EnpRisk - Lecture Notes Week 3

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0.0.1 How to Deal with Biases?

We introduce different strategies on how to **deal with biases:**

Heuristics Whend predictability is poor, inconsistency, based on unnoticed stimuli, is destructive of any predictive validity. Be consistent by using investment criteria, simple formulas, recipies or rules of thumb.

Example, consider an outside view Prior to the use of any inside information, try to predict a totally independent base rate, e.g. "how many start-ups in this field survive the first three years?" Use this as your anchor and adjust this base rate according to information obtained during the due diligence.

Decorrelate error Ask people's opinion independently of each other, wisdom of crowds versus groupt think, practice "constructive confrontation", avoid "cozy unanimity".

Sunk Cost Be aware of the difficulty to take a loss. A new manager does not carry the same mental accounts and is therefore more able to ignore the sunk cost of past investments.

Validity of intuition Intuition cannot be trusted in the absence of stable regualrities in the environment and in the absence of prolonged practice and learning.

0.1 From the First Pitch to the Final Investment

0.1.1 NDA - Non-Disclosure Agreement

If the introduction round is finished successfully a **Non-Disclosure Agreement (NDA)** is signed between the investors and the founders. This is a legal contract that outlines the use of confidential material, knowledge, and information that the parties wish to exchange.

Some common issues addressed in an NDA:

- The definition of what is confidential (e.g. trade secrets, upublished patent applications, vendor lists, customer lists, financial information, business strategies, etc.)
- Exclusions (e.g. information independently obtained)
- The time period of confidentiality
- Description of what must be done with the confidential material upon agreement ending (duty to return or destroy)

After the NDA is signed by both parties, access is given to the data room.

0.1.2 Term Sheet / Letter of Intent

After a first check of the data room, the investors will produce a term sheet or LOI, which:

- Outlines an agreement that two or more parties expect to make.
- Term Sheet and LOI are very similar in content, but TS is structured as a listen, often in table format, whereas LOI is in the form of a letter.
- Written before the execution of a formal and binding contract, most of the lsited agreements are *not legally binding.*

The topics included are:

- Valuation of the company
- Amount of investment
- Use of proceeds
- Cap table
- Share preference
- Governance (board composition and chair, voting rights, etc.)
- Investor commitment (lock up period)
- Management commitment

0.1.3 Exclusivity

This is a binding clause of the LOI or TS. Caveat: Transfers a lot of control to the investor, he will be the only party taking the next step in the process, he can take advantage of the "sunk cost effect", often exclusivity periods are extended. The investor can put you under pressure, test your tenacity and patience, try to decrease the valuation of the company, etc.

When you give exclusivity, you cancel out any competition for the investor, this will make him dominant.

0.1.4 Due Diligence

After the TS and/or LOI are signed, the **Due Diligence** process is started. This is supposed to take up to six weeks, in reality, it will turn out to be many months. Now, the external advisors enter the arena:

- Business lawyers will examine all the contracts in the data room
- IP lawyers will study the strengths of the patents of the company and the "freedom to operate"
- An external auditor will validate the accounting, financial statements, balance sheets, and taxes
- A technological consultant may analyze the product developement and the strength and relevance of the technology with respects to other solutions

The investors themselves will:

- Do reference checks of clients, founders, key personnel
- Analyze the commercial viability of the product and the sales process and tools
- Study the quality of the sales pipeline
- Based on that will make their own forecast of future sales
- And a forecast of future cashflows

Based on the results of the due diligence, the investors will challenge the business plan. This will allow them to:

- Create base-case and worst-case scenarios of cash burn
- Check the investment amount and the use proceeds with respect to these scenarios
- Access the risk of their investment
- Set goals and milestones for the management
- Make their own valuation of the company

0.2 Introduction to Company Valuation

0.2.1 Overview

We will give three approaches towards valuations:

- *Balance sheet:* Static, i.e. a snapshot: Equity = Assets - Liabilities
- *P&L:* Relative values by using multiple metrics from the Profit & Loss account
- *Discounted cash flow:* Absolute values by using the cash flows that will be generated by the business to calculate the Net Present Value of the business - like in the valuation of a bond.

