EFOP-3.4.3-16-2016-00014

# Complexities on the Capital Market

Written by: Dr. habil. Gábor Dávid KISS, PhD

Methodological expert: Edit GYÁFRÁS

This teaching material was compiled at the University of Szeged and is supported by the European Union. Project identity number: EFOP-3.4.3-16-2016-00014

University of Szeged

Faculty of Economics and Business Administration

2019

**Szegedi Tudományegyetem**
**Cím: 6720 Szeged, Dugonics tér 13.**
**www.u-szeged.hu**
**www.szechenyi2020.hu**

# Content

# Foreword

This book was written to support the lecture material within the *Complexities on the Capital Market* course for students of the Business Administration and Management BSc Programme **with basic financial knowledge** – namely students who already completed the *Introduction to Finance* and *Corporate Finance* courses. Therefore the reader must utilize their basic knowledge within the field of financial corporate management and **case study** solving.

The chapters are structured to first introduce the case study which will be solved during the semester from the following aspects: reorganisation, valuation, taxation, financial stress, exchange rate exposure as well as long- and short term funding.

All main chapters start out with and exercise to orient the reader, followed by the related theoretical background. This is later followed by some sample solutions and a guide to help the script writing in **Matlab** for optimization purposes. Each theoretical section ends with the lists of essential literature.

This learning material improves the **competencies** of an economist studying in the Business Administration and Management BSc programme in the following ways:

a) regarding knowledge, the student has a clear idea of the basic concepts and methods of founding institutions along with managing and altering their structure and organisational behaviour. The student is familiar with the relationships of national and international economies, relevant economic actors, functions and processes;

b) regarding competencies, the student is capable of planning, organising, leading and overseeing economic activities, projects, minor enterprises and economic organisations. The student can make informed decisions in connection with routine and partially unfamiliar issues both in domestic and international settings;

c) regarding attitude, the student is sensitive to the changes occuring to the wider economic and social circumstances of his/her job, workplace or enterprise. The student tries to follow and understand these changes;

d) regarding autonomy and responsibility, the student takes responsibility for his/her work and behaviour from all professional, legal and ethical aspects in connection with keeping the accepted norms and rules.

# I. Case study

How to solve a case study?

1. Have an overview of the case
2. "the Business Problem" - what has happened (key issues)
   - who, what, where, and when;
   - outcomes they would most hope to see for the company;
   - students are Consultants;
   - quantify the desired results.
3. Determine the causes, rank the critical problems/issues
   - interdependent - interconnected issues;
   - time dimension;
   - symptoms of larger or deeper problems.

All assignments are based on the teamwork of 3-4 students. Tasks are defined at the end of each exercise and the teams have 1 week to upload their solution on Coospace. Each submission can be evaluated according to the elaborateness of the idea, the numerical punctuality and the overall presentation of the suggestions.

## 1. About the company

Today is January 1, 2015.

Flatland Trans is a public traded company on the Hungarian Stock Exchange, the denomination in its records and reports is Hungarian Forint (HUF). To get an operation license and rolling stock, a Czech (Pandave a.s.) and an Austrian (Wraith AG) subsidiary was acquired many years ago after the liberalization of freight rail transport in the new member states after 2004. The company focuses on rail traction services: they are responsible for the traction of a daily Bremen-Csepel container freight train between Cheb (Czech-German border crossing) and Budapest. The previous CEO of this company signed this contract at the end of 2014 for 11.07 million euro/year. The pre-tax margin (pre-tax profit / revenues) was 0.0006 at 315 EUR/HUF, which is close to the industrial average (ground freight and logistics weighted average 0.3 in the last 5 years[1]) but the owners were not impressed and so you *have to work out a proposal to improve this profitability ratio*.

Profitability can be increased via the reduction of expenditures and currency fluctuations.

## 2. Revenues – traction for a daily freight train

The company's locomotives are pulling a freight train between Budapest and Cheb (CZ) every day (360 days in a year). This train consists of 29 Rgs container-carriage, 1708 tons at full load. Electric systems and train safety systems are different in Czech Republic, Austria and Hungary – in northern Czech Republic there is 3000 V DC (Cheb-Nedakonice), in southern Czech Republic there is 25000 V AC (Nedakonice-Breclav) as well as in Hungary (Hegyeshalom-Budapest), but in Austria there is 15000 V 16.7 Hz AC (Breclav-Hegyeshalom). These differences require the usage of four different traditional electric locomotives with local personnel. The company purchased a Vossloh Euro 4000 diesel engine to overcome these problems, but it requires the following time for transportation:

- Hungarian lines: 370km (3.08 hours)
- Austrian lines: 266km (2.21 hours)
- Czech lines: 1162km (10.2 hours)

The rail lines have the following characteristics in distance, electricity, fees, time and energy consumption:

[1] http://www.reuters.com/sectors/industries/rankings?industryCode=67&view=profitMargins

| | currency | distance (km) | speed (km/h) | gross weight (t) | fee/km | gross tonnkm fee | km fee to pay | gross tonnkm fee to pay | time (h) | fuel (l) | fuel price in HUF |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Cheb-Plzen hl.n. | CZK | 107 | 110 | 1831 | 36,1 | 0,04923 | 3862,7 | 9644,994 | 0,97 | 957 | 370422 |
| Plzen hl.n.-Beroun | CZK | 72 | 100 | 1831 | 36,1 | 0,04923 | 2599,2 | 6490,089 | 0,72 | 708 | 274182 |
| Praha-Beroun | CZK | 38 | 100 | 1831 | 36,1 | 0,04923 | 1371,8 | 3425,325 | 0,38 | 374 | 144707 |
| Česká Trebová os.n.-Praha | CZK | 160 | 120 | 1831 | 36,1 | 0,04923 | 5776 | 14422,42 | 1,33 | 1312 | 507744 |
| Pferov-Česká Trebová os.n. | CZK | 110 | 120 | 1831 | 36,1 | 0,04923 | 3971 | 9915,414 | 0,92 | 902 | 349074 |
| Nedakonice-Pferov | CZK | 46 | 120 | 1831 | 36,1 | 0,04923 | 1660,6 | 4146,446 | 0,38 | 377 | 145976 |
| Breclav-Nedakonice | CZK | 48 | 120 | 1831 | 36,1 | 0,04923 | 1732,8 | 4326,726 | 0,40 | 394 | 152323 |
| Wien-Breclav | EUR | 66 | 120 | 1831 | 1,3335 | 0,001244 | 88,011 | 150,3324 | 0,55 | 541 | 209444 |
| Wien-Hegyeshalom | EUR | 67 | 120 | 1831 | 1,3335 | 0,001244 | 89,3445 | 152,6102 | 0,56 | 549 | 212618 |
| Hegyeshalom-Budapest | HUF | 185 | 120 | 1831 | 448 | 0,23 | 82880 | 77909,05 | 1,54 | 1517 | 587079 |
| Hegyeshalom-Budapest | HUF | 185 | 120 | 1831 | 448 | 0,23 | 82880 | 77909,05 | 1,54 | 1517 | 587079 |
| Wien-Hegyeshalom | EUR | 67 | 120 | 1831 | 1,3335 | 0,001244 | 89,3445 | 152,6102 | 0,56 | 549 | 212618 |
| Wien-Breclav | EUR | 66 | 120 | 1831 | 1,3335 | 0,001244 | 88,011 | 150,3324 | 0,55 | 541 | 209444 |
| Breclav-Nedakonice | CZK | 48 | 120 | 1831 | 36,1 | 0,04923 | 1732,8 | 4326,726 | 0,40 | 394 | 152323 |
| Nedakonice-Pferov | CZK | 46 | 120 | 1831 | 36,1 | 0,04923 | 1660,6 | 4146,446 | 0,38 | 377 | 145976 |
| Pferov-Česká Trebová os.n. | CZK | 110 | 120 | 1831 | 36,1 | 0,04923 | 3971 | 9915,414 | 0,92 | 902 | 349074 |
| Česká Trebová os.n.-Praha | CZK | 160 | 120 | 1831 | 36,1 | 0,04923 | 5776 | 14422,42 | 1,33 | 1312 | 507744 |
| Praha-Beroun | CZK | 38 | 100 | 1831 | 36,1 | 0,04923 | 1371,8 | 3425,325 | 0,38 | 374 | 144707 |
| Plzen hl.n.-Beroun | CZK | 72 | 100 | 1831 | 36,1 | 0,04923 | 2599,2 | 6490,089 | 0,72 | 708 | 274182 |
| Cheb-Plzen hl.n. | CZK | 107 | 110 | 1831 | 36,1 | 0,04923 | 3862,7 | 9644,994 | 0,97 | 957 | 370422 |

*Source:* OEBB, VPE, SZDC

## 3. Prices and fees

Due to the temporary effect of deflation and fall of energy prices, expenditures are low for the enterprise:

| | |
|---|---|
| EUR/USD | 1.13 |
| EUR/HUF | 315 |
| EUR/CZK | 27.6 |
| CZK/HUF | 11.4 |
| diesel fuel from MÁV (HUF/l) | 387 |
| 12 month BUBOR benchmark interest rate | 2.11% |
| 12 month EURIBOR benchmark interest rate | 0.263% |
| 12 month USD LIBOR benchmark interest rate | 0.6315% |

*Source: STOOQ.com, MNB, ECB, EIA[2], VPE*

The company have to pay the following fee for using international railway lines:

| Country | fee of distance (km)* | fee of weight (gross ton km) | Traction electricity (/kWh) |
|---|---|---|---|
| Hungary (HUF) | 448 | 0.23 | 24.63 |
| Austria (EUR) | 1.3335 | 0.001244 | 0.1292 |
| Czech Republic (CZK) | 36.1 | 0.04923 | 1.82 |

*Source*: VPE[3], ÖBB Infrastruktur[4], SZDC[5]

[2] http://www.ksh.hu/docs/hun/xstadat/xstadat_eves/i_qsf003b.html
http://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=pet&s=eer_epd2dc_pf4_y05la_dpg&f=d
[3]https://www2.vpe.hu/document/3332/H%C3%9CSZ%202014-2015%2017.%20sz.%20m%C3%B3dos%C3%ADt%C3%A1s_T%C3%B6rzssz%C3%B6veg.zip

# 4. Balance sheet

### *a) Assets*

The entire company group has the following significant items in the balance sheet: 1752,75m HUF

**Fixed Assets (1090.75 million HUF)**

*Ownership in another companies– 490 million HUF*

The Czech subsidiary was purchased for 1 000 000 EUR in 2004 while the Austrian for 1 000 000 EUR at the same time.

*Rolling stock, locomotives* – 759.5mHUF *[actual market value:* 379.75 *million HUF]*

The Hungarian parent company has a Vossloh Euro 4000 diesel locomotive with ETCS train safety system. The top speed of this vehicle is 120km/h only, while its traction power is half of its electric counterparties. The amortization is calculated for 20 years and linear.

- Vossloh Euro 4000 purchasing value (2004): 3 100 000 euro, 759.5mHUF, Amortization: 379.75mHUF (37.975mHUF/year)

*How to rationalize rolling stock*

You can manage different electricity standards with four or three traditional locomotives or you can operate with now multiple-electricity locomotives which can handle different standards as well.

Our current rolling stock can be sold for their bookkeeping value (purchasing value - depreciation).

| name | Vossloh Euro 4000 | Siemens Vectron | Škoda 109E | Softronic Transmontana |
|---|---|---|---|---|
| year of production/renew | 2006 | 2010 | 2008 | 2015 |
| diesel | 1 | 0 | 0 | 0 |
| 25kV AC | 0 | 1 | 1 | 1 |
| 15kV AC | 0 | 1 | 1 | 1 |
| 3kV DC | 0 | 1 | 1 | 1 |
| v Max (km/h) | 120 | 160 | 160 | 160 |
| weight (t) | 123 | 87 | 86 | 120 |
| length (m) | 23 | 19 | 18 | 18 |
| power (kW) | 3178 | 6400 | 6400 | 6000 |
| fuel consumption l/hours | 984 | 0 | 0 | 0 |
| No of axes | 6 | 4 | 4 | 6 |
| price (thousand EUR) | 3100 | 4000 | 2800 | 2600 |
| yearly maintenance as % of price | 0,05 | 0,025 | 0,04 | 0,05 |
| regained electricity at slowing down (% of energy consumption) | 0 | 0,35 | 0,3 | 0,2 |

*Real estates – 112 million HUF, 0 EUR, 9,6 million CZK [market value:* ***221*** *million HUF]*

Szolnok (80+80 million HUF, amortization: 48 million HUF, market value: 112m HUF)

The HQ is in Szolnok, a land was purchased in 2004 for 80 million HUF where a 100m2 office building (60% usage, 30m HUF) and a 100m2 repair facility (40m HUF) with a 1800m long rail (10m HUF). Amortization is calculated for 15 years and linear.

Vienna (20.544 EUR/year)

40m2 office is rented for 2300 euro/month, locomotive is stored at ÖBB train station for a 0.2895 Euro/meter/day fee (1712 euro/year).

[4] http://www.oebb.at/infrastruktur/en/_p_Network_Access/Product_services__prices/02_DMS_Dateien/_Train_Path.jsp

[5] http://www.szdc.cz/en/soubory/prohlaseni-o-draze/2015/priloha-c-2015.pdf

Ostrava (8+4 million CZK, Amortization: 2,4 million CZK, market value: 9,6m CZK)

Subsidiary has a 10000m2 land (8 million CZK) with 600 meter electrified rail, a 5000m2 abandoned storage facility and a new 50m2 office building (build for: 4 million CZK, Amortization: 2,4 million CZK).

**Current Assets (662 million HUF)**

*Cash – 622 million forint*

Bank deposit in HUF 150 million (BUBOR-1% interest rate), and in EUR 1,5 million (EURIBOR-0,1%). Government bonds with 12 month maturities in Hungary have a 1,62% yield, and in Germany with 0,38% yield as an alternative investment.

*Supplies – 40 million HUF*

Old vehicle require spare parts.

### *b) Equity and Liabilities*

The company is enlisted on Hungarian Stock Exchange but corporate bonds were issued also for past acquisitions.

*Shareholder's equity – 1344 million HUF*

Share capital is 722 million HUF, past retained earnings are 622 million HUF. The company issued 1.000.000 shares in 2004. The company pays 20% of profit after tax as a dividend.

*Corporate bonds – 408.75 million HUF*

Bonds were issued in 2004 to cover the cost of acquisitions (2m EUR). Bonds have to paid back in March 2015 (8% interest rate), which means a 2 million EUR sum to pay (and the yearly 160 000 EUR as interest).

Bond liability can be refinanced via a syndicated loan for 2 million euro (EURIBOR+3%) with 5 year maturity or through a bond issue at 3 million face value and 3m initial market price (EURIBOR+2%), maturity 5 years.

## Balance Sheet

| Assets | | | | | | Liabilities and Equity | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Czech (CZK) | Austrian (EUR) | Hungarian (HUF) | Group (HUF) | | | Czech (CZK) | Austrian (EUR) | Hungarian (HUF) | Group (HUF) |
| **Investments, property, equipment** | | | | | | **Shareholders' equity** | | | | |
| shares in subsidiaries | | | | 490 000 000 | | common stock | | | | 100 000 000 |
| Locomotive | | | | 759 500 000 | | retained earnings | | | | 622 000 000 |
| *"-depreciation"* | | | | *-379 750 000* | *-37 975 000* | profit after tax | | | | 1 424 483 |
| Land and buildings | | | | | | **Liabilities** | | | | |
| land, Szolnok | | | | 80 000 000 | | Long-term liabilities | | | | |
| office, Szolnok | | | | 80 000 000 | | owners' loan | | 500 000 | | 157 500 000 |
| *"-depreciation"* | | | | *-48 000 000* | *-5 333 333* | corporate bond | | 1 500 000 | | 472 500 000 |
| land, Ostrava | 8 000 000 | | | 91 200 000 | | Short-term liabilities | | | | |
| office, Ostrava | 4 000 000 | | | 45 600 000 | | railway usage fees | 52 808 771 | 345 815 | 115 768 116 | 826 719 830 |
| *"-depreciation"* | 2 400 000 | | | *-27 360 000* | *-3 040 000* | fuel or electricity | 0 | 0 | 2 126 570 348 | 2 126 570 348 |
| **Current assets** | | | | | | maintenance | 0 | 0 | 37 975 000 | 37 975 000 |
| bank deposit HUF | | | | 150 000 000 | | rent | 0 | 20 544 | 0 | 6 471 360 |
| bank deposit EUR | | 1 500 000 | | 472 500 000 | | wages | 5 736 000 | 374 784 | 142 368 000 | 325 815 360 |
| supplies | | | | 40 000 000 | | other | | | | 563 763 618 |
| customers | | 11 070 000 | | 3 487 050 000 | | | | | | |
| **Total assets** | | | | **5 240 740 000** | | **Total liailities & shareholders' equity** | | | | **5 240 740 000** |

## 5. Organization

The subsidiaries remained autonomous after the takeover, wages are fixed costs for the company (they do not depend on the activity of the company at all).

- Strategic level: Executive Board
  - CEO – 5.000.000 HUF/month and 5% share package
  - Commercial and Operational Manager – 1.000.000HUF/month and 5% share package
  - Technical Director – 1.000.000 HUF/month and 5% share package
  - Financial Manager – 800.000 HUF/month
  - HR Manager – 600.000 HUF/month
- Operative level - Hungary
  - Commercial and Operational Division
    - 2 Rolling Stock Manager, 100.000 HUF/month/No and 0.5% share package – responsible for cargo forwarding
    - 2 Rolling Stock Manager Assistant, 100.000 HUF/month/No
    - Operative Coordinator, 150.000 HUF/month – responsible for purchase of rail track capacity in Hungary
    - Dispatch, 120.000 HUF/month – responsible for real-time rolling stock contact
  - Technical Division
    - 2 Engine Drivers, 272.000 HUF/month/No
    - Safety Advisor, 120.000 HUF/month
    - IT Assistant, 150.000 HUF/month
    - 4 Engineer-technicians, 200.000 HUF/month/No
    - Facility Manager, 120.000 HUF/month
    - Cleaning Personnel, 100.000 HUF/month
  - Financial Division
    - Chief Accountant, 200.000 HUF/month
    - Accountant, 150.000 HUF/month
    - Risk Manager, 200.000 HUF/month
    - Controller, 150.000 HUF/month
- Operative level: Austria
  - Branch Manager: 10.000 EUR/month, 2% share package
  - Commercial and Operational Division
    - Rolling Stock Manager, 2.000 EUR/month/No – responsible for cargo forwarding
    - Dispatch, 1.000 EUR/month – responsible for real-time rolling stock contact
  - Technical Division
    - 2 Engine Drivers, 1.666 EUR/month/No
    - Safety Advisor, 1.500 EUR/month
    - IT Assistant, 1.300 EUR/month
    - 2 Engineer-technicians, 1.500 EUR/month/No

- Financial Division
  - Accountant, 2.000 EUR/month
- HR Division
  - HR Assistant, 1.500 EUR/month

- Operative level: Czech Republic
  - Branch Manager: 100.000 CZK/month, 2% share package
  - Commercial and Operational Division
    - 2 Rolling Stock Managers, 10.000 CZK/month/No and 0.5% share package – responsible for cargo forwarding
    - 2 Rolling Stock Manager Assistants, 10.000 CZK/month/No
    - Operative Coordinator, 15.000 CZK/month – responsible for purchase of rail track capacity in Hungary
    - Dispatch, 12.000 CZK/month – responsible for real-time rolling stock contact
  - Technical Division
    - 2 Engine Drivers, 30.000 CZK/month/No
    - Safety Advisor, 12.000 CZK/month
    - IT Assistant,17.000 CZK/month
    - 4 Engineer-technicians, 22.000 CZK/month/No
    - Facility Manager, 11.000 CZK/month
    - Cleaning Personnel, 8.000 CZK/month
  - Financial Division
    - Chief Accountant, 22.000 CZK/month
    - Accountant, 15.000 CZK/month
    - Risk Manager, 22.000 CZK/month

## 6. Profit-and-loss statement (PLS) for 2015 in the current situation

Corporate tax in different countries: Austria 25%, Hungary 19%, Czech republic 19%.

| | | Czech (CZK) | Austrian (EUR) | Hungarian (HUF) | Group (HUF) |
|---|---|---|---|---|---|
| Income | | 60 944 771 | 741 143 | 2 558 829 593 | 3 487 060 028 |
| Expenditures | railway usage fees | -52 808 771 | -345 815 | -115 768 116 | -826 719 719 |
| | fuel | 0 | 0 | -2 126 570 348 | -2 126 570 348 |
| | maintenance, rent | 0 | -20 544 | -37 975 000 | -44 446 360 |
| | wages | -5 736 000 | -374 784 | -142 368 000 | -325 815 360 |
| | amortization (vehicle) | | | -37 975 000 | -37 975 000 |
| | amortization (building) | -2 400 000 | 0 | -48 000 000 | -75 360 000 |
| EBIT | | 0 | 0 | 50 173 130 | |
| Financial profit | subsidiaries | 0 | 0 | 0 | 50 173 241 |
| | gained interests | 0 | 0 | 0 | 2 435 175 |
| | paid interests | 0 | 0 | 0 | -50 400 000 |
| Pre-Tax Profit | | 0 | 0 | 0 | 2 208 416 |
| Corporate income tax (19%) | | 0 | 0 | 0 | 419 599 |
| Profit after tax | | 0 | 0 | 0 | 1 788 817 |
| Dividend | | 0 | 0 | 0 | 357 763 |
| Profit for the year | | 0 | 0 | 0 | 1 431 053 |

# II. Exercise 1 – Profit and loss statement in Matlab

## 1. Basics of Script Writing in Matlab

Each workgroup will elaborate a detailed strategy and an analysis within the different topics during solving the case study. Matlab is used to simulate the impacts of the different suggestions and the stress the company's profitability is under different external conditions. The analysis focuses mainly on the **Profit and Loss Statement (PLS)** as it will be the script's output as well.
Each row of the PLS can be defined as a row vector (like: revenues row, expenditures on wages row etc.), while the entire PLS functions as a matrix (to represent revenues and expenditures in different currencies).

$$PLS = \begin{bmatrix} revenues & in\ CZK & in\ EUR & in\ HUF \\ expenditure & in\ CZK & in\ EUR & in\ HUF \\ EBIT & in\ CZK & in\ EUR & in\ HUF \end{bmatrix}$$

**Rows and columns** can be referred to as the first and second coordinates of a matrix:
PLS(row,coloumn)
*row* can be defined as a number (row=1), as an interval (row=2:4), as an earlier defined variable (j=1:4; row=j) or as the entire set (row=:).
**Functions** in Matlab are defined as the left side of the equation containing all the outputs, while the right side contains the name of the function and the inputs:
[output1,output2]=function(input1,input2,input3);
There can be changes in the value of variables (like the exchange rate changes from 315 to 330) what can be captured in a **for-cycle**:

```
for i=1:15
        HUF_revenue(i,1)=EUR_revenue*(300+i-1);
end
```

**Decision trees (if-elseif-else)** can be constructed to adapt the behaviour of the script to an external factor:

```
for i=1:15
        if EUR_exchange_rate(i,1)<300
                HUF_revenue(i,1)=EUR_revenue*EUR_exchange_rate(i,1);
        elseif EUR_exchange_rate(i,1)<315 & EUR_exchange_rate(i,1)>300
                HUF_revenue(i,1)=EUR_revenue*option_target_rate;
        else
                HUF_revenue(i,1) =EUR_revenue*EUR_exchange_rate(i,1);
        end
end
```

Comments can be written in the script after a "%" mark.
Lines shall be ended with a ";" mark.

