

# FINANCIAL DERIVATIVES

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# What are Derivatives?

- A derivative is a financial instrument whose value is **derived** from the value of another asset, which is known as the **underlying**.
- When the price of the underlying changes, the value of the derivative also changes.
- A Derivative is not a product. It is a contract that derives its value from changes in the price of the underlying.

Example :

The value of a gold futures contract is derived from the value of the underlying asset i.e. Gold.

# Traders in Derivatives Market

There are 3 types of traders in the Derivatives Market :

- **HEDGER**

A hedger is someone who faces risk associated with price movement of an asset and who uses derivatives as means of reducing risk.

They provide economic balance to the market.

- **SPECULATOR**

A trader who enters the futures market for pursuit of profits, accepting risk in the endeavor.

They provide liquidity and depth to the market.

## • **ARBITRAGEUR**

A person who simultaneously enters into transactions in two or more markets to take advantage of the discrepancies between prices in these markets.

- Arbitrage involves making profits from relative mispricing.
- Arbitrageurs also help to make markets liquid, ensure accurate and uniform pricing, and enhance price stability
- They help in bringing about price uniformity and discovery.

- OTC and Exchange Traded Derivatives.

## • 1. OTC

Over-the-counter (OTC) or off-exchange trading is to trade financial instruments such as stocks, bonds, commodities or derivatives directly between two parties without going through an exchange or other intermediary.

- The contract between the two parties are privately negotiated.
- The contract can be tailor-made to the two parties' liking.
- Over-the-counter markets are uncontrolled, unregulated and have very few laws. Its more like a freefall.

## 2. Exchange-traded Derivatives

- Exchange traded derivatives contract (ETD) are those derivatives instruments that are traded via specialized Derivatives exchange or other exchanges. A derivatives exchange is a market where individuals trade standardized contracts that have been defined by the exchange.
- The world's largest derivatives exchanges (by number of transactions) are the **Korea Exchange**.
- There is a very visible and transparent market price for the derivatives.

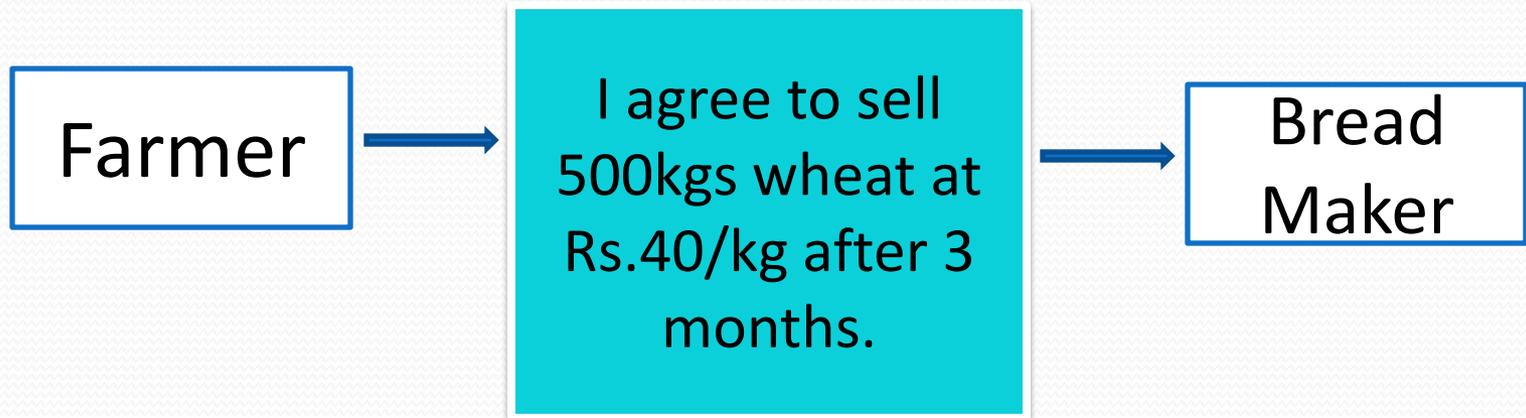
# **Economic benefits of derivatives**

- **Reduces risk**
- **Enhance liquidity of the underlying asset**
- **Lower transaction costs**
- **Enhances liquidity of the underlying asset**
- **Enhances the price discovery process.**
- **Portfolio Management**
- **Provides signals of market movements**
- **Facilitates financial markets integration**

# What is a Forward?

- A forward is a contract in which one party commits to buy and the other party commits to sell a specified quantity of an agreed upon asset for a pre-determined price at a specific date in the future.
- It is a customised contract, in the sense that the terms of the contract are agreed upon by the individual parties.
- Hence, it is traded OTC.

