COMILLAS
UNIVERSIDAD PONTIFICIA
ICAI ICADE CIHS

ICADE International
Fall 2024
Financial Markets

L8 – Derivatives

November 26th, 2025

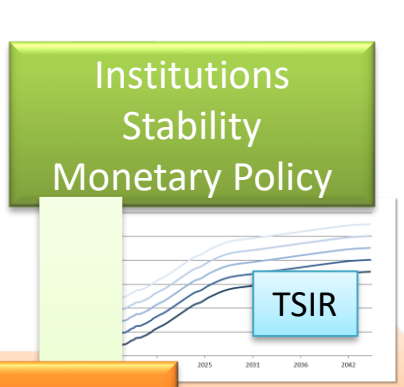
comillas.edu

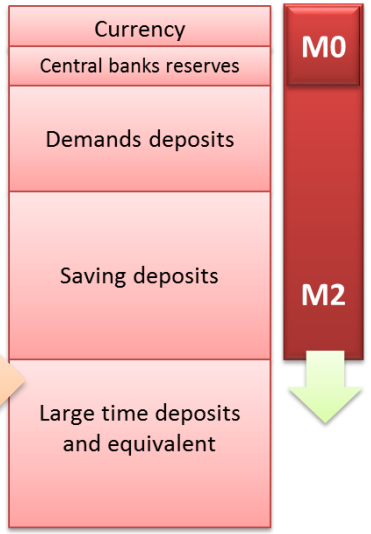
Where we are?

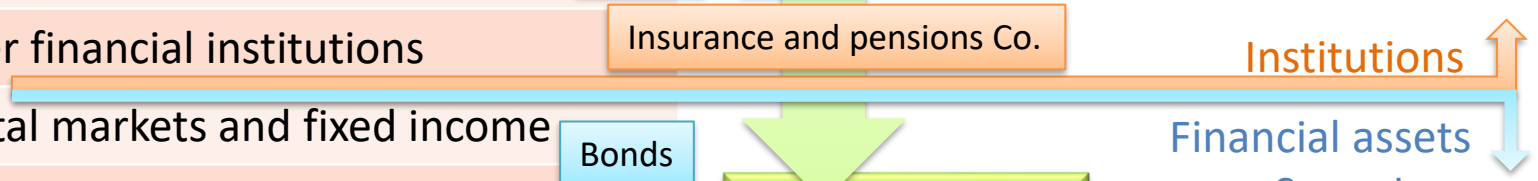
#	Lesson
1	The financial system
2	Central Banks
3	Money markets and interest rate risk
4	Credit institutions
5	Other financial institutions
6	Capital markets and fixed income
7	Equity markets
8	Sovereign debt market
9	Derivatives

And monetary policy

SWAPs, FRAs…







Any questions?

What are we going to do this week?

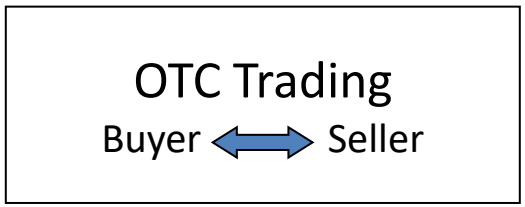
L9. Derivatives

- **Derivatives**
  - Introduction and MEFF
  - Future contracts
  - Introduction to option contracts
  - Options pricing
    - Binomial model
    - Black and Scholes
  - FRAs
  - SWAPs

  Derivatives
- **Summary of the course**

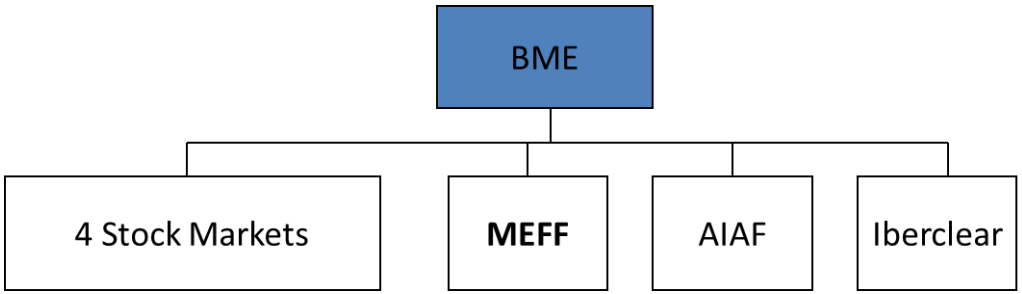
Introduction

- Derivatives are contracts between two parties that specify conditions (especially definitions of the underlying variables and resulting values) under which payments are to be made between the parties at a specified date in the future
- Any derivative derives its value from the performance of an underlying asset. This asset can be either financial (e.g. stocks, indices, etc) or non financial, e.g. raw materials
- Derivatives can be used for hedging and speculation
- There are two groups of derivative contracts:
  - The privately traded Over-The-counter (OTC) derivatives that do not go through an exchange or other intermediary. In this case, there is counterparty risk. Contracts are more flexible.
  - Exchange-traded derivatives (ETD) that are traded through specialized derivatives exchanges, so there is more liquidity and less counterparty risk. Contracts are standard.



MEFF

- MEFF is the Spanish Futures and Options market and was established in 1989
- MEFF is an official secondary market, part of BME and supervised by the CNMV
- Market members: ABN Amro, Ahorro Corporación, BBVA, Banco Santander, BNP Paribas, CaixaBank, Citigroup, Deutsche Bank, GVC SV, Interdin SVB, Renta 4 SVB, Société Générale, etc.
- MEFF Traded Contracts: IBEX 35 Futures; Stock Futures; Ibex 35 Options; Stock Options



Margin requirements:

- The initial margin requirement is the amount required to be collateralized in order to open a position.
- The variation margin or mark to market is a daily payment of profits and losses. Futures are marked-to-market every day, so the current price is compared to the previous day's price. The profit or loss on the day of a position is then paid to or debited from the holder by the exchange.

MEFF

- Up until September 2013, MEFF ran both the activities of exchange and **central counterparty (CCP)**. Since September 2013, in order to meet the requirements of EMIR (European Market Infrastructure Regulation), it has been necessary to separate the exchange activities from the CCP.
- The Central Counterparty allows parties to trade with the Counterparty rather than with each other, which removes counterparty risk and ensures anonymity.
- Central Counterparty's **main tasks**:
  - Provides liquidity
  - Stands between two firms and reduces the risk of one firm failing to honor its trade settlement obligations. Reduces the settlement risks by offsetting transactions between multiple counterparties, by requiring collateral deposits (also called "margin deposits"), by providing independent valuation of trades and collateral and by monitoring the credit worthiness of the clearing firms.
  - Settles gains and losses on a daily basis.
  - Settles contracts at maturity.

Futures contracts

- A standardized contract between two parties who commit to buy or sell a specified asset of standardized quantity for a price agreed upon today (the futures price) with delivery and payment occurring at a specified future date, the delivery date.
- Differences between a Future and a Forward:

Future	Forward contract
Standard contract. Standard size	Tailor-made contract
Traded on an offical Exchange	Privately traded
Daily margin	No margin requirements (credit risk)
Daily settlement depending on the underlying's price	The asset will only be delivered at maturity

- There are Futures on commodities, interest rates, stocks and stock indices

Futures contracts

- **Main elements:** underlying asset (financial or physical), maturity, collateral, Base (future's price minus underlying's spot price). The Base approaches zero as the maturity date gets closer

  - The party agreeing to buy the underlying asset in the future, the "buyer" of the contract, is said to be "long". Upward / bullish strategy.
  - The party agreeing to sell the asset in the future, the "seller" of the contract, is said to be "short". Downward / bear strategy.

- **Both parties of a futures contract must fulfill** the contract on the delivery date. The seller delivers the underlying asset to the buyer, or, if it is a cash-settled futures contract, then cash is transferred from the futures trader who sustained a loss to the one who made a profit. It is possible to exit the commitment prior to the settlement date

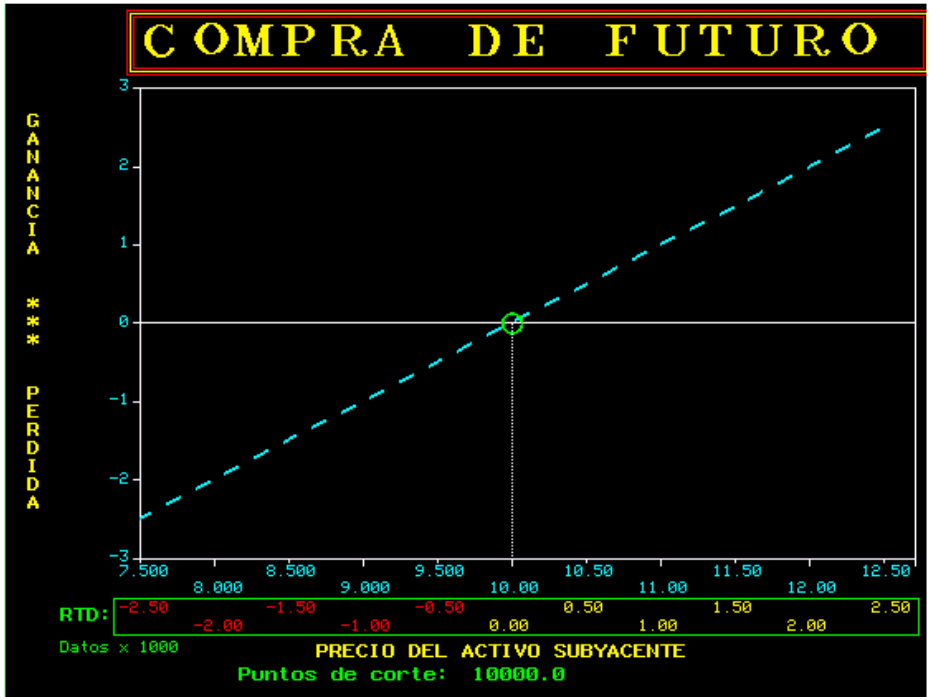
- The exchange requires both parties to put up an initial amount of cash, the margin. Additionally, since the futures price will generally change daily, the difference in the prior agreed-upon price and the daily futures price is settled daily (variation margin). The exchange will draw money out of one party's margin account and put it into the other's so that each party has the appropriate daily loss or profit. If the margin account goes below a certain value, then a margin call is made and the account owner must replenish the margin account. This process is known as marking to market. Thus on the delivery date, the amount exchanged is not the specified price on the contract but the spot value, since any gain or loss has already been previously settled by marking to market.