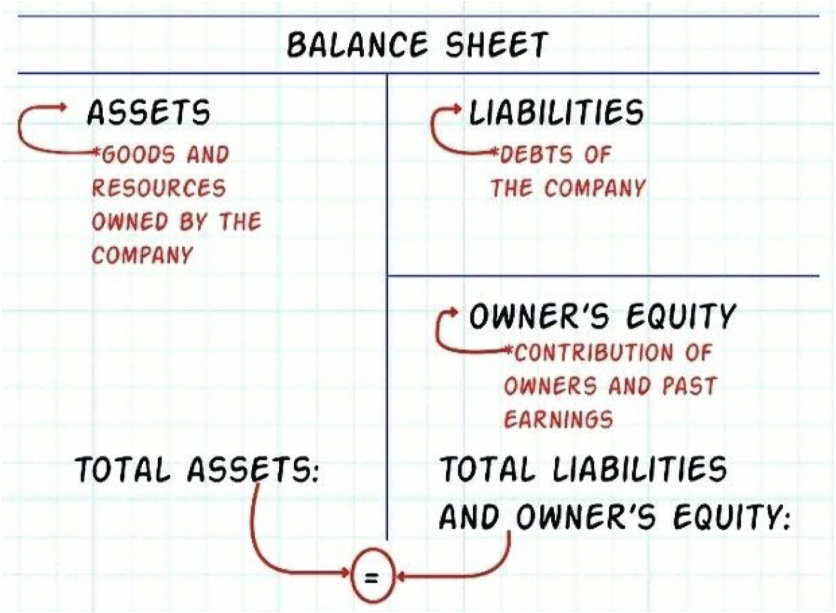
Before we start, let us first explain the difference ebtween EV and Equity:

- **Enterprise Value (EV)** is the price to acquire the whole company, the shares, the debt but also receiving the cash
- **Equity Value** is the price to acquire only the shares of a company.

In other words: Enterprise Value (EV) = Equity + Debt - Cash

0.2.2 Balance Sheet and Leverage

A **Balance Sheet** is of the following form:



Example: Assume we start a taxi business:

- We buy 5 Tesla Model 3 at a price of 40 kCHF each
- Our total investment is 200 kCHF
- To set up a LLC in Switzerland we need to pay up, personally, a minimu share capital of 20 kCHF
- We found a bank that was kind enough to provide us with a 5 year loan of 200 kCHF to buy the cars

Our initial balance sheet will look like this:

ASSETS = LIABILITIES + EQUITY	
BALANCE SHEET	
ASSETS	**LIABILITIES**
Cash: 20 kCHF	Bank loan: 200 kCHF
	EQUITY
5 cars Tesla model 3: 200 kCHF	Contribution of owners: 20 kCHF
	Past earnings : 0 kCHF

The balance sheet changes with the business, after one year it may look like this:

ASSETS = LIABILITIES + EQUITY	
BALANCE SHEET	
ASSETS	**LIABILITIES**
Cash: 25 kCHF	Bank loan: 160 kCHF
	EQUITY
5 cars Tesla model 3: 160 kCHF	Contribution of owners: 20 kCHF
	Past earnings : 5 kCHF

- You made a profit of 5 kCHF, you paid down 20% of the bank loan and the cars lost 20% in value
- Your **Return on Equity (ROE)** is 25%, you did very well! But your **financial leverage (Debt-to-Equity)** is 6.4 (160/25), which is very high
- Now the value of the company is 25 kCHF

If we do the same calculations, but started with 10 cars, we get the following balance sheet after 1 year:

ASSETS = LIABILITIES + EQUITY	
BALANCE SHEET	
ASSETS	**LIABILITIES**
Cash: 30 kCHF	Bank loan: 320 kCHF
	EQUITY
10 cars Tesla model 3: 320 kCHF	Contribution of owners: 20 kCHF
	Past earnings : 10 kCHF