## 2. Simulation of the PLS in Matlab

```
%% Complexity 2019 - profit and loss statement
%0. loading in the inputs
clear
    %assets
vehicle=xlsread('IFM_input_1.3.xlsx','vehicles');
real_estate=[4000000 0 80000000];
```

```
deposit=[0 1500000 150000000];
customer=[0 11070000 0];
    %liabilities
corp_bond=[0 2000000 0];
    %expenditures
wage=[5736000 374784 142368000];
rent=[0 20544 0];
railway_usage_fees=[52808771 345815 115768116];
    %capital market related inputs
EURHUF=315;
CZKHUF=11.4;
r_eur=0.00263;
r_huf=0.0211;
r_corp_bond =0.08;
    %locomotive
locomotive=1; %1: dízel, 2: Siemens 3: Skoda 4: Transm
%1. PLS structure
    %1.a. expenditures
PLS(2,:)=railway_usage_fees; %railway usage fees
PLS(3,:)=vehicle(locomotive,1:3);  %traction electricity or
%fuel
PLS(4,3)=vehicle(locomotive,4); %maintenance
PLS(5,:)=rent;  %office rental fee
PLS(6,:)= wage;  %wages
PLS(7,:)=[0 0 vehicle(locomotive,end)];  %depreciation (locom)
PLS(8,:)=[2400000 0 48000000]; %depreciation (build)
    %1.b. income
    for j=1:2
PLS(1,j)=sum(PLS(2:8,j));
    end
PLS(1,3)=sum(customer.*[CZKHUF EURHUF 1])-PLS(1,1)*CZKHUF...
    -PLS(1,2)*EURHUF;
    %1.c. EBIT
for j=1:3
    PLS(9,j)=PLS(1,j)-sum(PLS(2:8,j));
end
    %1.d. group-level conversion to HUF
for i=1:9
    PLS(i,4)=sum(PLS(i,1:3).*[CZKHUF EURHUF 1]);
end
    %1.e. Financial profit
        %dividends
PLS(10,4)=PLS(9,4);
        %gained interests
PLS(11,4)=sum(deposit.*[CZKHUF EURHUF 1].*...
            [0 r_eur-0.001 r_huf-0.01]);
        %paid interests
```

```
PLS(12,4)=sum(corp_bond.*[CZKHUF EURHUF 1].*...
            [0 r_corp_bond r_huf-0.01]);
    %1.f. Profit
        % Pre-Tax Profit
PLS(13,4)=PLS(10,4)+PLS(11,4)-PLS(12,4);
        %Corporate income tax
CIT=0.19;
PLS(14,4)=PLS(13,4)*CIT;
        %Profit after tax
PLS(15,4)=PLS(13,4)-PLS(14,4);
        %paid dividend - 20%
PLS(16,4)=PLS(15,4)*0.2;
        %profit for the year
PLS(17,4)=PLS(15,4)*0.8;
```

# III. Exercise 2 – Asset selection

*Please evaluate the Pre-Tax Profit Ratio of the company - according to the market averages. What are the reasons of poor company performance at these benchmarks? What is the most important issue to deal with? Hint: you can fire people and buy new locomotive. (Current date for the case study is January 1, 2015)*

## 1. Re-balancing internal and external capital

### *a) Multinational restructuring*

- Success: the acquirer must substantially improve the target's cash flows → overcome the large premium it pays for the target
- Valuing a Foreign Target
  - Initial Outlay: price to be paid for the target
  - cash flows + salvage value
  - Exchange rate
  - → net present value of a foreign target

$$NPV_a = -IO_a + \sum_{t=1}^{n} \frac{CF_{a,t}}{(1+k)^t} + \frac{SV_a}{(1+k)^n}$$

$$= -(IO_f)S + \sum_{t=1}^{n} \frac{(CF_{f,t})S_t}{(1+k)^t} + \frac{(SV_f)S_n}{(1+k)^n}$$

- Market Assessment of International Acquisitions
  - *foreign* targets neutral or slightly favourable stock price effects for acquirers (→ new market)
    - comparative advantage in terms of their technology or image
    - competition is not as intense on a foreign market
  - acquisitions of *domestic* targets lead to negative effects for acquirers, on average (→ market share)
  - Sarbanes-Oxley Act on the Pursuit of Targets
    - Improved the process for reporting profits used by U.S. based MNCs
    - Executives of MNCs are prompted to conduct a more thorough review of the target firm's operations and risk (called due diligence)
    - hire outside advisers (including attorneys and investment banks) to offer their assessment
- Factors That Affect the Expected Cash Flows of the Foreign Target
  - Target's Previous Cash Flows
  - Managerial Talent of the Target
    - managed as it was before the acquisition
    - downsize the target firm later
      - new technology that reduces the need for some of the target's employees
      - reduces expenses but may also reduce productivity and revenue
    - maintain the existing employees of the target but restructure the operations so that labour is used more efficiently
  - Country-Specific Factors
    - Target's Local Economic Conditions (export or domestic market focus)

        - Target's Local Political Conditions (layoff, privatisation)
        - Target's Industry Conditions – industry 4.0
            - Cloud computing, human-machine interface, internet of things, sensor integration, B2C and B2B relations → flexibility
        - Target's Currency Conditions (target's remitted earnings to the parent)
        - Target's Local Stock Market Conditions (volatility)
        - Taxes Applicable to the Target
- Other Types of Multinational Restructuring
    - International Partial Acquisitions (substantial stakes + public listing *or* local partner)
        - requires less funds
        - some influence on the target's management
        - meeting the standards
        - Valuation: much the same way as when it purchases the entire firm
    - International Acquisitions of Privatized Businesses (government-owned businesses sold to individuals or corporations)
        - increase their efficiency
        - operating in environments of little or no competition
        - data are very limited
        - economic and political conditions tend to be volatile
        - the government retains a portion of the firm's equity, it may attempt to exert some control
    - International Alliances (joint ventures and licensing agreements)
        - initial outlay and cash flows to be received are typically smaller
        - Royalties
    - International Divestitures (assessment: maintain or sell)
        - increased cost of capital, host government taxes, political risk, or revised projections of exchange rates
        - sell them at a low price

**Literature**

Madura: part 4, chapter 15

### *b) Multinational capital budgeting*

- Subsidiary versus Parent Perspective
    - parent is financing the project → evaluating the results from its point of view
    - Tax Differentials (remitted funds)
    - Restricted Remittances (percentage of the subsidiary earnings remain in the country)
    - Excessive Remittances (parent that charges its subsidiary very high administrative fees because management is centralized at the headquarters)
    - Exchange Rate Movements (normally converted from the subsidiary's local currency to the parent's currency)
- Input for Multinational Capital Budgeting
    - parent's initial investment
        - finance inventory, wages, and other expenses until the project begins to generate revenue
    - Price and consumer demand
        - price at which the product could be sold can be forecasted using competitive products in the markets as a comparison
        - future prices will most likely be responsive to the future inflation rate

        - market share percentage forecast - projected demand
    - Costs
        - variable-cost forecasts - variable cost per unit
        - fixed cost (not sensitive to changes in demand)
    - Tax laws
        - tax deductions or credits for tax payments
    - Remitted funds
        - host government may prevent a subsidiary from sending its earnings to the parent (encourage additional local spending *or* to avoid excessive sales of the local currency)
    - Exchange rates
        - hedging techniques are used to cover short-term positions
    - Salvage (liquidation) value
        - success of the project and the attitude of the host government toward the project
    - Required rate of return
- Factors to Consider in Multinational Capital Budgeting
    - Exchange rate fluctuations
    - Inflation
    - Financing arrangement - subsidiary & parent financing
    - Blocked funds (earnings generated by the subsidiary be reinvested locally for at least 3 years before they can be remitted)
    - Uncertain salvage value
    - Impact of project on prevailing cash flows
    - Host government incentives
- Adjusting Project Assessment for Risk
    - Risk-Adjusted Discount Rate
        - the greater the *uncertainty* about a project's forecasted *cash flows*, the *larger* should the *discount rate* applied to cash flows be
        - tends to reduce the worth of a project
    - **Sensitivity Analysis**
        - alternative estimates for its input variables
    - **Simulation**
        - range of possible values for one or more input variables (100 iterations)

**Literature**
Madura: part 4, chapter 14

## 2. Restructuring in the case study

It is necessary to improve the efficiency of the company through the flowing methods:

- by cutting traction expenditures (new, electric locomotives)
- by cutting labour-related expenditures (making some of the employees redundant, redefining subsidiaries' competences)
- by issuing new corporate bonds (old one expires, lower yields)

Traction expenditure is the main determinant of profitability, therefore the selection of the new locomotive has key importance. It means that we need to calculate the PLS again under the different vehicles – considering that we are selling the old diesel engine.

*"Our current rolling stock can be sold for their book value (purchasing value-depreciation)."*

| name | Vossloh Euro 4000 | Siemens Vectron | Škoda 109E | Softronic Transmontana |
|---|---|---|---|---|
| year of production/renew | 2006 | 2010 | 2008 | 2015 |
| diesel | 1 | 0 | 0 | 0 |
| 25kV AC | 0 | 1 | 1 | 1 |
| 15kV AC | 0 | 1 | 1 | 1 |
| 3kV DC | 0 | 1 | 1 | 1 |
| v Max (km/h) | 120 | 160 | 160 | 160 |
| weight (t) | 123 | 87 | 86 | 120 |
| length (m) | 23 | 19 | 18 | 18 |
| power (kW) | 3178 | 6400 | 6400 | 6000 |
| fuel consumption l/hours | 984 | 0 | 0 | 0 |
| No of axes | 6 | 4 | 4 | 6 |
| price (thousand EUR) | 3100 | 4000 | 2800 | 2600 |
| yearly maintenance as % of price | 0,05 | 0,025 | 0,04 | 0,05 |
| regained electricity at slowing down (% of energy consumption) | 0 | 0,35 | 0,3 | 0,2 |

First, we can understand that all the possible electric locomotives can operate under the different electricity standards of Hungary, Austria and Czechia (highlighted with yellow).
Second, the main physical characteristics are similar as weight, speed or traction power (highlighted with green).
However, price, maintenance, depreciation are in functional relationship (marked with teal), making Vectron the most expensive to purchase but the cheapest to operate (4m EUR price and 0.1m EUR annual maintenance), while Transmontana can be considered as cheap (2.6m EUR) but less reliable (0.13m EUR annual maintenance fee). The Skoda is somewhere between the two (2.8m EUR price and 0.112m EUR annual maintenance). Electricity recuperation reduces running costs further, as an additional benefit for the Vectron (marked with grey). Depreciation is neutral from a cash-flow point of view and provides tax-benefits, so we will not consider it now.
Hence, by selling the old diesel engine, we can raise 379.75 mHUF (1.2m EUR), so altogether with our bank deposits we have 1.2+1.5+0.47=3.176 million EUR liquid reserves for the purchase.
Meanwhile we have an additional 1m EUR capacity to issue additional corporate bonds at floating rates.
Consequently, we have the following rational options:

- Vectron will require 0.82m bond issuance and it clears all of our cash reserves. However, our annual maintenance and running costs will be at a minimum – combined with a hypothetical 0.82*2.263%=0,01864m EUR interest payment (considering that EURIBOR remains the same).
- Skoda requires no additional bond issuance and the company keeps 0.576 million EUR as bank deposit with 0.00094 million EUR as gained interest. Meanwhile the maintenance costs will increase by 0.012m EUR and electricity expenditures are 0.05 percentage point higher.
- Transmontana purchase requires no further bond issuance and the company keeps 0.776 million EUR as bank deposit with 0.00126 million EUR as gained interest. Meanwhile the maintenance costs will increase by 0.03m EUR and electricity expenditures are 0.15 percentage point higher (but the locomotive is weaker, so this relationship is not linear!).

Although we can use the "*vehicles*" spreadsheet from the "*complexity_en_1.3.xlsx*" file and conclude similar results:

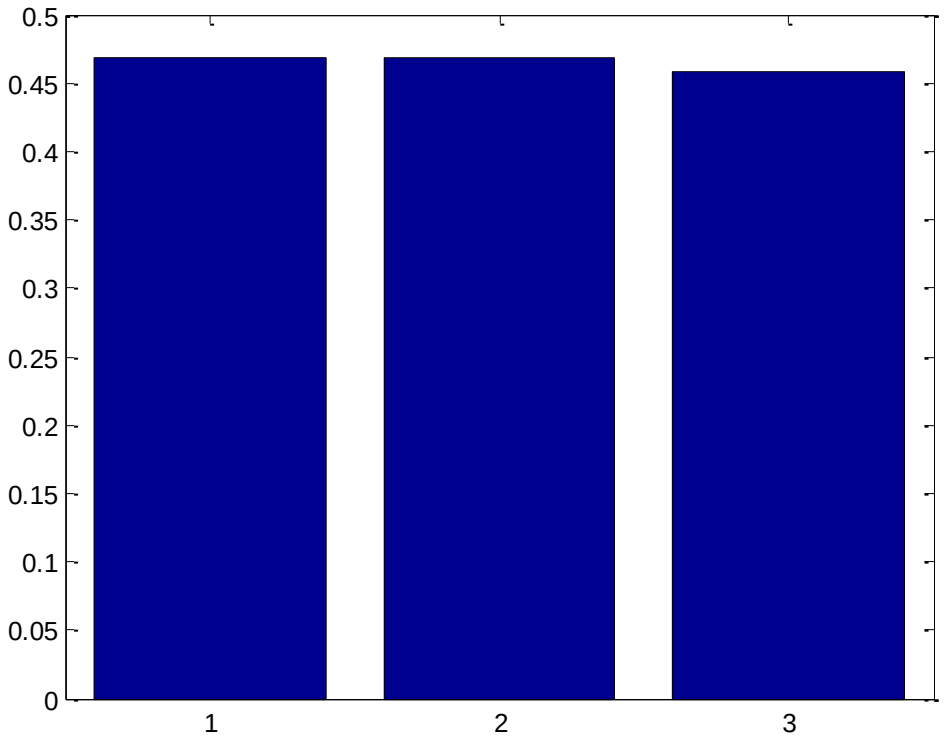
| | fuel or electricity consumption (reduced) | maintenance fee | depretiation | together |
|---|---|---|---|---|

| locomotive name | CZK | EUR | HUF | HUF | HUF | HUF |
|---|---|---|---|---|---|---|
| Vossloh Euro 4000 | 0 | 0 | 2 126 570 348 | 37 975 000 | 37 975 000 | 2 164 545 348 |
| Siemens Vectron | 23 337 148 | 321 677 | 85 298 616 | 31 500 000 | 63 000 000 | 484 170 357 |
| Škoda 109E | 25 132 313 | 346 421 | 91 860 048 | 35 280 000 | 44 100 000 | 522 771 153 |
| Softronic Transmontana | 26 927 479 | 371 166 | 98 421 480 | 40 950 000 | 40 950 000 | 563 261 950 |

Therefore we can say that the Vectron has a 38.6 million HUF annual cost benefit against the Skoda and 79.1 million HUF against the Transmontana. Deducting the 5.8716 million HUF for the additional interest payment after the Vectron and the 0.2961 million HUF and 0.397 million HUF gained interest after both locomotives, the ranking is mostly the same.
Consequently we can identify two competing strategies:

- An aggressive Vectron purchase with higher debt but lower annual expenditures with higher cash-flow making capabilities.
- A conservative Transmontana purchase with lower debt, higher initial cash reserve but with higher annual expenditures, therefore lower cash-flow generation.

These considerations will have their impact on the bankruptcy-ratio, valuation, currency exposure, short-term lending properties of the company.
However, the pre-tax ratio suggested insignificant difference among the Vetron (1), Skoda (2) and Transmontana (3) options:




## 3. Matlab script writing

To evaluate the different strategies, we need to refer to the different rows of the "*vehicles*" spreadsheet from the "*complexity_en_1.3.xlsx*" file and change the following variables:

- traction electricity expenditure: PLS(3,1:3) – for all subsidiaries
- maintenance-fee: PLS(4,3) – for the Hungarian parent company
- depreciation (locomotive): PLS(7,3) – for the Hungarian parent company
- interest-related variables
    - deposit=[0 1500000 150000000];
    - corp_bond=[0 2000000 0];

A for-cycle can be used for the comparison of the different locomotives, were *locomotive= loco* and *loco =1:4* under the following consideration:

```
for loco=1:4 %as he first row of the script
…
PLS_loco{loco}=PLS; %as the last row of the script
end
```

Meanwhile, the interest-payment must be responsive on the locomotive selection, so a simple decision-tree is necessary:

```
    loco_price=[3100000 4000000 2800000 2600000];
    old_deposit=[0 1500000 150000000];
    deposit_eur=old_deposit(1,2)+old_deposit(1,3)/315+1200000; %1.2m EUR is the sale of old loco
if loco_price(1,loco)>deposit_eur
    corp_bond=[0 2000000+loco_price(1,loco)-deposit_eur 0];
    deposit=[0 0 0];
else
    corp_bond=[0 2000000 0];
    deposit=[0 deposit_eur-loco_price(1,loco) 0];
end
```

## 4. Simulated PLS under different locomotives

```
%% Complexity 2019 - loco selection
%0. loading in the inputs
clear
    %assets
vehicle=xlsread('IFM_input_1.3.xlsx','vehicles');

for loco =1:4 % starting the for-cycle
real_estate=[4000000 0 80000000];
deposit=[0 1500000 150000000];
customer=[0 11070000 0];
    %liabilities
corp_bond=[0 2000000 0];

% Test-related codes:
   loco_price=[3100000 4000000 2800000 2600000];
   old_deposit=[0 1500000 150000000];
   deposit_eur=old_deposit(1,2)+old_deposit(1,3)/315+1200000;    %1.2m
EUR is the sale of old loco
if loco_price(1,loco)>deposit_eur
   corp_bond=[0 2000000+loco_price(1,loco)-deposit_eur 0];
```

```
    deposit=[0 0 0];
else
    corp_bond=[0 2000000 0];
    deposit=[0 deposit_eur-loco_price(1,loco) 0];
end
    %expenditures
wage=[5736000 374784 142368000];
rent=[0 20544 0];
railway_usage_fees=[52808771 345815 115768116];
    %capital market related inputs
EURHUF=315;
CZKHUF=11.4;
r_eur=0.00263;
r_huf=0.0211;
r_corp_bond =0.08;
    %locomotive
locomotive=loco; %1: dízel, 2: Siemens 3: Skoda 4: Transm
%1. PLS structure
PLS=[];
    %1.a. expenditures
PLS(2,:)=railway_usage_fees; %railway usage fees
PLS(3,:)=vehicle(locomotive,1:3);  %traction electricity or
%fuel
PLS(4,3)=vehicle(locomotive,4); %maintenance
PLS(5,:)=rent;  %office rental fee
PLS(6,:)= wage;  %wages
PLS(7,:)=[0 0 vehicle(locomotive,end)];  %depreciation (locom)
PLS(8,:)=[2400000 0 48000000]; %depreciation (build)
    %1.b. income
    for j=1:2
PLS(1,j)=sum(PLS(2:8,j));
    end
PLS(1,3)=sum(customer.*[CZKHUF EURHUF 1])-PLS(1,1)*CZKHUF...
    -PLS(1,2)*EURHUF;
    %1.c. EBIT
for j=1:3
    PLS(9,j)=PLS(1,j)-sum(PLS(2:8,j));
end
    %1.d. group-level conversion to HUF
for i=1:9
    PLS(i,4)=sum(PLS(i,1:3).*[CZKHUF EURHUF 1]);
end
    %1.e. Financial profit
        %dividends
PLS(10,4)=PLS(9,4);
        %gained interests
PLS(11,4)=sum(deposit.*[CZKHUF EURHUF 1].*...
            [0 r_eur-0.001 r_huf-0.01]);
```

```
        %paid interests
PLS(12,4)=sum(corp_bond.*[CZKHUF EURHUF 1].*...
            [0 r_corp_bond r_huf-0.01]);
    %1.f. Profit
        % Pre-Tax Profit
PLS(13,4)=PLS(10,4)+PLS(11,4)-PLS(12,4);
        %Corporate income tax
CIT=0.19;
PLS(14,4)=PLS(13,4)*CIT;
        %Profit after tax
PLS(15,4)=PLS(13,4)-PLS(14,4);
        %paid dividend - 20%
PLS(16,4)=PLS(15,4)*0.2;
        %profit for the year
PLS(17,4)=PLS(15,4)*0.8;
PLS_loco{loco}=PLS; %as the last row of the script
pre_tax_ratio(loco,1)=PLS(13,4)./PLS(1,4);
end

%pre-tax ratio comparison:
bar(pre_tax_ratio(2:4))
```

## 5. Sample assignment

**Performance of the company – compared to the market**

- Pre-tax profit ratio is way under the market average (zero Vs. 30%)

**Reasons of poor performance**

- The company has zero profit due to sheer luck: with stronger HUFEUR or weaker CZKHUF exchange rates losses would be imminent.
- Most important expenditure: fuel costs (-2 126 570 348 HUF) – can be improved via purchase of electric locomotives (better efficiency)
- Second most important expenditure: railway usage costs (-826 719 719 HUF) – it is fixed, the company has no impact on it
- Third most important expenditure: wages (-325 815 360HUF) – Czech and Austrian subsidiaries have excessive competences
- Expensive funding: 8% interest rate on corporate bonds (-50 400 000)

**Ideas of rationalization**

- Without firing people
- Sell old traction vehicle:
    - diesel loco: 379.75 million HUF
    - spare parts: 40 million HUF
- Issuing new corporate bond with flexible interest rate
    - EURIBOR+2%
    - 3m EUR initial market price (potential!)
- Liquid assets:
    - HUF 150 million

- EUR 1.5 million
- All together:
  - 1045.25 million HUF or **3.3 million EUR**
- Possible vehicle prices at constant exchange rates:
  - Vectron: 4 million EUR (*too expensive*)
  - Skoda: 2.8 million EUR (*affordable*)
  - Softronic: 2.6 million EUR (*affordable*)

**Suggestions**

- don't fire people
- buy a Softronic Transmontana for 2.6 million EUR by selling the Vossloh Euro 4000 and utilizing the bank deposit
- with the remaining 0.509 million EUR, the corporate debt could be decreased further
- issue new corporate bond for 1.49 million EUR

**New profit and loss statement (planned)**

| | | Czech (CZK) | Austrian (EUR) | Hungarian (HUF) | Group (HUF) |
|---|---|---|---|---|---|
| Income | | 60 944 771 | 741 143 | 2 558 819 566 | 3 487 050 000 |
| Expenditures | railway usage fees | 52 808 771 | 345 815 | 115 768 116 | 826 719 830 |
| | fuel | 26 927 479 | 371 166 | 98 421 480 | 522 311 950 |
| | maintenance | 0 | 0 | 40 950 000 | 40 950 000 |
| | wages | 5 736 000 | 374 784 | 142 368 000 | 325 815 360 |
| | amortization (vehicle) | 0 | 0 | 40 950 000 | 40 950 000 |
| | amortization (building) | 2 400 000 | 0 | 48 000 000 | 75 360 000 |
| | rent | 0 | 20 544 | 0 | 6 471 360 |
| EBIT | | -26 927 479 | -371 166 | 2 072 361 970 | 1 648 471 500 |
| Financial profit | subsidiaries | 0 | 0 | 0 | 1 648 471 500 |
| | gained interests | 0 | 0 | 0 | 0 |
| | paid interests | 0 | 0 | 0 | 10 621 391 |
| Pre-Tax Profit | | 0 | 0 | 0 | 1 637 850 109 |
| Corporate income tax (19%) | | 0 | 0 | 0 | 311 191 521 |
| Profit after tax | | 0 | 0 | 0 | 1 326 658 588 |
| Dividend | | 0 | 0 | 0 | 265 331 718 |
| Profit for the year | | 0 | 0 | 0 | 1 061 326 871 |

*New Pre-tax margin: 47%*

# IV. Exercise 3 – Valuation

*Please evaluate your company's fundamental value! What is the fundamental value of your shares? Please summarize the following variables:*

- *Free Cashflow*
- *WACC%*
- *Discounted cashflow*
- *Salvage value*
- *Total UEAE value*
- *UEAE value/shares*

## 1. Mergers and acquisitions

- Background on International Acquisitions
  - international acquisition
    - similar to other international projects
    - requires an initial outlay and is expected to generate cash flows
    - present value will exceed the initial outlay
  - motivated by the desire to increase
    - global market share
    - capitalize on economies of scale
  - international acquisitions are better than direct foreign investment (establishing a new subsidiary)
    - target is already in place
    - establishing a new subsidiary requires time
    - acquisition usually generates quicker and larger cash flows
    - larger initial outlay
    - integration of the parent's management style
  - Market Assessment of International Acquisitions
    - announcements of acquisitions of foreign targets
      - → neutral or slightly favourable stock price effects for acquirers
      - ability of acquirers to more easily capitalize on their strengths in foreign markets
    - acquisitions of domestic targets → negative effects for acquirers, on average
    - Sarbanes-Oxley (SOX) Act (2002):
      - impact on the process for assessing acquisitions
      - executives of MNCs are prompted to conduct a more thorough review of the target firm's operations and risk (called due diligence).
      - MNCs increasingly hire outside advisers (including attorneys and investment banks)
      - acquirer must ensure that financial information of the target is accurate

### *a) Country risk analysis*

- Objectives
  - identify common factors to measure a country's political risk and financial risk
  - techniques used to measure country risk
  - how the assessment of country risk is used when making financial decisions
- Definition: Country risk represents the potentially adverse impact of a country's environment on the MNC's cash flows

- Political Risk Factors
  - Attitude of Consumers in the Host Country
    - Some consumers may be very loyal to homemade products.
  - Attitude of Host Government
    - special requirements or taxes
    - restrict fund transfers
      - Funds that are blocked may not be optimally used
      - Currency Inconvertibility: MNC parent may need to exchange earnings for goods
    - subsidize local firms
    - fail to enforce copyright laws
  - Political Risk Factors
    - War
      - Internal and external battles, or even the threat of war, can have devastating effects
    - Bureaucracy
      - Bureaucracy can complicate businesses
    - Corruption
      - Corruption can increase the cost of conducting business or reduce revenue
- Financial Risk Factors
  - Current and Potential State of the Country's Economy
    - A recession can severely reduce demand
    - Financial distress can also cause the government to restrict MNC operations
  - Indicators of Economic Growth
    - A country's economic growth is dependent on several financial factors - interest rates, exchange rates, inflation, etc.
- Techniques of Assessing Country Risk
  - A *checklist approach* involves rating and weighting all the identified factors and then consolidating the rates and weights to produce an overall assessment
  - The *Delphi technique* involves collecting various independent opinions and then averaging and measuring the dispersion of those opinions
  - *Quantitative analysis* techniques like regression analysis can be applied to historical data to assess the sensitivity of a business to various risk factors
  - *Inspection visits* involve traveling to a country and meeting with government officials, firm executives, and/or consumers to clarify uncertainties

### *b) Political risk management*

A. Preinvestment Planning Four Policy Options

a. Avoidance (no risk)
b. Insurance (shift risk)
c. Negotiate environment
d. Structure the investment

B. Operating Policies

Five Post-Investment Policy Options:

- Planned Divestment
- Short-Term Profit Maximization
- Changing the Benefit/Cost Ratio

    - Developing Local Stakeholders
    - Adaptation: create a post-confiscation management contract
- Comparing Risk Ratings Among Countries
    - One approach to comparing political and financial ratings among countries is the *foreign investment risk matrix (FIRM)*
    - The matrix measures financial (or economic) risk on one axis and political risk on the other axis
    - Each country can be positioned on the matrix based on its political and financial ratings
- Actual Country Risk Ratings Across Countries
    - Some countries are rated higher according to some risk factors, but lower according to others
    - On the whole, industrialized countries tend to be rated highly, while emerging countries tend to have lower risk ratings
    - Country risk ratings change over time in response to changes in the risk factors
- Reducing Exposure to Host Government Takeovers
    - The benefits of FDI can be offset by country risk, the most severe of which is a host government takeover
    - To reduce the chance of a takeover by the host government, firms often use the following strategies:
    - Use a Short-Term Horizon
        - This technique concentrates on recovering cash flow quickly
        - Rely on Unique Supplies or Technology
            - In this way, the host government will not be able to take over and operate the subsidiary successfully
        - Hire Local Labour
            - The local employees can apply pressure on their government
        - Borrow Local Funds
            - The local banks can apply pressure on their government
        - Purchase Insurance
            - Investment guarantee programs offered by the home country, host country, or an international agency insure to some extent various forms of country risk.

### *c) Credit rating*

Instead of taking a loan from a bank, companies and governments borrow money directly from investors by issuing bonds or notes. Investors purchase these debt securities – such as municipal bonds – expecting to receive interest plus the return of their principal. Credit ratings may facilitate the process of issuing and purchasing bonds and other debt issues by providing an efficient, widely recognized and long-standing measure of relative credit risk. Credit ratings are assigned to issuers and debt securities as well as bank loans. Investors and other market participants may use the ratings as a screening device to match the relative credit risk of an issuer or individual debt issue with their own risk tolerance or credit risk guidelines in making investment and business decisions.