Futures contracts

Buying a future at 10€

The buyer locks-in a €10 price. If the price of the underlying asset goes up, the investor will make a profit. On the contrary, if the price goes down, the investor will incur a loss.

Future price	Gain / Lose
7	-3
7,5	-2,5
8	-2
8,5	-1,5
9	-1
9,5	-0,5
10	0
10,5	0,5
11	1
11,5	1,5
12	2
12,5	2,5
13	3

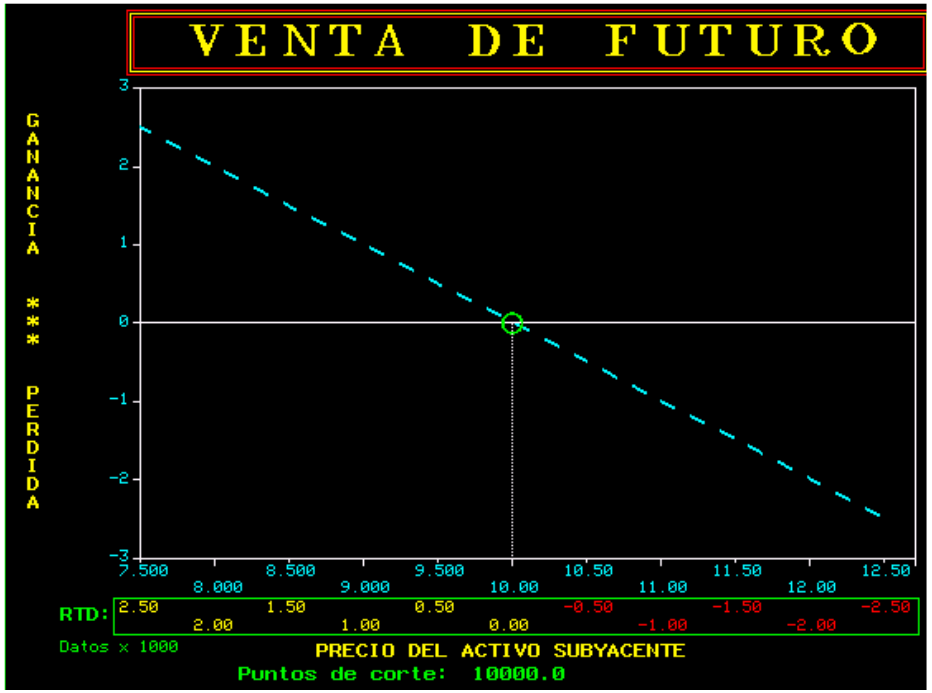


Futures contracts

Selling a future at 10€

The seller locks-in a €10 price. If the price of the underlying asset goes down, the investor will make a gain. On the contrary, if the price goes up, the investor will incur a loss.

Future price	Gain / Lose
7	3
7,5	2,5
8	2
8,5	1,5
9	1
9,5	0,5
10	0
10,5	-0,5
11	-1
11,5	-1,5
12	-2
12,5	-2,5
13	-3



Futures contracts

- **Pricing.** The price of a futures contract depends on the spot Price of the underlying asset, the interest rate and time to maturity of the contract.
- The price of a futures contract does not depend on the expected future behaviour of the underlying asset, it is established on the basis of the arbitrage conditions between spot markets and futures markets
  - Two different financial asset that generate the same future return must have at all times equivalent prices. If this basic principle did not hold, there would be room for an arbitrage transaction (possibility to make a profit with no risk)
  - The theoretical price of the futures contract will be that wich makes buying it today or in at maturity of the contract equivalent
  - Differences between theoretical prices and real prices in the futures market can arise. In these circumstances an arbitraje opportunity arises, and such arbitrage fixes the imbalance

$$F_0 = S_0 * (1+r)$$

- where:
  - F_0 is the price of the future contract
  - S_0 is the spot price of the underlying asset
  - r is the interest rate

Futures contracts

Advantages

1. As compared to buying shares spot, a futures contract involves a lower up-front divestment
2. Profits can be large if the investor is right and the long / short strategy is correct
3. It is possible to exit the commitment prior to the settlement date

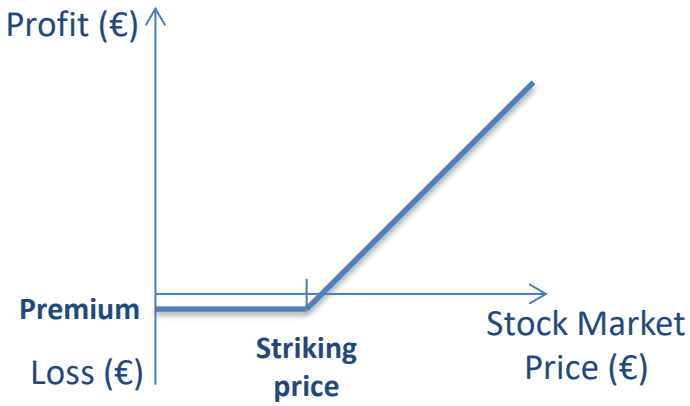
Disadvantages

1. It is necessary to meet the collateral requirements
2. Potential losses are large if the strategy is wrong
3. Risk is high so the investor must be highly familiar with the market

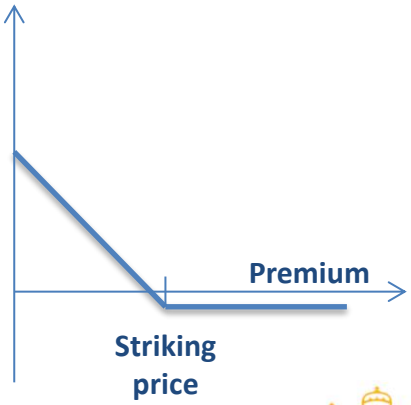
Options

- Are contracts that give its holder a right, not an obligation
- Marketable: Call (the right consists on buying something) – Put (the right consists on selling). (generally 100 shares of same security)
- Exercise price / contract price / stricking price.
- Could be American (may be exercised at any time before mature) or European (only can be exercised on the day when they expire)
- It has a price: premium.
- Collateral (cash or stocks) must be provided when selling options, and must be held as long as the position is open.
- Each equity option contract traded on MEFF has 100 shares as underlying
- Warrants are similar to options, but issued by private parties -i.e. companies and investment banks - and mainly oriented to retail investors

Profit – loss graph for a call



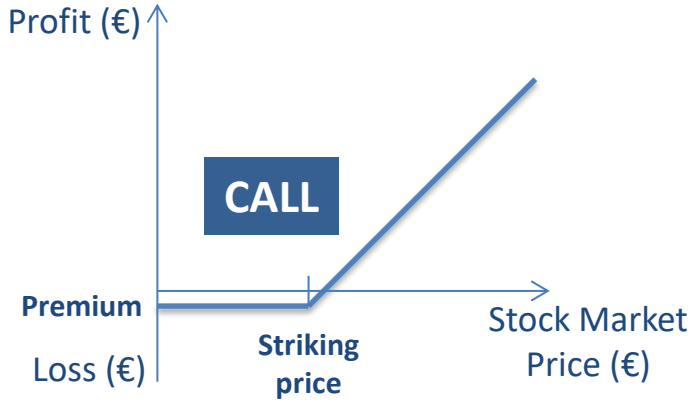
Profit – loss graph for a put

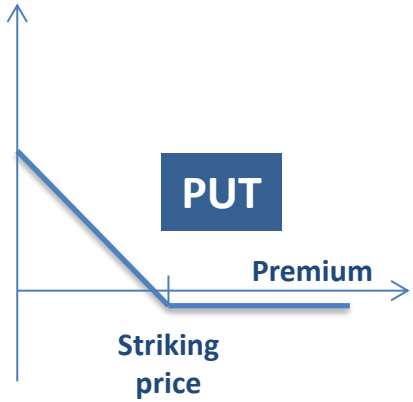


Options

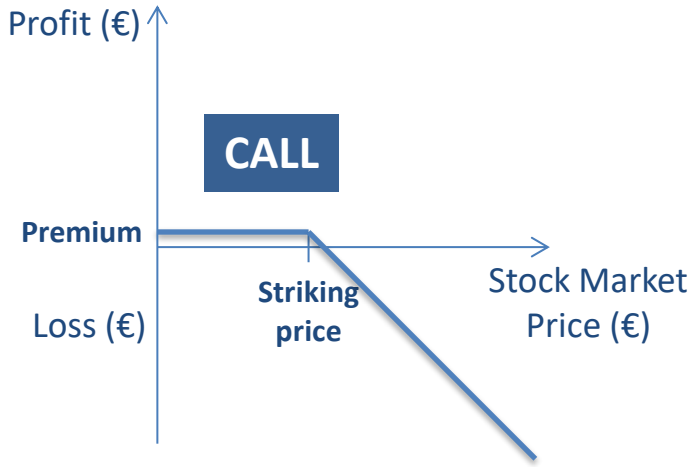
Profit – loss graphs

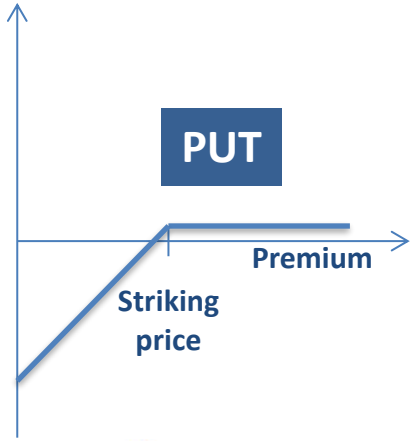
Buying





Selling





Options

Option combinations

We invest in a combination of following options:

