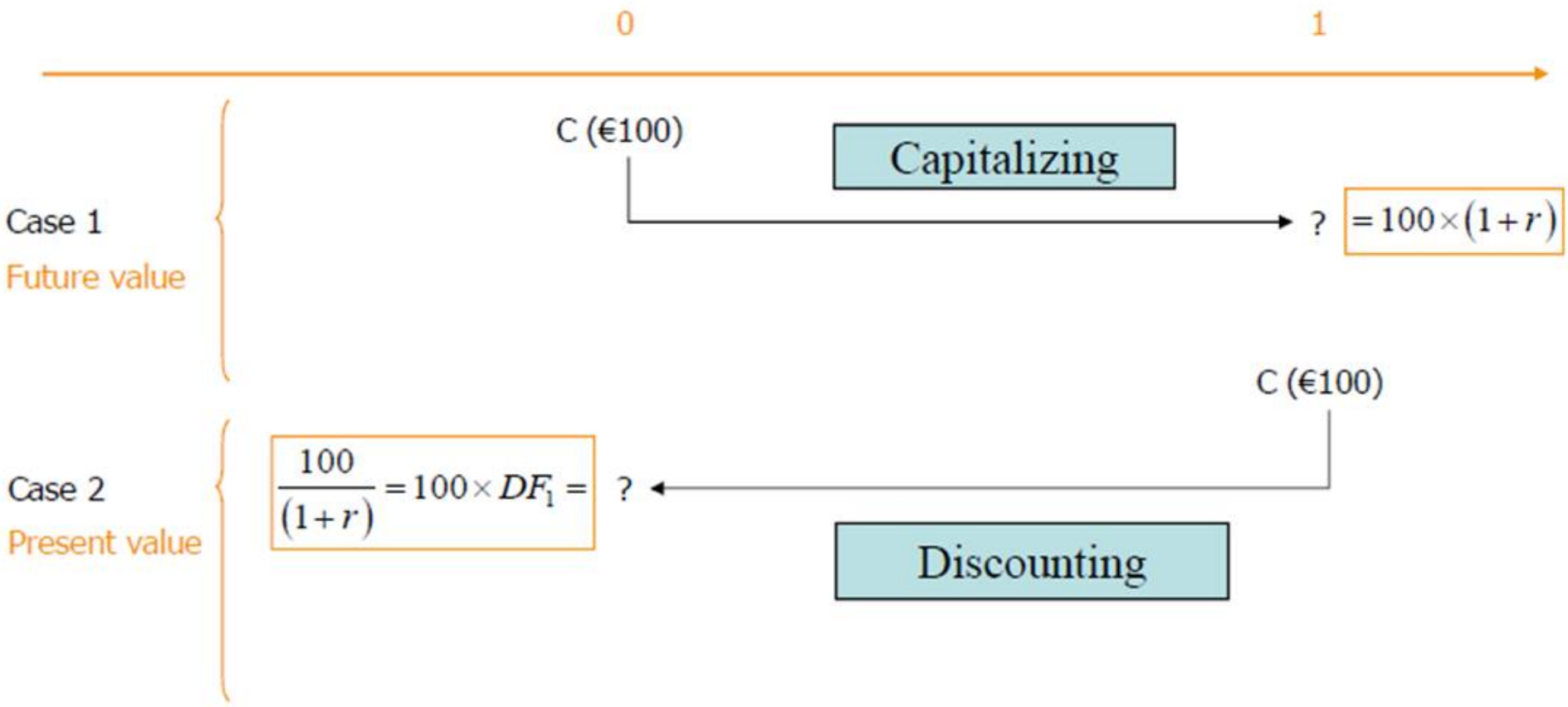
« Time value of Money, annuities »

