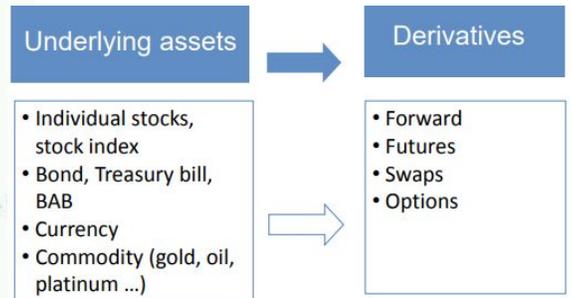


**Terminologies**



**Derivative:** Instrument whose value depends on the value of the underlying asset.

4 Types of Derivative:

- Forward

- Futures
- Swaps
- Options

**Swaptions:** Options on Swaps (Swap itself becomes the underlying asset)

The **present** value of  $X$  is defined as

$$PV = \frac{X}{e^{rT}} = Xe^{-rT} \quad (3)$$

The **future** value of  $X$  is defined as

$$FV = Xe^{rT} \quad (4)$$

$r$  = continuously compounded rate of interest. ( $r = 10\%$  p.a compounded continuously - all interest rates are quoted annually).

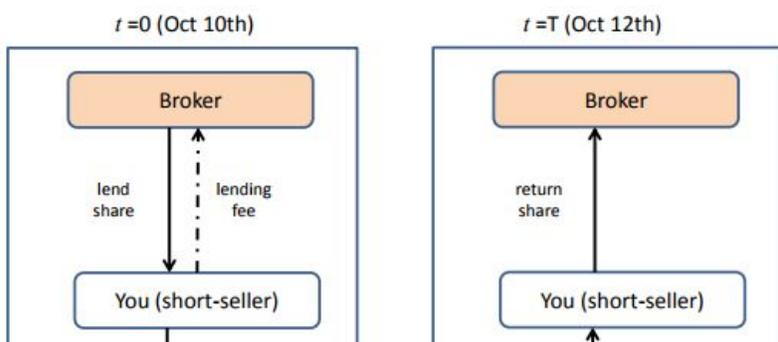
**Discount Factor**  $e^{-rT}$  & **Compounding Factor**  $e^{rT}$

**Long:** buy a security / derivative instrument

**Short:** selling a security / derivative instrument

**Short-sell:** Selling a security or derivative which you don't have BY borrowing from another party at  $t = 0$  AND promise to return the asset to the owner at  $t = T$ .

- does NOT mean taking a short position in forward/future contract on a share
- FOR arbitrage and speculation



If company issued a dividend while the broker has lent the short seller the shares, @  $t = T$ , the short seller **MUST pay that div amount to the broker** (the short-seller didn't receive any div because he sold it).

**Short-Selling Issues:**

# Lecture 1 - FINM3405 Derivatives and Risk Management

- A. Regulatory risk - likelihood for imposed bans during financial crisis period to avoid panic
- B. Gamble that leads to infinite loss - when share prices increase instead of dropping
- C. Forced Buy-In - Broker can force the short-seller to settle before T (forcing short-seller to buy back shares and return to broker)
- D. Hard to find a broker
- E. Short Squeeze risk - if supply is monopolized, hard to buy back shares.
- F. **Promotes Market Liquidity and Price Discovery**

**Arbitrage Profit:** A sure (risk free) profit with no initial investment involved.

- There will be no arbitrage opportunity in these situations:
  - If a trading strategy costs **nothing** today to establish, its future payoff must be 0; or
  - If future payoff of portfolio A = future payoff of portfolio B, then both portfolios A and B must have the **same cost** today; or
  - A risk-free strategy that produces a certain/sure future payoff must earn **risk-free** rate of interest.

AKA Speculative Profit (involves risk - not an arbitrage profit)  
**Forward Contract** - Contract b/w two parties to exchange an asset for cash at a specified forward price - fixed price (F) at a specified future time (T).

When initiated at  $t = 0$ ,

- no money changes hand at  $t = 0$
- the underlying asset does not change hand at  $t = 0$  and
- F and T are determined at  $t = 0$



Payoffs:

1. Short Position makes money if the underlying asset price falls below the forward price.  
**Payoff =  $-(S_T - F)$**
2. Long Position makes money when the underlying asset price rises above the forward price.  
**Payoff =  $S_T - F$**

	Forward Contract	Future Contract
<b>Traded</b>	Over the Counter (OTC) - negotiate directly with the other party.	Organized Exchanges (Australia - before: SFE. <b>now: ASX Futures</b> )
<b>Standardization</b>	Not Standardized	Standardized by futures exchanges
<b>Settlement</b>	Maturity	Daily Settlement
<b>Closing</b>	Physical delivery / Cash	Cash settlement or close out prior to expiry
<b>Credit Risk</b>	Has Credit (counterparty risk)	Little credit risk

**SPI - Futures Contract** (SPI is derivative)

**Settlement for Forward Contract:**

- Settled at maturity.
- Cash (physically deliver the underlying asset)

**Settlement for Future Contract:**

- settled before or at maturity

Specification	SPI200 futures
Exchange	Sydney Futures Exchange (SFE)
Underlying asset	S&P ASX200
Contract size	AUD\$25 × index points
Contract months	March, June, Sept, Dec
Last trading day	12.00 p.m. (Sydney time) on the 3rd Thursday of the contract month
Trading hours	5.10 p.m. 7.00 a.m. & 9.50 a.m. 4.30 p.m. (Sydney time)
Settlement method	cash

# Lecture 1 - FINM3405 Derivatives and Risk Management

- Closing Out - enter into a new futures position equal in magnitude but opposite in direction.
- Cash Settlement - deliver the physical underlying asset and receive cash.



- At  $t = 0$ , short a forward contract on greasy wool
  - Maturing in 2 months
  - Forward price (F) = \$10/kg
  - 1 forward contract = 1000kg of greasy wool

What happen at maturity in 2-mth time?

Committed to sell (i.e., deliver) the wool at  $\$10 \times 1000 = \$10,000$  (i.e., receive cash)

- Closing Out Settlement



Activity	Amount
In July, you <b>short</b> @	200
In Sept, you <b>close-out</b> by <b>long</b> @	220
Loss	20