- Buy two calls:
  - Strike price: 9 € Premium: 0,6€
  - Strike price: 11 € Premium: 0,2€
- Sell two calls:
  - Strike price: 10 € Premium: 0,3€
  - Strike price: 10 € Premium: 0,3€

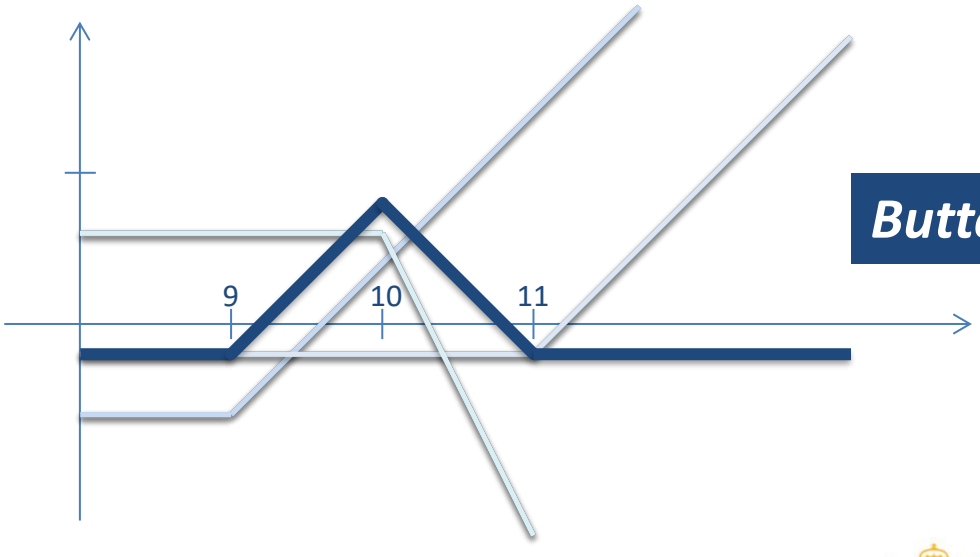
Premiums

Maximum gain = 1 – 0,8 + 0,6 = 0,8

Maximum loss = – 0,8 + 0,6 = - 0,2

Breakeven = 9 + (– 0,8 + 0,6) = 9,2

= 11 – 0,8 + 0,6 = 10,8



Butterfly spread

Options

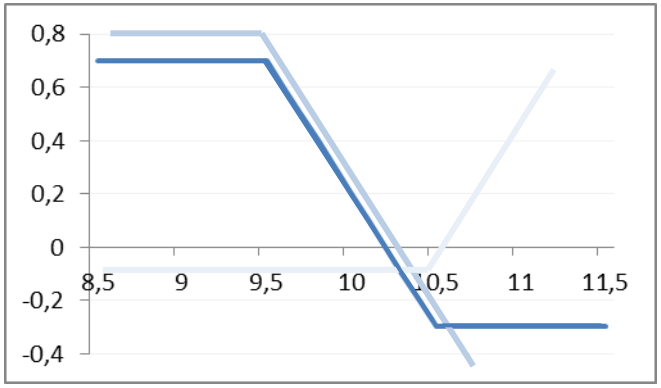
Option combinations

All these strategies can be done with both call or put options.

Bear spread

Strike	Premium	Type	Operation
10,5	-0,1	Call	Buy
9,5	-0,8	Call	Sell

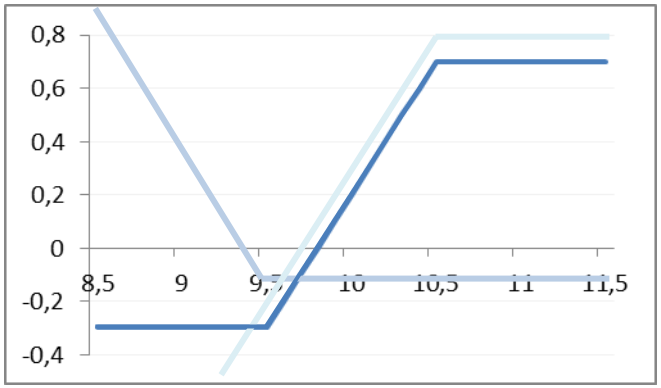
Maximum gain = 0,8 – 0,1 = 0,7
Maximum loss = 9,5 – 10 + 0,8 – 0,1 = - 0,3
Breakeven = 9,5 + (0,8 – 0,1) = 10,2



Bull spread

Strike	Premium	Type	Operation
10,5	-0,8	Put	Sell
9,5	-0,1	Put	Buy

Maximum gain = 0,8 – 0,1 = 0,7
Maximum loss = 9,5 – 10 + 0,8 – 0,1 = - 0,3
Breakeven = 10,5 - (0,8 – 0,1) = 9,8



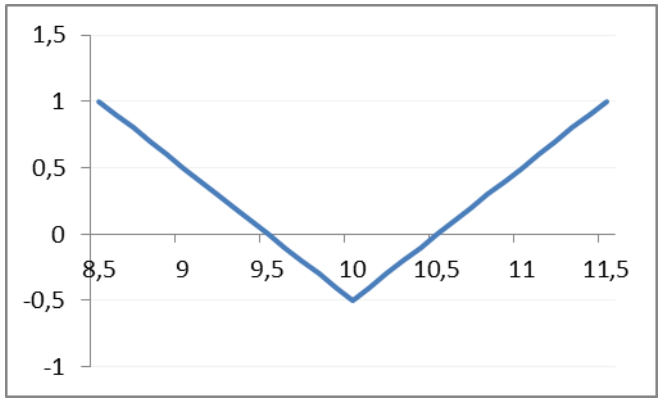
Options

Option combinations

Long straddle

Strike	Premium	Type	Operation
10	-0,2	Call	Buy
10	-0,3	Put	Buy

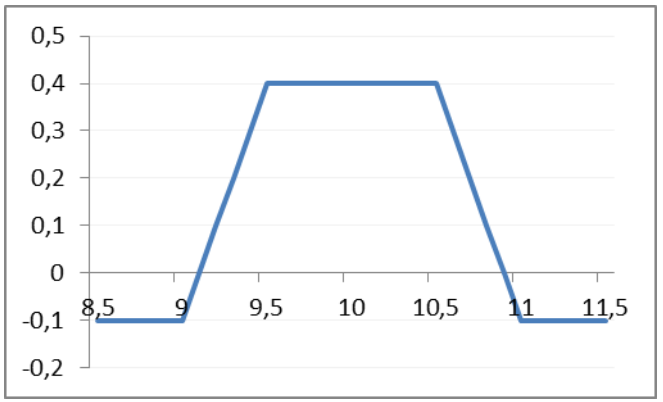
Maximum gain = No limit
Maximum loss = – 0,2 – 0,3 = – 0,5
Breakeven = 10 ± 0,5 = 9,5 y 10,5



Long Iron Condor

Strike	Premium	Type	Operation
9	-0,2	Put	Buy
9,5	-0,3	Put	Sell
10,5	-0,6	Call	Sell
11	-0,3	Call	Buy

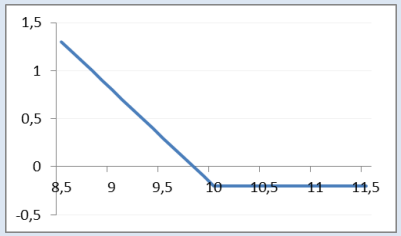
Maximum gain = – 0,5 + 0,9 = 0,4
Maximum loss = 10,5 – 11 – 0,5 + 0,9 = - 0,1
Breakeven = 9 + 0,1 = 9,1
= 11 – 0,1 = 10,9

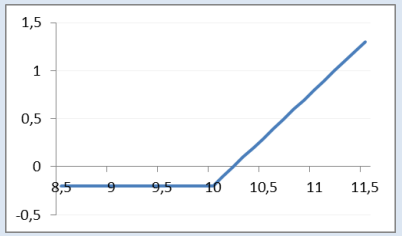


Options

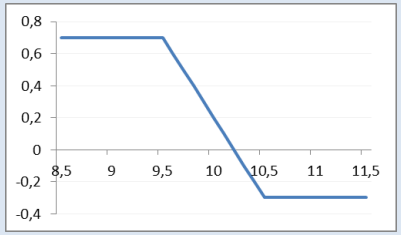
Strategies – Hedging vs. Speculation

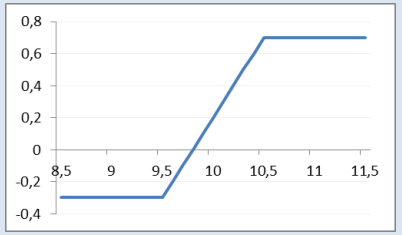
If we anticipate a **high** raise or high fall of the stock.
- Put: stock will rise.
- Call: stock will fall.



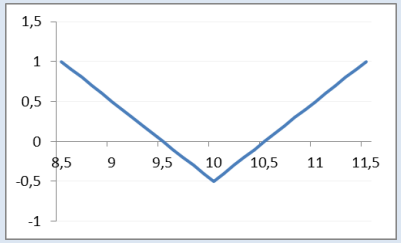


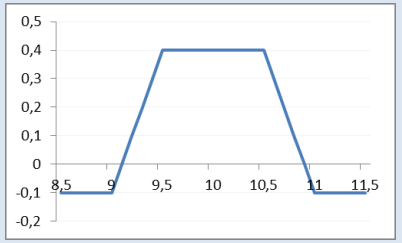
If we anticipate a **low** raise or low fall of the stock.
- Bear spread: stock will rise.
- Bull spread: stock will fall.