Credit ratings are *opinions about credit risk*. It expresses the rating agencies' opinion about the ability and willingness of an issuer, such as a corporation or state or city government, to meet its financial obligations in full and on time. Credit ratings are not absolute measure of default probability. Since there are future events and developments that cannot be foreseen, the assignment of credit ratings

is not an exact science. Credit ratings can also speak to the credit quality of an individual debt issue, such as a corporate or municipal bond, and the relative likelihood that the issue may default.
Ratings at S&P can be scaled as:

- AAA: investment-grade with extremely strong capacity to meet financial commitments
- AA: investment-grade with very strong capacity to meet financial commitments
- A: investment-grade with strong capacity to meet financial commitments but somewhat susceptible to adverse economic conditions and changes in circumstances
- BBB: investment-grade with adequate capacity to meet financial commitments, but more subject to adverse economic conditions
- BB: speculative-grade with less vulnerable in the near-term but faces major ongoing uncertainties to adverse business, financial and economic conditions
- B: speculative-grade with more vulnerable to adverse business, financial and economic conditions, but currently has the capacity to meet financial commitments
- CCC: speculative-grade with currently vulnerable and dependent on favourable business, financial and economic conditions to meet financial commitments
- CC: speculative-grade with highly vulnerable; default has not yet occurred but it is expected to be virtual certainty
- C: speculative-grade with currently highly vulnerable to non-payment, and ultimate recovery is expected to be lower than that of higher rated obligations
- D: speculative-grade with payment default on a financial commitment or breach of an imputed promise; also used when a bankruptcy petition has been filled or similar action taken

**Cumulative Defaulters By Time Horizon Among Global Corporates, From Original Rating (1981-2018)**

| | AAA | AA | A | BBB | BB | B | CCC | Total |
|---|---|---|---|---|---|---|---|---|
| Number of issuers defaulting per time frame | | | | | | | | |
| One year | 0 | 0 | 0 | 3 | 13 | 81 | 110 | 207 |
| Three years | 0 | 1 | 6 | 29 | 141 | 587 | 210 | 974 |
| Five years | 0 | 3 | 13 | 71 | 293 | 1,012 | 240 | 1,632 |
| Seven years | 2 | 6 | 28 | 102 | 399 | 1,231 | 256 | 2,024 |
| Total | 8 | 30 | 98 | 208 | 613 | 1,523 | 274 | 2,754 |
| Percentage of total defaults per time frame (%) | | | | | | | | |
| One year | 0 | 0 | 0 | 1,4 | 6,3 | 39,1 | 53,1 | |
| Three years | 0 | 0,1 | 0,6 | 3 | 14,5 | 60,3 | 21,6 | |
| Five years | 0 | 0,2 | 0,8 | 4,4 | 18 | 62 | 14,7 | |
| Seven years | 0,1 | 0,3 | 1,4 | 5 | 19,7 | 60,8 | 12,6 | |
| Total | 0,3 | 1,1 | 3,6 | 7,6 | 22,3 | 55,3 | 9,9 | |

Source: S&P (2018): Default, Transition, and Recovery: 2018 Annual Global Corporate Default And Rating Transition Study. Standard and Poor's

**Literature:**

https://www.spratings.com/en_US/understanding-ratings

### *d) Foreign Direct Investment (FDI)*

- Foreign investment that establishes
  - a lasting interest in or effective management control over an enterprise
  - buying shares of an enterprise in another country
  - reinvesting earnings of a foreign-owned enterprise in the country where it is located, and

- parent firms extending loans to their foreign affiliates.
- International Monetary Fund (IMF) guidelines consider an investment to be a foreign direct investment if it accounts for at least 10 percent of the foreign firm's voting stock of shares.

- Trends
  - Flow and stock increased in the last 20 years
  - In spite of decline of trade barriers, FDI has grown more rapidly than world trade because
    - Businesses fear protectionist pressures
    - FDI is seen as a way of circumventing trade barriers
    - Dramatic political and economic changes in many parts of the world
    - Globalization of the world economy has raised the vision of firms who now see the entire world as their market
- FDI forms
  - Purchase of assets: why? why not?
    - Quick entry, local market know-how, local financing may be possible, eliminate competitors, buying problems
  - New investment: why? why not?
    - No local entity is available for sale, local financial incentives, no inherited problems, long lead time to generation of sales
  - International joint-venture
    - Shared ownership with local and/or other non-local partner
    - Shared risk
- Alternative Modes of Market Entry
  - FDI
    - FDI - 100% ownership
    - FDI < 100% ownership, International Joint Venture
  - Strategic Alliances (non-equity)
  - Franchising
  - Licensing
  - Exports: Direct vs Indirect
- Pattern of FDI Explanations
  - International product life-cycle (Ray Vernon)
    - Trade theory similarity
  - Eclectic paradigm of FDI (John Dunning)
    - Combines ownership specific, location specific, and internalization specific advantages
    - Explains FDI decision over a decision to enter through licensing or exports
    - Ownership advantage: creates a monopolistic advantage to be used in markets abroad
      - Unique ownership advantage protected through ownership
      - e.g., Brand, technology, economies of scale, management know-how
    - Location advantage: the FDI destination market must offer factors (land, capital, know-how, cost/quality of labour, economies of scale) that are advantageous for the firm to locate its investment there (link to trade theory)

- Internalization advantage: transaction costs of an arms-length relationship – licensing, exports – higher than managing the activity within the MNC's boundaries.

**Literature**

Madura: part 4, chapter 13, 16

## 2. DCF model

- Model for Valuing a Foreign Target
  - the value of an MNC is based on the present value of expected cash flows to be received.
  - similar to the decision to invest in other projects in that it is based on a comparison of benefits and costs as measured by net present value

$$NPV_a = -IO_a + \sum_{t=1}^{n} \frac{CF_{a,t}}{(1+k)^t} + \frac{SV_a}{(1+k)^n}$$

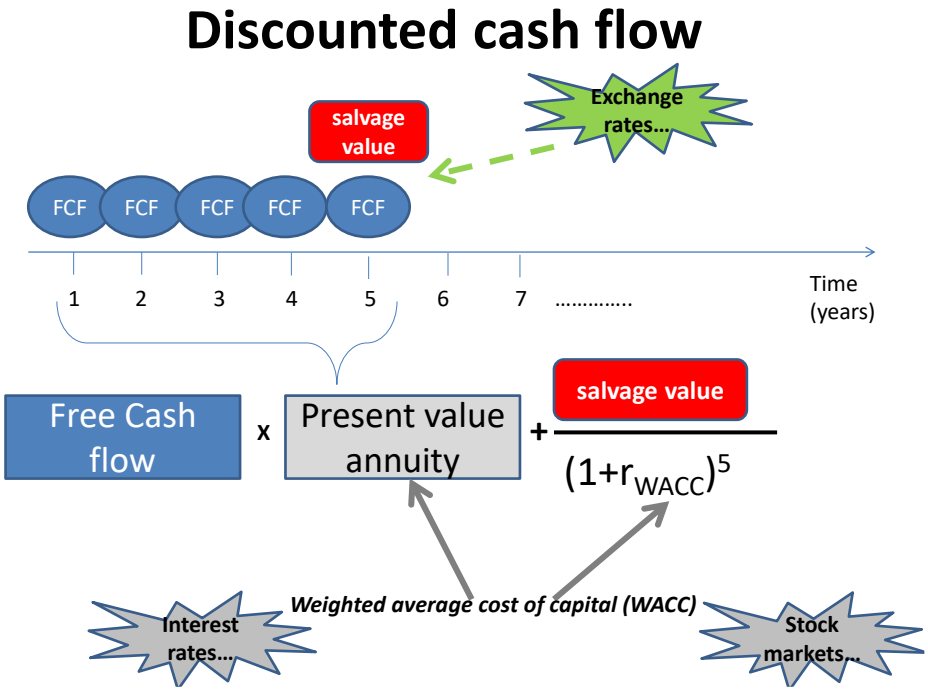
where

$IO_a$ = initial outlay needed by the acquiring firm to acquire the target
$CF_{a,t}$ = cash flow to be generated by the target for the acquiring firm
$k$ = required rate of return on the acquisition of the target
$SV_a$ = salvage value of the target (expected selling price of the target at a point in the future)
$n$ = time when the target will be sold by the acquiring firm

  - Estimating the Initial Outlay
    - price to be paid for the target
    - acquire publicly traded foreign targets, they commonly pay premiums (10-40%)
    - acquirer must substantially improve the target's cash flows → overcome the large premium
    - excessively optimistic when estimating the target's future cash flows → ☹
    - Exchange rate of concern
  - Estimating the Cash Flows
    - foreign currency cash flows ($CF_{f,t}$) per period remitted to the United States
    - At the spot rate at that time ($S_t$)
    - $\boldsymbol{CF_{a,t} = (CF_{f,t})S_t}$
    - ignores any withholding taxes or blocked-funds restrictions
    - salvage value in foreign currency units ($SV_f$) and the spot rate at the time (period $n$) when it is converted to dollars ($S_n$)
    - $\boldsymbol{SV_a = (SV_f)S_n}$
  - Estimating the ***NPV***

$$NPV_a = -IO_a + \sum_{t=1}^{n} \frac{CF_{a,t}}{(1+k)^t} + \frac{SV_a}{(1+k)^n}$$

$$= -(IO_f)S + \sum_{t=1}^{n} \frac{(CF_{f,t})S_t}{(1+k)^t} + \frac{(SV_f)S_n}{(1+k)^n}$$




- **Free Cash Flow (FCF)=**
  EBIT *(PLS)*
  -taxes
  (corporate_income_tax+municip_tax+gained_interests*CIT_rate+paid_interests*CIT_rate)
  -spending on investments
  +amortization (depreciation) *(PLS)*
  +floating capital ← *current assets-short term liabilities (PLS)*
- **Weighted average cost of capital (WACC)**

Equity or debt financing to fund long-term projects. Firms attempt to use a specific capital structure, or mix of capital components that will minimize their cost of capital. The lower a firm's cost of capital, the lower its required rate of return on a given proposed project is. A firm's weighted average cost of capital (referred to as $r_{WACC}$) can be measured as:

$$r_{WACC} = \left(\frac{E}{D+E}\right) r_E + \left(\frac{D}{D+E}\right) r_D (1 - CIT)$$

Where E: amount of firm's equity, D: amount of firm's debt, CIT: corporate income tax rate (effective if there is available data), $r_E$: expected return from equity (CAPM: $r_E = r_F + (r_M - r_F) * \beta$; $\beta = \sigma_{EM}/\sigma_M^2$ beta represents the sensitivity of the project's cash flow to market conditions), $r_D$: average interest rate of the debt ($r_D = \frac{paid\ interests}{D}$ from the profit and loss statement). Two types of risk: (1) unsystematic variability in cash flows unique to the firm (it can be diversified away) and (2) systematic risk.

The advantage of using debt instead of equity as capital: the interest payments on debt are tax deductible. However, the greater the debt, the greater the interest expense and the probability, so much so that the firm will be unable to meet its expenses.

Many possible values for each input variable (such as demand, price, labour cost, etc.) can be incorporated to estimate net present values (NPVs) under alternative scenarios and then derive a probability distribution of the NPVs. When the WACC is used as the required rate of return, the probability distribution of NPVs can be assessed to determine the probability that the foreign project

will generate a return that is at least equal to the firm's WACC. If the probability distribution contains some possible negative NPVs, this suggests that the project could backfire.

**Literature**

Madura: Chapter 17: Multinational Cost of Capital and Capital Structure

- **E=shareholders' equity *(BS)***
  - $r_e = r_f + (r_m + r_f) * \beta_{sector}$
    - $r_f$: 10y gov bond yield
    - $r_m$: stock market index (exponential moving average)
    - $\beta_{sector}$ : Damodaran-database
      - http://www.stern.nyu.edu/~adamodar/New_Home_Page/datafile/variable.htm
- **D=long term liabilities**

$$r_d = \frac{paid\ interest\ (PLS)}{long\ term\ liabilities\ (BS)}$$

- **Salvage value**
  - Marketable long term assets:
    - Real estates – 5 year depreciation *(BS)*
    - Vehicles – 5 year depreciation *(BS)*
    - *Anything what we can sell on the market*
    - *Market value: book value Vs Discounted cashflow of the asset*
  - Cash reserves

**Literature**

Madura: part 1, chapter 1

Frykman, D. – Tolleryd, J. (2003): Corporate valuation: an easy guide to measuring value. Pearson, London

## 3. Company valuation in the case study

*Please evaluate your company's fundamental value! What is the fundamental value of your shares? Please summarize the following variables:*

- *Free Cashflow*
- *WACC%*
- *Discounted cashflow*
- *Salvage value*
- *Total UEAE value*
- *UEAE value/shares*

**Cash-flow status of the company**

The efficiency of the company was poor, presenting a 302 million HUF Free Cash Flow on a yearly basis. The new strategy allows us to increase it to 2 066 million HUF, after the modernization of the locomotive.

The old corporate bond which funded the company in the long run has expired. Earlier, its fixed interest rate was 8% while the debt was 2 million EUR. After the reorganization, the company issued new corporate bonds with floating interest rate (r=EURIBOR 12M+2%) and collected 1.49 million

EUR. The company reduced its debt from the cash reserves – this is why the company needs short-term funding (82 500 EUR/year).
The weighted average cost of capital (WACC) was 4.54% but after the debt reduction and initiation of the short term funding strategy the new WACC is 3.54%.
The company doesn't allocate resources to hedge its foreign exchange exposures.
Assuming that the company could follow the previous or the new strategy, the discounted cash flows are changing from 1.323 billion HUF to 9.32 billion HUF.

**Salvage value**

The company can sell its locomotive and real estates in case of liquidation. Originally 296 million HUF could be realized, the new strategy provides 730 million HUF as salvage value 5 years ahead.

**Valuation**

The original company had an estimated 1.6 billion HUF value, with 162 HUF reasonable share price. The strategy would allow us to increase it to 10.05 billion HUF with 1005 HUF share price.
Assuming that an investor would purchase a 60% package for 972 million HUF and would be able to sell it for 6 billion HUF after the implementation of this strategy. The added value of this strategy is 5 billion HUF.

## 4. Matlab code for DCF valuation

```
% Free Cash Flow
CIT_rate=0.19;
corporate_income_tax=;
gained_interests=;
paid_interests=;

taxes=corporate_income_tax+gained_interests*CIT_rate+paid_inte
rests*CIT_rate
current_asset=;
accounts_payable=;
other_short_term_liabilities=;
    floating_capital=current_asset-accounts_payable-
other_short_term_liabilities
EBIT=;
spending_on_investements=;
amortization=;
    FCF=EBIT-taxes-
spending_on_investements+amortization+floating_capital

% Weighted average cost of capital
common_stock=;
reained_earnings=;
    Shareholders_equity=common_stock+reained_earnings
beta_sector=1.79; %transportation, railroad, emerging
http://pages.stern.nyu.edu/~adamodar/
dBUX=;
HU10Y=;
    r_e=HU10Y+(dBUX-HU10Y)*beta_sector
```

```
debt=;
    r_d=paid_interests/debt
WACC=r_e*Shareholders_equity/(Shareholders_equity+debt)+r_d*de
bt/(Shareholders_equity+debt)*(1-CIT_rate)

% Discounted Cashflow
t=5;
DCF=FCF/(1+WACC)^t

% Union of European Accounting Experts (Goodwill-based)
valuation
    %Salvage value:
    real_estates=;
    vehicles=;
    cash=;
        SV=real_estates+vehicles+cash-amortization*t-debt
UEC_value=DCF+SV/(1+WACC)^t
```

# V. Exercise 4 – Tax optimization

*After the reorganization, the company will have the potential of generating _____ million HUF pre-tax profit as well as _____ million HUF profit after taxation and dividends.*
*The question is: how can we increase the efficiency of this money generating process through optimized taxation?*
*Let's compare the original and an offshore strategy (it's up to you, see lecture slides), supposing constant cash-flows, exchange rates and the following interest rates: 3% for EUR and 4% for HUF. The two alternatives can be compared via future value annuities. Please compare your results!*
*Databases:*
*tax rates: https://home.kpmg.com/xx/en/home/services/tax/tax-tools-and-resources/tax-rates-online/corporate-tax-rates-table.html*
*countries: https://www.offshorecompany.com/company/*

## 1. Offshoring and backshoring

- Offshoring:
  - the location of firms' activities in foreign countries irrespective of the governance mode
  - early 1990s
  - by Western manufacturing companies in order to maintain or to foster their *competitive* advantage
- last decade a counter trend
  - Companies that had offshored their production have started bringing production back to their home countries
- reshoring
  - "the relocation of value creation tasks from offshore to geographically closer locations […] irrespective of the ownership mode"
  - Backshoring: relocation back to the home country of the firm
  - Nearshoring: relocation to a location closer to (but not within) the home country
- full outsourcing:
  - the vendor provides services to the client as specified in a commercial contract
  - work is actually performed at the vendor's discretion (service-level requirements)
- captive center (critical mass of work )
  - company builds an entire service operation from scratch
  - wholly owned
- "collaborative" model
  - Between full outsourcing and a pure captive - hires an outside service provider in the chosen offshore market to help set up an offshore service center on the company's behalf
  - "build-operate-transfer" (BOT) model:
    - vendor initially builds and operates the center and eventually hands over ownership to the parent company
  - "assisted captive" model:
    - vendor assists the parent company to build the center but the actual work is performed by the parent company
  - "joint venture" model:
    - the service center is set up as a joint venture between the parent company and the vendor

- Backshoring motivations
  - managerial errors such as insufficient planning and knowledge of the offshore location (Resource Based View):
    - firm's inability to develop distinctive resources abroad, and/or to properly exploit the host country's resources
  - contingencies and changes in the offshore or home country environment,
    - rising total costs of ownership in China, or
    - the lower costs of energy in the West
    - Internalization Theory: backshoring can be explained by changes in the fundamental characteristics of the world economy
    - Dunning's eclectic paradigm: interprets backshoring as a response to a deterioration of one or more of the offshore location advantages
    - productivity improvement due to production rationalization
  - inability of firms to solve complex challenges created by offshore production (Transaction Cost Economics)
    - higher control and coordination costs of globally extended supply chains
    - repatriating production activities to better connect R & D, engineering and manufacturing units
  - consumers' pressures on companies ("made in" effect): higher value consumer goods
- two variables:
  - the company's strategic goal
  - increasing customer perceived value vs. improving cost-efficiency
  - Value: perceived quality - product innovation - customer services
  - Efficiency: lower unit of labour costs or higher labour productivity, benefits from automation, shorter logistics lead times, lower inventories, psychic distance, lower monitoring costs
- the predominant factors
  - internal to the company vs. relating to the external environment

**Literature**

Mauro C. D. et al. (2018): Offshoring and backshoring: A multiple case study analysis. Journal of Purchasing and Supply Management, 24 (2) p. 108-134

**Reading**

https://www.ssonetwork.com/business-process-outsourcing/articles/offshoring-support-services-outsourced-or-captive

## 2. Tax havens

### *a) Basics*

- Definition
  - identifies an area as a tax haven is the existence of a composite tax structure established deliberately to take advantage of, and exploit, a worldwide demand for opportunities to engage in tax avoidance
- ***Four key factors:***
  - No or nominal tax on the relevant income;
    - Level of taxes

        - Treaty network
        - Tax incentives
        - Stability of tax laws
    - Lack of effective exchange of information, transparency;
    - Non-tax factors :
        - Political and economic stability
        - Availability of professional services
        - Access to capital markets and other sources of finance
        - Exchange control and currency restrictions
        - Initial formation and recurring costs
    - *No substantial activities*
- OECD: Important aspects
    - The 'no or nominal tax' criterion is not sufficient, by itself, to result in characterization as a tax haven
    - The 'no substantial activities' criterion was included in the 1998 Report as a criterion for identifying tax havens because the lack of such activities suggests that a jurisdiction may be attempting to attract investment and transactions that are purely tax driven
    - In 2001, the OECD's Committee on Fiscal Affairs agreed that this criterion would not be used to determine whether a tax haven was co-operative or un-cooperative
- Usage of tax havens
    - The 'no or nominal tax' criterion is not sufficient, by itself, to result in characterization as a tax haven
    - The 'no substantial activities' criterion was included in the 1998 Report as a criterion for identifying tax havens because the lack of such activities suggests that a jurisdiction may be attempting to attract investment and transactions that are purely tax driven
    - In 2001, the OECD's Committee on Fiscal Affairs agreed that this criterion would not be used to determine whether a tax haven was co-operative or un-cooperative
- Legal entities
    - Offshore International Business Corporation
    - Offshore Limited Liability Company
    - Offshore Trusts & Foundations
        - Offers asset protection as legal ownership no longer vests with settler
        - But settler continues to enjoy control / benefits -Foundations are legal entities unlike Trusts
        - All types of assets (tangible & intangible) can be held including shares in a corporation which in turn may undertake commercial activities


- 

## TOP TEN TAX HAVENS

| (Billions of $) | 2012 | 2013 | 2014 |
|---|---|---|---|
| BARBADOS | 64.4 | 64.5 | 71.2 |
| CAYMAN ISLANDS | 28.7 | 32.3 | 36.6 |
| LUXEMBOURG | 26.6 | 36.6 | 31.1 |
| BERMUDA | 13.7 | 16.9 | 17.8 |
| IRELAND | 12.0 | 15.5 | 15.3 |
| SWITZERLAND | 3.6 | 8.7 | 11.3 |
| HONG KONG | 3.5 | 4.4 | 6.1 |
| CYPRUS | 4.8 | 4.1 | 4.4 |
| SINGAPORE | 2.0 | 2.8 | 3.0 |
| BRITISH VIRGIN ISLANDS | 1.5 | 1.7 | 1.9 |
| TOTAL* | 160.8 | 187.5 | 198.7 |

SOURCE CANSIM Table 376-0051. Compiled by Canadians for Tax Fairness. * These figures do not include money sent offshore by individuals. It reflects the amount sent by registered corporations using the tax loophole options created for them by the Canadian government

- 
- Types
  - Base Havens:

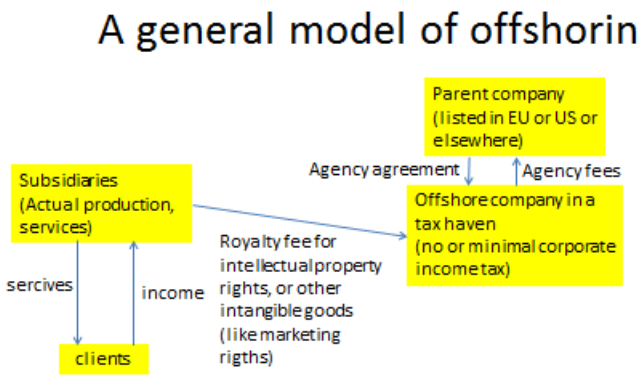
        - Traditional offshore centers with nil or very low tax on corporate or business income
        - Few or no treaties
        - Charges fees in lieu of taxes
        - No Exchange Control
        - High Level of Banking and Commercial Secrecy
        - Less Chances of Exchange of Information
        - Scant regulatory norms
        - Primary Use – to collect and accumulate income in tax free / low tax environment; safe haven for undeclared funds
    - Treaty Havens:
        - Traditional offshore centers with reasonable domestic tax rates
        - Special tax regimes that allow the use of their treaty network for offshore activities
        - NIL withholding taxes on inbound and outbound income
        - Primary Use: Flow through income with low or NIL taxes

| **Particular** | **Example of Countries** |
|---|---|
| No corporate tax | Bermuda, Cayman Island |
| low-taxed countries | Hong Kong, Ireland, Jersey |
| Jurisdictions with no (or very few) tax treaties that offer nil (or very low) or negotiated tax regimes for offshore entities | British Virgin Islands, Cook Islands, US Virgin Islands |
| No or nil tax regimes for offshore companies with the benefit of tax treaties | Cyprus, Malaysia, Mauritius |
| Fiscally beneficial regimes for intermediary holding finance or licensing companies with full benefits of treaty network | Austria, Belgium, Denmark, France, Germany |
| Special tax concessions for entities engaged solely in management services and coordination activities | Belgium, Denmark, France, Germany, Malaysia |
| Jurisdictions with fiscal incentive for new residents | Ireland, Israel |
| Retirement havens for high net worth individuals | Cyprus, Sri Lanka |
| Offshore jurisdictions for estate planning or asset protection trusts | Bahamas, Cayman Island |
| Special incentives for shipping operations | Singapore, Cyprus |
| Encourage captive insurance activities | Ireland, Mauritius |

- Effects
    - Integrated financial markets pose new global challenges
    - Opportunities for illicit activities:
        - Money laundering
        - Misuse of corporate vehicles
        - Terrorist financing

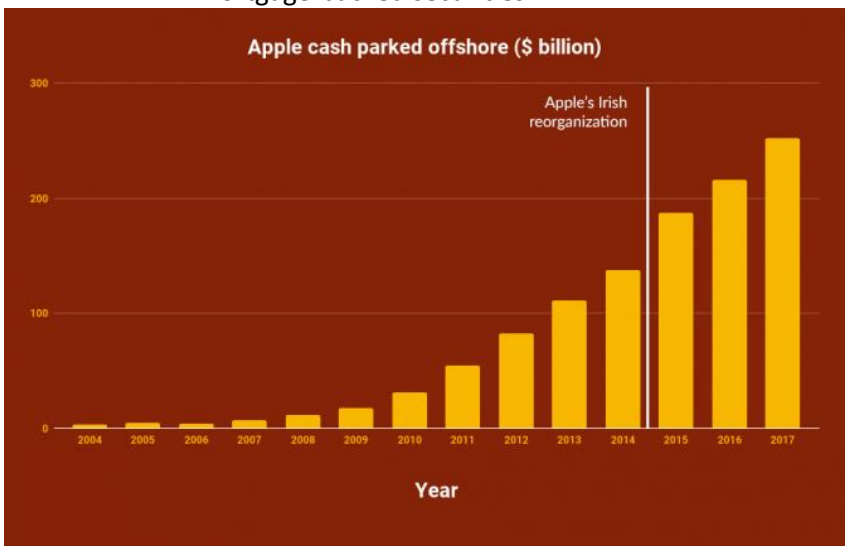
        - Tax abuse
        - Threats to stability of financial system
        - All activities which thrive in climate of secrecy, non-transparency and non-cooperation
    - Treaty shopping: Routing of income arising in one country to a person in another country through an intermediary country to obtain the tax advantage of tax treaties
    - Round Tripping: Flow back of money into the country sent out through hawala
    - Escaping the regulatory regime of home country
    - Revenue implications of the illegitimate use of tax havens can be serious; it is estimated that developing countries lose as much as US $50 billion per year in tax revenue
    - But Tax Havens have following positive aspects:
        - Offers legitimate tax planning opportunities
        - Provides a neutral regulatory environment for residents of other countries to do business e.g. collective investment funds; captive insurance
        - Can be used for non-commercial reasons
        - Offers tax competition which is a healthy disciplining force. It is the only competition governments of different jurisdictions have
- Broader impacts
    - It undermines the fairness and the integrity of the tax system
    - It either:
        - Restricts the ability of the government to reduce tax rates for all
        - Requires the government to increase tax rates on labour or consumption with negative impact on labour markets
        - Or forces expenditure cuts
        - Or raises deficit
    - As a matter of public policy, condoning tax abuse is bad politics
- Global response (fiscal policy)
    - Launching the FATF (Financial Action Task Force)
    - Creating the FSF (Financial Stability Forum)
    - Creating the OECD Forum on Harmful Tax Practices
    - Parallel tracks but common goals:
        - To improve transparency
        - To raise governance standards in financial centers
        - To encourage cooperation to counter abuse
    - Limitation of Benefits clause in DTAAs (Double taxation)
    - Treaty override
    - Anti – avoidance measures

