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Derivatives - Options Theory

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Derivatives
Options Theory – the building blocks

Definitions

Option

- The right, but not the obligation, to buy or sell an asset for a specified price at a specified time in the future (cf. forward contract)

Call Option

- The right to buy an underlying asset (e.g. a share) for a specified price at a specified time in the future. The buyer of a call is bullish on the underlying (i.e. the investor expects the price to increase)

Put Option

- The right to sell an underlying asset (e.g. a share) for a specified price at a specified time in the future. The buyer of a put is bearish on the underlying (i.e. the investor expects the price to fall)

Strike Price

- The specified price at which the investor has the right to buy/sell an underlying asset

Premium

- The price paid for the option/contract

Being 'Long'

- Buying an underlying asset or having 'synthetic' exposure to the underlying asset through an option or contract

Being 'Short'

- Selling an asset or having 'synthetic' exposure to the underlying asset through an option or contract. The term 'shorting' refers to borrowing shares and selling them to a third party (legal title will pass) in the hope the share price will fall before having to return to shares to the original owner

Hedge

- The purchase of an asset, option or contract in order to protect against the rise or fall in value of another underlying asset

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Definitions (continued)

European Style Option
- The owner/holder of the option has the right to exercise the option only at maturity

American Style Option
- The owner/holder of the option has the right to exercise the option anytime before or at maturity

Cash Settlement
- Settlement of an option or contract by means of a net cash payment that is equal to the difference between the strike price of the option/contract and the spot/market price of the underlying asset.

Physical settlement
- Settlement of an option or contract by means of a physical delivery of the underlying asset

In the Money
- Where exercise of the option would result in a profitable outcome for the owner/holder of the option if exercised today

Out of the Money
- Where exercise of the option would result in a loss for the owner/holder of the option if exercised today

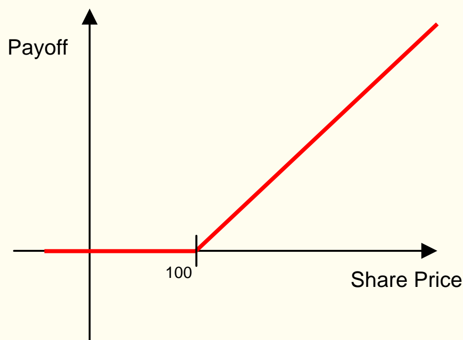
At the Money
- Where exercise of the option would result in neither a profit nor a loss (as the spot price of the asset equals the strike price) if the owner/holder of the option exercised today.

Bull market / bullish view
- A market where the investor considers the market/underlying asset will increase in value

Bear market / bearish view
- A market where the investor considers the market/underlying asset will fall in value

Derivatives
Options Theory – the building blocks

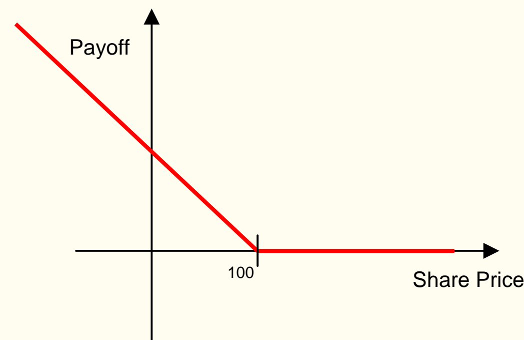
- *Long Call Option*



Rationale for Long Call Option

- An option bought by an investor where the investor thinks that the underlying stock will increase in price.
- Profits are unlimited as long as the underlying stock continues in rise.
- Losses are limited to the premium paid for the option.
- Investors will buy a call for two reasons:
  – bullish speculators wanting to take advantage of the leverage options can offer; and
  – the investor buying a Call as a substitute for buying the stock (synthetic exposure)

- *Long Put Option*



Rationale for Long Put Option

- An option bought by an investor where the investor thinks that the underlying stock will fall in price.
- Profits are unlimited as long as the underlying stock continues in fall.
- Losses are limited to the premium paid for the option.
- Investors will buy a put for two reasons:
  – bearish speculators wanting to take advantage of the leverage options can offer; and
  – an investor seeking an alternative to 'shorting' the stock