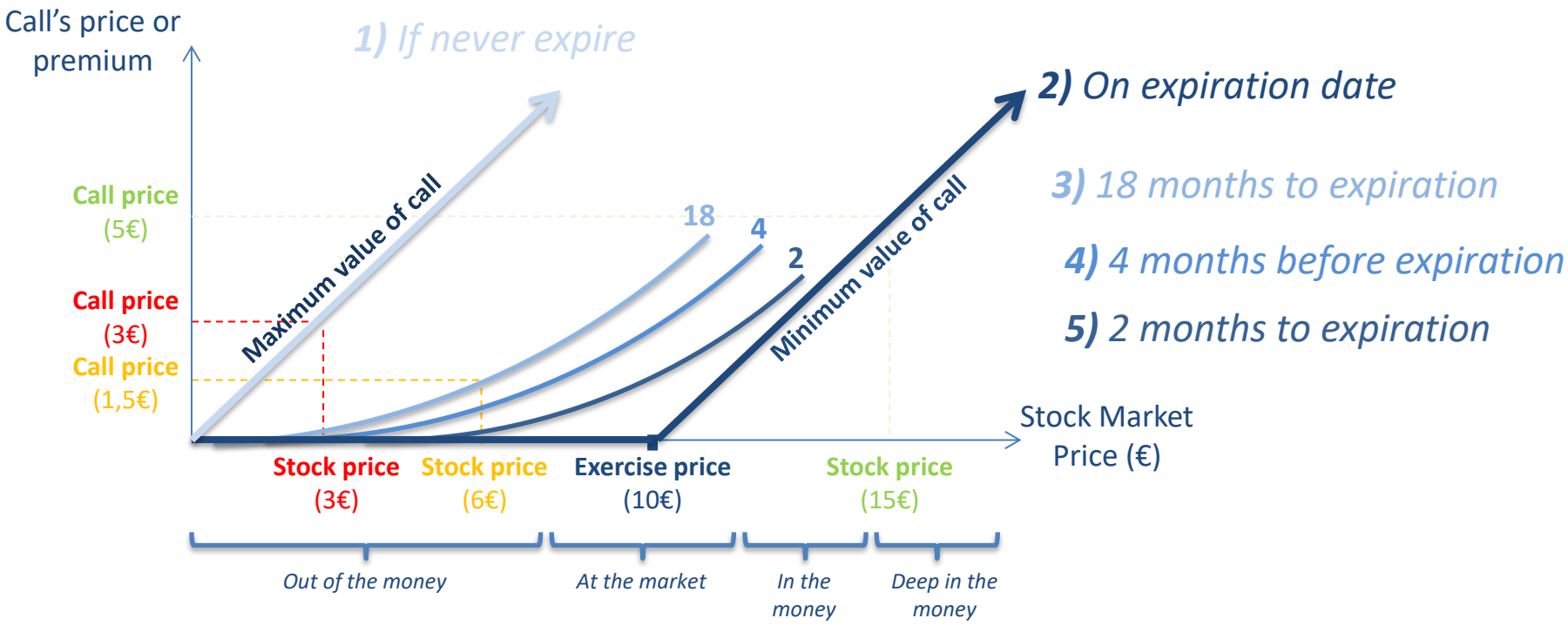
If we anticipate a high or low volatility of the stock.
- Long straddle: high volatility.
- Long iron condor: low volatility.





Options

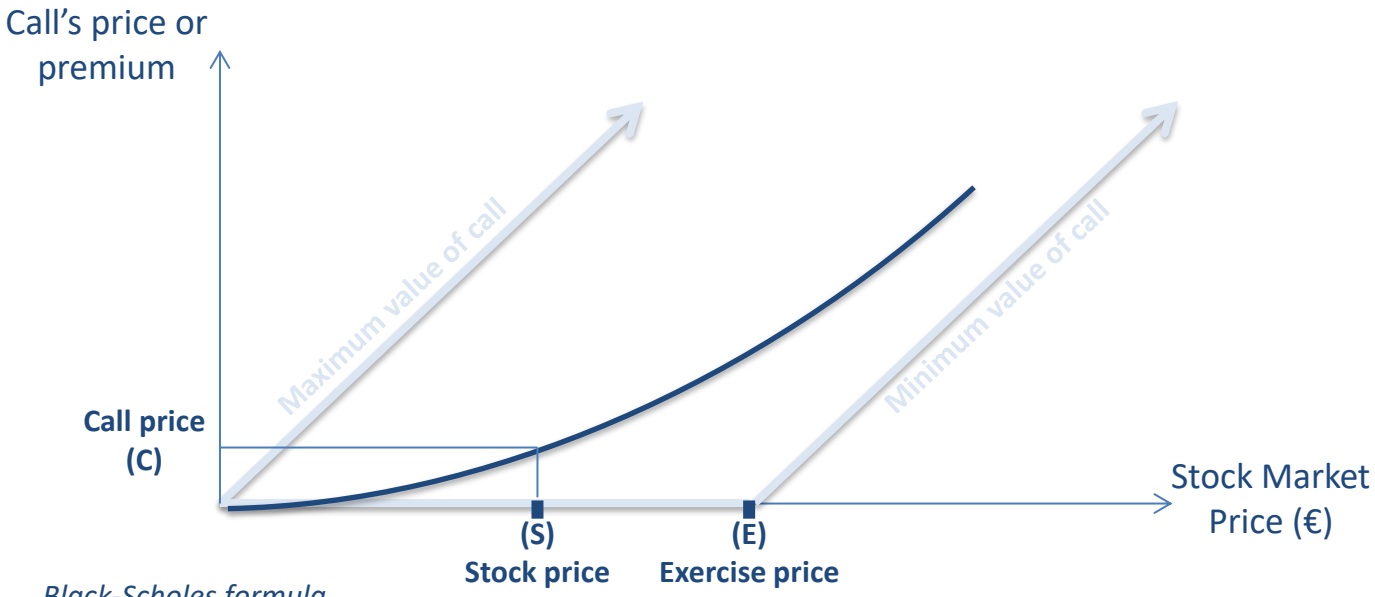
Determinants of call prices (premiums).



First homework exercise asks for the determinants of put prices

Options

Determinants of call prices (premiums).



Black-Scholes formula

$$C = S \cdot N(x) - E \cdot e^{-r \cdot \Delta t} \cdot N(y)$$

where:

$$x = \frac{ln\left(\frac{S}{E}\right) + (r + 0{,}5 \cdot \sigma^2)\Delta t}{\sigma\sqrt{\Delta t}}$$

$$y = \frac{ln\left(\frac{S}{E}\right) + (r - 0{,}5 \cdot \sigma^2)\Delta t}{\sigma\sqrt{\Delta t}}$$

We will try to understand it

$0 < N(x) < 1 \quad 0 < N(y) < 1$

$S \cdot N(x)$ is what we win.

$E \cdot e^{-r \cdot \Delta t} \cdot N(y)$ is what we pay.

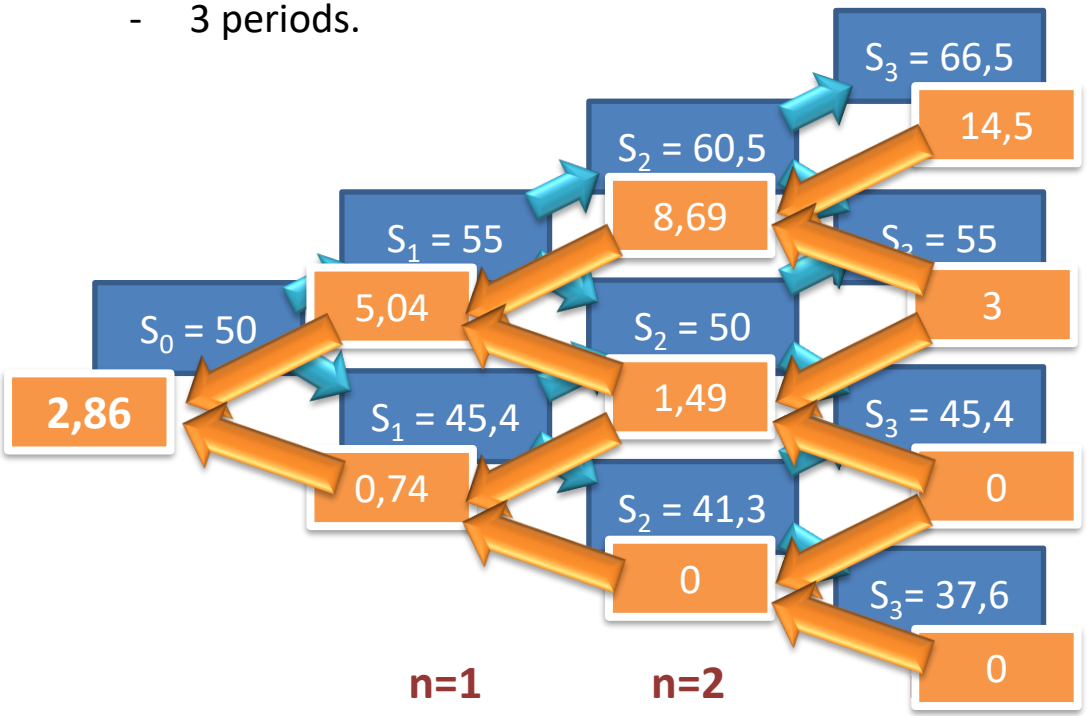
If $\Delta t \to 0$ then $C = E - S$ or $C = 0$

If $\sigma \uparrow$ *then* $x \uparrow$ *and* $y \downarrow$

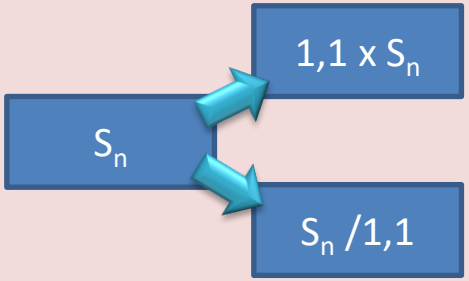
Options - pricing

Binomial model

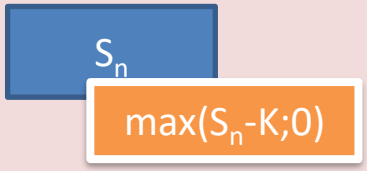
- Price of underlying asset (S): 50€
- Call option exercise price (K): 52€
- Price change each period: 10% up (x1,1) or 9,09% down (/1,1) with equal probability
- Risk-free rate for the period: 1%
- 3 periods.