# Forward Contract Example



3 months Later



# Risks in Forward Contracts

- Credit Risk – Does the other party have the means to pay?
- Operational Risk – Will the other party make delivery?  
Will the other party accept delivery?
- Liquidity Risk – In case either party wants to opt out of the contract, how to find another counter party?

# Terminology

- Long position - Buyer
- Short position - seller
- Spot price – Price of the asset in the spot market.(market price)
- Delivery/forward price – Price of the asset at the delivery date.

# What are Futures?

- A future is a standardised forward contract.
- It is traded on an organised exchange.
- Standardisations-
  - quantity of underlying
  - quality of underlying(not required in financial futures)
  - delivery dates and procedure
  - price quotes

# Futures Contract Example

**A**

L \$10  
S \$12  
Profit \$2

| Market Price/Spot Price |      |
|-------------------------|------|
| D1                      | \$10 |
| D2                      | \$12 |
| D3                      | \$14 |

**B**

S \$10  
L \$14  
Loss \$4

**C**

L \$12  
S \$14  
Profit \$2

# Types of Futures Contracts

- Stock Futures Trading (dealing with shares)
- Commodity Futures Trading (dealing with gold futures, crude oil futures)
- Index Futures Trading (dealing with stock market indices)

# Closing a Futures Position

- Most futures contracts are not held till expiry, but closed before that.
- If held till expiry, they are generally settled by delivery. (2-3%)
- By closing a futures contract before expiry, the net difference is settled between traders, without physical delivery of the underlying.

# Terminology

- Contract size – The amount of the asset that has to be delivered under one contract. All futures are sold in multiples of lots which is decided by the exchange board.

Eg. If the lot size of Tata steel is 500 shares, then one futures contract is necessarily 500 shares.

- Contract cycle – The period for which a contract trades. The futures on the NSE have one (near) month, two (next) months, three (far) months expiry cycles.

- Expiry date – usually last Thursday of every month or previous day if Thursday is public holiday.

# Terminology

- Strike price – The agreed price of the deal is called the strike price.
- Cost of carry – Difference between strike price and current price.

# Margins

- A **margin** is an amount of a money that must be deposited with the clearing house by both buyers and sellers in a margin account in order to open a futures contract.
- It ensures performance of the terms of the contract.
- Its aim is to minimise the risk of default by either counterparty.

# Margins

- Initial Margin - Deposit that a trader must make before trading any futures. Usually, 10% of the contract size.
- Maintenance Margin - When margin reaches a minimum maintenance level, the trader is required to bring the margin back to its initial level. The maintenance margin is generally about 75% of the initial margin.
- Variation Margin - Additional margin required to bring an account up to the required level.
- Margin call – If amt in the margin A/C falls below the maintenance level, a margin call is made to fill the gap.

# Marking to Market

- This is the practice of periodically adjusting the margin account by adding or subtracting funds based on changes in market value to reflect the investor's gain or loss.
- This leads to changes in margin amounts daily.
- This ensures that there are no defaults by the parties.

## COMPARISON

## FORWARD

## FUTURES

|  |    |        |
|--|----|--------|
| • Trade on organized exchanges                                   | No | Yes    |
| • Use standardized contract terms                                | No | Yes    |
| • Use associate clearinghouses to guarantee contract fulfillment | No | Yes    |
| • Require margin payments and daily settlements                  | No | Yes    |
| • Markets are transparent  | No | Yes    |
| • Marked to market daily   | No | Yes    |
| • Closed prior to delivery                                       | No | Mostly |
| • Profits or losses realised daily                               | No | Yes    |

# What are Options?

- Contracts that give the holder the option to buy/sell specified quantity of the underlying assets at a particular price on or before a specified time period.
- The word “option” means that the holder has the right but not the obligation to buy/sell underlying assets.

# Types of Options

- Options are of two types – call and put.
- Call option give the buyer the right but not the obligation to buy a given quantity of the underlying asset, at a given price on or before a particular date by paying a premium.
- Puts give the buyer the right, but not obligation to sell a given quantity of the underlying asset at a given price on or before a particular date by paying a premium.