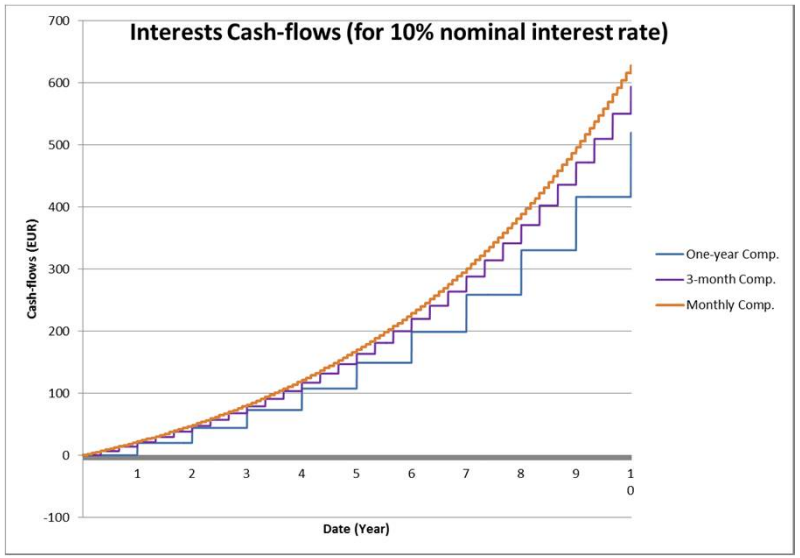


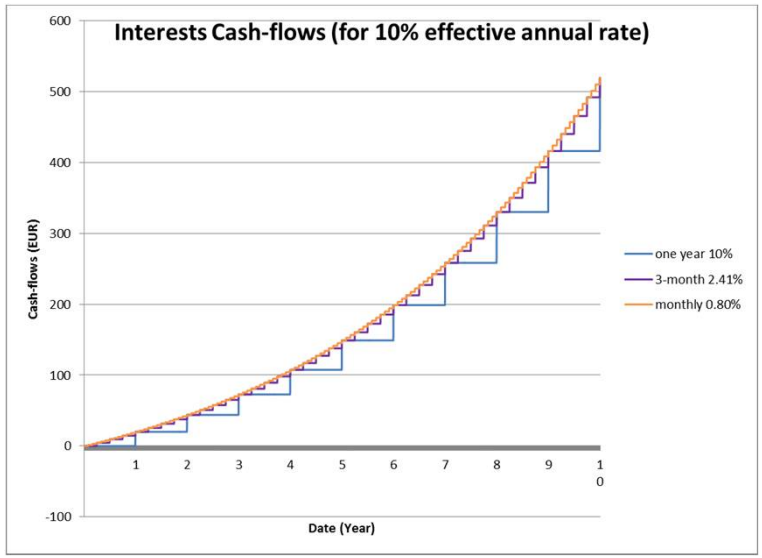
Bond and Equity Valuation

Shortcut formulas

- Constant perpetuity ($t = 1 \rightarrow \infty$): $C_t = C$ $\quad PV = \frac{C}{r}$
- Growing perpetuity ($t = 1 \rightarrow \infty$): $C_t = C_{t-1} * (1 + g)$ $\quad PV = \frac{C_1}{r-g}$
- Constant annuity ($t = 1 \rightarrow T$): $C_t = C$ $\quad PV = \frac{C}{r} * \left(1 - \frac{1}{(1+r)^T}\right)$
- Growing annuity ($t = 1 \rightarrow T$): $C_t = C_{t-1} * (1 + g)$ $\quad PV = \frac{C_1}{r-g} * \left(\frac{(1+g)^T}{(1+r)^T}\right)$

Compounding Interest Rates





Compounding Interest rate

- $1 + r_{yearly} = (1 + r_{\frac{year}{n}})^n$
- $1 + r_{yearly} = e^{r_{cont}}$

Time value of money, annuities Q1

- Ability to repay = 1500 €/month
- Monthly rate= 0,3% per month (for 30-year horizon)

- How much are you able to borrow today?

Time value of money, annuities
Q1 Buying a house

- Constant Annuity
- $PV = \frac{C}{r} * \left(1 - \frac{1}{(1+r)^T}\right)$
- Solving with:
  - C=1500€
  - r = 0,3%
  - T=12*30=360

- PV=329.927,5€

Time value of money, annuities
Q2 Debating with your brother

- Your bank rate: 0,3% /month
- Your brother suggestion: 3,6% / year

- Should you do so?
- What is the yearly equivalent of 0,3%/month?
- How much can you borrow with your brother's rate?

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Time value of money, annuities
Q2 Debating with your brother

- *Should you change bank?*
  - $1 + r_{yearly} = (1 + r_{\frac{year}{n}})^n$
  - Solving for:
    - n=12
    - $r_{\frac{year}{n}}$=0,3%
  - r_{yearly}= 3,66% > 3,6%
- How much can you borrow now?
  - Solving for
    - r_{yearly}=3,6%
    - n=12
  - $r_{\frac{year}{n}}$=0,295% => using the constant annuity formula, PV= 332.307,9€

Time value of money, annuities
Q3 Continuous rate

- *What is the quarterly equivalent of a continuous rate of 3%?*
  - $1 + r_{yearly} = e^{r_{cont}}$
  - $1 + r_{yearly} = (1 + r_{\frac{year}{n}})^{n}$
  - $r_{yearly} = 3{,}05\%$
  - $r_{\frac{year}{n}} = 0{,}75\%$

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« Time value of Money, annuities »

« Bond & Equity Valuation »

« CAPM & Beta »

Bond & Equity Valuation
Q4 Tongolville

- Existing bonds:
  - Bond 1:
    - FV: 5.000.000$
    - Coupon: 5%
    - Maturity: Perpetuity
    - Price: 95% of par
  - Bond 2:
    - FV: 1.000.000$
    - Coupon: 4%
    - Maturity: 5 years
    - Prices: traded at par

- What are their YTM?
- What would be the rate of bond 3?
- What is the new bond price

Bond and Equity Valuation
Q4 YTM

- Yield to maturity (YTM) is the Discount rate at which the sum of the future cash flows = the price of the bond