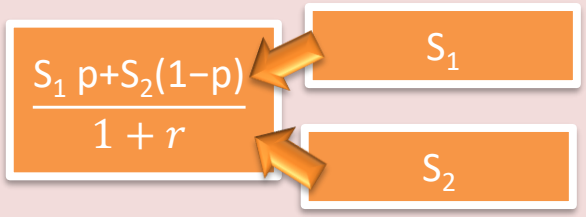
1) Calculate the tree



2) Calculate final option value



3) Calculate back option value



Options - pricing

Binomial model (II)

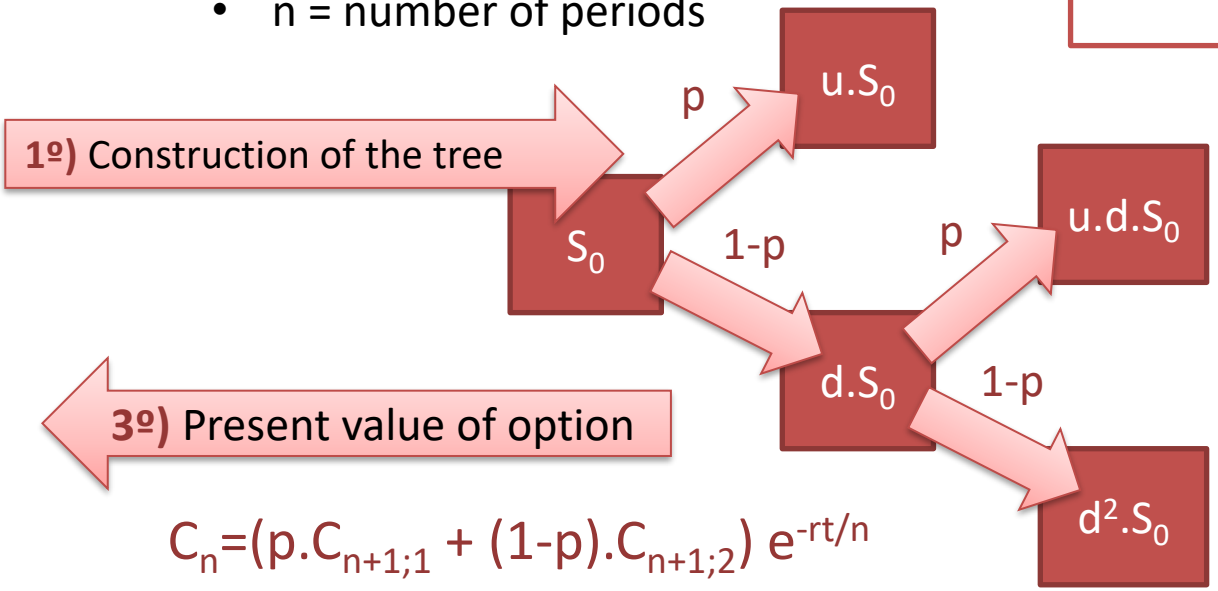
Cox, Ross and Rubinstein (1979)

- S = stock price
- K = strike exercise
- r = risk free rate
- σ = standard deviation
- t = option term
- n = number of periods

$$u = e^{\sigma\sqrt{t/n}}$$

$$d = e^{-\sigma\sqrt{t/n}}$$

$$p = \frac{e^{rt/n} - d}{u - d}$$



$$C_n = (p.C_{n+1;1} + (1-p).C_{n+1;2})\, e^{-rt/n}$$

2º) Calculation of final values

Call

Max(S_n-K;0)

Put

Max(K-S_n;0)

Options - pricing

Binomial model (III)

Expiration time (T)	1
Stock price (S)	100
Strike price (K)	100
Deviation (σ)	0,3
Risk free rate (r)	5%

n=1

time	1,000
n	1
	134,986
100	34,98588
16,96397	74,082
	0

n=2

time	0,500	1,000
n	1	2
		152,847
	123,631	52,84652
100	26,10012	100
12,89047	80,886	0
	0	65,425
		0

n=3

time	0,333	0,667	1,000
n	1	2	3
			168,138
		141,398	68,13806
	118,911	43,0511	118,911
100	25,95716	100	18,91099
15,16496	84,097	9,393703	84,097
	4,666156	70,722	0
		0	59,475
			0

n=9

time	0,111	0,222	0,333	0,444	0,556	0,667	0,778	0,889	1,000
n	1	2	3	4	5	6	7	8	9
									245,960
								222,554	145,9603
							201,375	123,1081	201,375
						182,212	102,4802	182,212	101,3753
					164,872	83,86473	164,872	82,7659	164,872
				149,182	67,06984	149,182	65,97709	149,182	64,87213
			134,986	52,20317	134,986	50,83532	134,986	49,73648	134,986
		122,140	39,48636	122,140	37,75223	122,140	36,09084	122,140	34,98588
	110,517	29,04009	110,517	27,06727	110,517	24,94325	110,517	22,69429	110,517
100	20,79976	100	18,80033	100,000	16,56398	100,000	13,94828	100,000	10,51709
14,53957	90,484	12,6987	90,484	10,64997	90,484	8,274931	90,484	5,259006	90,484
	8,371038	81,873	6,669915	81,873	4,787976	81,873	2,629733	81,873	0
		4,087916	74,082	2,7193	74,082	1,314982	74,082	0	74,082
			1,522335	67,032	0,657548	67,032	0	67,032	0
				0,328803	60,653	0	60,653	0	60,653
					0	54,881	0	54,881	0
						0	49,659	0	49,659
							0	44,933	0
								0	40,657
									0

How does it changes if we deals with american options?

Options - pricing

Black & scholes formula

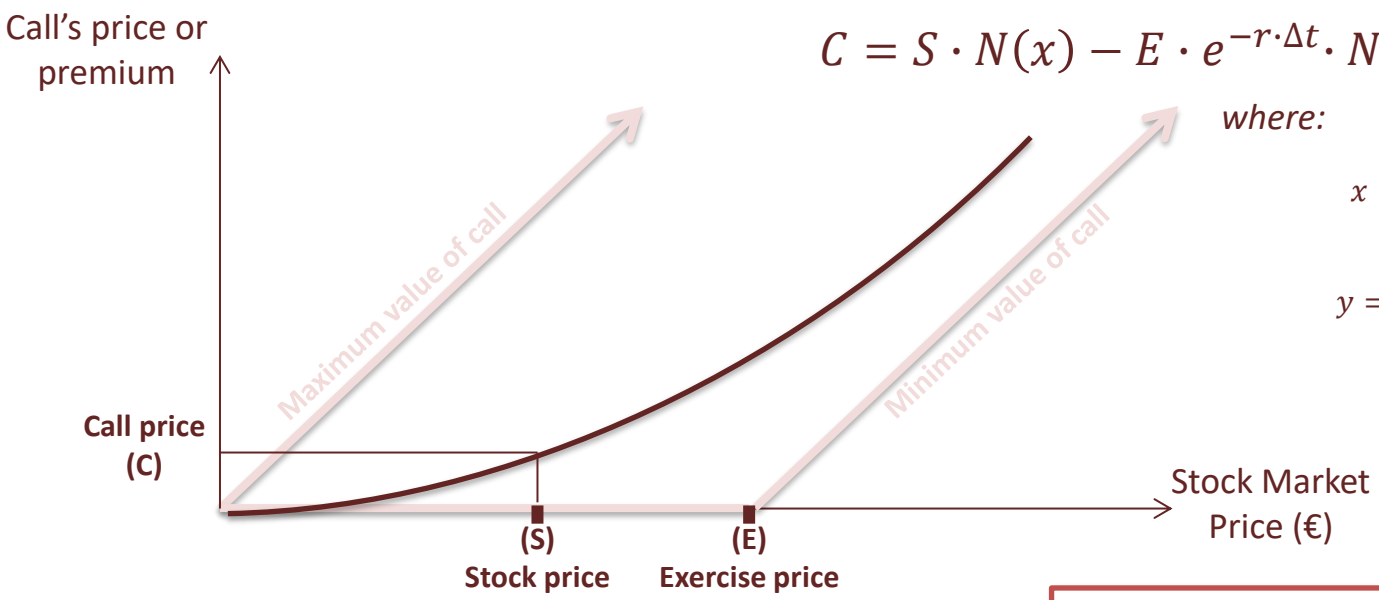
Black-Scholes formula

$$C = S \cdot N(x) - E \cdot e^{-r \cdot \Delta t} \cdot N(y)$$

where:

$$x = \frac{ln\left(\frac{S}{E}\right) + (r + 0{,}5 \cdot \sigma^2)\Delta t}{\sigma\sqrt{\Delta t}}$$

$$y = \frac{ln\left(\frac{S}{E}\right) + (r - 0{,}5 \cdot \sigma^2)\Delta t}{\sigma\sqrt{\Delta t}}$$