# Types of Options (cont.)

- The other two types are – European style options and American style options.
- European style options can be exercised only on the maturity date of the option, also known as the expiry date.
- American style options can be exercised at any time before and on the expiry date.

# Call Option Example

## CALL OPTION

Right to buy 100  
Reliance shares at  
a price of Rs.300  
per share after 3  
months.

Current Price = Rs.250

Premium =  
Rs.25/share

Amt to buy Call  
option = Rs.2500

Strike Price

Expiry  
date

Suppose after a month,  
Market price is Rs.400, then  
the option is exercised i.e.  
the shares are bought.  
Net gain =  $40,000 - 30,000 - 2500$   
= Rs.7500

Suppose after a month, market  
price is Rs.200, then the option is  
not exercised.  
Net Loss = Premium amt  
= Rs.2500

# Put Option Example

## PUT OPTION

Right to sell 100  
Reliance shares at  
a price of Rs.300  
per share after 3  
months.

Current Price = Rs.250

Strike Price

Expiry  
date

Premium =  
Rs.25/share

Amt to buy Call  
option = Rs.2500

Suppose after a month,  
Market price is Rs.200, then  
the option is exercised i.e.  
the shares are sold.

Net gain =  $30,000 - 20,000 - 2500$   
= Rs.7500

Suppose after a month, market  
price is Rs.300, then the option is  
not exercised.

Net Loss = Premium amt  
= Rs.2500

# Features of Options

- A fixed maturity date on which they expire. (Expiry date)
- The price at which the option is exercised is called the exercise price or strike price.
- The person who writes the option and is the seller is referred as the “option writer”, and who holds the option and is the buyer is called “option holder”.
- The premium is the price paid for the option by the buyer to the seller.
- A clearing house is interposed between the writer and the buyer which guarantees performance of the contract.

# Options Terminology

- Underlying: Specific security or asset.
- Option premium: Price paid.
- Strike price: Pre-decided price.
- Expiration date: Date on which option expires.
- Exercise date: Option is exercised.
- Open interest: Total numbers of option contracts that have not yet been expired.
- Option holder: One who buys option.
- Option writer: One who sells option.

# Options Terminology (cont.)

- Option class: All listed options of a type on a particular instrument.
- Option series: A series that consists of all the options of a given class with the same expiry date and strike price.
- Put-call ratio: The ratio of puts to the calls traded in the market.

# Options Terminology (cont.)

- Moneyness: Concept that refers to the potential profit or loss from the exercise of the option. An option maybe in the money, out of the money, or at the money.

|                  | Call Option               | Put Option                |
|------------------|---------------------------|---------------------------|
| In the money     | Spot price > strike price | Spot price < strike price |
| At the money     | Spot price = strike price | Spot price = strike price |
| Out of the money | Spot price < strike price | Spot price > strike price |

# What are SWAPS?

- In a swap, two counter parties agree to enter into a contractual agreement wherein they agree to exchange cash flows at periodic intervals.
- Most swaps are traded “Over The Counter”.
- Some are also traded on futures exchange market.

# Types of Swaps

There are 2 main types of swaps:

- Plain vanilla fixed for floating swaps  
or simply **interest rate swaps**.
- Fixed for fixed currency swaps  
or simply **currency swaps**.