### *b) Strategies*




- Territorial scheme
  - nation will **tax** income generated within its borders, regardless of whether the corporation is domestic or foreign
  - **parent** company (in Country A) with a subsidiary (in Country B)
  - pay **tax** according to Country A's provisions for the parent company's income, and according to Country B's tax law for the subsidiary's income
- Foreign trade - offsite pricing
  - imported into the U.S.:
    - invoiced through a company established in one of the tax havens
  - Products exported from the U.S.
    - „sold" first to a tax haven company to drop most of the profit in the no tax jurisdiction
  - importing cheese from Holland
    - set up a company in the Bahamas to buy the cheese
      - buys $100,000 worth of cheese from Holland
      - sells the cheese to you in America for $150,000
    - sell for $200,000 to US supermarkets
      - gross profit is only $50,000 not $100,000 in the US
      - other $50,000 in profit was earned by the Bahamas company where there is no income tax
  - U.S. company sells T-shirts to France for gross of $300,000 ($3 per shirt)
    - company in Hong Kong at a price of $1.50 per shirt
      - no tax on this income
    - sells the shirts to France for the full $3
    - → U.S. company now has gross income of only $150,000
- Receive royalty income from patents or copyrights
  - book authors, software developers, and inventors
  - rights to offshore companies and
  - have the funds collected in a tax haven jurisdiction
- **Apple**

- Ireland:
  - company can collect profits through one subsidiary with *Irish tax residence*
  - and shift the profits to a **second** Irish subsidiary with *tax residency in a low-tax haven*
  - intangible asset tax reliefs
  - *$1.5 billion in tax there – 7 percent of all corporate income taxes paid in that country*
- Apple Sales International and Apple Operations International in Jersey (English Channel island):
  - no tax on corporate profits for most companies
    - crown dependency of the United Kingdom, but it makes its own laws, sets its own tax rates and is not subject to most European Union legislation
  - „Confirm that an Irish company can conduct management activities . . . without being subject to taxation in your jurisdiction."
  - "Are there any developments suggesting that the law may change in an unfavourable way in the foreseeable future?"
  - Apple Sales International holds 60% of its **non-U.S.** earnings
    - two-thirds of its worldwide profits were made in other countries
  - Apple Operations International: cash manager
    - portfolio that includes corporate bonds, government debt and mortgage-backed securities



Source: SEC

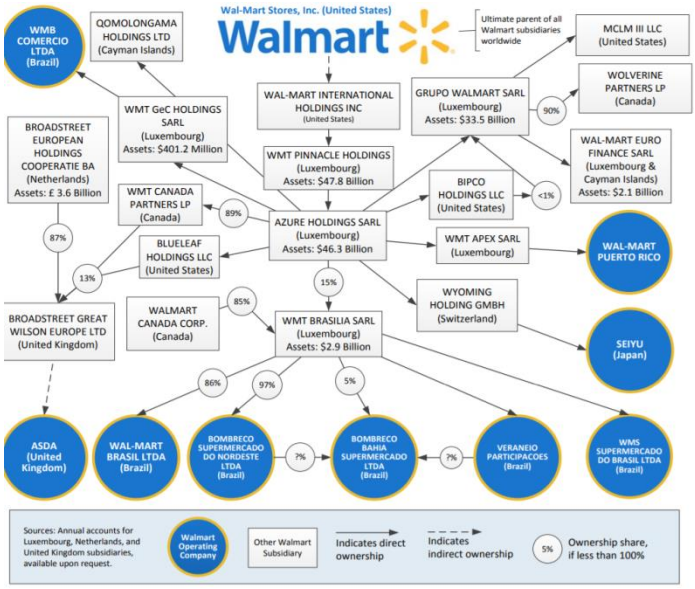

- Taxation in Ireland based on management and control; in USA: place of formation
- Apple Operations International (Ireland, no tax residence – not controlled or managed in Ireland, but is not in the US)
- Apple Operations Europe (Ireland, no tax residence

- Reading:
  - https://www.icij.org/investigations/paradise-papers/apples-secret-offshore-island-hop-revealed-by-paradise-papers-leak-icij
  - https://itep.org/shopping-for-a-tax-haven-how-nike-and-apple-accelerated-their-tax-avoidance-strategies-according-to-the-paradise-papers

- **Google**
  - international operations is headquartered in Dublin
    - international company purchases advertisements
  - the office accommodates over 2,000 employees and claims 88% of Google's $12.5 billion in foreign sales
    - earnings do not remain in the Ireland office, the company is exempt from paying 12.5% corp. income tax
    - payment is first directed to the Netherlands (EU member states), "post box office,"
    - passes approximately 99.8% of the original payment from the customer to Bermuda
  - most profits are directed to a tax haven in Bermuda (no corporate income tax)
  - Effective tax rate of 2.4% on foreign earnings
- **Nike**
  - Pre-2014 Nike International Ltd.: trademarks were owned by a Bermudan subsidiary
    - charge royalty fees for use of the logo in Europe
    - island of Bermuda: profits were taxed at a rate of 0 percent
    - no employees or offices in Bermuda
  - Post-2014 Nike Innovate CV (new Dutch subsidiary)
- **Walmart**
  - established at least 78 subsidiaries and branches in 15 overseas tax havens
    - never listed any of them on Exhibit 21 ("Subsidiaries") of the company's annual 10-K filing with the SEC
  - Walmart's foreign operating companies are owned through subsidiaries in tax havens

- Walmart has transferred ownership assets to its Luxembourg subsidiaries (companies in Brazil, Japan, Puerto Rico and South Africa), total of $64.2 billion
  - paying less than 1 percent in tax to Luxembourg on $1.3 billion in profits

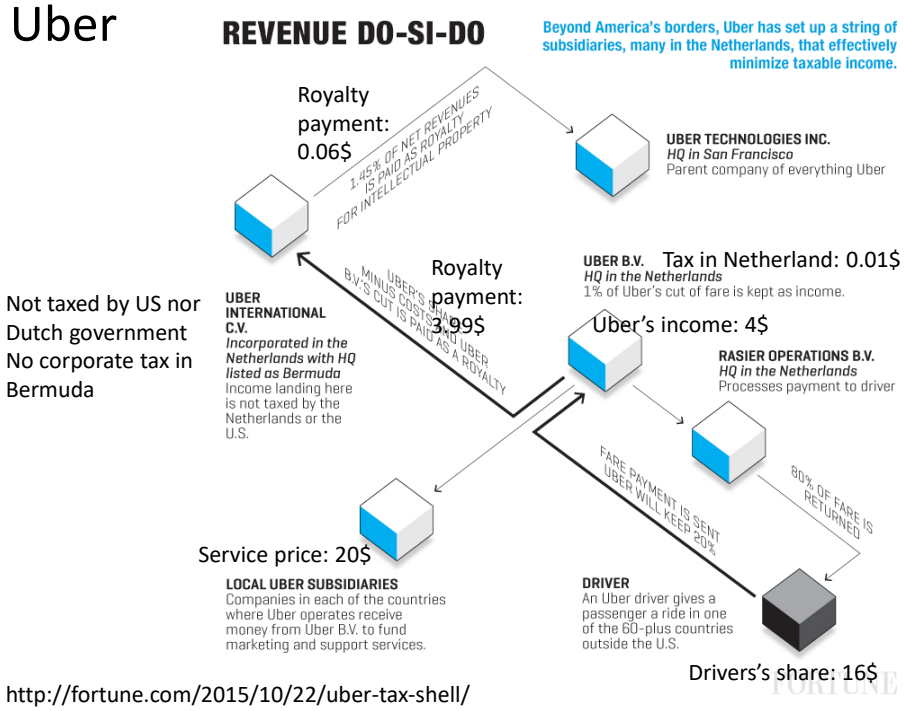
- Walmart took $2.4 billion in low-interest, short-term loans from subsidiaries in tax havens
  - making phantom interest payments to Wal-Mart International Holdings, Inc. in the United States
  - some of its foreign operating companies to take out long-term loans from Walmart subsidiaries in tax havens




- Reading:
  - https://americansfortaxfairness.org/files/TheWalmartWeb-June-2015-FINAL.pdf

- **Uber**

Uber




http://fortune.com/2015/10/22/uber-tax-shell/

**Literature**
Przychocka I. (2013): Methods of making use of tax havens. Finanse, 6 (1) p. 125-145
Julia Galica (2015): Corporate Tax Havens: Analysis of an Aggressive Tax Approach as a Strategic Necessity for Large Multinational Corporations. Honors Scholar Theses. 436
**Reading**
https://www.rjmintz.com/offshore-havens/common-tax-strategies

## 3. Tax optimization in the case study

After the reorganization, the company will have the potential of generating 1044.48 million HUF profit after taxation and dividends[6] being reinvested into the enterprise. The question is: how can we increase this amount of money through the optimized taxation of the 1611.85 million HUF pre-tax profit?
Let's compare the original and an offshore strategy, supposing constant cash-flows, exchange rates and the following interest rates: 3% for EUR and 4% for HUF. The two alternatives were compared via future value annuities.
Further analysis based on the KPMG's Corporate tax rates table: Bahamas has no corporate income taxation and the maximum authorized share capital is $5,000 USD, for the minimum Government fees.
**Accumulation in the original strategy:**

- The company has 1044 million HUF as profit after taxation, which can be theoretically invested into a bank deposit for 10 year with 4% interest rate, where 12 540,19 million HUF would be accumulated:
- *=JBÉ(0,04;10; 1044)* in HU, *=FV(0,04;10; 1044)* in EN in Excel.

[6] Considerations: 1 Transmontana locomotive is used and minimal cost short term funding is applied.

**Our offshore-strategy is:**

- Flatland International Ltd. registered on Bahamas as the owner of the "Flatland" trademark in the Czech Republic and Austria. It charges royalty fees for use of the logo in Czech Republic and Austria, for 1.5 million EUR/year (or 41.45 million CZK/year) fee in each countries.
- Planning with a 3 million EUR accumulation and 3% interest rate for 10 years, this subsidiary can accumulate 34.39 million EUR in this subsidiary as a reserve for further business expansion: =JBÉ(0,03;10;3) in HU, =FV(0,03;10;3) in EN
- The remaining 432 million HUF profit will be reinvested in a bank deposit with an estimated 4% interest rate, where the result would be 5188.13 million HUF: =JBÉ(0,04;10;432) in HU, =FV(0,04;10;432) in EN.
- Total accumulation: 16021.5 million HUF.

# VI. Exercise 05 – Forecasting corporate defaults

*Please compute the Altman Z and Ohlson O scores for the original and the modified company!*

## 1. Traditional methods

Bankruptcy forecasting was initiated by the multivariate discriminant analysis of Altman (1968) as the Altman-Z model for public traded enterprises. Later on other approaches were published like the logit model of Ohlson (1980), Taffler's (1984) modified Z and Zmijewski's (1984) probit model. Since then, these are the most popular methods next to the neural networks and contingent claims analysis (Jackson – Wood 2013) and they provide similar results for the companies (Agarwal – Taffler 2008, Altman 2017).

The Altman-Z (1968) model was the first multivariate default-model for public-listed enterprises in the manufacturing sector – based on their liquidity, profitability and funding conditions. Later on, it was modified to study private firms as well (Altman 1977, Altman 2000), often referred as Altman-Z':

*Z' = 0.717X1 + 0.847X2 + 3.107X3 + 0.420X4 + 0.998X5*

*X1 = (current assets − current liabilities) / total assets*

*X2 = retained earnings / total assets*

*X3 = earnings before interest and taxes / total assets*

*X4 = book value of equity / total liabilities*

*X5 = sales / total assets*

Companies under Z'<1.23 have 95% chance to go default in the next business years (it is 72% two years later and 48% three years later), while this chance is minimal above 2.9 (Altman 2000, Betts 1987, Kotormán 2009).

The original Altman-Z score has been modified many times in the last 50 years to fit private or non-manufacturing enterprises (Altman 2000).

The Ohlson-O model based on a logistic regression (Ohlson 1980), and it represents the probability of default within the next two years for P>0,5 under 96% reliability:

*O=-1,32-0,407*log(TA/GNP)+6,03*TL/TA-1,43*WC/TA+0,0757*CL/CA-1,72*X-2,37*NI/TA-1,83*FFO/TL+0,285*Y-0,521*(NIt-NIt-1)/(abs(NIt)-abs(NIt-1))*

$$P = \frac{e^O}{1-e^O}$$

*TA = total assets*

*GNP = Gross National Product price index level*

*TL = total liabilities*

*WC = working capital*

*CL = current liabilities*

*CA = current assets*
*X = 1 if TL > TA, 0 otherwise*
*NI = net income*
*FFO = funds from operations*
*Y = 1 if a net loss for the last two years, 0 otherwise*

The Ohlson-O score has lower popularity in the literature: the Ebsco database accounts for 172 articles which is remarkably lower than the appearance of the Altman-Z score (N=2536). However, it can be converted to an exact default-probability instead of thresholds and the relative size of the company was involved to consider the too-big-to-fail effect as well as the cash-flow.
The combined use of the Altman-Z and Ohlson-O methods was suggested by Dichev (1998) due to their different econometric fundaments (discriminant analysis and logit regression) and different calibration background (samples from the 1960's and the 1970's).

**Literature**

Altman, E. I. (2000): Predicting Financial Distress of Companies: Revisiting the Z-Score and Zeta models. Journal of Banking and Finance, 1, p. 1-51
Ohlson, J. A. (1980): Financial ratios and the probabilistic prediction of bankruptcy. Journal of Accounting Research, 18, p. 109-131

## 2. Rating agencies

This section summarizes the Standard & Poor's approach to rate nonfinancial corporations.

**Stand-alone credit profile**

- **Business risk profile**: *risk/return potential for a company* in the markets in which it participates, the *country risks* within those markets, the competitive climate within those markets (its industry risk), and the competitive advantages and disadvantages the company offers within those markets. The business risk profile affects the amount of financial risk that a company can bear at a given stand-alone credit profile and constitutes the foundation for a company's expected economic success. The assessments of country risk, industry risk, and competitive position are combined to determine a corporate issuer's business risk profile. Business risk profile assessments range from "excellent" (highest) to "vulnerable" (lowest).
    - Industry risk: competitive climate within those markets (scored 1-6)
        - Cyclicality: degree of revenue and profitability cyclicality
        - Competitive risk and growth environment
            - The effectiveness of industry barriers to entry;
            - The level and trend of industry profit margins;
            - The risk of secular change and substitution by products, services, and technologies;
            - The risk in industry growth trends.
    - Country risk: broad range of factors that can affect credit quality, which arise from doing business from or within a specific country
    - Competitive position: advantages and disadvantages the company offers
        - Competitive advantage
        - Scale, scope, and diversity
        - Operating efficiency
        - Profitability

- **Financial risk profile:** The financial risk profile is the outcome of decisions that *management* makes in the *context of its business risk profile and its financial risk tolerances*. This includes

decisions about the manner in which the company is *funded* and how its *balance sheet is constructed*. It also reflects the relationship of the *cash flows* the organization can achieve, given its business risk profile, relative to its financial obligations. Cash flow/leverage analysis is used to determine a corporate issuer's financial risk profile assessment. Financial risk profile assessments range from "minimal" (least financial risk) to "highly leveraged" (greatest financial risk).

- Cash flow/leverage: pattern of cash flow generation, current and future, in relation to cash obligations is often the best indicator of a company's financial risk.
  - funds from operations (FFO) to debt
  - debt to EBITDA
  - payback ratios
    - cash from operations [CFO] to debt
    - free operating cash flow [FOCF] to debt
    - discretionary cash flow [DCF] to debt
  - coverage ratios
    - [FFO+ interest] to cash interest
    - EBITDA to interest

**Modifiers**

- Diversification/portfolio effect (for conglomerates): to capture the value of diversification or the portfolio effect for a company that has multiple business lines
  - how meaningful the diversification
  - degree of correlation in each business line's sensitivity to economic cycles
- Capital structure
  - Currency risk of debt
  - Debt maturity profile
  - Interest rate risk of debt
  - Investments
- Financial policy: short-to-medium term event risks or the longer-term risks stemming from an issuer's financial policy
  - over a longer time horizon, the firm's financial policies can change its risk profile based on management's appetite for incremental financial risk or, conversely, plans to reduce leverage
- Liquidity: the sources and uses of cash
  - potential for a company to breach covenant tests related to declines in EBITDA
  - ability to absorb high-impact, low-probability events
  - the nature of bank relationships
  - the level of standing in credit markets
  - the degree of prudence of the company's financial risk management
- Management and governance: broad range of oversight and direction conducted by an enterprise's owners, board representatives, executives and functional managers
  - strategic competence
  - operational effectiveness
  - ability to manage risks
- Comparable ratings analysis: issuer's credit characteristics in aggregate

**Group or government influence:** assessment of likely extraordinary group or government support (or conversely, negative intervention) factors into the issuer credit rating on an entity that is a member of a group or is a government-related entity.

- identify the members of the group
- determine a group credit profile
- assess the status of an entity within the group and the resulting likelihood of support
- and combine the entities' stand-alone credit profile with the support conclusion
- five categories of group status:
    - "core,"
    - "highly strategic,"
    - "strategically important,"
    - "moderately strategic,"
    - "nonstrategic."

**Literature:**

S&P (2014): How Standard & Poor's Rates Nonfinancial Corporate Entities. Standard and Poor's Rating Serivces https://www.spratings.com/documents/20184/774196/HowWeRateNonFinCorps.pdf

## 3. Financial distress in the case study

*Please compute the Altman Z and Ohlson O scores for the original and the modified company!*

***SAMPLE***

The corporate strategy was renewed at the beginning of the year, including:

- A new locomotive (2.6 m EUR)
- Reduced expenditures (maintenance and traction electricity bills)
- Reduced long-term debt (1.49 m EUR)
- Emptied cash reserves (bank deposits: 0)
- A need for short-term funding on min cost basis (82 500 EUR/year)

Financial distress conditions are measured via Altman-Z' and Ohlson-O ratios in this report.

- Altman-Z' (private companies, Altman 2000[7]): Z= 0,717*A + 0,847*B + 3,107*C + 0,420*D + 0,998*E
    - A = (current assets − current liabilities) / total assets
    - B = retained earnings / total assets
    - C = earnings before interest and taxes / total assets
    - D = book value of equity / total liabilities
    - E = sales / total assets

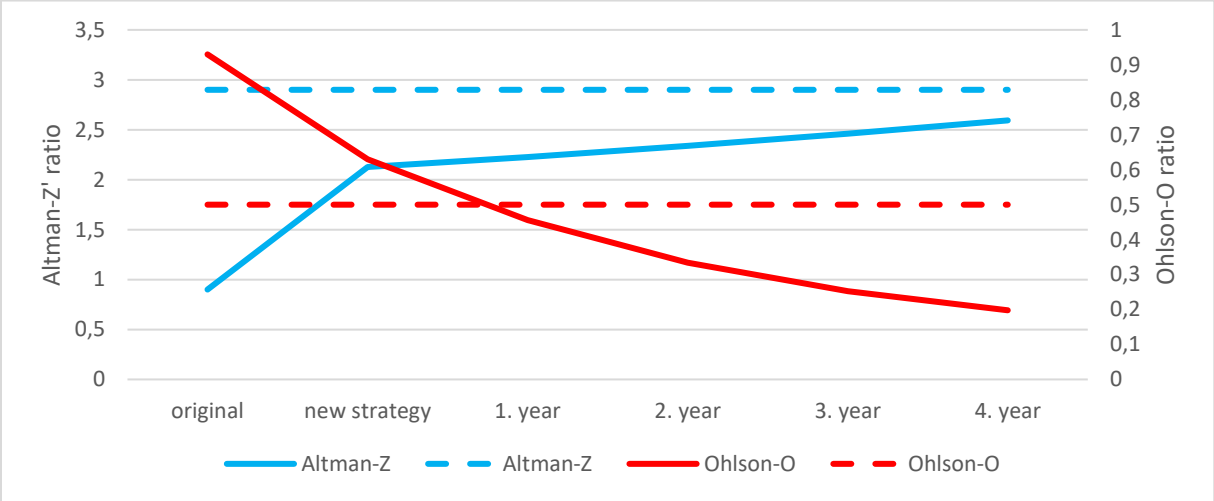
      Zones of discrimination:
      Z' > 2.9 – "Safe" Zone
      1.23 < Z' < 2.9 – "Grey" Zone
      Z' < 1.23 – "Distress" Zone
- Ohlson-O (1980)[8]: O=-1,32-0,407*log(TA/GNP)+6,03*TL/TA-1,43*WC/TA+0,0757*CL/CA-1,72*X-

[7] Altman, E. I. (2000): Predicting Financial Distress of Companies: Revisiting the Z-Score and Zeta models. *Journal of Banking and Finance*, 1, 1-51.

2,37*NI/TA-1,83*FFO/TL+0,285*Y-0,521*(NIt-NIt-1)/(abs(NIt)-abs(NIt-1))

- TA = total assets
- GNP =
- TL = total liabilities
- WC = working capital
- CL = current liabilities
- CA = current assets
- X = 1 if TL > TA, 0 otherwise
- NI = net income
- FFO = funds from operations
- Y = 1 if a net loss for the last two years, 0 otherwise

The original setup presented high financial distress level as Altman-Z' was 0.9 (red zone: 1.23) and Ohlson-O was p=0.93, representing the unprofitability of this company.
The new strategy decreased these ratios towards more sustainable levels, however the lack of cash reserves had their adverse impacts.




As time passes and company makes 1.027 billion HUF in each year approximately, the financial distress signals are decreasing even further – representing a sustainable design.
Both approaches provided similar results, so the assumptions about the financial distress of the restructured company seems to be robust.

[8] Ohlson, J. A. (1980): Financial ratios and the probabilistic prediction of bankruptcy. *Journal of Accounting Research*, 18, 109-131.

# VII. Exercise 6 – Exchange rate risk management

*Please test your strategy not under EUR=315, CZK=11.4 and BUBOR=0.0211 or EURIBOR=0.00263 but under the following unlucky conditions as well: EUR=300, CZK=13 and BUBOR=0.05 or EURIBOR=0.04. What is happening with your pre-tax margin? If you are under the market average of pre-tax margin=30%, how could you modify your own strategy to perform better?*

*Please introduce your hedging strategy!*
*1. Size of currency exposure in each currency*
*2. Required change of the exchange rate (appreciation or depreciation)*
*3. Which hedging strategy is preferred by you for EURHUF and CZKHUF? No hedge, total hedge, partial hedge?*
*4.a If no hedge is selected: what is happening with the pre-tax ratio under 10% de- and appreciation of the HUF?*
*4.b Elseif total hedge is selected: total expenditure of the option contract(s)? It impact on pre-tax ratio.*

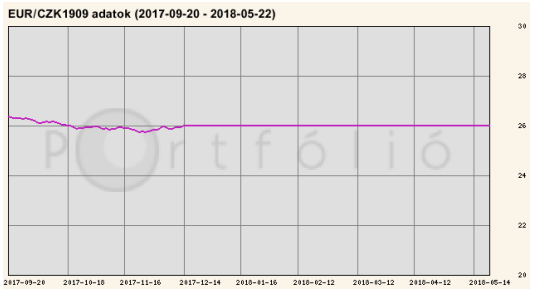
## 1. Exchange rate behaviour - Forecasting exchange rates

**Database:**
Stooq.com - https://stooq.com/t/?i=576
CME - https://datamine.cmegroup.com/#t=p&p=cme.dataHome

**Exchange rate forecasting: spot: 25.84 EURCZK (November 8, 2018)**

- Historical EURCZK (daily): *Czech Koruna has a tendency towards appreciation*


- Futures EURCZK for September 2019 delivery: *similar exchange rate is expected*



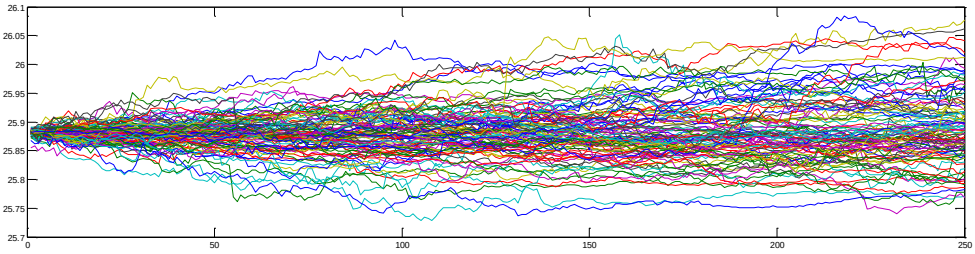

- A univariate simulation of EURCZK: *a minor depreciation is more possible*
  - APARCH(1,1,1) model with skewed-t distribution is fitted in Matlab (UCSD toolbox)

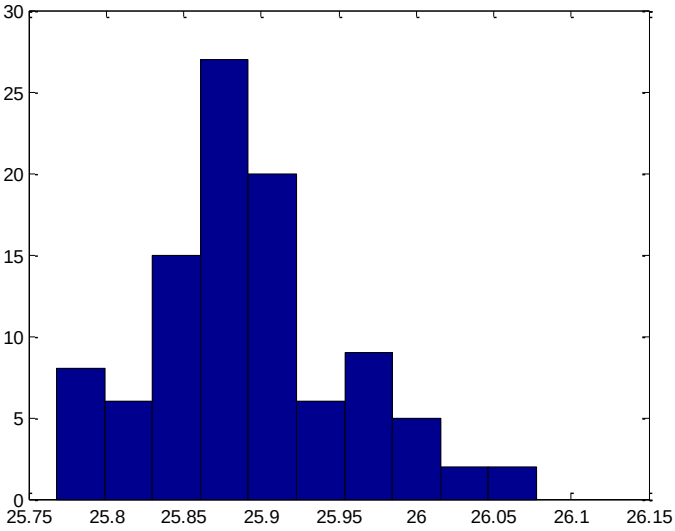
APARCH(1,1,1)
---
Loglikelihood: 25641.30
AIC: -4.3326