S = 50€
E = 49€
R = 7%
Δt = 199 días
Variance = 0,09

x = 0,3742
y = 0,1527

N(x) = 0,6459
N(y) = 0,5607

C = 5,85€

$$C = S \cdot N(x) - E \cdot e^{-r \cdot \Delta t} \cdot N(y)$$

$$C = w_1 \cdot Stock - Loan$$

Replicant

$$\boldsymbol{w_1 = 0,6459}$$

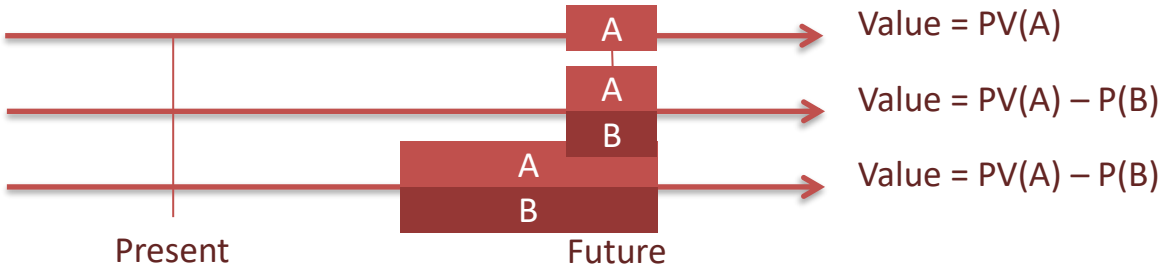
$$\boldsymbol{Loan = 26,45€}$$

$$(49€ \cdot 0{,}9626 \cdot 0{,}5607)$$

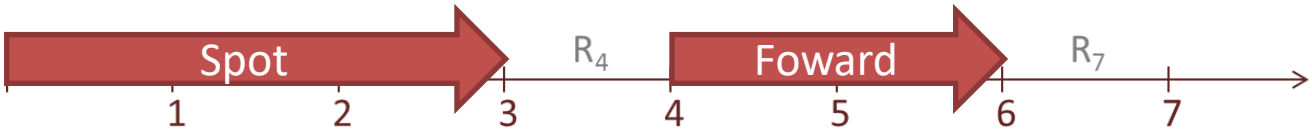
Other derivatives

Other derivatives

- *Futures*
- *Swaps*
- *FRAs*



Interest rates



Time	1	2	3	4	5	6	7
Spot	1,0%	2,0%	2,5%	3,0%	3,3%	3,5%	3,6%

Calculate **Foward$_{4,6}$**

$$(1+3{,}5\%)^6 = (1+3\%)^4 \cdot \left(1+F_{4,6}\right)^2$$

$$F_{4,6} = \sqrt{\frac{(1+3{,}5\%)^6}{(1+3\%)^4}} - 1 = \mathbf{4,51\%}$$

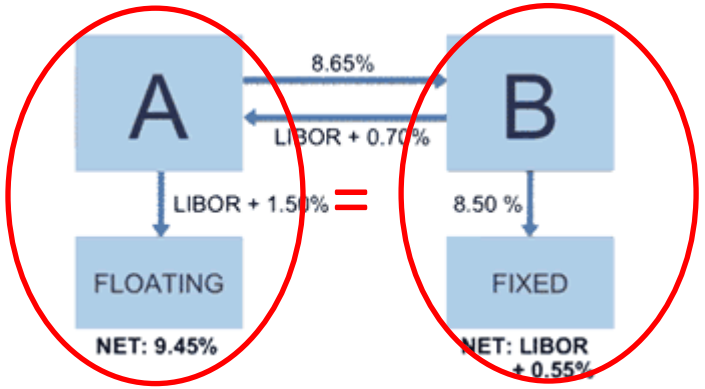
Swap

Swaps

A SWAP is an exchange.

- Interest rate swaps
- Currency swaps
- Credit swaps
- Commodity swaps
- Equity swaps

Cross-Currency Swaps

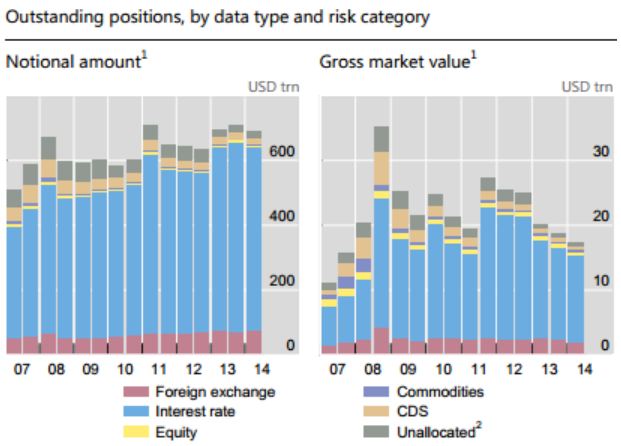


SWAP = Valuea A – Value B

Value A Value B

Swaps are traded on OTC and often are "tailor-made“ solutions for the counterparties.

Global OTC derivatives market



Interest rate swap is the most popular. The swap market has grown immensely in the last 30 years and its size currently amounts to around $400 trillion.

Investment and commercial banks with strong credit ratings are swap market makers, offering both fixed and floating-rate cash flows to their clients. Swap contracts between financial institutions are standardized according to ISDA rules.

between end-December 2013 and end-June 2014. SOURCE: BIS
http://www.bis.org/publ/otc_hy1411.pdf

Swaps

Plain vanilla interest rate swap.

Most common interest rate swap (and derivate) used. Also known as generic interest rate swap. It involves the exchange of fixed-rate payments for floating-rate payments.

Fixed rate payments

Each period = $N \cdot r$

$$PV\ (fixed) = \frac{N \cdot r}{1 + i_1} + \frac{N \cdot r}{(1 + i_2)^2} + \cdots \frac{N \cdot r + N}{(1 + i_T)^T}$$

N = notional
r= fixed rate
(price of swap)

Floating rate payments

Each period = $N \cdot R_V(i.e.:\ Euribor)$

$$PV\ (floating) = N$$

$$PV\ (fixed) = PV\ (floating)$$

$$\frac{N \cdot r}{1 + i_1} + \frac{N \cdot r}{(1 + i_2)^2} + \cdots \frac{N \cdot r + N}{(1 + i_T)^T} = N$$

$$N \cdot r \left(\frac{1}{1 + i_1} + \frac{1}{(1 + i_2)^2} + \cdots \frac{1}{(1 + i_T)^T} \right) + \frac{N}{(1 + i_T)^T} = N$$

$$r = \frac{1 - \frac{1}{(1 + i_T)^T}}{\frac{1}{1 + i_1} + \frac{1}{(1 + i_2)^2} + \cdots \frac{1}{(1 + i_T)^T}}$$

Swaps

Plain vanilla interest rate swap. *Example*

A bank should give a quotation for a five year interest rate swap with annual payments both in the fixed and floating leg. The term structure of zero coupon rates is given on the following table.

Time	1	2	3	4	5	6	7
Spot	1,0%	2,0%	2,5%	3,0%	3,3%	3,5%	3,6%

Calculate the fixed rate of a 5 years plain vanilla IRS.

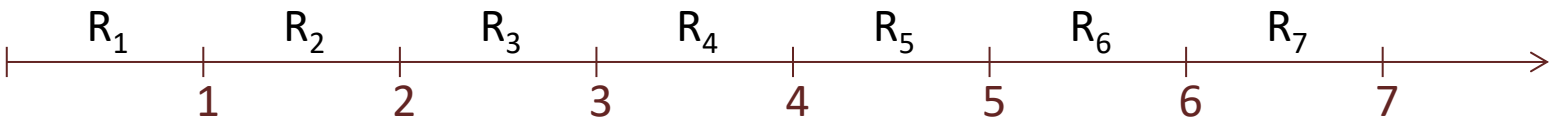
$$r = \frac{1 - \frac{1}{(1+i_T)^T}}{\frac{1}{1+i_1} + \frac{1}{(1+i_2)^2} + \cdots \frac{1}{(1+i_T)^T}} = \frac{1 - X_T}{X_1 + X_2 + \cdots X_T}$$

Time	1	2	3	4	5	6	7
Spot	1,0%	2,0%	2,5%	3,0%	3,3%	3,5%	3,6%
X	0,990	0,961	0,929	0,888	0,850	0,814	0,781

$$X_t = \frac{1}{(1+i_t)^t}$$

$$r = \frac{1 - X_5}{X_1 + X_2 + X_3 + X_4 + X_5} = \frac{1 - 0{,}85}{0{,}99 + 0{,}961 + 0{,}929 + 0{,}888 + 0{,}85} = 3{,}244\%$$

FRAs



R_3 = interest rate between year 2 and 3

Spot rate

r_3 = interest rate between today and year 3

$$(1 + r_3)^3 = (1 + R_1) \cdot (1 + R_3) \cdot (1 + R_3)$$

We get it from the bonds market

Careful with coupons and reinvestment risk

(zero coupon curve)

STRIP concept.

http://online.wsj.com/mdc/public/page/2_3020-tstrips.html

Forward Rate Agreement (FRA)

F_{35} = interest rate between year 3 and year 5

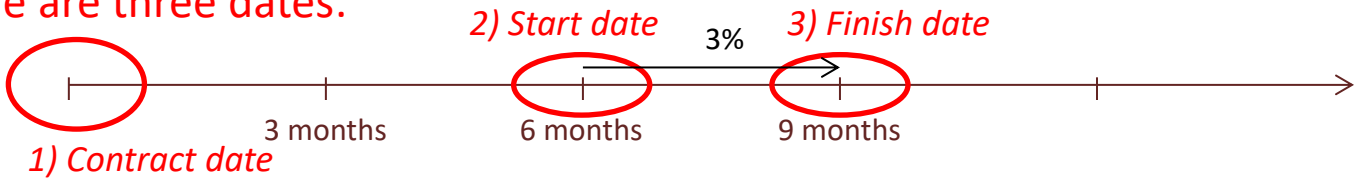
$$(1 + r_3)^3(1 + F_{35})^2 = (1 + r_5)^5$$

FRAs

- **A forward rate agreement (FRA)** is a contract between two counterparties to exchange a fixed interest payment for a floating interest payment on a single date. OTC

$$We\ buy\ a\ FRA_{6/9}\ with\ rate\ 3\%\ and\ principal\ 100.000€$$

There are three dates:



a) After 9 months interest rate is 2%.

$$r_{FRA} - r = 1\%.\ FRA\ payoff\ is\ -100.000 \cdot (1{,}01^{\frac{1}{4}} - 1) = 249{,}07€\ (-)$$

b) If interest rate rise to 4% we will earn 249,07€.

- The buyer hedges against the risk of rising interest rates, while the seller hedges against the risk of falling interest rates.
- The buyer of the contract is paid if the reference rate is above the contracted rate, and the buyer pays to the seller if the reference rate is below the contracted rate.

This is in order to understanding the concept in practice it is calculated with simple interest laws...