- $Price = \sum_{t=1}^{T} \frac{C_t}{(1+YTM)^t} + \frac{FV}{(1+YTM)^T}$

- Bond 1:perpetuity => $Price = \frac{C}{YTM}$ => YTM = 5,26%
- Bond 2 is traded at par => YTM = coupon rate = 4,00%

- The issue of Bond 3 is not affecting the rating of the company => its YTM is the same as Bond 2

Bond and Equity Valuation
Q4 New bond price

- One year later the company can borrow at 3,5%. What is the new bond price?
- $Price = \sum_{t}^{T} \frac{C_t}{(1+r)^t} + \frac{FV}{(1+r)^T}$
- Solving for:
  - C_t=4€
  - r=3,5%
  - FV=100€
  - T=4
- Price=101,84€

Bond and Equity Valuation
Q5-1&2 Total

- DDM value in 2007?
  - Dividend (2008)=2,1€
  - ROE=16%
  - Payout ratio=50%
  - Expected return for levered shares=9%

- Under DDM: $Price = \frac{Dividend}{(r_e - g)}$
- g=ROE*Retention rate
- Solving for
  - Div=2,1€
  - r_e=9%
  - g=8%
- Price=210 => not realistic

Bond and Equity Valuation
Q5-3&4 Total

- Historical dividend growth rate=4%
- Expected return are more likely to be worth 8%
- Under DDM: $Price = \frac{Dividend}{(r_e - g)}$
- Solving for
  - Div=2,1€
  - r_e=8%
  - g=4%
- Price=52,5 => looks more like 2007 price
- Can the dividend be paid out of earnings? YES

Period	Share price
2007	58
2010 & 2011	46
July 2011	32
Jan 2012	42

Core figures	2011	2012	2013
EPS	4,64	5,17	5,34
DPS	2,310	2,300	2,360
Ev/Ebitda	3,91	3,3	3,24
Adj P/E	8,35	7,49	7,25
Divi yield	5,96	5,94	6,09

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CAPM & Beta
Q6-a Analyze the stock exchange

- If you were to invest in only one security which one would you never pick?

	Vinamelk	Vinawine	Vinacoff	VinaT
Expected return (r_e)	**8%**	**12%**	**13%**	**14%**
σ_e	**20%**	**27%**	**26%**	**35%**

CAPM & Beta
Q6-a & b Analyze the stock exchange

- Vinawine is inefficient: more risk for a lower return than vinacoff

- To compare different stocks based on return and variance => Build Sharpe Ratios

	Vinamelk	Vinawine	Vinacoff	VinaT
re	8%	12%	13%	14%
sigma e	20%	27%	26%	35%
Sharpe ratio	**0,10**	**0,22**	**0,27**	**0,23**

CAPM & Beta
Q6-c Analyze the stock exchange

- $Return_{pf} = \sum_{i=1}^{I} Weight_i * Return_i$
- Solve for:
  - $w_1=w_2=0,5$
  - $r_1=6\%$
  - $r_2=13\%$
- Return of portfolio=9,5%

- How to have a portfolio expected return of 14%?
- Solve for:
  - $w_1+w_2=1$
  - $r_1=6\%$
  - $r_2=13\%$
  - $r_{pf}=14\%$
- $w_1=-0,14$ $w_2=1,14$

CAPM & Beta
Q6-d

- *Intuitively, why would you want to invest in the market portfolio?*
- r_m=15%
- σ_m=30%

- Show that it is possible to obtain the same expected return as above for a lower risk.
- $Return_{pf} = \sum_{i=1}^{I} Weight_i * Return_i$
- Solve for:
  - $w_1+w_2=1$
  - r_1=6%
  - r_2=15%
  - r_{pf}=14%
- $w_{1=}$11% w_2=89%

CAPM & Beta
Q6-d

$$\sigma_{pf} = \sqrt{\sum_{i=1}^{I} w_i^2 * \sigma_i^2 + \sum_{i=1}^{I} \sum_{j \neq i}^{J} w_i w_j \sigma_i \sigma_j \rho_{ij}}$$

σ_{pf1} (rf bond + vinacoff)

- Solve for:
  - w_1=-14%
  - w_2=114%
  - σ_1=0%
  - σ_2=26%
  - r_1=6%
  - r_2=13%
  - ρ_{ij}=0
- σ_{pf}=29,71%

σ_{pf2} (rf bond + mkt pf)

- Solve for:
  - w_1=11%
  - w_2=89%
  - σ_1=0%
  - σ_2=30%
  - r_1=6%
  - r_2=15%
  - ρ_{ij}=0
- σ_{pf}=27%

CAPM & Beta
Q6-e

CAPM

$$r_i = r_f + \beta_i * (r_m - r_f)$$

a) What does the Beta represent?
« The expected percent change in the excess return of the market portfolio »

b) What is the Beta of the market pf?
1!

c) What are the Beta of the different companies?

	Vinamelk	Vinawine	Vinacoff	VinaT
Beta	0,22	0,67	0,78	0,89

d) What is the Beta of the portfolio previously made?
0,89