BIC: -4.3247

| | Parameters | Std. Err. | T-stat | P-val |
|---|---|---|---|---|
| omega | 0.0026 | 0.0000+0.0012i | 0.0000-2.1411 | 0.0323 |
| alpha(1) | 0.0796 | 0.0062+0.0000i | 12.7489+0.0000i | 0.0000 |
| gamma(1) | 0.1069 | 0.0619+0.0000i | 1.7276+0.0000 | 0.0841 |
| beta(1) | 0.9202 | 0.0000+0.0020i | 0.0000-461.0323 | 0.0000 |
| delta | 0.3000 | 0.0000+0.0316i | 0.0000-9.4935 | 0.0000 |
| nu | 4.3448 | 0.2238+0.0000i | 19.4107+0.0000i | 0.0000 |
| lambda | 0.0335 | 0.0154+0.0000i | 2.1676+0.0000 | 0.0302 |

- Model is simulated 100 times with 240 iterations (~trading days in a year)




The exchange rate stays between the 25.7884-26.0132 range under 90% probability with an expected value of 25.8840.

```
ret=real(diff(log(eurczk)));
cd 'C:\Users\kiss.gabor\Documents\MATLAB\MATLAB\UCSD_toolbox\UCSD_toolbox'
[parameters, LL, ht, VCVrobust, VCV, scores, diagnostics] = aparch(ret, 1, 1, 1, 'SKEWT');
[text,AIC,BIC]=aparch_display(parameters,LL,VCV,ret,1,1,1,'SKEWT')
for j=1:100
[simulatedata(:,j), ht] = aparch_simulate(250,parameters,1,1,1,'SKEWT');
end
for j=1:100
   arf_sim(1,j)=eurczk(end,1)+simulatedata(1,j);
   for i=2:250
      arf_sim(i,j)=arf_sim(i-1,j)+simulatedata(i,j);
   end
end
Y(1,1) = prctile(arf_sim(end,:),5)
Y(2,1) = prctile(arf_sim(end,:),50)
Y(3,1) = prctile(arf_sim(end,:),95)
mean(arf_sim(end,:))
plot(arf_sim)
hist(arf_sim(end,:))
```

- International Fisher-rule of EURCZK (quarterly): *no causality between the exchange rate and the yield premium*
    - d(EURCZK)=DE10Y-CZ10Y

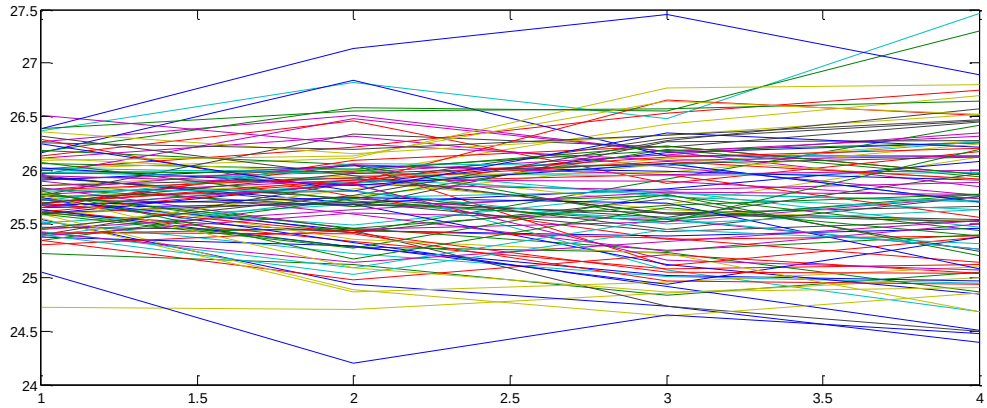
***** Vector Autoregressive Model *****

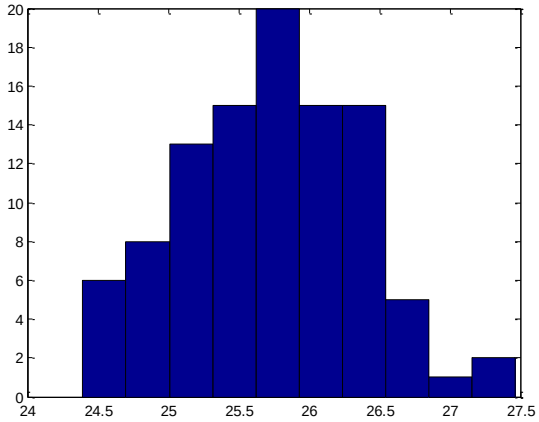
Equation 1
R-squared = 0.2687
Rbar-squared = 0.0859
sige = 0.4226
Q-statistic = 2.5021
Nobs, Nvars = 41, 9
**********

| Variable | Coefficient | t-statistic | t-probability |
|---|---|---|---|
| d(EURCZK) lag1 | -0.194153 | -1.245357 | 0.222043 |
| d(EURCZK) lag2 | -0.184022 | -1.210313 | 0.235023 |
| d(EURCZK) lag3 | -0.266358 | -1.821528 | 0.077887 |
| d(EURCZK) lag4 | -0.099236 | -0.686072 | 0.497609 |
| DE10Y-CZ10Y lag1 | 0.228472 | 0.557764 | 0.580887 |
| DE10Y-CZ10Y lag2 | -0.025583 | -0.038578 | 0.969466 |
| DE10Y-CZ10Y lag3 | -0.996132 | -1.464850 | 0.152718 |
| DE10Y-CZ10Y lag4 | 0.558548 | 1.248458 | 0.220921 |
| constant | -0.041738 | -0.363503 | 0.718620 |

```
cd 'C:\Users\kiss.gabor\Documents\MATLAB\MATLAB\JPL_toolbox'
quarterly(:,1)=diff(Close);
results = vare(quarterly,4)
prt(results)
```

- Enhanced simulation of a CCC-TARCH model (1,1,1) under the assumption of International Fisher-rule for EURCZK (quarterly)
    - d(EURCZK)=DE10Y-CZ10Y – Constant Conditional Correlation model






The exchange rate stays between the 24.6781- 26.7223 range under 90% probability with an expected value of 25.7450.

```
% CCC-GARCH
cd 'C:\Users\kiss.gabor\Documents\MATLAB\MATLAB\MFEToolbox\MFEToolbox'
[parameters_CCC, ll_CCC, Ht_CCC, VCV_CCC, scores_CCC] = ccc_mvgarch(quarterly,[],1,1,1,2);
for j=1:100
[simulatedata]=ccc_mvgarch_simulate(4,2,parameters_CCC,1,1,1);
sim_ccc(:,j)=simulatedata(:,1);
end
for j=1:100
    arf_sim_ccc(1,j)=Close(end,1)+sim_ccc(1,j);
    for i=2:4
        arf_sim_ccc(i,j)=arf_sim_ccc(i-1,j)+sim_ccc(i,j);
    end
end
Y(1,2) = prctile(arf_sim_ccc(end,:),5)
Y(2,2) = prctile(arf_sim_ccc(end,:),50)
Y(3,2) = prctile(arf_sim_ccc(end,:),95)
mean(arf_sim_ccc(end,:))
plot(arf_sim_ccc)
hist(arf_sim_ccc(end,:))
```

## 2. FX exposure in the case study

*Please test your strategy not just under EUR=315, CZK=11.4 and BUBOR=0.0211 or EURIBOR=0.00263 but under the following unlucky conditions as well: EUR=300, CZK=13 and BUBOR=0.05 or EURIBOR=0.04. What is happening with your pre-tax margin? If you are under the market average of pre-tax margin=30%, how could you modify your own strategy to perform better?*

**My profit and loss statement (under original conditions)**

*EUR=315, CZK=11.4, BUBOR=0.0211, EURIBOR=0.00263*

| | | Czech (CZK) | Austrian (EUR) | Hungarian (HUF) | Group (HUF) |
|---|---|---|---|---|---|
| Income | | 60 944 771 | 741 143 | 2 558 819 566 | 3 487 050 000 |
| Expenditures | railway usage fees | 52 808 771 | 345 815 | 115 768 116 | 826 719 830 |
| | electricity | 26 927 479 | 371 166 | 98 421 480 | 522 311 950 |
| | maintenance | 0 | 0 | 40 950 000 | 40 950 000 |
| | wages | 5 736 000 | 374 784 | 142 368 000 | 325 815 360 |
| | amortization (vehicle) | 0 | 0 | 40 950 000 | 40 950 000 |

| | | | | | |
|---|---|---|---|---|---|
| | amortization (building) | 2 400 000 | 0 | 48 000 000 | 75 360 000 |
| | rent | 0 | 20 544 | 0 | 6 471 360 |
| EBIT | | -26 927 479 | -371 166 | 2 072 361 970 | 1 648 471 500 |
| Financial profit | subsidiaries | 0 | 0 | 0 | 1 648 471 500 |
| | gained interests | 0 | 0 | 0 | 0 |
| | paid interests | 0 | 0 | 0 | 10 621 391 |
| Pre-Tax Profit | | 0 | 0 | 0 | 1 637 850 109 |
| Corporate income tax (19%) | | 0 | 0 | 0 | 311 191 521 |
| Profit after tax | | 0 | 0 | 0 | 1 326 658 588 |
| Dividend | | 0 | 0 | 0 | 265 331 718 |
| Profit for the year | | 0 | 0 | 0 | 1 061 326 871 |

*Pre-tax margin: 47%*

**My profit and loss statement (under much less optimal conditions)**

*EUR=300, CZK=13, BUBOR=0.05, EURIBOR=0.04*

| | | Czech (CZK) | Austrian (EUR) | Hungarian (HUF) | Group (HUF) |
|---|---|---|---|---|---|
| Income | | 60 944 771 | 741 143 | 2 306 375 077 | 3 321 000 000 |
| Expenditures | railway usage fees | 52 808 771 | 345 815 | 115 768 116 | 906 026 639 |
| | electricity | 26 927 479 | 371 166 | 98 421 480 | 559 828 429 |
| | maintenance | 0 | 0 | 40 950 000 | 40 950 000 |
| | wages | 5 736 000 | 374 784 | 142 368 000 | 329 371 200 |
| | amortization (vehicle) | 0 | 0 | 40 950 000 | 40 950 000 |
| | amortization (building) | 2 400 000 | 0 | 48 000 000 | 79 200 000 |
| | rent | 0 | 20 544 | 0 | 6 163 200 |
| EBIT | | -26 927 479 | -371 166 | 1 819 917 481 | 1 358 510 532 |
| Financial profit | subsidiaries | 0 | 0 | 0 | 1 358 510 532 |
| | gained interests | 0 | 0 | 0 | 0 |
| | paid interests | 0 | 0 | 0 | 26 820 000 |
| Pre-Tax Profit | | 0 | 0 | 0 | 1 331 690 532 |
| Tax | | 0 | 0 | 0 | 253 021 201 |
| Profit after tax | | 0 | 0 | 0 | 1 078 669 331 |
| Dividend | | 0 | 0 | 0 | 215 733 866 |
| Profit for the year | | 0 | 0 | 0 | 862 935 464 |

*Pre-tax margin: 40.1%*

**What is happening with your pre-tax margin?**

It is still 40.1% which is above the industrial average (30%), so no modification is required.

# 3. Currency derivatives

### *a) Currency futures contract*

Forward and futures contracts are financial instruments that allow market participants to offset or assume the risk of a price change of an asset over time.

A *futures contract* is distinct from a forward contract in two important ways: first, a futures contract is a legally binding *agreement to buy or sell a standardized asset on a specific date* or during a specific month. Second, this transaction is facilitated through a *futures exchange*.
The fact that futures contracts are standardized and exchange-traded makes these instruments indispensable to commodity producers, consumers, traders and investors. A standardized contract specifies the quality, quantity, physical delivery time and location for the given product. Given the standardization of the contract specifications, the only contract variable is price. Price is discovered by bidding and offering, also known as quoting, until a match, or trade, occurs.
The exchange guarantees that the contract will be honoured, eliminating counterparty risk due to *centrally cleared contracts*: as a futures contract is bought or sold, the exchange becomes the buyer to every seller and the seller to every buyer. This greatly reduces the credit risk associated with the default of a single buyer or seller and provides anonymity to futures market participants.
*Hedge ratio* defines the amount of futures to sell against a long currency cash position to effectively hedge market risk.

$$Hedge\ ratio = \frac{value\ at\ risk}{notional\ value} = \frac{value\ at\ risk}{contract\ unit * \ contract\ price}$$

Futures markets have *an official daily settlement price* set by the exchange. Once a futures contract's final daily settlement price is established the back-office functions of trade reporting, daily profit/loss, and, if required, margin adjustment is made. In the futures markets, losers pay winners every day. This means no account losses are carried forward but must be cleared up every day. Mark-to-market enforces the daily discipline of exchanges profit and loss between open futures positions – eliminating any loss or profit carry forwards that might endanger the clearinghouse. Having one final daily settlement for all, means every open position is treated equally. By publishing these daily settlement values the exchange provides a great service to commercial and speculative users of the futures markets and the underlying markets they derive their price from.
Futures *margin* is the amount of money that *you must deposit and keep on hand with your broker when you open* a futures position. It is not a down payment and you do not own the underlying commodity or currency. Futures margin generally represents a smaller percentage of the notional value of the contract, *typically 3-12% per futures contract* as opposed to up to 50% of the face value of securities purchased on margin. When markets are changing rapidly and daily price moves become more *volatile*, market conditions and the clearinghouses' margin methodology may result in *higher margin requirements* to account for increased risk. Types of margins are:

- Initial margin is the amount of funds required by the clearing house to initiate a futures position. Your broker may be required to collect additional funds for deposit.
- Maintenance margin is the minimum amount that must be maintained at any given time in your account.

If the funds in your account drop below the maintenance margin level, a few things can happen:

- you will be required to add more funds immediately to bring the account back up to the initial margin level;
- if you cannot meet the margin call: position reduction or liquidation may follow.

Exit strategies:

- *Offsetting or liquidating* a position is the simplest and most common method of exiting a trade. When offsetting a position, a trader is able to *realize all profits or losses* associated with that position without taking physical or cash delivery of the asset. To offset a position, a trader must take out an opposite and equal transaction to neutralize the trade, where the difference in price between his initial position and offset position will represent the profit or loss on the trade.
- *Rollover* is when a trader *moves* his position from the *front month contract to another* contract further in the future: a trader will simultaneously offset his current position and establish a new position in the next contract month.
- If a trader has not offset or rolled his position prior to contract expiration, the contract will expire and the trader will go to *settlement*. At this point, a trader with a short position will be *obligated to deliver* the underlying asset under the terms of the original contract. This can be either *physical delivery or cash settlement* depending on the market.

Pricing is based on the currency pair's spot rate and a short-term interest differential:

$$Futures\ price = Spot\ price * \frac{1+r_{foreign}*\frac{days\ utnil\ expiration}{360}}{1+r_{domestic}*\frac{days\ utnil\ expiration}{360}},$$

where *r* represents a short-term interest rate of the specific currency. As a futures contract approaches expiration, the time value of money runs out and futures price converges toward spot.

**Reading:**
https://www.cmegroup.com/education/courses/introduction-to-futures/definition-of-a-futures-contract.html
https://www.cmegroup.com/education/courses/introduction-to-fx/importance-of-fx-futures-pricing-and-basis.html

### b) *Currency forward contracts*

A forward contract is an agreement between a *corporation and a commercial bank* to exchange a specified amount of a currency at a specified exchange rate (called the forward rate) on a specified date in the future.
Forward contracts normally are not used by consumers or small firms. In cases when a bank does not know a corporation well or does not fully trust it, the bank may request that the corporation make an *initial deposit* to assure that it will fulfil its obligation. Such a deposit is called a compensating balance and typically does not pay interest.
The most common forward contracts are for 30, 60, 90, 180, and 360 days, although other periods (including longer periods) are available. The forward rate of a given currency will typically vary with the length (number of days) of the forward period.

**Literature:**
Madura: Chapter 5: Currency Derivatives

### c) *Currency options*

Currency options are derivative financial instruments where there is an agreement between two parties that *gives the purchaser the right, but not the obligation*, to exchange a given amount of one currency for another, at a *specified rate*, on an *agreed date* in the future. Currency *options insure* the purchaser against adverse exchange rate movements (Hull, 1997).
A *call option* on a particular currency gives the holder the *right* but not an obligation *to buy* that currency at a predetermined exchange rate at a particular date and a foreign currency *put* option

gives the holder the *right to sell* the currency at a predetermined exchange rate at a particular date. The seller or *writer of the option, receives a payment* (*option premium*), that then obligates him to sell the exchange currency at the pre specified price known as the strike price, if the option purchaser chooses to exercise his right to buy or sell the currency.
Foreign currency options can either be *European options* that can only be exercised on the *expiry* date or *American* options that can be exercised at *any day* and up to the expiry date.
The **Garman and Kohlhagen model** is used in the pricing of options as an extension of the Black–Scholes model to manage two interest rates (one for each currency), based in the idea that foreign exchange rates could be treated as nondividend-paying stocks.
Garman-Kohlhagen put option fee:

$$European\ call = e^{-r^*T} SN\left\{\frac{ln\frac{S}{X}+T[r-r^*+\frac{\sigma^2}{2}]}{\sigma\sqrt{T}}\right\} - e^{-rT} XN\left\{\frac{ln\frac{S}{X}+T[r-r^*-\frac{\sigma^2}{2}]}{\sigma\sqrt{T}}\right\}$$

$$European\ put = Europen\ call + e^{-rT}X - e^{-r^*T}S$$

where *r* represents domestic interest rate, *r** is foreign interest rate, *S* spot exchange rate, *X* target exchange rate, *T* remaining time till maturity in years, *e* natural logarithm, *N(.)* is standard normal cumulative distribution function and $\sigma$ conditional standard deviation from GARCH model (Madura 2008, pp. 136).
**Volatility** is *time variant* as market sentiment changes constantly, so the usage of uncontidional (time-invariant) standard deviation would be misleading. Different GARCH models can be fitted to estimate conditional (time-variant) standard deviations, following Cappeiello, Engle and Sheppard (2006). The flowing GARCH(p,q), GJR GARCH(p,o,q), TARCH(p,o,q) and APARCH(p,o,q) models can be useful to capture volatility developments and their clustering in time (heteroscedasticity).
GARCH (p,q): $\sigma_t^2 = \omega + \sum_{i=1}^{p} \alpha_i \varepsilon_{t-i}^2 + \sum_{j=1}^{q} \beta_i \sigma_{t-j}^2$.
where $\sigma_t^2$ represents present variance, $\omega$ is a constant term, *p* denotes the lag number of squared past $\varepsilon_{t-i}^2$ innovations with $\alpha_i$ parameters, while *q* denotes the lag number of past $\sigma_{t-j}^2$.variances with $\beta_i$ parameters to represent volatility persistence. Asymmetric GARCH models can be introduced via $\begin{cases} S_{t-i}^- = 1, if\, \varepsilon_{t-i} < 0 \\ S_{t-i}^- = 0, if\ \varepsilon_{t-i} \geq 0 \end{cases}$ as a sign asymmetric reaction to decreasing returns.
GJR GARCH (p,o,q): $\sigma_t = \omega + \sum_{i=1}^{p} \alpha_i |\varepsilon_{t-i}| + \sum_{i=1}^{o} \gamma_i S_{t-i}^- |\varepsilon_{t-i}| + \sum_{j=1}^{q} \beta_i \sigma_{t-j}$ ,
TARCH (p,o,q): $\sigma_t^2 = \omega + \sum_{i=1}^{p} \alpha_i \varepsilon_{t-i}^2 + \sum_{i=1}^{o} \gamma_i S_{t-i}^- \varepsilon_{t-i}^2 + \sum_{j=1}^{q} \beta_i \sigma_{t-j}^2$ ,
APARCH (p,o,q): $\sigma_t^\delta = \omega + \sum_{i=1}^{p} \alpha_i (|\varepsilon_{t-i}| - \gamma_i \varepsilon_{t-i})^\delta + \sum_{j=1}^{q} \beta_j \sigma_{t-j}^\delta$ ,
where $\alpha_i > 0$ ($i=1,\dots,p$), $\gamma_i + \alpha_i > 0$ ($i=1,\dots,o$), $\beta_i \geq 0$ ($i=1,\dots,q$), $\alpha_i + 0{,}5\,\gamma_j + \beta_k < 1$ ($i=1,\dots,p$, $j=1,\dots,o$, $k=1,\dots,q$) and $\delta$ index parameter can be between 1 and 2.
Model selection can be made with a focus on homoscedastic residuals (using a 2 lagged ARCH-LM test), searching for the lowest Bayesian Information Criteria (BIC).
**Strategies:**

- Long Currency Straddle: take a long position (*buying*) in both a *call option and a put* option for that currency; the call and the put option have the same expiration date and striking price. Call option will become profitable if the foreign currency appreciates, and the put option will become profitable if the foreign currency depreciates, a long straddle becomes profitable when the *foreign currency either appreciates or depreciates.* Disadvantage of a long straddle position is that it is *expensive* to construct, because it involves the purchase of two separate options.
- Short Currency Straddle: *selling* (taking a short position in) both a *call option and a put* option for that currency. As in a long straddle, the call and put option have the same expiration date

and strike price. The advantage of a short straddle is that it provides the option writer with income from two separate options. The disadvantage is the possibility of substantial losses if the underlying currency moves substantially away from the strike price.

- Currency strangles: call and put options of the underlying foreign currency have *different exercise prices*. Nevertheless, the underlying security and the expiration date for the call and put options are identical.
- Currency Bull Spreads with Call Options: *buying a call option* for a particular underlying currency and simultaneously *writing a call option* for the same currency with a *higher exercise price* – expecting that the underlying currency *will appreciate* modestly, but not substantially.
- Currency Bull Spreads with Put Options: buy a *put option with a lower* exercise price and *write a put option with a higher* exercise price.
- Currency Bear Spreads: *writes a call option* for a particular underlying currency and simultaneously *buys a call option* for the same currency with a *higher exercise price*. Consequently, the bear spreader *anticipates a modest depreciation* in the foreign currency.

**Literature:**

Madura: Chapter 5: Currency Derivatives
Madura: Appendix 5B Currency Option Combinations
Hull, John C. (1997). Options, Futures and Other Derivatives, Prentice Hall International, Inc.
Cappeiello, L., Engle, R. F., & Sheppard, K., (2006). Asymmetric Dynamics in the Correlations of Global Equity and Bond Returns. Journal of Financial Econometrics, 4 (4), 537–572. http://dx.doi.org/10.1093/jjfinec/nbl005

**Reading:**

https://www.kevinsheppard.com/MFE_Toolbox

**Matlab Script:**

```
clear
% 0. loading in the data
data=xlsread('opc_curr_rv_int.xlsx');
CZ10Y=data(:,4);
EU10Y=data(:,5);
eurczk=data(:,10)./data(:,9);
% 1. conditional variance with a GARCH model
cd 'C:\Users\tanar\Documents\MATLAB\UCSD_toolbox'
epsilon=real(diff(log(eurczk)));
[parameters, LL, ht] = tarch(epsilon, 1, 1, 1);
plot(ht)
% 2. option fee
TT=size(eurczk);
for i=1:TT(1,1)-1
      S0 =eurczk(i,1); %spot price
      X = S0; %tagret price (hedge == spot price)
      T= 1; %remaining time in YEARS
      rd=CZ10Y(i,1)/100; %domestic interest rate --> czk
      rf=EU10Y(i,1)/100; % foreign interest rate --> eur
      vol=sqrt(ht(i,:)); %GARCH
      F=S0*exp((rd-rf).*T);
      d1=log(F./X)./(vol.*sqrt(T))+vol.*sqrt(T)/2;
      d2=log(F./X)./(vol.*sqrt(T))-vol.*sqrt(T)/2;
      European_call(i,1) = exp(-rd.*T).*(F.*normcdf(d1)-X.*normcdf(d2));
      European_put(i,1) = European_call(i,1)+(X-F)*exp(-rd.*T);
```

```
end
% 2. option fee is affected by interest or volatility?
r_diff=CZ10Y-EU10Y;
cd 'C:\Users\tanar\Documents\MATLAB\JPL_toolbox'
y=[European_call r_diff (1:end-1,1) sqrt(ht)];
results = vare(y,1);
prt(results)
```

## 4. Measuring exposure to exchange rate fluctuations

### *a) Is Exchange Rate Risk Relevant?*

- Purchasing Power Parity Argument:
  - exchange rate movements are just a response to differentials in *price changes* between countries → irrelevant
  - But: exchange rate will not necessarily change in accordance with the inflation differential between the two countries
- The Investor Hedge Argument
  - investors in MNCs can hedge exchange rate risk on their own
  - But: An MNC may be able to hedge at a lower cost than individual investors
- Currency Diversification Argument
  - MNC is well diversified across numerous countries, its value will not be affected by exchange rate movements because of offsetting effects
  - Creditors may prefer that the MNCs maintain low exposure to exchange rate risk. Consequently, MNCs that hedge their exposure to risk may be able to borrow funds at a lower cost.

**Literature**

Madura p. 280-281

### *b) Types of Foreign Exchange Risk*

- 1. Translation exposure („accounting exposure")
  - difference between foreign-currency-denominated assets and foreign-currency-denominated liabilities
  - FX rate in Annual reports
- 2. Transaction exposure
  - resulting from the uncertain domestic currency value of a foreign-currency-denominated transaction to be completed at some future date
  - → estimate "Net" Cash Flows in Each Currency
- 3. Economic exposure
  - firm's value to changes in exchange rates
  - Value of future after-tax cashflows -> parent company's balancesheet
  - Share price: industry price-earnings (P/E) ratio to expected annual earnings to derive a value per share of stock
  - Determinants
    - The proportion of its business conducted by foreign subsidiaries
    - The locations of its foreign subsidiaries
    - The accounting methods that it uses

**Literature**

Madura p 282

Melvin M., Norrbin S. C. (2013): International Money and Finance, Elsevier p 151-155

### c) *Exposure*

Measuring the Potential Impact of the Currency Exposure

- net cash flows of an MNC are generated from a portfolio of currencies
  - standard deviation of the portfolio
  - $\sigma_p = \sqrt{w_{eur}2\sigma EUR^2 + w_{czk}2\sigma CZK^2 + 2w_{eur}w_{czk}\sigma_{eur}\sigma_{czk}\rho_{eurczk}}$
  - MNC's exposure to multiple currencies is influenced by the variability of each currency and the correlation of movements between the currencies
  - Currency Variability and cross-correlation over Time: GARCH-models (conditional volatility) and dynamic conditional correlation
- Value at Risk:
  - net cash flows under 1% probable change
  - Maximum one-day loss= $CF_{EUR, CZK \text{ in } HUF}$*1.65*$\sigma_p$
  - distribution of exchange rate movements is normal

Measuring Economic Exposure

- Sensitivity Analysis
  - firms have developed forecasts of sales, expenses and exchange rates for several periods ahead, they can assess their economic exposure over time
- Regression Analysis
  - applying regression analysis to historical cash flow and exchange rate data
  - Assuming ceteris paribus!