FRAs

FRA's calculation formulas

$$FRA\ \ Payoff\ = N \cdot \frac{(R - FRA) \cdot \frac{n}{base\ \cdot 100}}{1 + \frac{R \cdot n}{base\ \cdot 100}}$$

N = Notional value (Price of the deposit)
R = Interest rate at the end of the period
FRA = Interest rate accorded in the FRA
n = maturity of the deposit.
Base = 360 (with some currencies 365)

Example:

FRA contracted the 31-03-2014 with a notional value of 1.000.000€, value date: 30-06-2014 and final date: 30-12-2009. FRA's rate is 1,08%. Reference is Euribor to 6 months. On the 30-06-2014 Euribor to 6 months is 1,04%. Payoff will be:

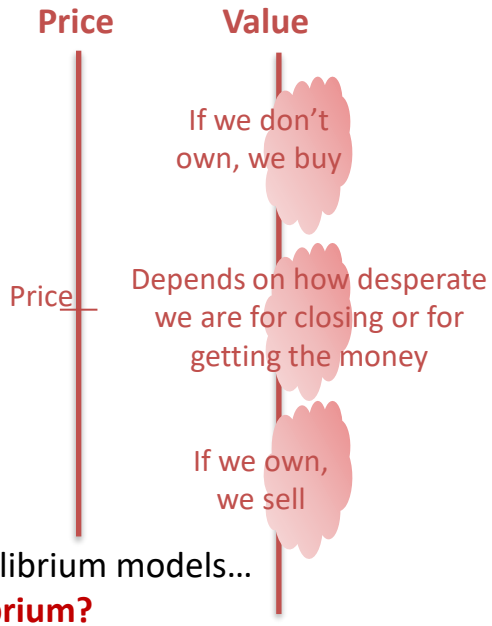
$$-206{,}26 = 1.000.000 \cdot \frac{(1{,}04 - 1{,}08) \cdot \frac{183}{360\ \cdot 100}}{1 + \frac{1{,}04 \cdot 183}{360\ \cdot 100}}$$

FRA's buyer will have to pay the seller 206,26€

Price vs. value

Remember from the first day… **¿price and value is the same?**

Price: Is objective (there is only one)
Value: Is subjective (each one has its own)



What about traditional Finance?

$CAPM$: $K_E = r_f + \beta(\bar{r}_M - r_f)$

Bonds valuation

NPV…

Price = value

And what will happen if not?

Arbitrage **Why?**

Because there are all equilibrium models…

When we will get **equilibrium?**

In the **long run**… so?

In the long run we are all dead ☺

It is reasonable apply valuation models based on equilibrium when everything is changing due to crisis and technology?

How much would you pay for Whatsapp?

WhatsApp Free For All Users After App Removes 99 Cent Subscription Fee

Facebook $22 Billion WhatsApp Deal Buys $10 Million in Sales

Bloomberg 2014

Summary

FINAL EXAM

Theory (40%):

- Test questions (10): 20%
- Short questions (2): 20%

Practice (60%):

- Exercises (2): 40%
- Newspaper article: 10%

ASSESSMENT AND EVALUATION CRITERIA

Activities assessed	Weight
Classroom participation and discussions	10%
On-going assessments	40%
Final exam	50%

To pass this course it is necessary to pass the final exam, you must reach at least a 5.0 to pass the exam.

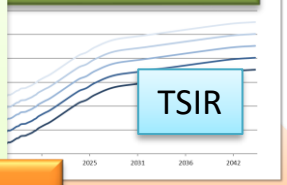
Summary of the course

#	Lesson
1	The financial system
2	Central Banks
3	Money markets and interest rate risk
4	Credit institutions
5	Other financial institutions
6	Capital markets and fixed income
7	Equity markets
8	Sovereign debt market
9	Derivatives

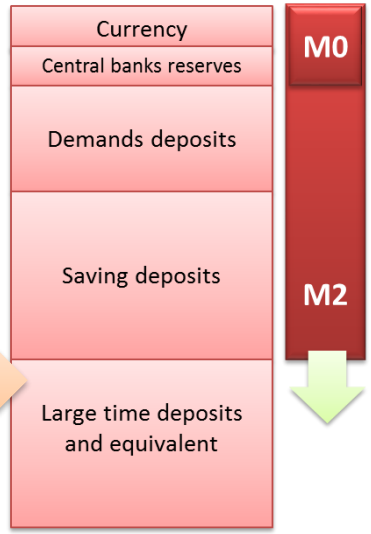
And monetary policy

SWAPs, FRAs…

Institutions
Stability
Monetary Policy



Interest rate



Banks

Loans

Insurance and pensions Co.

Institutions

Financial assets & markets

Bonds

Stocks

Public bonds

Markets
Risk & return
Corporate Finance

First part

- Macro analysis (stability)
- Institutions
- Monetary policy

Second part

- Markets
- Risk & Return
- Financial assets

Summary of the course – First part

Lesson 1. Financial system

Efficient-market hypothesis (Fama, 1965).
- **Weak form**
- **Semi-strong form**
- **Strong form**

Arbitrage concept

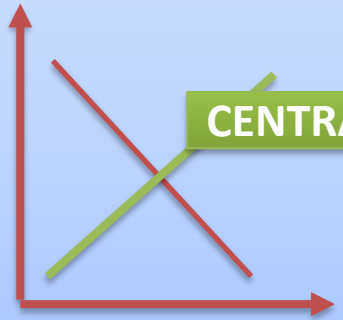
Lesson 2. Monetary policy

Currency
Central banks reserves
Demands deposits
Saving deposits
Large time deposits and equivalent

M0

M2

$\frac{M2}{M0} = money\ multiplier$



IS-LM Model

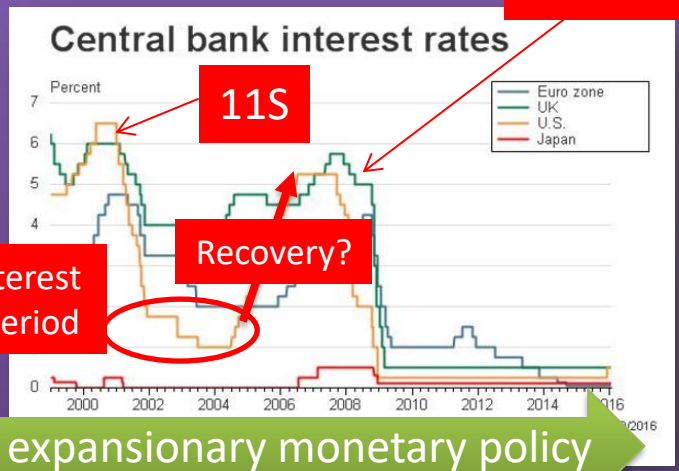
1928-1992
- Hyperinflation
- Bretton Woods
- Soros

16S-1992

Bank of England: 10%-15% in 1h.

2001-2008

Lehman



CENTRAL BANKS: expansionary monetary policy
- Open market operations
- Standing facilities (interest rate)
- Maintenance of minimum reserves.

Summary of the course – First part
Banking and insurance

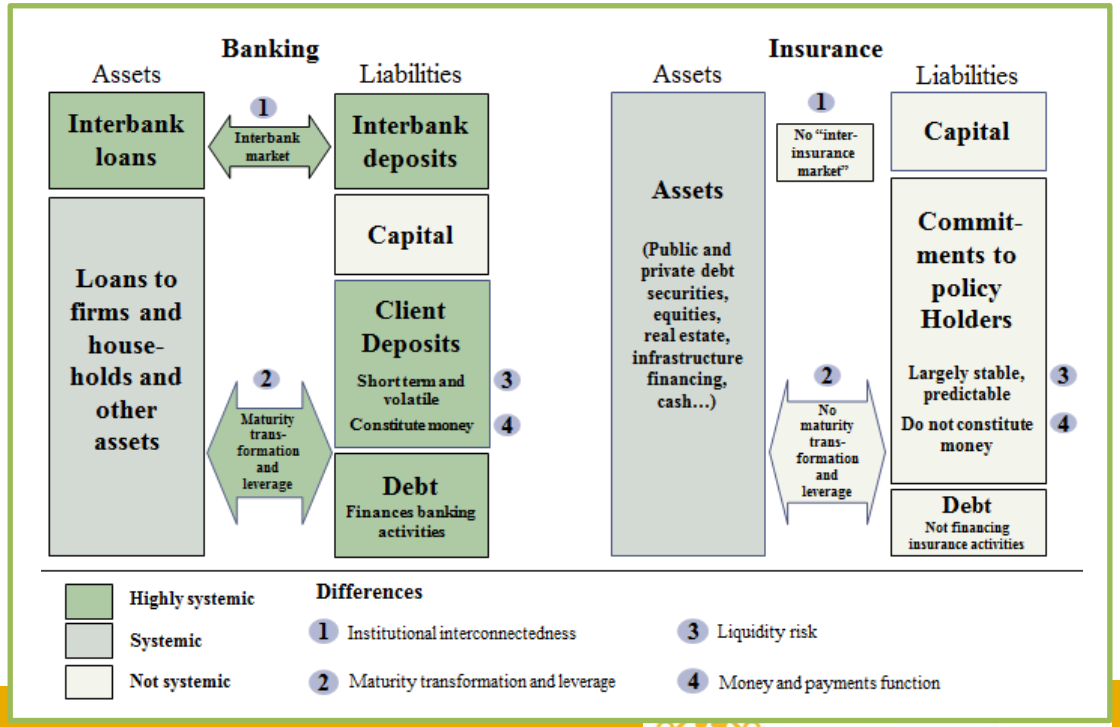
Differences between banks and insurers

- **Institutional interconnectedness:** banks operate within a system (banking system), while insurers do not. There exists no 'central insurer' comparable to a central bank.
- **Maturity transformation.** Banks engage in maturity transformation combined with leverage; they transform short-term liabilities into longer-term assets. Insurers do not engage in maturity transformation.
- **Liquidity risk.** Liquidity risk is inherent in banking, but not in insurance.
- Insurance liabilities are less fugitive.
- **Money, credit, and payment function.** Banks deal with the payment function, they create credit, and their liabilities constitute money.