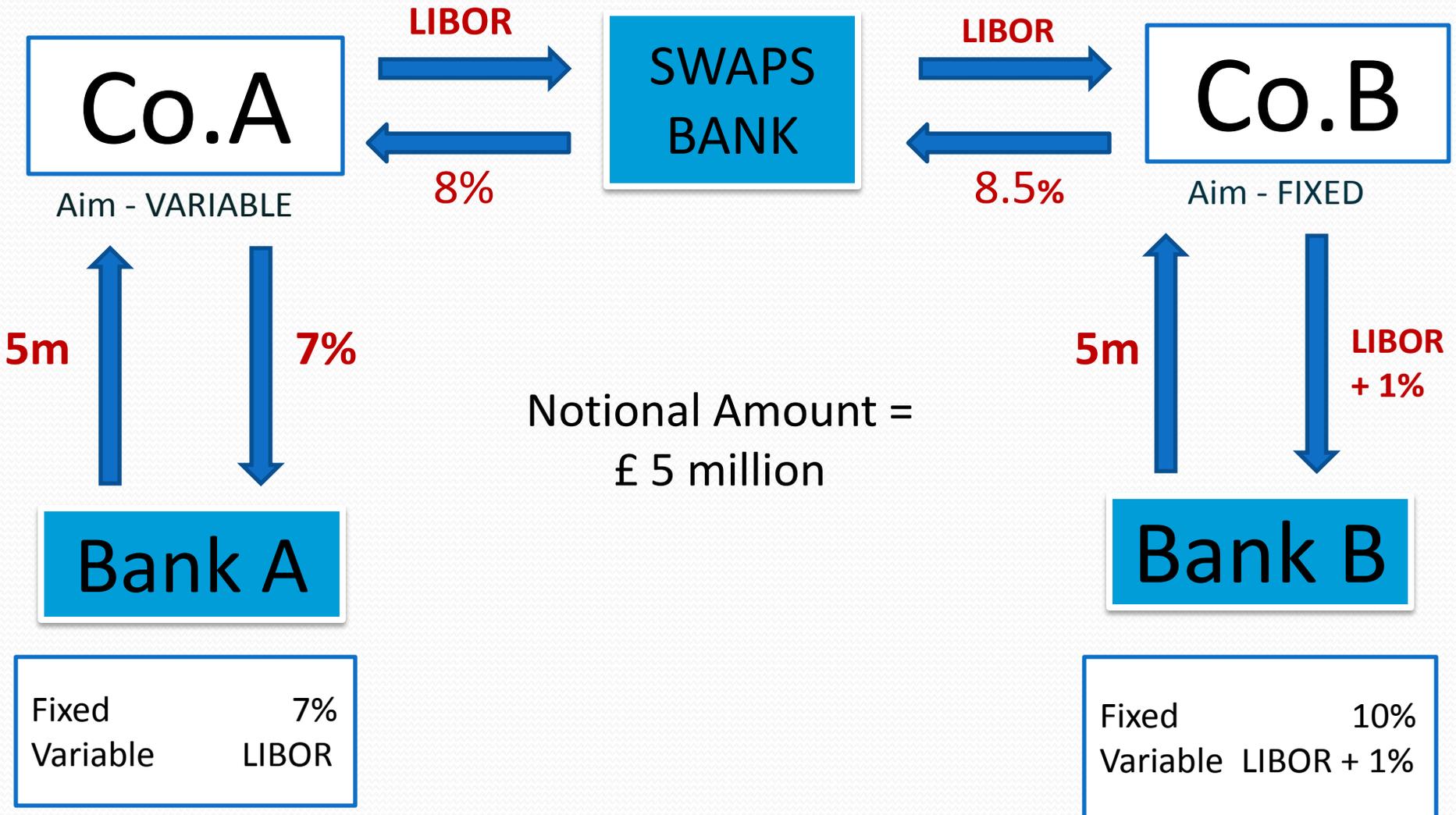
# What is an Interest Rate Swap?

- A company agrees to **pay** a pre-determined **fixed interest rate** on a **notional principal** for a fixed number of years.
- In return, it **receives** interest at a **floating rate** on the same notional principal for the same period of time.
- The **principal is not exchanged**. Hence, it is called a notional amount.

# Floating Interest Rate

- LIBOR – London Interbank Offered Rate
- It is the average interest rate estimated by leading banks in London.
- It is the primary benchmark for short term interest rates around the world.
- Similarly, we have MIBOR i.e. Mumbai Interbank Offered Rate.
- It is calculated by the NSE as a weighted average of lending rates of a group of banks.

# Interest Rate Swap Example



# Using a Swap to Transform a Liability

- Firm A has transformed a fixed rate liability into a floater.
  - A is borrowing at LIBOR – 1%
  - A savings of 1%
- Firm B has transformed a floating rate liability into a fixed rate liability.
  - B is borrowing at 9.5%
  - A savings of 0.5%.
- Swaps Bank Profits =  $8.5\% - 8\% = 0.5\%$