## 5. Managing transaction exposure

### a) *Steps*

1. Identify its degree of transaction exposure.
   - Expenditures and incomes in different FX rates
2. decide whether to hedge this exposure.
   - Total hedge: to avoid the possibility of a major adverse movement in exchange rates
   - No hedge: well diversified across many countries may consider not hedging their exposure.
   - Selective hedge: hedging only when a market benchmark signs higher market risks
   - Hedge versus No Hedge
     - Desired exchange rate movements (devaluation – appreciation)
     - Historical trends, forward rates (expectations)
     - No hedge: profit decrease under 10% undesired change in FX rate (simple) or usual yearly changes from the last decade (histogram)
     - Hedge: currency call option fee (last decade)
     - RCH= Cost of *hedging payables* - Cost of payables if *not hedged*
3. if it decides to hedge part or all of the exposure, it must choose among the various hedging techniques available
   - Selective Hedging: hedge only when they expect the currency to move in a direction that will make hedging feasible
   - Following a market benchmark to find a signal of market stress (like VaR)

**Literature**

Madura p. 307, 325

### b) Hedge techniques

- 1. *Trading in forward, futures, or options markets*
- 2. Invoicing in the domestic currency
- 3. Speeding (slowing) payments of currencies expected to appreciate (depreciate)
- 4. Speeding (slowing) collection of currencies expected to depreciate (appreciate)
- 5. Short-term currency loans
- Forward market:
  - Forward exchange market refers to buying and selling currencies to be delivered at a future date
  - With a bank as a middleman
- Futures market:
  - Where foreign currencies may be bought and sold for delivery at a future date.
  - The futures market differs from the forward market in that only a few currencies are traded;
  - trading occurs in standardized contracts and in a specific geographic location, such as the Chicago Mercantile Exchange (CME)
  - → interest parity: $\frac{1+rEUR}{1+rHUF} = \frac{forward\ (or\ futures)}{spot}$
- Currency option:
  - Contract that provides the right to buy or sell a given amount of currency at a fixed exchange rate (*strike price*) on (European option) or before (American option) the maturity date
  - call option gives the right to buy currency
  - put option gives the right to sell
  - Garman-Kohlhagen option
- Selective hedge: Value-at-Risk act as a benchmark as extreme fluctuation of the data can be detected with ordinary Value-at-Risk (1%) and (5%) models:

  $VaR\ (1\%): r \in (r_n \cup r_x^- \cup r_x^+),\ where\ r_x^- < \mu - 2.326 * \sigma\ and\ r_x^+ > \mu + 2.326 * \sigma$ ,

  $VaR\ (5\%): r \in (r_n \cup r_x^- \cup r_x^+),\ where\ r_x^- < \mu - 1.65 * \sigma\ and\ r_x^+ > \mu + 1.65 * \sigma$ ,

  - where $r$ is a logarithmic return, $\mu$ unconditional mean, $\sigma$ conditional standard deviation from a GARCH model, $r_x^-$represents extreme negative, $r_x^+$extreme positive returns and $r_n$ denotes a non-extreme subset of data (Madura 2008). VaR (5%) has the tendency to define more return as extreme (~5% of the data on each tail), so it can be used better to highlight the difference between missing data approaches. However, selective hedging requires low amount or signals, which is why VaR (1%) approach will be used there.

**Literature:**

Melvin M., Norrbin S. C. (2013): International Money and Finance, Elsevier p 86
Madura: Chapter 11: Managing Transaction Exposure

## 6. Exchange rate risk management in the case study

*Please introduce your hedging strategy!*

*1. Size of currency exposure in each currency*

*2. Required change of the exchange rate (appreciation or depreciation)*

*3. Which hedging strategy is preferred by you for EURHUF and CZKHUF? No hedge, total hedge, partial hedge?*

*4.a If no hedge is selected: what is happening with the pre-tax ratio under 10% de- and appreciation of the HUF?*
*4.b Elseif total hedge is selected: total expenditure of the option contract(s)? It impact on pre-tax ratio.*

**My profit and loss statement (under original conditions)**
*EUR=315, CZK=11.4, BUBOR=0.0211, EURIBOR=0.00263*

| | | Czech (CZK) | Austrian (EUR) | Hungarian (HUF) | Group (HUF) |
|---|---|---|---|---|---|
| Income | | 60 944 771 | 741 143 | 2 558 819 566 | 3 487 050 000 |
| Expenditures | railway usage fees | 52 808 771 | 345 815 | 115 768 116 | 826 719 830 |
| | electricity | 26 927 479 | 371 166 | 98 421 480 | 522 311 950 |
| | maintenance | 0 | 0 | 40 950 000 | 40 950 000 |
| | wages | 5 736 000 | 374 784 | 142 368 000 | 325 815 360 |
| | amortization (vehicle) | 0 | 0 | 40 950 000 | 40 950 000 |
| | amortization (building) | 2 400 000 | 0 | 48 000 000 | 75 360 000 |
| | rent | 0 | 20 544 | 0 | 6 471 360 |
| EBIT | | -26 927 479 | -371 166 | 2 072 361 970 | 1 648 471 500 |
| Financial profit | subsidiaries | 0 | 0 | 0 | 1 648 471 500 |
| | gained interests | 0 | 0 | 0 | 0 |
| | paid interests | 0 | 0 | 0 | 10 621 391 |
| Pre-Tax Profit | | 0 | 0 | 0 | 1 637 850 109 |
| Corporate income tax (19%) | | 0 | 0 | 0 | 311 191 521 |
| Profit after tax | | 0 | 0 | 0 | 1 326 658 588 |
| Dividend | | 0 | 0 | 0 | 265 331 718 |
| Profit for the year | | 0 | 0 | 0 | 1 061 326 871 |

*Pre-tax margin: 47%*

**1. Size of currency exposure in each currency**

- CZK: after summing up all the expenditures: -87.8 million CZK
- EUR: 11.07 (income) -1.49*0.026315 (bond interest)-1.111 (total expenditures in EUR)=9.9 million EUR

**2. Required change of the exchange rate (appreciation or depreciation)**

- CZK: HUF shall appreciate (from current 11.4 to become 10,9,8 etc.)
- EUR: HUF shall depreciate (from current 315 to become 316, 317,318 etc)

**3. Which hedging strategy is preferred by you for EURHUF and CZKHUF? No hedge, total hedge?**

- No hedge in EURHUF, because HUF is on a depreciation trend on the long run
- Total hedge in CZKHUF, because it is highly improbable that HUF can appreciate in the future

**4.a If no hedge is selected: what is happening with the pre-tax ratio under 10% de- and appreciation of the HUF?**

- 10% appreciation of EURHUF – 283.5 EURHUF, Pre-tax ratio is 42.23% (-5%)

| | | Czech (CZK) | Austrian (EUR) | Hungarian (HUF) | Group (HUF) |
|---|---|---|---|---|---|
| Income | | 60 944 771 | 741 143 | 2 233 460 570 | 3 138 345 000 |
| Expenditures | railway usage fees | 52 808 771 | 345 815 | 115 768 116 | 815 826 658 |

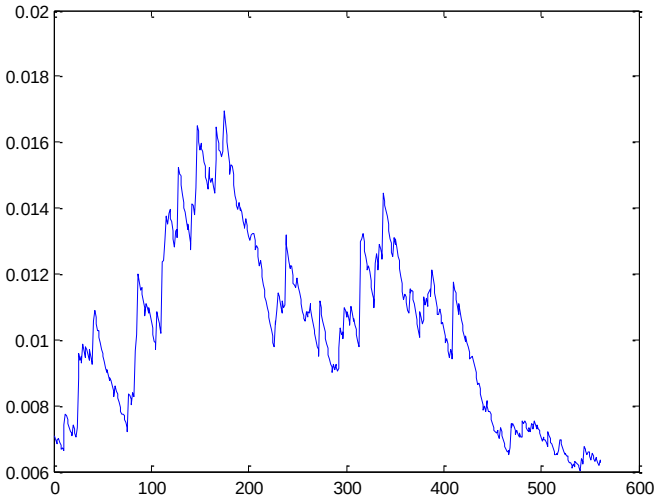
| | | | | | |
|---|---|---|---|---|---|
| | fuel | 26 927 479 | 371 166 | 98 421 480 | 510 620 229 |
| | maintenance | 0 | 0 | 40 950 000 | 40 950 000 |
| | wages | 5 736 000 | 374 784 | 142 368 000 | 314 009 664 |
| | amortization (vehicle) | 0 | 0 | 40 950 000 | 40 950 000 |
| | amortization (building) | 2 400 000 | 0 | 48 000 000 | 75 360 000 |
| | rent | 0 | 20 544 | 0 | 5 824 224 |
| EBIT | | -26 927 479 | -371 166 | 1 747 002 974 | 1 334 804 225 |
| Financial profit | subsidiaries | 0 | 0 | 0 | 1 334 804 225 |
| | gained interests | 0 | 0 | 0 | 0 |
| | paid interests | 0 | 0 | 0 | 9 559 251 |
| Pre-Tax Profit | | 0 | 0 | 0 | 1 325 244 974 |
| Tax | | 0 | 0 | 0 | 251 796 545 |
| Profit after tax | | 0 | 0 | 0 | 1 073 448 429 |
| Dividend | | 0 | 0 | 0 | 214 689 686 |
| Profit for the year | | 0 | 0 | 0 | 858 758 743 |

- 10% depreciation of EURHUF – 346.5 EURHUF, Pre-tax ratio is 50.85% (+4%)

| | | Czech (CZK) | Austrian (EUR) | Hungarian (HUF) | Group (HUF) |
|---|---|---|---|---|---|
| Income | | 60 944 771 | 741 143 | 2 884 178 561 | 3 835 755 000 |
| Expenditures | railway usage fees | 52 808 771 | 345 815 | 115 768 116 | 837 613 003 |
| | fuel | 26 927 479 | 371 166 | 98 421 480 | 534 003 672 |
| | maintenance | 0 | 0 | 40 950 000 | 40 950 000 |
| | wages | 5 736 000 | 374 784 | 142 368 000 | 337 621 056 |
| | amortization (vehicle) | 0 | 0 | 40 950 000 | 40 950 000 |
| | amortization (building) | 2 400 000 | 0 | 48 000 000 | 75 360 000 |
| | rent | 0 | 20 544 | 0 | 7 118 496 |
| EBIT | | -26 927 479 | -371 166 | 2 397 720 965 | 1 962 138 774 |
| Financial profit | subsidiaries | 0 | 0 | 0 | 1 962 138 774 |
| | gained interests | 0 | 0 | 0 | 0 |
| | paid interests | 0 | 0 | 0 | 11 683 530 |
| Pre-Tax Profit | | 0 | 0 | 0 | 1 950 455 244 |
| Tax | | 0 | 0 | 0 | 370 586 496 |
| Profit after tax | | 0 | 0 | 0 | 1 579 868 748 |
| Dividend | | 0 | 0 | 0 | 315 973 750 |
| Profit for the year | | 0 | 0 | 0 | 1 263 894 998 |

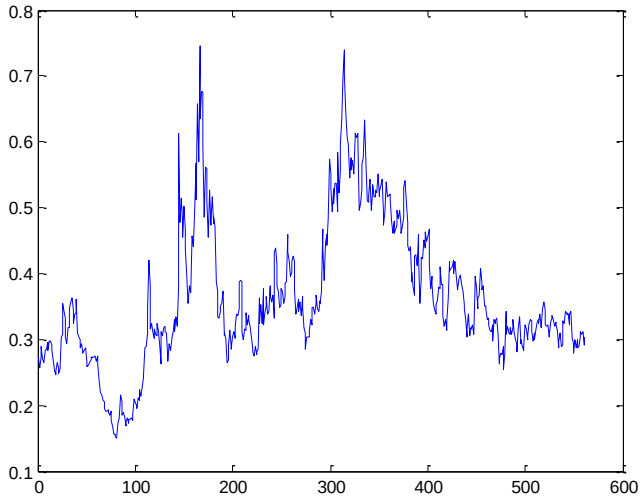
**4.b Elseif total hedge is selected: total expenditure of the option contract(s)? It impact on pre-tax ratio.**

We have to buy 87.8 million CZK in each year to cover our expenditures.

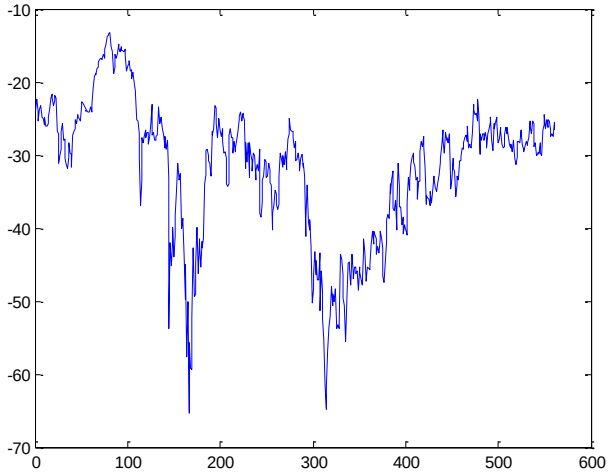



According to a GARCH(1,1) model, the CZKHUF had the following conditional standard deviation on each week between 2006 and 2016. On January 1 2015, it was 0.0000536.

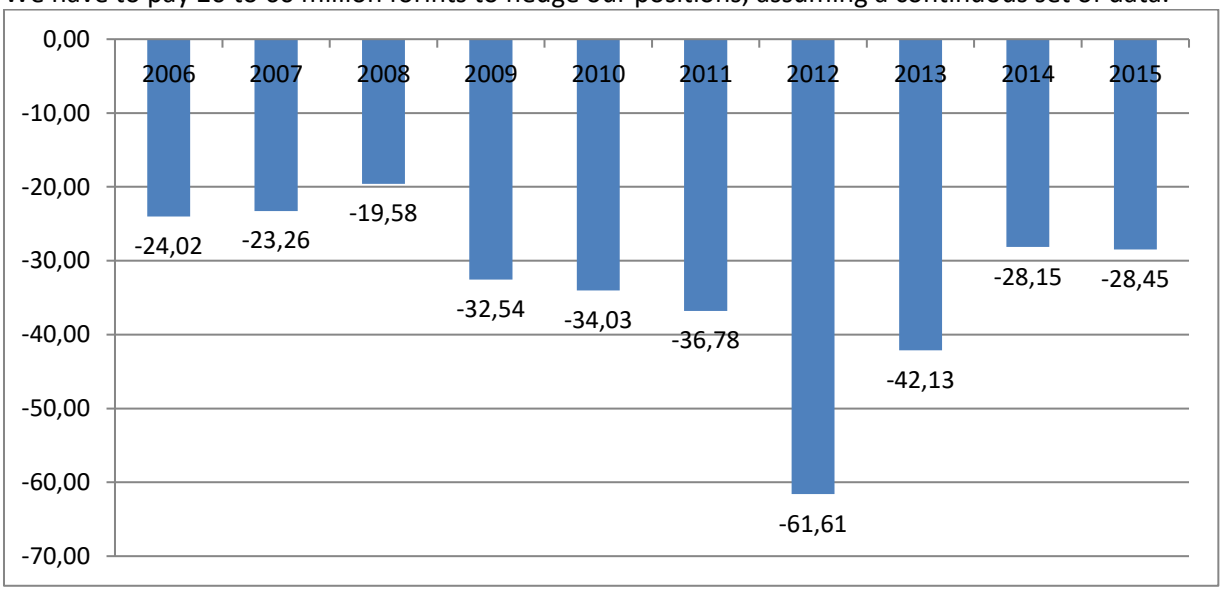
We would like to buy CZK, so a call option is required.




Call option prices are fluctuating around 0.4 HUF for each CZK to be hedged. It was 0,327 on the specific day.




We have to pay 20 to 60 million forints to hedge our positions, assuming a continuous set of data.

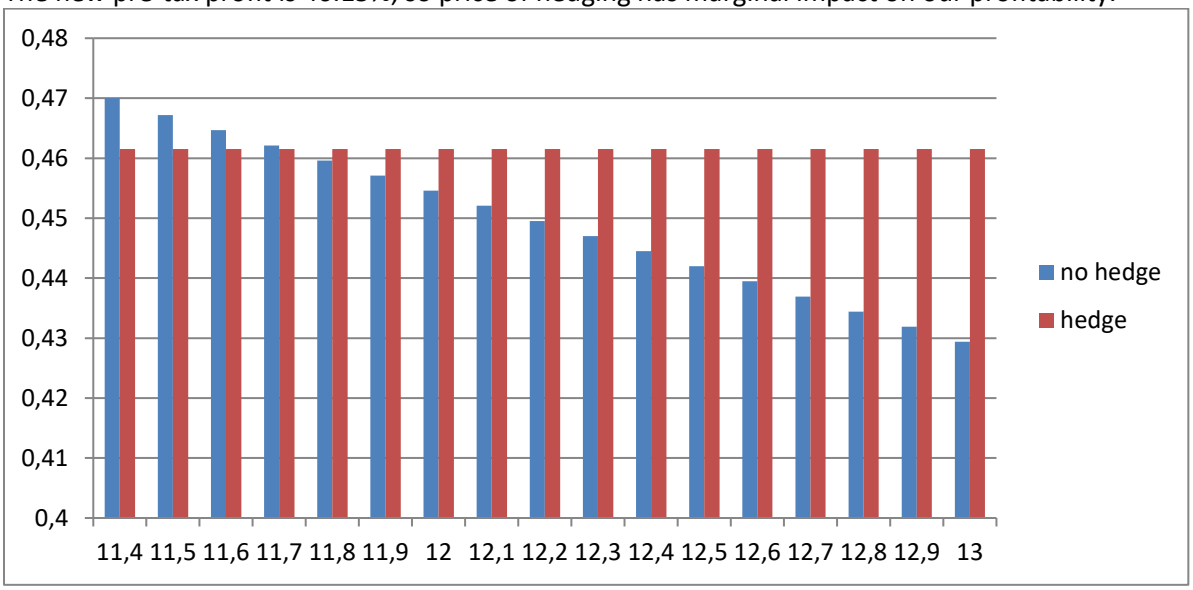



The price of total hedge was 28.45 million HUF in 2015 (is was added to the paid interests).

| | | Czech (CZK) | Austrian (EUR) | Hungarian (HUF) | Group (HUF) |
|---|---|---|---|---|---|
| Income | | 60 944 771 | 741 143 | 2 558 819 566 | 3 487 050 000 |
| Expenditures | railway usage fees | 52 808 771 | 345 815 | 115 768 116 | 826 719 830 |
| | fuel | 26 927 479 | 371 166 | 98 421 480 | 522 311 950 |
| | maintenance | 0 | 0 | 40 950 000 | 40 950 000 |
| | wages | 5 736 000 | 374 784 | 142 368 000 | 325 815 360 |
| | amortization (vehicle) | 0 | 0 | 40 950 000 | 40 950 000 |
| | amortization (building) | 2 400 000 | 0 | 48 000 000 | 75 360 000 |
| | rent | 0 | 20 544 | 0 | 6 471 360 |
| EBIT | | -26 927 479 | -371 166 | 2 072 361 970 | 1 648 471 500 |

| | | | | | |
|---|---|---|---|---|---|
| Financial profit | subsidiaries | 0 | 0 | 0 | 1 648 471 500 |
| | gained interests | 0 | 0 | 0 | 0 |
| | paid interests | 0 | 0 | 0 | 39 071 391 |
| Pre-Tax Profit | | 0 | 0 | 0 | 1 609 400 109 |
| Tax | | 0 | 0 | 0 | 305 786 021 |
| Profit after tax | | 0 | 0 | 0 | 1 303 614 088 |
| Dividend | | 0 | 0 | 0 | 260 722 818 |
| Profit for the year | | 0 | 0 | 0 | 1 042 891 271 |

The new pre-tax profit is 46.15%, so price of hedging has marginal impact on our profitability.




Hedging is highly recommended, as the above figure suggests. The impact of option expenditures are compensated by the FX exposure right after 11.7 exchange rate.

## 7. Matlab script for hedge strategies

```
%% IFM - case study 2018, FX exposures
%We have to manage CZK exposure: 60.94 million CZK
    % we can choose between the following strategies:
        %a. no hedge (no way)
        %b. total hedge (buy a call option)
        %c. selective hedge (if CZK appreciates more
            %than 1% probable, than CZK call option,
otherwise: nothing)
%0. load the data
clear
data=xlsread('ifm_currency.xlsx');
    %HU10Y   CZ10Y   EU10Y   CZKHUF   EURHUF
CZKHUF=data(:,4);
```

```
 ret=real(diff(log(CZKHUF))); %logarithmic differential as
change
    std(ret)
CZ10Y=data(:,2);
HU10Y=data(:,1);
%1. call option fees
%GARCH
    cd 'C:\Users\tanar\Documents\MATLAB\UCSD_toolbox'
    p=1; %lag number of error term
    o=1; %non asymetric model
    q=1; %lag number of past variance
    ht=[]; %variance
    [parameters, LL, ht,VCVrobust,VCV] =tarch(ret, p,o,q);
    [TEXT,AIC,BIC] =
tarch_display(parameters,LL,VCV,ret,p,o,q);
    st_dev=sqrt(ht);
    plot(st_dev)
    %3.b.2. calculate the option fee
    for i=1:561
    S0 =CZKHUF(i,1); %price
    X = S0; %target prices - now it is equal to spot price
    T= 1; %remaining time in YEARS
    rd=HU10Y(i,1); %r huf
    rf=CZ10Y(i,1); % r czk
    vol=st_dev(i,1); %GARCH standard deviation
    F=S0*exp((rd-rf).*T);
    d1=log(F./X)./(vol.*sqrt(T))+vol.*sqrt(T)/2;
    d2=log(F./X)./(vol.*sqrt(T))-vol.*sqrt(T)/2;
    European_call(i,1) = exp(-rd.*T).*(F.*normcdf(d1)-
X.*normcdf(d2));
    European_put(i,1) = European_call(i,1)+(X-F)*exp(-rd.*T);
    end
    plot(European_call)
%2. comparing different strategies
    %b. total hedge (buy a call option on each Jan)
for i=1:10
    total_hedge(i,1)=CZKHUF(i*52-51,1);
    total_hedge(i,2)=European_call(i*52-51,1)*60.94;
    total_hedge(i,3)=st_dev(i*52-51,1)*1000;
    total_hedge(i,4)=(HU10Y(i*52-51,1)-CZ10Y(i*52-51,1))*100;
end
bar(total_hedge)
Expenditure(1,1)=sum(total_hedge(:,2));%million HUF
    %c. selective hedge (if CZK appreciates more
            %than 1% probable, than CZK call option,
otherwise: nothing)
        %VaR(1%)-GARCH benchmark
```

```
    for i=1:561
            if ret(i,1)>mean(ret)+2.326*st_dev(i,1)
                VaR(i,1)=1;
                VaR(i,2)=CZKHUF(i,1);
                VaR(i,3)=European_call(i,1);
            else
                VaR(i,1)=0;
                VaR(i,2)=0;
                VaR(i,3)=0;
            end
    end
  bar(VaR)
  for i=1:561
      if VaR(i,1)==1
          selective_hedge(i,1)=VaR(i,2);%exchange rate
          selective_hedge(i,2)=VaR(i,3)*60.94;%option fee
          VaR(i+1:i+52,:)=zeros(52,3);
      end
  end
  bar(selective_hedge)
Expenditure(1,2)=sum(selective_hedge(:,2));%million HUF
bar(Expenditure)
```

# VIII. Exercise 7 – Long-term Funding

The selection among different international projects requires the estimation of funding costs on the long run to calculate the expected net present value for each project.

## 1. Markets

### *a) International Money Market*

Serves to transfer **short-term funds** denominated in the local or foreign currency from local surplus units (savers) to local deficit units (borrowers).

Corporations and governments commonly need to borrow short-term funds to support their operations or to finance their budget deficits. Individuals or institutional investors provide funds through short-term deposits at commercial banks. In addition, corporations and governments may issue short-term securities that are purchased by investors. It involves the exchange rate risk. Interest rates in developing countries are typically higher than rates in other countries.

### *b) International Credit Market*

- MNCs also have access to **medium-term funds** through banks located in foreign markets.
- Loans of one year or longer extended by banks to MNCs or government agencies in Europe are commonly called Eurocredits or Eurocredit loans. These loans are provided in the so called Eurocredit market.
- The loans can be denominated in dollars or many other currencies and commonly have a maturity of 5 years.
- Because banks accept short-term deposits and sometimes provide longer-term loans, their asset and liability maturities do not match. This can adversely affect a bank's performance during periods of rising interest rates, since the bank may have locked in a rate on its longer-term loans while the rate it pays on short-term deposits is rising over time. To avoid this risk, banks commonly use floating rate loans.
    - The loan rate floats in accordance with the movement of some market interest rate, such as the London Interbank Offer Rate (LIBOR), which is the rate commonly charged for loans between banks.
    - The premium paid above LIBOR will depend on the credit risk of the borrower. The LIBOR varies among currencies because the market supply of and demand for funds vary among currencies.
- Financial institutions tend to reduce their participation in those markets when credit risk increases. Thus, even though funding is widely available in many markets, the funds tend to move toward the markets where economic conditions are strong and credit risk is tolerable.
- **Syndicated Loans:**
    - A single bank is unwilling or unable to lend the amount needed by a particular corporation or government agency. In this case, a syndicate of banks may be organized.
    - Each bank within the syndicate participates in the lending. A lead bank is responsible for negotiating terms with the borrower. Then the lead bank organizes a group of banks to underwrite the loans.
    - The syndicate of banks is usually formed in about 6 weeks, or less if the borrower is well known, because then the credit evaluation can be conducted more quickly.
    - Borrowers that receive a syndicated loan incur various fees besides the interest on the loan. Front-end management fees are paid to cover the costs of organizing the syndicate and underwriting the loan.

- Not only reduce the default risk of a large loan to the degree of participation for each individual bank, but they can also add an extra incentive for the borrower to repay the loan (likely have difficulty obtaining future loans).

### *c) International Bond Market*

MNCs obtain **long-term debt** by issuing bonds in their local and foreign markets as well. Institutional investors such as commercial banks, mutual funds, insurance companies, and pension funds from many countries are major participants in the international bond market.