Similarities

- **Financial intermediaries.** Both are financial intermediaries between savers and investors
- **Financial investors.** Both are large-scale investors in financial markets.

Systemic risk:
two different business models



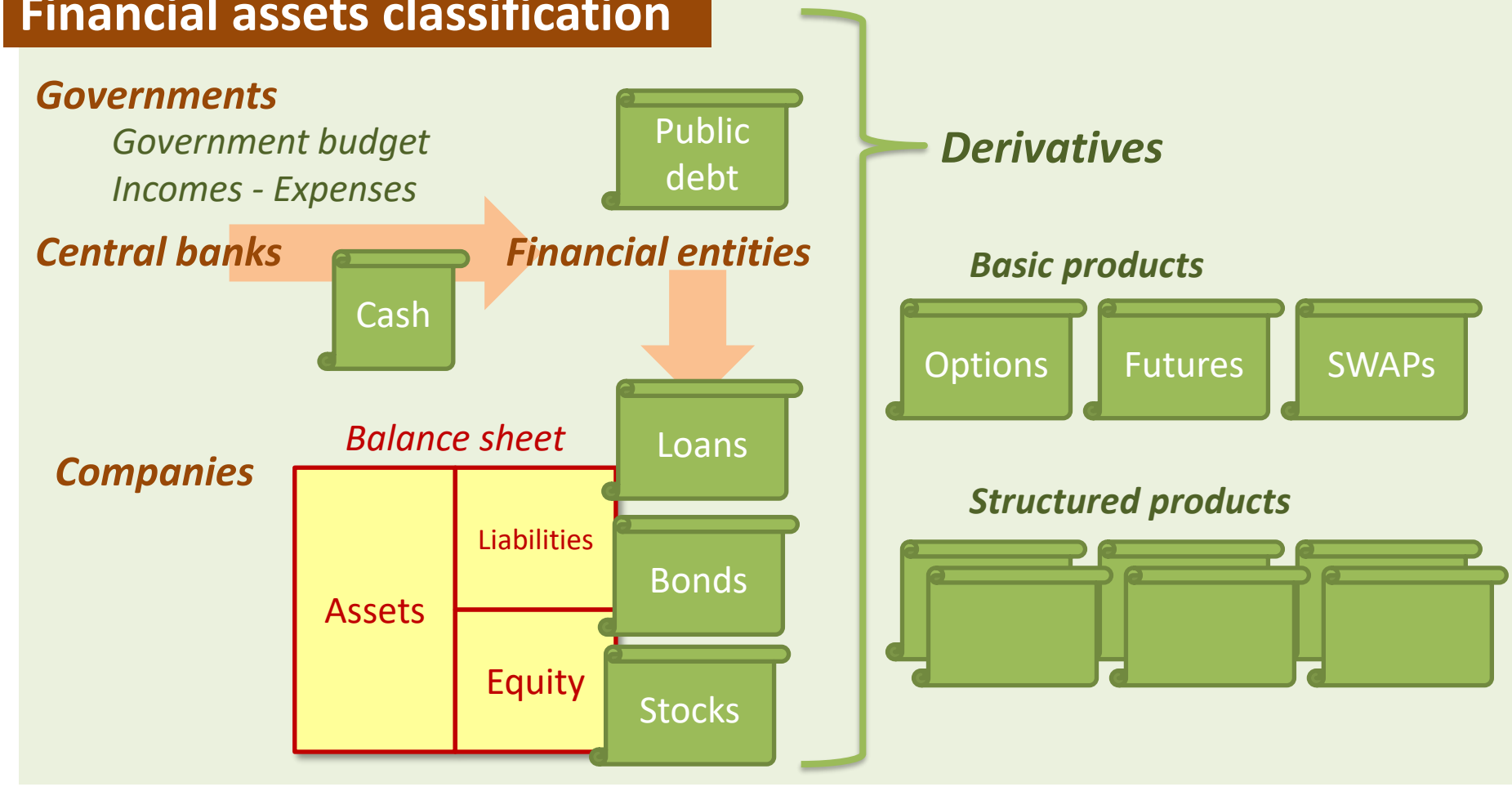
SOURCE: Link

First part – Most important concepts

- Difference between Price and value
- Principal characteristics of financial assets
- Efficient market-hypothesis (understanding)
- Arbitrage concept
- Competences:
  - Of each central bank (credit institutions)
  - Market supervisor (markets except interest rate risk markets)
- Three principal uses of money
- Monetary base, M2 and monetary multiplier.
- Instruments of a central bank related with monetary policy
- Interest rate risk
- Difference between yield curve, EURIBOR and central bank interest rate
- Duration
- Risk and Banks: credit and liquidity risk
- Basel regulation
- Comparison between insurance and banks.
- Insurance companies
- Pensions

Summary of the course – Second part

Financial assets classification

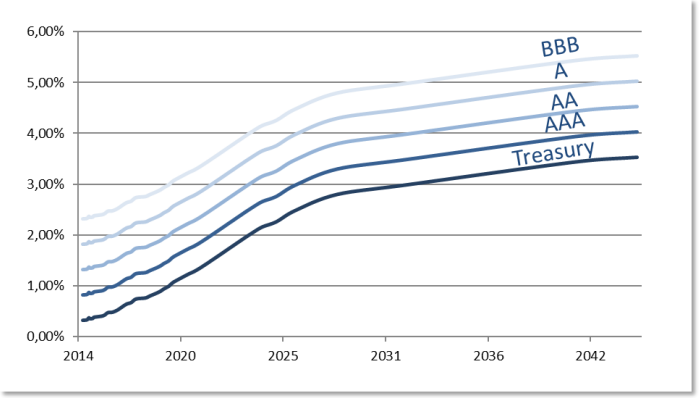


Summary of the course – Second part

Security

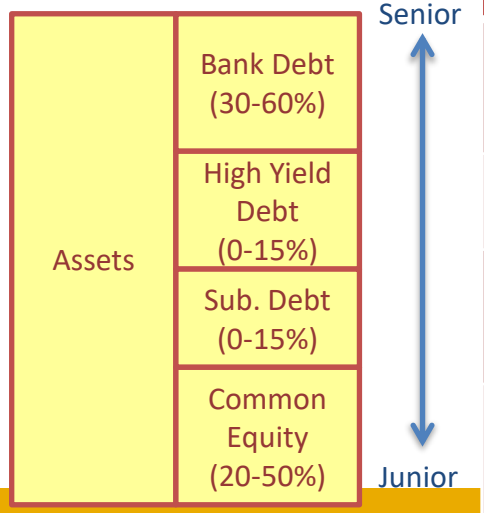
Risk free assets
Loans with guarantees
Corporate bonds
Consumer lending
Mezzanine
Stocks

Uncertainty



Can we predict the future?
No.
But we can earn money with uncertainty.

How can we deal with uncertainty?

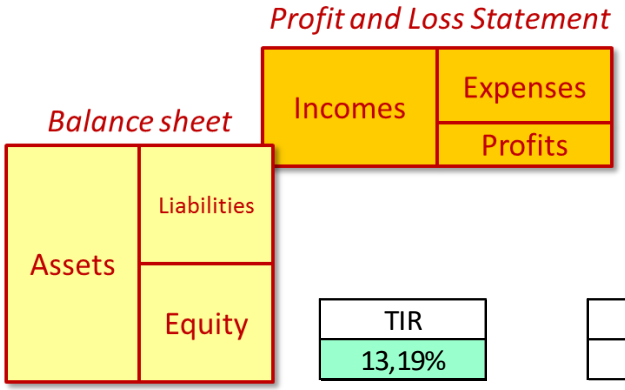


Expected returns	Key Characteristics
4% - 8%	- Low financing costs - Lowest default risk - Floating rate
8% - 14%	- Typically fixed rate - Pre-payable penalties
15% - 20%	- Debt service paid pre-taxes - Highest default risk compared with other debt.
20% - 40%	- Riskiest security in capital structure - No downside protection with unlimited upside potential.

It is all about information.
Efficient market hypothesis and more…

RISK - RETURN

Summary of the course – Second part



TIR
11,03%

Año	0	1	2	3
FCF	- 1.000.000	170.000	170.000	170.000

TIR
6,00%

Año	0	1	2	3
FCF	- 500.000	118.698	118.698	118.698

TIR
13,19%

Año	0	1	2	3	4	5	6
FCF	- 500.000	51.302	51.302	51.302	51.302	51.302	170

Lesson 8

LIABILITIES. (K_D) The creditor has to be paid. K_D

Lesson 9 – 10. Loans

Lesson 15 – 16. Bonds

Central Bank Interest rate
Temporal Structure of Interest Rates
EURIBOR

EQUITY. (K_E) There is no obligation to pay off dividends.

Lesson 19 – 21. Equity

$$K_E = r_f + \beta(\bar{r}_M - r_f)$$

More risk = more return

β < 1: the stock price is less risky than the market (fluctuate less)
β > 1: the stock price is more risky than the market (fluctuate more)

$$WACC = K_e \frac{E}{D+E} + K_d(1-t)\frac{D}{D+E}$$

Second part – Most important concepts

- **What is a market? Primary and secondary markets**
- **Investment Service Companies (L15)**
- **Collective Investment schemes (L17) –** Investment fund, Private Equity, REIT…
- **Market orders (L20)**
- **Fixed income**
- **Accrued interest (Clean Price and dirty Price)**
- **Duration – Interest rate risk**
- **Reinvestment risk – Immunization**
- **Yield curve**
- **Equity markets**
- **Differences between bonds and stocks**
- **CAPM (Beta concept)**
- **Dividend discount models**
- **Financing a long position & Short sale (L21)**
- **Derivatives**
- **Option strategies (calculate payoff graphs)**
- **Option pricing: binomial model and black & scholes**
- **Futures, forwards, SWAPs and FRAs concept**

Exercises review

- NPV & IRR
- Loans
- Fix income: pricing bonds, calculate duration and interest rate risk impact
- Financing a long position & Short sale (L21)
- Option strategies payoff diagram

Thanks