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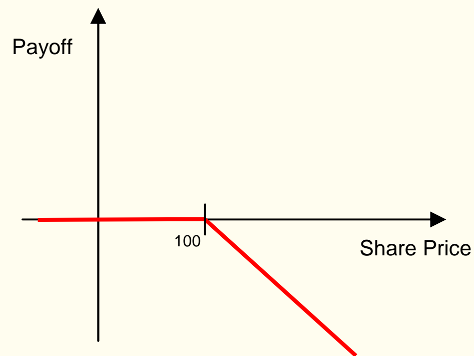
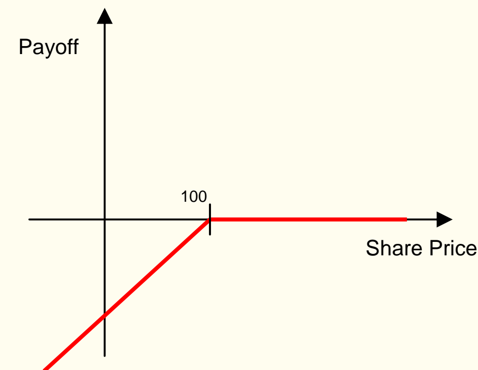
- *Short Call Option*



- *Short Put Option*



Rationale for Short Call Option

- An option sold by an investor where the investor thinks that the share price will remain static or will fall in value.
- Economic equivalent to being long a put option
- Profits are limited no matter how large the decline in the underlying stock (as the stock cannot fall below zero).
- Losses are unlimited.
- Selling a call is an extremely risky investment strategy, particularly where the investor does not hedge their exposure by also owning the underlying stock (called a 'naked' call)

Rationale for Short Put Option

- An option bought by an investor where the investor thinks that the share price will remain static or will increase in value.
- Profits are limited to the option premium received.
- Losses are unlimited.
- While selling a put is an extremely risky investment strategy, investors will sell a put for two reasons:
  - to receive premium income (usually in combination with the purchase of another option such as a call); and
  - to acquire stock at a net cost below the market value

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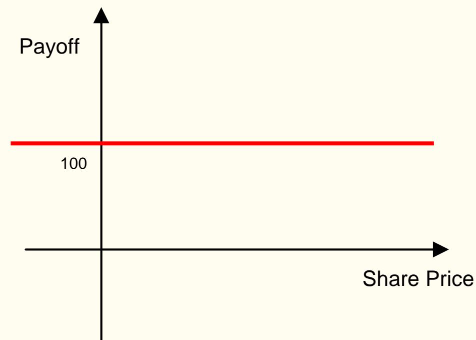
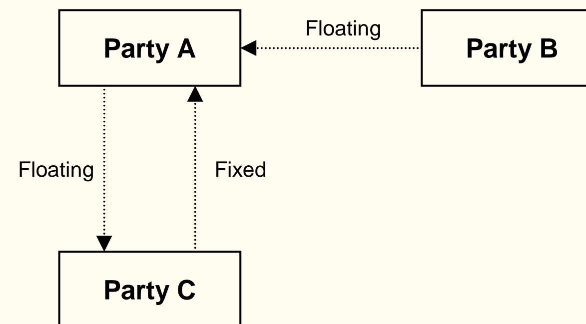
- *Forward contract*



- *Swap contract*



Rationale for forward contract

- A forward contract is an obligation to sell or purchase an asset for a specified price at a specified time in the future
- Unlike an option, a forward contract creates a permanent obligation to complete the contract
- A forward contract may be cash or physically settled.
- In the example above (assuming the investor is required to buy the underlying asset):
  - If the share price falls below 100, the investor will make a loss on the forward contract.
  - If the share price rises above 100, the investor will make a gain on the forward contract.

Rationale for swap contract

- A swap contract is a contract that allows the parties to exchange cash flows
- Swap contracts can be used for interest rates, currency etc
- In the example above:
  - Party A has a floating interest rate exposure from Party B
  - However, Party A wants certainty on its cash flows so enters into a floating/fixed swap contract
  - Party A pays the floating payment received from Party B to Party C. In exchange, Party C pays Party A a fixed payment

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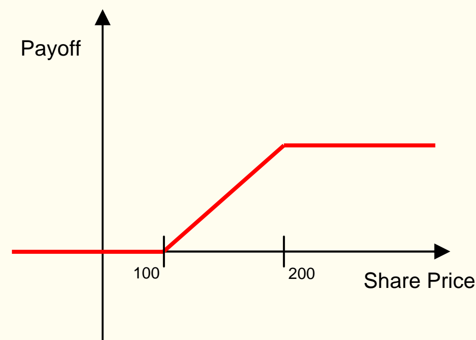
- *Collar*



Rationale for collar

- A standard collar is a combination of two options: the purchase of a call option and the sale of a put option
- Under a 'zero cost' collar, the strike price of the call and put are set so that the premium payable on the bought call is equal to the premium received on the sold put.
- In the example above:
  - The option is out of the money where the share price stays below 100
  - The investor will make a profit where the share price remains between 100 and 200
  - The investor will not make additional profit where the share price increases above 200.

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