- Motivations:
  - Issuers recognize that they may be able to attract a stronger demand by issuing their bonds in a particular foreign country rather than in their home country. Some countries have a limited investor base, so MNCs in those countries seek financing elsewhere
  - MNCs may prefer to finance a specific foreign project in a particular currency and therefore may attempt to obtain funds where that currency is widely used
  - Financing in a foreign currency with a lower interest rate may enable an MNC to reduce its cost of financing, although it may be exposed to exchange rate risk (as explained in later chapters)
- Eurobond:
  - International bonds are typically classified as either foreign bonds or Eurobonds
  - A foreign bond is *issued by a borrower foreign to the country* where the bond is placed. For example, a U.S. corporation may issue a bond denominated in Japanese yen, which is sold to investors in Japan
  - They are usually issued in bearer form, which means that there are no records kept regarding ownership. Coupon payments are made yearly. Some Eurobonds carry a convertibility clause allowing them to be converted into a specified number of shares of common stock
  - Commonly denominated in a number of currencies: USD ~60%, EUR ~20%, GBP, JPY (extremely low interest rates), RNB etc.
- Parallel bonds:
  - Currency denominating each type of bond is determined by the country where it is sold

### *d) International Stock Markets*

MNCs and domestic firms commonly obtain long-term funding by issuing stock locally. Yet, MNCs can also attract funds from foreign investors by issuing stock in international markets. The stock offering may be more easily digested when it is issued in several markets. In addition, the issuance of stock in a foreign country can enhance the firm's image and name recognition there.

- Issuance of Stock in Foreign Markets
  - The stocks of some U.S.-based MNCs are widely traded on numerous stock exchanges around the world. This enables non U.S. investors easy access to some U.S. stocks
  - MNCs need to have their stock listed on an exchange in any country where they issue shares. Investors in a foreign country are only willing to purchase stock if they can easily sell their holdings of the stock locally in the secondary market
  - The stock is denominated in the currency of the country where it is placed

- Large MNCs have begun to float new stock issues simultaneously in various countries. Investment banks underwrite stocks through one or more syndicates across countries. The global distribution of stock can reach a much larger market, so greater quantities of stock can be issued at a given price
- Market Characteristics:
  - degree of trading activity
  - legal protection of shareholders
  - government enforcement of securities laws
  - less corporate corruption
  - degree of financial information that must be provided by public companies

**Literature**
Madura: Chapter 3: International Financial Markets

## 2. Long-term funding

Equity or debt financing to fund long-term projects. Firms attempt to use a specific capital structure or a mix of capital components that will minimize their cost of capital. The lower a firm's cost of capital, the lower is its required rate of return on a given proposed project. A firm's weighted average cost of capital (referred to as $r_{WACC}$) can be measured as:

$$r_{WACC} = \left(\frac{E}{D+E}\right) r_E + \left(\frac{D}{D+E}\right) r_D (1 - CIT)$$

Where E: amount of firm's equity, D: amount of firm's debt, CIT: corporate income tax rate (effective if there is available data), $r_E$: expected return from equity (CAPM: $r_E = r_F + (r_M - r_F) * \beta$; $\beta = \sigma_{EM}/\sigma_M^2$ beta represents the sensitivity of the project's cash flow to market conditions), $r_D$: average interest rate of the debt ($r_D = \frac{paid\ interests}{D}$ from the profit and loss statement). Two types of risk: (1) unsystematic variability in cash flows unique to the firm (it can be diversified away) and (2) systematic risk

**Literature**
Madura: Chapter 17: Multinational Cost of Capital and Capital Structure

### *e) Long-term financing*

Sources of Equity

- MNCs may consider a domestic equity offering in their home country in which the funds are denominated in their local currency
- They may consider a global equity offering in which they issue stock in their home country and in one or more foreign countries. The stock will be listed on an exchange in the foreign country so that investors there can sell their holdings of the stock
- MNCs may offer a private placement of equity to financial institutions in their home country. Private placements are beneficial because they may reduce transaction costs. The funding must come from a limited number of large investors who are willing to maintain the investment for a long period of time because the equity has very limited liquidity
- May offer a private placement of equity to financial institutions in the foreign country where they are expanding

Sources of Debt

- Public placement of debt in their own country or a global debt offering
- Engage in a private placement of debt in their own country or in the foreign country where they are expanding

- They may also obtain long-term loans in their own country or in the foreign country where they are expanding

Cost of Debt Financing

- Steps: (1) determine the amount of funds needed, (2) forecast the price at which it can issue the bond, and (3) forecast periodic exchange rate values for the currency denominating the bond
- Use of exchange rate probabilities (historical density of changes) or simulation
- The *exchange rate risk* from financing with bonds in foreign currencies can be reduced:
    - *Offsetting Cash Flows with High-Yield Debt:* If a U.S.-based MNC issues bonds denominated in the local currency in one of subsidiaries' countries where yields on debt are typically high, there may be a natural offsetting effect that will reduce the MNC's exposure to exchange rate risk because it can use its cash inflows in that currency to repay the debt. Alternatively, the MNC might obtain debt financing in dollars at a lower interest rate, but it will not be able to offset its earnings in the foreign currency. Also consider that the currencies of countries with relatively high inflation tend to weaken over time (as suggested by purchasing power parity)
    - *Implications of the Euro for Financing to Offset Cash Inflows.* The decision of several European countries to adopt the euro as their currency has important implications for MNCs that require long-term financing and wish to offset some of their cash inflows with debt payments. MNCs that have cash inflows in many of the participating European countries can now issue bonds denominated in euros and then use their cash inflows from operations in these countries to make the debt payments
    - *Forward Contracts*: The firm could arrange to purchase the foreign currency forward for each time at which payments are required. However, the forward rate for each horizon will most likely be above the spot rate
    - *Currency Swaps*: The large commercial banks that serve as financial intermediaries for currency swaps sometimes take positions. That is, they may agree to swap currencies with firms, rather than simply search for suitable swap candidates
    - *Parallel Loans*: Using Parallel Loans to Hedge Exchange Rate Risk for Foreign Projects - function as a useful alternative to forward or futures contracts as a way to finance foreign projects
    - *Diversifying among Currencies*: A U.S. firm may denominate bonds in several foreign currencies, rather than a single foreign currency, so that substantial appreciation of any one currency will not drastically increase the number of dollars needed to cover the financing payments.
        - Currency Cocktail Bonds: currency cocktail simply reflects a multicurrency unit of account
- *Interest Rate Risk* from Debt Financing:
    - The Debt Maturity Decision:
        - assess the yield curves of the countries in which they need funds
            - Upward-sloping yield curve: the annualized yields are lower for short-term debt than for long-term debt. Investors may require a higher rate of return on long-term debt as compensation for lower liquidity. The market value of long-term debt is more sensitive to market interest rate movements, so investors face a greater risk of a loss if they need to sell the debt before its maturity

- Not always upward sloping because other forces such as interest rate expectations may affect the demand and supply conditions for debt at various maturity levels. In some countries, the yield curve is commonly flat or downward sloping for longer maturities
- Compare annualized rates among debt maturities, so that they can choose a maturity that has a relatively low rate
- Assess the prevailing market demand for and supply of funds for particular debt maturities, which may indicate the future movement in interest rates

  - The Fixed versus Floating Rate Decision
    - If it wishes to avoid the prevailing fixed rate on long-term bonds may consider floating rate bonds. In this case, the coupon rate will fluctuate over time in accordance with interest rates. For example, the coupon rate is frequently tied to the London Interbank Offer Rate (LIBOR), which is a rate at which banks lend funds to each other. As LIBOR increases, so does the coupon rate of a floating rate bond.
    - A floating coupon rate can be an advantage to the bond issuer during periods of decreasing interest rates, when otherwise the firm would be locked in at a higher coupon rate over the life of the bond. It can be a disadvantage during periods of rising interest rates.
    - If the coupon rate is floating, then forecasts are required for interest rates as well as for exchange rates.

**Literature:**
Madura: Chapter 18: Long-Term Financing
**Database:**
FRED corporate bond yield database: https://fred.stlouisfed.org/categories/32348

## 3. Financial lease

### *a) Concept*

**International Financial Reporting Standards 16** (*after 1 January 2019*): single lessee accounting model

- requires a lessee to recognise assets and liabilities for all leases with a term of more than 12 months, unless the underlying asset is of low value.
  - similarly to other non-financial assets (such as property, plant and equipment): depreciation of the right-of-use asset on a straight-line basis
- lessee is required to recognise a right-of-use asset representing its right to use the underlying leased asset and a lease liability representing its obligation to make lease payments.
  - similarly to other financial liabilities: interest on the lease liability
  - In the statement of cash flows, a lessee separates the total amount of cash paid into principal (presented within financing activities) and interest (presented within either operating or financing activities)
- Assets and liabilities arising from a lease are initially measured on a present value basis
  - includes non-cancellable lease payments (including inflation-linked payments),
  - and also includes payments to be made in optional periods
  - if the lessee is reasonably certain to exercise an option to extend the lease,
  - or not to exercise an option to terminate the lease.

- The initial lease asset equals the lease liability in most cases.

**Literature:**
https://www.ifrs.org/issued-standards/list-of-standards/ifrs-16-leases/

**Definition:** Lease is a contractual arrangement, under which the right to use the asset (usually fixed assets like the industrial equipments), has been granted by a person or company to another person or company, in consideration of the return by way of periodical payments of the lease rent. The person who so gives the asset on lease is known as the 'lessor', and the person, to whom it has been given, with the right to use the same, is called the 'lessee'.

**Finance Lease** (also referred to as Capital Lease or Full-Pay-Out Lease), a means and source of financing on a *medium or long-term* basis.

- (i)It is granted for a medium or long-term (period), and such an arrangement *cannot be cancelled or revoked* during the initial lease period (also known as the primary lease period). This (initial) period usually ranges from three to five years or even up to eight years.
- (ii)The lease, by and large, is *fully amortized during* the primary or initial lease period itself. That is to say that the **lessor** is able to get back (realize) the entire amount of his capital investment in the industrial equipment in question, plus a *reasonable and acceptable rate of return*, by way of realization of the periodical rental regularly.
- (iii)In such cases, the **lessee** (and not the lessor) is responsible for the *periodical maintenance* as also for the payment of the insurance instalments and taxes.
- (iv)Besides, here the **lessee** has been given the *option to get the lease renewed* for a future period, and this time usually at a much lesser rental charges

Economic Life vs Running Life

- Thus, the economic life of an equipment, can be said to be the period up to which its operating/running cost is well within the range, based on the basic principle of cost and benefit.
- As a practical matter, however, a lessor must generally use a residual value greater than zero to be price competitive.

Dry and Wet lease

- (a)'Wet Lease', where the lessor is responsible for maintenance and insurance of the equipment so leased.
- (b)'Dry Lease', where these responsibilities lie with the lessee, instead.

Operating lease

- The term (period) of operating lease is substantially less than the economic life of the industrial equipment.

Single Investor Lease

- In a Single Investor Lease arrangement, the leasing company raises sufficient long-term funds, by way of a suitable mix of equity and debt, to acquire the required fixed asset (industrial equipment) to be leased.
- But, in such an arrangement, the loan fund (the debt raised by the lessor company) is without recourse to the lessee. That is to say, in the event of the lessor company failing to make regular payments against the instalments, with interest due, on due dates, the creditors (lenders) of the lessor company cannot demand payment of the instalments and interest due against the lessor company, from the lessee company or person.

Full Service Lease and Net Lease

- Full Service Lease: When the lease agreement provides that the lessor will be responsible for the insurance and maintenance of the leased assets (like cars, computers or office equipment), such lease is known as the 'full-service lease'.
- Net Lease: Where the lessee is responsible for the insurance and maintenance of the leased asset, such lease is known as the 'net lease'.

**Literature:**

Mathur, S. B., & Rangarajan, C. (2015). Financial Management : Theory and Practice. New Delhi: Laxmi Publications Pvt Ltd.; Chapter 27 - Leasing, Hire-Purchase, and Project Financing

### *b) Pricing a lease (classical approach)*

Lease fee must cover the present value or the asset with respect on the residual value (*Re*), while it is derived from 5 interest components (*r*).

$$Lease\ fee = \frac{(Asset\ price * (1 - Re)) * 0.9}{\frac{1 - (1 + r)^{-T}}{r}}$$

Where $r = r_0 + r_1 + r_2 + r_3 + r_4$

Interest base is defined by the lessor's liability interest rate, where the leasing company can fund itself in the long run. Interest premium 1 depends on the maturity and additional down payments. Interest premium 2 is defined by the commission of the leasing company. Interest premium 3 represents the partner risk and the volatility of the asset price volatility while interest premium 4 covers the additional services (if there is any).

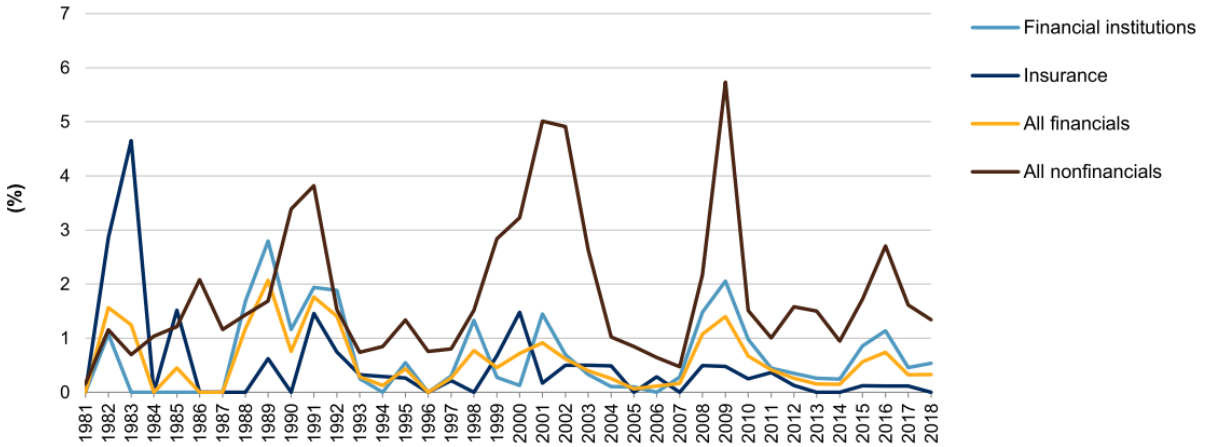
$$r_3 = \frac{default\ rate}{time\ to\ default} * 12\ month * Multiplier\ due\ to\ capital\ reduction$$

### *c) Default rates from S&P*

An obligor rated 'D' (default) is in default on one or more of its financial obligations, including rated and unrated financial obligations but excluding hybrid instruments classified as regulatory capital or in nonpayment according to terms. An obligor is considered in default unless S&P Global Ratings believes that such payments will be made within five business days of the due date in the absence of a stated grace period, or within the earlier of the stated grace period or 30 calendar days. A 'D' rating is assigned when S&P Global Ratings believes that the default will be a general default and that the obligor will fail to pay all or substantially all of its obligations as they come due.

S&P Global publishes its "*Annual Global Corporate Default And Rating Transition Study*" report with sectoral and industrial breakdown.

**One-year Default Rates By Broad Sector**




Source: S&P (2018): Default, Transition, and Recovery: 2018 Annual Global Corporate Default And Rating Transition Study. Standard and Poor's

*"Over the long term, nonfinancial sectors have tended to show a more pronounced cyclicality of defaults than the financial sectors. While the one-year default rate for nonfinancial companies has climbed above 3.5% in three previous cyclical peaks (1991, 2001-2002, and 2009), the annual default rate for financial services has remained below 2% since 1990. The higher default rates for nonfinancials is not surprising, given this sector's higher concentration of speculative-grade issuers. Financial services companies are more likely to be initially rated in the investment-grade category, while nonfinancial companies are more likely to initially be rated speculative grade."*

**Global Corporate Default Rates By Industry**

| (%) | 2018 | 2017 | Weighted average (1982-2018) | Median | std | Minimum | Maximum |
|---|---|---|---|---|---|---|---|
| Aerospace/auto/capital goods/metals | 1,13 | 1,33 | 2,11 | 1,32 | 2,02 | 0 | 9,47 |
| Consumer/service | 2,49 | 2,74 | 2,3 | 1,79 | 1,56 | 0 | 6,29 |
| Energy & natural resources | 3,95 | 4,72 | 3,05 | 1,72 | 2,86 | 0 | 13,67 |
| Financial institutions | 0,54 | 0,46 | 0,66 | 0,34 | 0,72 | 0 | 2,8 |
| Forest & building products/homebuilders | 0,82 | 1,65 | 2,48 | 1,46 | 2,87 | 0 | 14,51 |
| Health care/chemicals | 0,87 | 1,11 | 1,37 | 0,84 | 1,3 | 0 | 4,89 |
| High tech/computers/office equipment | 0,86 | 1,53 | 1,15 | 0,94 | 1,43 | 0 | 4,82 |
| Insurance | 0 | 0,12 | 0,3 | 0,23 | 0,9 | 0 | 4,65 |
| Leisure time/media | 1,44 | 1,42 | 3,29 | 2,11 | 3,27 | 0 | 17,02 |
| Real estate | 0,26 | 0,27 | 0,69 | 0 | 2,72 | 0 | 12 |
| Telecommunications | 0,94 | 0,93 | 2,47 | 0,92 | 3,83 | 0 | 18,52 |
| Transportation | 0,69 | 0,37 | 2 | 1,77 | 1,64 | 0 | 6 |
| Utility | 0 | 0,31 | 0,43 | 0,17 | 0,75 | 0 | 4,26 |

Source: S&P (2018): Default, Transition, and Recovery: 2018 Annual Global Corporate Default And Rating Transition Study. Standard and Poor's

*"When comparing default rates across sectors, we note some key differences between the various industries. Several sectors have had distinct default cycles, such as the high technology, computers, and office equipment sector and the telecommunications sector, which both fuelled the prolonged and pronounced spike in the default rate during the tech bubble, when the global speculative-grade default rate reached 12.1% in June 2002. Other sectors, such as the consumer services sector, have had more frequent default cycles, both during and between economic cycles"*

**Time To Default From Post-Original Ratings By Industry**

| | Average years to default | Median years to default | Standard deviation of years to default |
|---|---|---|---|
| Aerospace/auto/capital goods/metals | 3,7 | 1,5 | 5 |
| Consumer/service | 3,6 | 1,6 | 5,1 |
| Energy & natural resources | 2,7 | 1 | 4,2 |
| Financial institutions | 2,9 | 1 | 4,7 |
| Forest & building products/homebuilders | 2,9 | 1,3 | 3,9 |
| Health care/chemicals | 3,1 | 1,4 | 4,7 |
| High tech/computers/office equipment | 4 | 2 | 5,1 |
| Insurance | 3,1 | 1,7 | 3,7 |
| Leisure time/media | 3,1 | 1,2 | 4,5 |
| Real estate | 1,4 | 0,8 | 1,7 |
| Telecommunications | 1,6 | 0,6 | 2,7 |
| Transportation | 4,8 | 1,8 | 6,5 |
| Utility | 3,2 | 0,8 | 5,2 |
| Total | 3,2 | 1,3 | 4,8 |

Source: S&P (2018): Default, Transition, and Recovery: 2018 Annual Global Corporate Default And Rating Transition Study. Standard and Poor's

*"Among the 2,754 defaults recorded globally over the long term, six sectors displayed average times to default that are lower than the overall average of 5.8 years. These sectors are energy and natural resources; financial institutions; high technology, computers and office equipment; leisure time and media; real estate; and telecommunications*"

### *d) An example for full service lease*

Indicative proposal for the lease of one Siemens Vectron VM locomotives

- Locomotive: Siemens Vectron VM
- VM Quantity: 1
- Homologation requested: HU, CZ, AT
- Lease term: 36 months
- Assumed mileage per year: 150,000 km/ 200,000 km
- Type of lease: Full service
- Lease price per month 150,000 km: €42,252,-
- Lease price per month 200,000 km: €44,746,-

This offer is subject to the lease company's management approval.
Our full service offer includes:

- preventive (PM)-,
- corrective maintenance (CM) and
- main overhaul (MO)/ revisions, and
- insurance (I)

This offer does not include a spare locomotive option.
Overview of the service package included in the monthly lease price:

- Preventive maintenance - Total-country coverage in the relevant countries of use in accordance with the regulations of the manufacturer.

- Corrective maintenance - Damage due to technical defects will be borne by the lease company. The Lessee, therefore, does not bear any technical risk.
- Spare/wearing parts - Spare parts and wearing parts due to normal wear during service.
- Stocking of spare parts - Stocking of selected spare parts, 24-hour access to your own store, as well as cooperation with other utility companies.
- Wheels - Turning of wheels, change of new wheels.
- Main overhaul reserves - Formation of reserves for main overhauls.
- Locomotive service - Software Upgrades, documentation, operational support.
- Change of locomotive type - A change of the locomotive according to other operational requirements is always possible during the lease term.
- Driver training - Optionally we can offer you a driver training and instruction for the type of locomotives in our offer.

Indicative prices for the VM type for 150,000 km and 200,000 km per year.
The VM variant has a broad homologation range and is therefore a high-end and relatively more costly locomotive. Domestic locomotives are considerably more affordable compared to our extend VM type locomotive (which is meant to cover the majority of Europe).
I have reviewed your indicated annual mileage and due to practical implications would like to propose an alternative.
The majority of lease company's customers driving with this type of locomotives, drive approximately 150,000-200,000 km per year. This annual mileage is realistic with one locomotive, more than 300,000 km per year would not be realistic due to scheduled maintenance etc. If more kilometres need to be covered, multiple locomotives are needed.
Due to safety regulations, lease company's locomotives require on average once a week one day downtime for preventive maintenance.

## 4. Long-term asset and liability management in the case study

*Please show, how the acceptance of the lease-offer (3 Vectrons) would change the profitability (considering: no maintenance personnel, no own locomotive)!*

**Ideas of rationalization**

- Sell old traction vehicle:
  - diesel loco: 379.75 million HUF
  - spare parts: 40 million HUF
- Issuing new corporate bond with flexible interest rate
  - EURIBOR+2%
  - 3m EUR initial market price
- Liquid assets:
  - HUF 150 million
  - EUR 1.5 million (472,500,000 HUF)

**Two scenarios were compared** in this assignment: the first uses a full service lease contracts to modernize the traction capacities, while the second one increases corporate debt level to acquire the necessary locomotives. Considering depreciation appears in both cases, it was left out from the comparison.
**1. Full service lease contract** (not considering the tax-benefits of depreciation)**:**

- Savings:

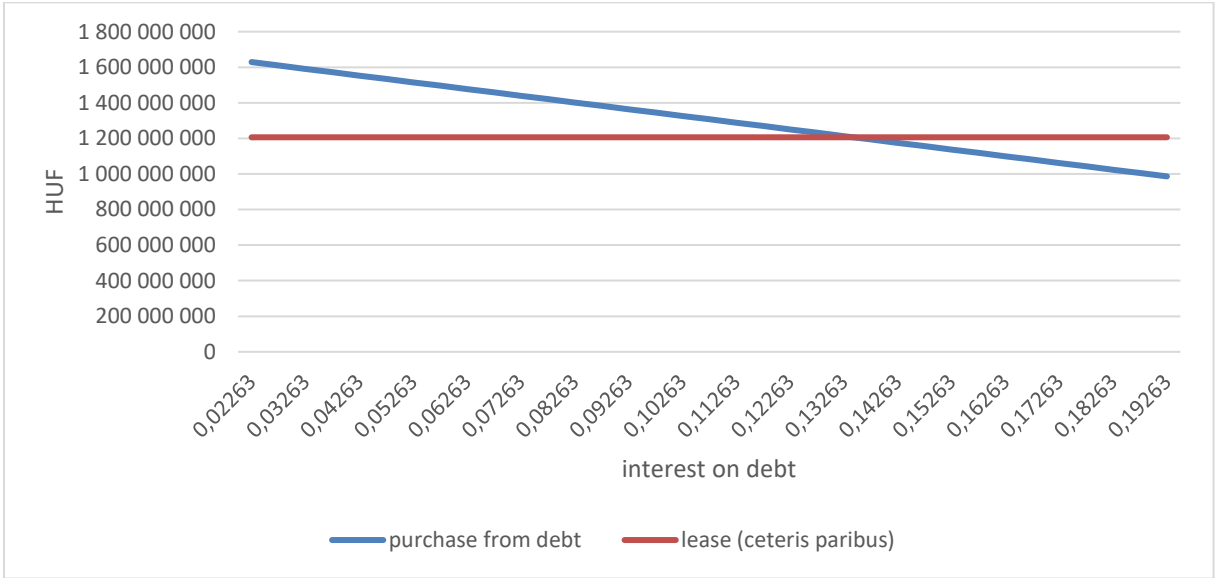
- Fire all engineer-technicians (Wages are reduced by 9 600 000 HUF, 36 000 EUR and 056 000 CZK, a total of 32 978 400 HUF saving).
- Selling the diesel locomotive increases the bank deposits by 419.75 million HUF, increasing our total interest revenues after our bank deposits by 4 617 250 HUF
- Renew our 2 million EUR debt by issuing new corporate bonds (EURIBOR+2%) to save 36 143 100 HUF on interest payment
- The company would save on traction electricity instead of spending on diesel fuel: 1 673 899 991

- Expenditures:
  - Lease 3 Siemen Vectron locomotives (1 718 856 EUR/year for leasing fees, a total of 541 439 640 HUF expenditure).
- Total: 1 206 199 101 HUF, the use of lease would increase profitability

**2. Purchasing 3 Siemens Vectrons from debt** (not considering the tax-benefits of depreciation)**:**

- Savings:
  - Selling the diesel locomotive increases the bank deposits by 419.75 million HUF, increasing our total interest revenues after our bank deposits by 4 617 250 HUF
  - Renew our 2 million EUR debt by issuing new corporate bonds (EURIBOR+2%) to save 36 143 100 HUF on interest payment
  - The company would save on traction electricity instead of spending on diesel fuel: 1 673 899 991
- Expenditures:
  - Issuing 12 million EUR corporate bonds under similar yields and increasing interest payments by 85 541 400 HUF
- Total: 1 629 118 941 HUF, so the purchase of the vehicles from debt would increase profitability even more.

Assuming that the company is able to issue more bonds under the same conditions, the “purchase from debt” strategy would be more profitable. Full service financial lease can be favourable after the interest rates of the additional bonds exceeded the 13.7% level.