- After one year, the profit could have been around 10 kCHF, you paid down 20% of the bank loan, and the cars lost 20% in value
- Now the ROE is 50% and the financial leverage is 10.7 (320/30)
- *You made 10x more money with the same investment, but the risk is much higher!*

We have seen that leverage increases your risk proportionally. The larger your business is, the higher your losses can be. If you increase your business with debt, and without increasing the equity buffer proportionally, you will have a higher ROE but als a much higher *risk of insolvency* (i.e. not being able to service the larger amount of debt).

When you continue accumulating losses, after some time you will have consumed your full equity buffer. Because of the cash you burn, your debts become higher than your assets, your company has so-called negative equity. Often that is a sign of future insolvency.

0.2.3 Banking

For our taxi business, the losses may come from operating the business. These losses may eat up the equity buffer and lead to insolvency and bankruptcy. There is no substantial risk from assets depreciating unexpectantly.

This is quite different for a bank. A bank can also have operational losses eating up its equity, but in addition, there may be large market depreciation of its assets during a financial crisis.

The leverage ratios of the five major investment banks were as high as 40 to 1 (2007). This means that a *mere drop of 2.5% in the value of their assets would wipe out entirely their equity buffer* and basically reduce their stock prices, which were soraing high, to zero.

The banking system is a closely knitted system. When a bank A collapses, this may lead to asset depreciations for bank B. As a result, also B gets in trouble. When banks get in trouble, they no longer provide loans to companies. As a result, the whole economic systems gets infected.

Too much leverage in the system may make it very vulnerable and susceptible to systemic shocks.

0.2.4 P&L - Profit and Loss

Lets go back to out taxi business and introduce several different metrics:

Taxi business income, cost and operating assumptions	CHF
income per hour (average)	100
cost per hour for the driver	55
Other operating **costs** per hour (gasoline, fleet maintenance)	20
Fixed **costs** for overhead (dispatching, office)	100 000
Operating hours per day	18
Operating hours per year	6 570
Occupancy rate	80%
Fleet size	5
Purchase price per taxi	40 000
Bank loan	200 000
Interest on loan	3.5%
Corporate tax rate	18%
Annual depreciation	20%

- **Revenues (sales)** = income per hour * operating hours per year * occupancy rate * fleet size = 2'628'000 CHF (per year)
- **Cost of goods sold (COGS)** = cost of the material and the labor directly used to rund the

business = operating hours per year * fleet size * (cost per hour for the driver + operating costs * occupancy rate) = - 2'332'350 CHF

- **Gross Margin** = Revenue - COGS = 295'650 CHF = 11.3%
- **Operating Expenses (OPEX)** = the remaining costs that are not included in COGS = - 140'000 CHF
- **Earnings Before Interest and Taxes (EBIT)** = Gross Margin - OPEX = 155'650 CHF = 5.9%
- **Earnings Before Interest, Taxes, Depreciation and Amortization (EBITDA)** = EBIT + D&A = 195'650 CHF = 7.4%
- **Earnings Before Taxes (EBT)** = EBIT - Interests paid = 148'650 CHF
- **Taxes** = - 26'757 CHF
- **Net Profit** = EBIT - Interests paid - Taxes = 121'893 CHF = 4.6%

Finally, our P&L looks as follows:

P&L (per year)	CHF
Revenues	2 628 000
Cost Of Goods Sold (COGS)	-2 332 350
Gross Margin	295 650
GM (%)	11.3%
Operating Expenses (OPEX)	-140 000
Of which: Fixed costs	*-100 000*
Depreciation	*-40 000*
EBIT	155 650
EBIT (%)	5.9%
EBITDA	195 650
EBITDA (%)	7.4%
Interests paid	-7 000
EBT	148 650
Taxes	-26 757
Net profit	121 893
Net profit margin	4.6%