# What is a Currency Swap?

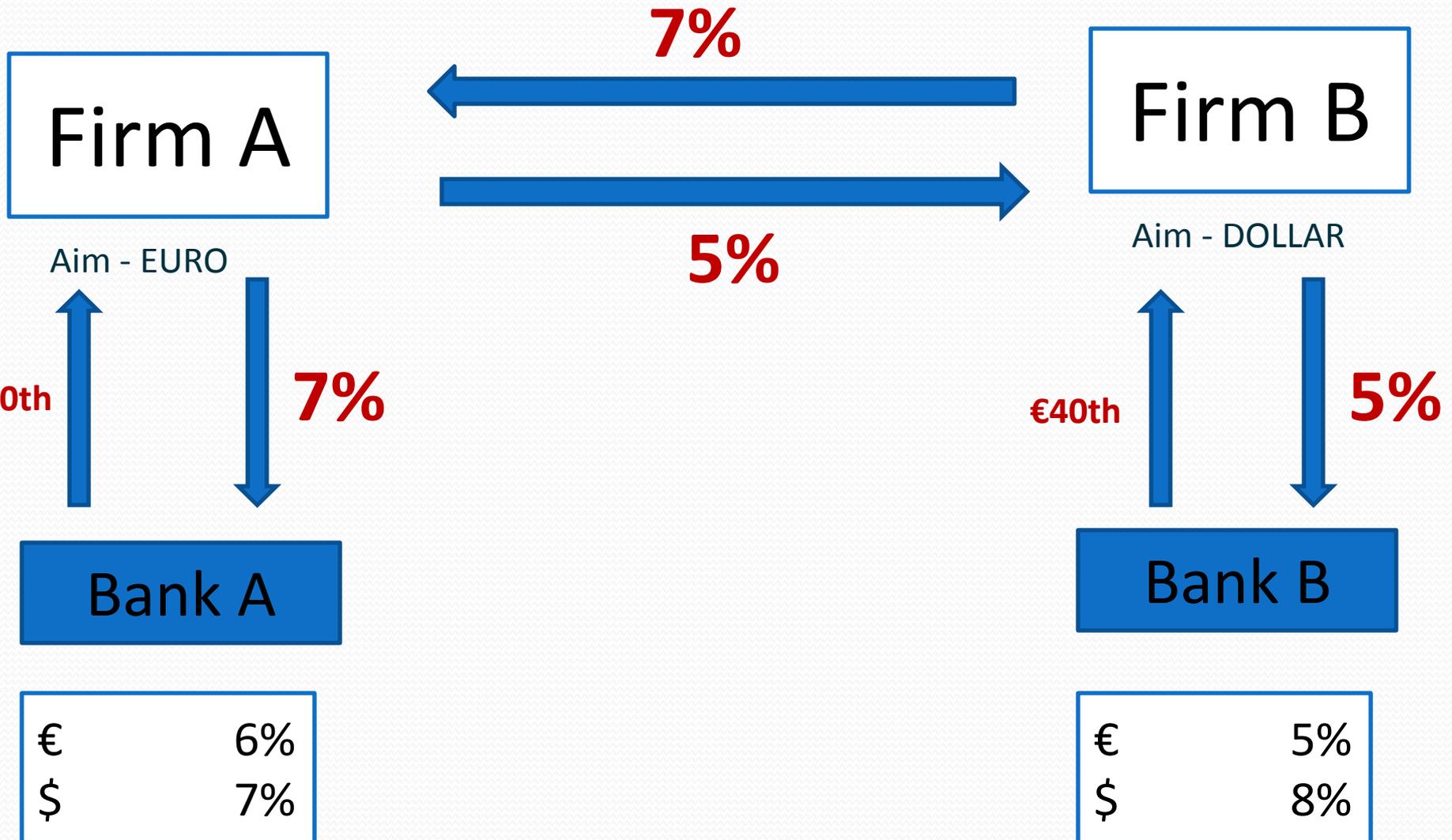
- It is a swap that includes exchange of principal and interest rates in one currency for the same in another currency.
- It is considered to be a foreign exchange transaction.
- It is not required by law to be shown in the balance sheets.
- The principal may be exchanged either at the beginning or at the end of the tenure.

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- However, if it is exchanged at the end of the life of the swap, the principal value may be very different.
  - It is generally used to hedge against exchange rate fluctuations.

# Direct Currency Swap Example

- Firm A is an American company and wants to borrow €40,000 for 3 years.
- Firm B is a French company and wants to borrow \$60,000 for 3 years.
- Suppose the current exchange rate is  $\text{€}1 = \text{\$}1.50$ .

# Direct Currency Swap Example



# Comparative Advantage

- Firm A has a **comparative advantage** in borrowing Dollars.
- Firm B has a **comparative advantage** in borrowing Euros.
- This comparative advantage helps in reducing borrowing cost and hedging against exchange rate fluctuations.