# IX. Exercise 8 – Short-term funding

*Assuming that the company acquires its annual income at the end of the year, but pays its expenditures on monthly basis (only the interests are accounted at the end of the year).*
*Please evaluate both short term funding strategies:*
*1. Minimizing risk*
*2. Minimizing expenditures*
*Which one was the cheapest for you?*

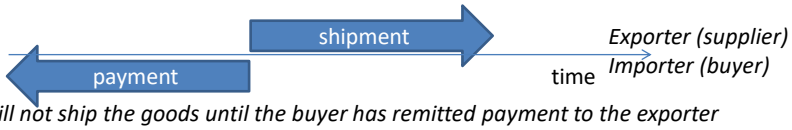
### *a) Financing international trade*

Production → delivery → payment

- supplier credit
- bank financing (middleman)

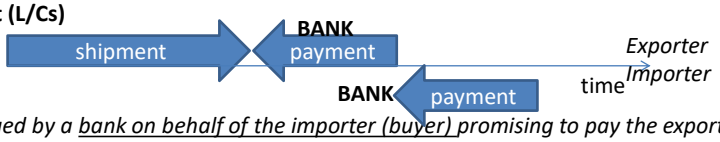
## Payment Methods

**Prepayment**



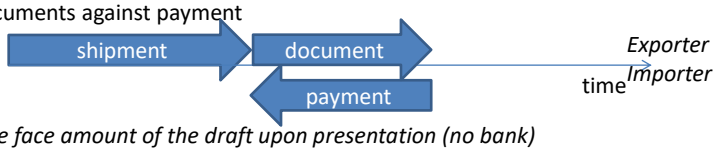

*the exporter will not ship the goods until the buyer has remitted payment to the exporter*

**Letter of credit (L/Cs)**




*instrument issued by a bank on behalf of the importer (buyer) promising to pay the exporter (beneficiary) upon presentation of shipping documents*
→ exporter receiving payment from the issuing bank as long as it presents documents

**Sight draft**; documents against payment

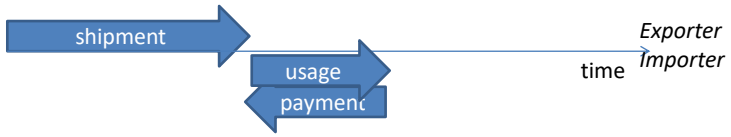



*buyer to pay the face amount of the draft upon presentation (no bank)*
buyer's bank will not release the shipping documents to the buyer until the buyer has paid the draft

**Time draft**; documents against acceptance


exporter instructs the buyer's bank to release the shipping documents against acceptance (signing) of the draft → buyer is promising to pay the exporter at the specified future date

**Consignment**




exporter ships the goods to the importer's warehouse but owns the merchandise. The importer has access to the inventory but does not have to pay for the goods until they have been sold to a third party

**Open Account**


exporter ships the merchandise and expects the buyer to remit payment according to the agreed-upon terms
exporter is relying fully upon the financial creditworthiness, integrity, and reputation of the buyer

### *b) Working capital*

- Working Capital Management
  - Alternative Working Capital Policies
  - Cash Management
  - Inventory and A/R Management
  - Trade Credit
  - Bank Loans
- Working Capital Terminology
  - Working capital – current assets.
  - Net working capital – current assets minus non-interest bearing current liabilities.
  - Working capital policy – deciding the level of each type of current asset to hold, and how to finance current assets.
  - Working capital management – controlling cash, inventories, and A/R, plus short-term liability management.
- Working Capital Financing Policies
  - Moderate – Match the maturity of the assets with the maturity of the financing.
  - Aggressive – Use short-term financing to finance permanent assets.
  - Conservative – Use permanent capital for permanent assets and temporary assets
- Operating cycle: average age of inventory + average collection period
  - average age of inventory: sell finished good on account – purchase raw material on account
  - average collection period: collect accounts receivable - sell finished good on account
- Cash Conversion Cycle
  - The cash conversion cycle focuses on the length of **time between** when a company **makes payments** to its creditors and when a company **receives payments** from its customers.
  - CCC: cash inflow – cash outflow (time requirement)

  - CCC=inventory conversion period + receivables collection period – payables deferral period
  - CCC=(days per year/inventory turnover)+days sales outstanding – payables deferral period
- Determining permanent vs. Seasonal Funding Needs
  - permanent or minimal need
  - peak need: seasonal need
  - Sum: total need
- Accounts Receivable Management: The Five Cs of Credit
  - **Character:** The applicant's record of meeting past obligations.
  - **Capacity:** The applicant's ability to repay the requested credit.
  - **Capital:** The applicant's debt relative to equity.
  - **Collateral:** The amount of assets the applicant has available for use in securing the credit.
  - **Conditions:** Current general and industry-specific economic conditions.
- Minimizing Cash Holdings
  - Use a lockbox
  - Insist on **wire transfers** and debit/credit cards from customers
  - Synchronize **inflows and outflows**
  - Reduce need for **"safety stock" of cash**
    - Increase *forecast* accuracy
    - Hold *marketable securities*
    - Negotiate a *line of credit*
- Cash Budget
  - Forecasts **cash inflows, outflows, and ending** cash balances.
  - Used to **plan loans** needed or funds available to invest.
  - Can be daily, weekly, or monthly, **forecasts**.
    - Monthly for annual planning and daily for actual cash management.
- Inventory Costs
  - Types of inventory costs
    - **Carrying** costs – *storage and handling* costs, *insurance*, property *taxes, depreciation*, and *obsolescence*.
    - **Ordering** costs – cost of *placing orders*, *shipping*, and *handling* costs.
    - Costs of **running short** – loss of *sales or customer goodwill*, and the disruption of *production schedules*.
  - **Reducing inventory** levels generally **reduces carrying costs**, **increases ordering costs**, and may increase the **costs of running short**.
- Elements of Credit Policy
  - Credit Period – **How long to pay?** Shorter period reduces DSO and average A/R, but it may discourage sales.
  - **Cash Discounts** – Lowers price. Attracts new customers and reduces DSO.
  - Credit Standards – **Tighter standards** tend to **reduce sales, but reduce bad debt** expense. Fewer bad debts reduce DSO.
  - Collection Policy – How tough? Tougher policy will reduce DSO but may damage **customer relationships**.
- What is trade credit?
  - Trade credit is credit furnished by a **firm's suppliers**.

- Trade credit is often **the largest source of short-term credit**, especially for small firms.
- Spontaneous, easy to get, but cost can be high.

**Literature**

Gitman, L. Managerial Finance. Pearson, Chapter 14
Shapiro, A.: Multinational Financial Management. J.Wiley & Sons

### *c) Short-term financing strategy*

A. **Strategy**

1. Identify: **key factors**
2. Formulate/evaluate: **objectives**
3. Describe: available **options**
4. Develop a methodology: to calculate/compare **costs**

B. **Key Factors**

1. **Deviation**s from **Int'l Fisher Effect**?
*(exchange rate change=interest differential)*
   a. If yes
      trade-off required between
      **int. cost and exchange risk**
   b. If no
      **interest costs** are same everywhere
2. **Exchange** Risk
   a. Offset **foreign assets** with foreign **liabilities**
   b. Borrow where no exposure increases exchange risk
3. Firm's **Risk Aversion**
   direct relation to price incurred to reduce exposure
4. Does **Interest Rate Parity** Hold?
   $F/S=r_{domestic}/r_{foreign}$
   a. Yes. Currency is irrelevant.
   b. No. Cover costs may differ
      -added risk may mean the forward premium/discount does not offset interest rate differentials.

**5. Political Risk**: If high,

a. MNCs should
1.) maximize **local financing**.
2.) Faced with confiscation or currency controls, **fewer assets** at risk.
(*Outsourcing, Lease, joint venture, franchise….)*

C. Short-Term Financing **Objectives**

1. Four Possible Objectives:
   a. **Minimize** expected **cost**.
   b. **Minimize risk** without regard to cost.
   c. Trade off expected **cost and**

systematic **risk**.

d. Trade off expect cost and total risk.

D. Short-Term **Financing Options**

1. Three Possibilities
   a. **Inter-company** loans
   b. **Local currency** loans
   c. **Euro** market
   (taking up a loan in a foreign currency on a foreign market)
2. **Local Currency** Financing: Bank Loans
   a. Short-term in nature role of cleanup clause
   b. Forms
      1.) Term loans
      2.) **Line of credit**
      3.) Overdrafts
      4.) Revolving Credit
      5.) Discounting
3. Calculating **Interest Costs**
   a. **Effective interest rate** (EIR): most efficient measure of cost
   b. Basic formula:
   EIR = **Annual Interest Paid / Funds Received**
4. Commercial Paper

a. Definition: short-term unsecured promissory note generally sold by large MNCs on a discount basis.

b. Standard maturities

c. Bank fees charged for:
   1.) Backup line of credit
   2.) **Credit rating** service

**Literature**

Shapiro, A.: Multinational Financial Management. J.Wiley & Sons

### *d) International cash management*

**A. Seven Key Areas:**

1. **Organization – centralization**
   Advantages:
   a. Efficient liquidity levels
   b. Enhanced profitability
   c. Quicker headquarter action
   d. Decision making enhanced
   e. Better volume currency quotes
   f. Greater cash management expertise
   g. Less political risk
2. **Collection**/Fund Disbursement
   1. Key Element: Accelerate collections
   2. Acceleration Methods:
      a. Cable remittances
      b. Mobilization centers
      c. Lock boxes

d. Electronic fund transfers

3. Methods to Expedite Cash Payments
   a. Cable remittances
   b. Establish accounts in client's bank
   c. Negotiate with banks
      - obtain value dating

3. Interaffiliate Payments **Netting**
   1. Definition: offset payments of affiliate receivables/payables so that net amounts only are transferred.
   2. Create **Netting Center**
      a. a subsidiary set up in a location with minimal exchange controls
      b. Coordinate interaffiliate payment flows
      c. Center's value is a direct function of transfer volume.

4. **Excess-Funds** Investment
   1. Major task:
      a. determine *minimum cash balances*
      b. short-term *investment of excess* balances
   2. Requirements:
      a. Forecast of *cash needs*
      b. Knowledge of minimum cash position
   3. Investment Selection Criteria:
      a. Government regulations
      b. Market structure
      c. Foreign tax laws

5. Optimal Global **Cash Balances**
   1. Establish centrally managed **cash pool**
   2. Require affiliates to **hold minimum**
   3. Benefits of Optimal Cash Balances
      a. Less borrowing needed
      b. More excess fund investment
      c. Reduced internal expense
      d. Reduced **currency exposure**

6. Cash **Planning**/Budgeting

7. **Bank** Relations
   1. **Good Relations** Will Avoid
      a. Lost *interest income*
      b. *Overpriced services*
      c. Redundant services
   2. Common Bank Relation **Problems**
      a. *Too many* banks
      b. High costs such as compensating balances
      c. Inadequate *reporting*
      d. Excessive *clearing delays*

**B. Goals of an International Cash Manager**

1. Quick/efficient *cash control*
2. Optimal conservation/*usage*

**1. Organization: Centralize**

**2. Collection/Disbursement of Funds**

**Literature**

Shapiro, A.: Multinational Financial Management. J.Wiley & Sons
Madura: part 5

## 5. Short-term asset and liability management in the case study

*Please evaluate both short term funding strategies:*
*1. Minimizing risk*
*2. Minimizing expenditures*
*Which one was the cheapest for you?*

**Data and assumptions**

Assuming, that: incomes will be scheduled to paid at the end of the year; as interest payments, tax payments are accounted at the end of the year as well as the rental fee of the Vienna-office. The company covers short term funding needs (represented by EBITDA) through monthly bank loans until the end of the year.

Estimations are based on Assignment 1, and *seminar_06_ST_funding.m* Matlab sript file.

**Short term funding conditions in different currencies are:**

CZK: PRIBOR+0.04=4.51%
EUR: EURIBOR+0.03=3.26%
HUF: BUBOR+0.05=7.11%

**Revenues** (corrected with interests) are considered as the collateral for these loans: 11.036 million EUR, which was distributed originally among the subsidiaries to cover their expenditures:

| CZK | EUR | HUF | *Group (HUF)* |
|---|---|---|---|
| 60 944 771 | 741 143 | 2 558 819 566 | *3 487 050 000* |

Without short term funding, the company would face the following position at the end of the year:

| | CZK | EUR | HUF |
|---|---|---|---|
| running fee | -52 808 771 | -345 815 | -115 768 116 |
| energy and maintenance | -26 927 479 | -371 166 | -139 371 480 |
| labor costs | -5 736 000 | -374 784 | -142 368 000 |
| **total** | **-85 472 250** | **-1 091 765** | **-397 507 596** |

**Monthly expenditures in local currencies** to cover with short term loans until the company is paid at the end of the year (monthly EBITDA in different currencies)**:**

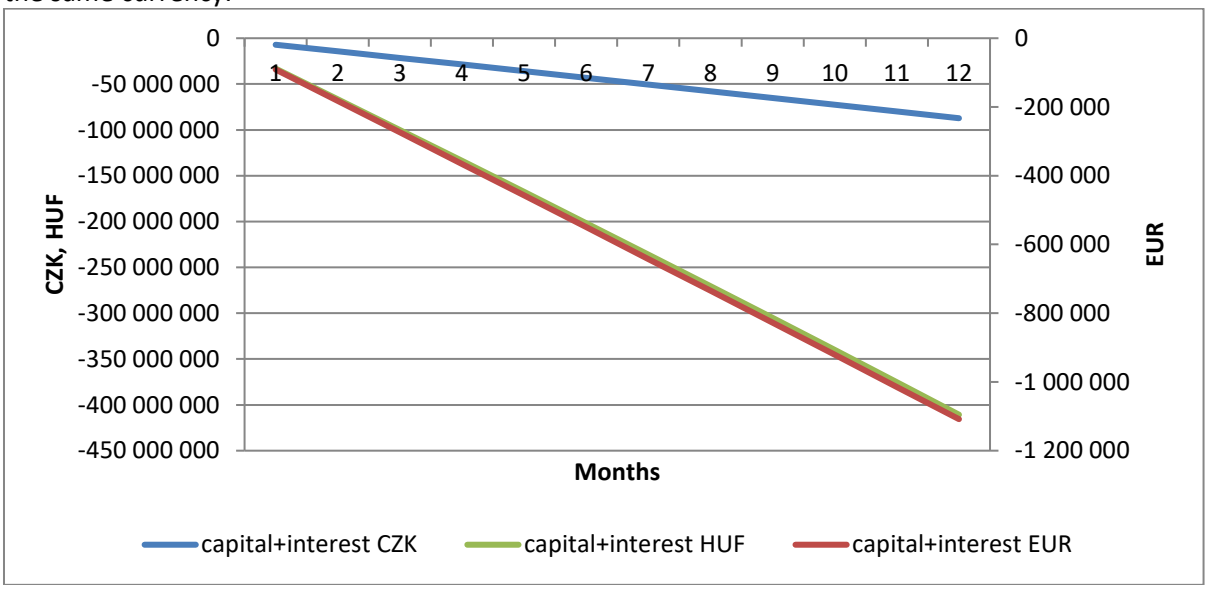
| | | |
|---|---|---|
| running fee | CZK | -4 400 731 |
| | EUR | -28 818 |
| | HUF | -9 647 343 |
| energy and maintenance | CZK | -2 243 957 |
| | EUR | -30 931 |
| | HUF | -11 614 290 |
| labour costs | CZK | -478 000 |
| | EUR | -31 232 |
| | HUF | -11 864 000 |
| **Total monthly expenditure** | **CZK** | **-7 122 688** |
| | **EUR** | **-90 980** |

| | | |
|---|---|---|
| | **HUF** | **-33 125 633** |

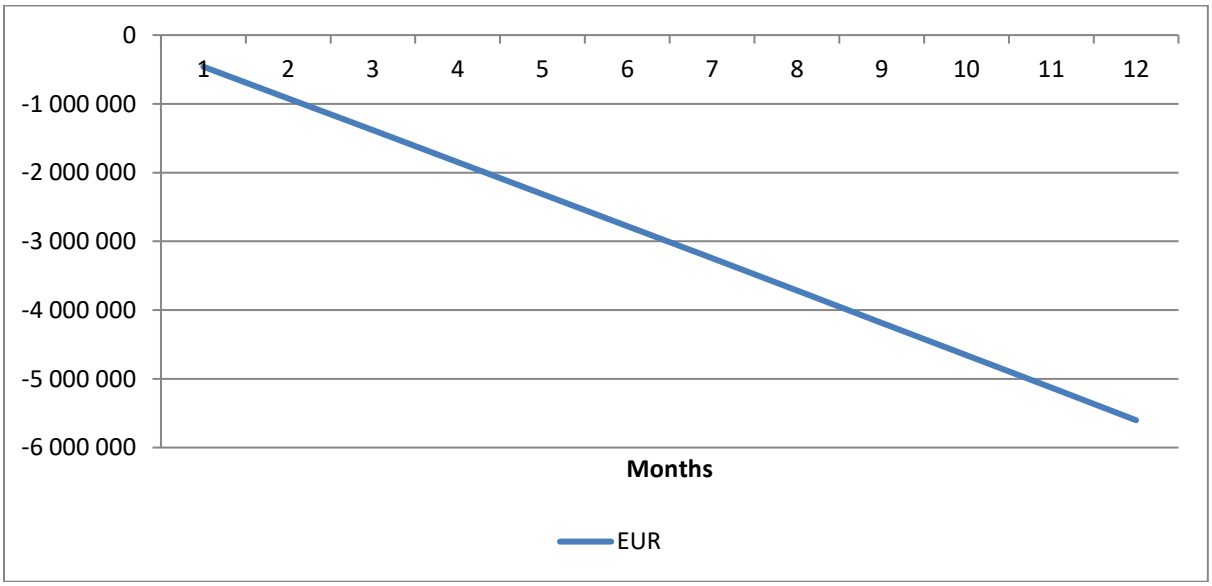
Note: depreciation has no impact on cash flows.

**Comparison of different funding strategies**

Minimum risk strategy considers no currency mismatch – each monthly expenditure is financed from the same currency.




Minimum cost strategy uses euro to finance the entire short term debt, because it has the lowest interest rate and it has the same denomination as the revenues.




Assuming that **monthly expenditures** can be aggregated **as annuities**, the following debt is generated until the end of the year (under constant exchange rates).

| | Min risk (no currency mismatch) | Min cost (funding in EUR) |
|---|---|---|
| CZK | 87 261 355 | 0 |
| EUR | 1 108 242 | 5 602 629 |
| HUF | 410 720 655 | 0 |
| **group (HUF)** | **1 754 596 236** | **1 764 828 278** |

The company has the **following position at the end of the year** as a corrected EBITDA after the short term funded position (monthly expenditure annuities) are deducted from the incoming incomes:

| | CZK | EUR | HUF | group (HUF) |
|---|---|---|---|---|
| Min risk (no currency mismatch) | -26 316 584 | -367 099 | 2 148 098 911 | 1 732 453 764 |
| | | | EBITDA | *1 715 797 140* |
| | | | **gap:** | **16 656 624** |
| Min cost (funding in EUR) | 60 944 771 | -4 861 486 | 2 558 819 566 | 1 722 221 723 |
| | | | EBITDA | *1 715 797 140* |
| | | | **gap:** | **6 424 583** |

As we can see, short term funding was always more expensive than the original EBITDA. However, the "mind risk" strategy proved to be 10 million HUF more expensive than the "min cost" approach with currency mismatch. However, the exchange rates can change.

## 6. Matlab code for short-term funding

```
%% 2. Short term funding
%1. Monthly net expenditures (EBITDA-incomes)
for j=1:3
    C(1,j)=sum(PLS([2:4 6],j))/12; %CZK,EUR,HUF
end
%2. Avaliable income at the end of the year (EUR)
net_income=PLS(1,4);
%3. Annuity ^:altgr+3
  %PRIBOR+0.04 EURIBOR+0.03 BUBOR+0.05
r=[0.0051+0.04 r_eur+0.03 r_huf+0.05];
for j=1:3
FV(1,j)=((((1+(r(1,j)/12))^12)-1)/(r(1,j)/12))*C(1,j);
end

%4.a. Strategy 1: Minimize risk! (HUF)
    %no currency missmatch
    ST=FV(1,:)-C*12;
Spending_on_ST_funding(1,1)=ST(1,1)*CZKHUF...
    +ST(1,2)*EURHUF+ST(1,3);
ST_EBITDA(1,1)=...
    (sum(PLS([2:4 6],4))-Spending_on_ST_funding(1,1))...
    /(net_income);
%4.b. Minimize expenditure!
    %all lending in EUR
    r=[];
r=[r_eur+0.03];
C_EUR=C(1,1)*(CZKHUF/EURHUF)+C(1,2)+C(1,3)/EURHUF;
FV(2,:)=[0 ((((1+r/12))^12)-1)/(r/12))*C_EUR 0];
ST=[];
ST=FV(2,2)-C_EUR*12;
Spending_on_ST_funding(2,1)=ST*(EURHUF);
ST_EBITDA(1,2)=...
    (sum(PLS([2:4 6],4))-Spending_on_ST_funding(2,1))...
```

```
    /(net_income);
Spending_on_ST_funding(1,1)-Spending_on_ST_funding(2,1)

bar(ST_EBITDA)
```

# X. Exercise 9 – Final presentation

*Please summarize the different aspects of your strategy in one coherent, 15 minutes long presentation!*

Sample presentation for Complexity – case study 1.3

- Vision of your strategy
  - *Making the world a better place trough efficient traction*.
- The new structure of the company
  - HR: Austrian subsidiary was rationalized (saving 0.394 million EUR)
  - Locomotives: Transmontana was purchased
    - Cheaper to buy, a bit more expensive to operate (saving 1.6 billion HUF)
  - Funding: 1.4 million EUR variable interest corp. bond was issued (saving 40 m HUF)
  - Money: utilised all of the bank deposits for modernisation and debt reduction
  - New pre-tax ratio: 50%
- Profit and loss statement

| | | Czech (CZK) | Austrian (EUR) | Hungarian (HUF) | Group (HUF) |
|---|---|---|---|---|---|
| Income | | 87 872 250 | 716 981 | 2 259 457 416 | 3 487 050 000 |
| Expenditures | railway usage fees | 52 808 771 | 345 815 | 115 768 116 | 826 719 830 |
| | fuel or electricity | 26 927 479 | 371 166 | 98 421 480 | 522 311 950 |
| | maintenance | 0 | 0 | 40 950 000 | 40 950 000 |
| | rent | 0 | 0 | 0 | 0 |
| | wages | 5 736 000 | 0 | 142 368 000 | 207 758 400 |
| | amortization (vehicle) | 0 | 0 | 40 950 000 | 40 950 000 |
| | amortization (building) | 2 400 000 | 0 | 48 000 000 | 75 360 000 |
| EBIT | | 0 | 0 | 1 772 999 820 | |
| Financial profit | subsidiaries | 0 | 0 | 0 | 1 772 999 820 |
| | gained interests | 0 | 0 | 0 | 0 |
| | paid interests | 0 | 0 | 0 | 26 401 468 |
| Pre-Tax Profit | | 0 | 0 | 0 | 1 746 598 352 |
| corporate income tax | | 0 | 0 | 0 | 331 853 687 |
| Profit after tax | | 0 | 0 | 0 | 1 414 744 665 |
| Dividend | | 0 | 0 | 0 | 282 948 933 |
| Profit for the year | | 0 | 0 | 0 | 1 131 795 732 |

- How EUR and CZK affects our profitability?
  - Exposures are:
    - 87.9 million CZK (HUF depreciation unwanted)
    - 10.32 million EUR (HUF appreciation unwanted)
  - Market trend (about appreciation/depr.)
    - HUF weakens against CZK and EUR as well
  - Strategies:
    - CZK: Total hedge for 16 million HUF

        - EUR: no hedge
- Bankruptcy
    - Ohlson-O value defines the probability of default
        - The original value was 93%, a really high probability of default
        - The new value is 56%, a mediocre probability of default – as the company starts to refill its bank deposits, the probability of default will decrease further (next year: 39%)
    - Altman-Z' defines financial distress under 2.9 and high chance of default under 1.23
        - The original value was 0.87, a really high probability of default
        - The new value is at 1.16 (still bad), but later on it will be improved (one year later 1.43)
- Valuation
    - WACC of your company: 4.02%
        - Return of equity: 2.85%
        - Interest of loans: 5.91%
    - FCF of your company: 2257 million HUF / year
    - Your strategy is useful, because the value of the company can be increased:
        - Old value was: 158 HUF/shares
        - New value is assumed as: 1086 HUF/shares
            - Added value of the strategy: 928 million HUF
- Thank you for your attention!

# XI. References

Altman, E. I. (2000): Predicting Financial Distress of Companies: Revisiting the Z-Score and Zeta models. Journal of Banking and Finance, 1, p. 1-51

Cappeiello, L., Engle, R. F., & Sheppard, K., (2006): Asymmetric Dynamics in the Correlations of Global Equity and Bond Returns. Journal of Financial Econometrics, 4 (4), 537–572. http://dx.doi.org/10.1093/jjfinec/nbl005

Contino M. R. (2002): The Complete Equipment-Leasing Handbook. AMACOM

Frykman, D. – Tolleryd, J. (2003): Corporate valuation: an easy guide to measuring value. Pearson, London

Gitman, L. Managerial Finance. Pearson

Hull, John C. (1997): Options, Futures and Other Derivatives, Prentice Hall International, Inc.

Jeff Madura (2008): International Financial Management. 9th edition, Thomson, ISBN: 0-324-56820-7

Julia Galica (2015): Corporate Tax Havens: Analysis of an Aggressive Tax Approach as a Strategic Necessity for Large Multinational Corporations. Honors Scholar Theses. 436

Mathur, S. B., & Rangarajan, C. (2015). Financial Management : Theory and Practice. New Delhi: Laxmi Publications Pvt Ltd.

Mauro C. D. et al. (2018): Offshoring and backshoring: A multiple case study analysis. Journal of Purchasing and Supply Management, 24 (2) p. 108-134

Melvin M., Norrbin S. C. (2013): International Money and Finance, Elsevier

Ohlson, J. A. (1980): Financial ratios and the probabilistic prediction of bankruptcy. Journal of Accounting Research, 18, p. 109-131

Przychocka I. (2013): Methods of making use of tax havens. Finanse, 6 (1) p. 125-145

S&P (2014): How Standard & Poor's Rates Nonfinancial Corporate Entities. Standard and Poor's Rating Serivces

S&P (2018): Default, Transition, and Recovery: 2018 Annual Global Corporate Default And Rating Transition Study. Standard and Poor's

Shapiro, A.: Multinational Financial Management. J.Wiley & Sons

# XII. Appendix I.: Hungarian Keyboard and Special Characters

| | | |
|---|---|---|
| **:** | colon | → shift + . |
| **;** | semicolon | → alt gr + , |
| **,** | comma | → , |
| **-** | hyphen | →- |
| **(** | bracket | → shift + 8/9 |
| **[** | square bracket | → alt gr + f/g |
| ^ | upper cap | → alt gr + 3 |