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CFA LEVEL I

Option

泽稷网校罗老师

CFA一级重难点—期权

直播时间--北京时间19:00-20:00
网课视频地址：
http://live.zejicert.cn/item?targetId=94
详细板书讲解请见视频

Option

- An Option Contract: 权利义务不对等的远期合约.
  - ✓ Call option: An option to buy an asset

Buyer of the call	Right to buy	
Seller of the call		Obligation to sell

  - ✓ Put option: An option to sell an asset

Buyer of the put	Right to sell	
Seller of the put		Obligation to buy

Option

- Long方: 买权利的人
- Short方: 卖权利的人
  - ✓ Long call & Short call
  - ✓ Long put & short put
  - ✓ The seller or short position in an options is sometimes referred to as the writer of the options contract .
- Option value: Option premium
- Striking price: X or K represents the exercise price

Option

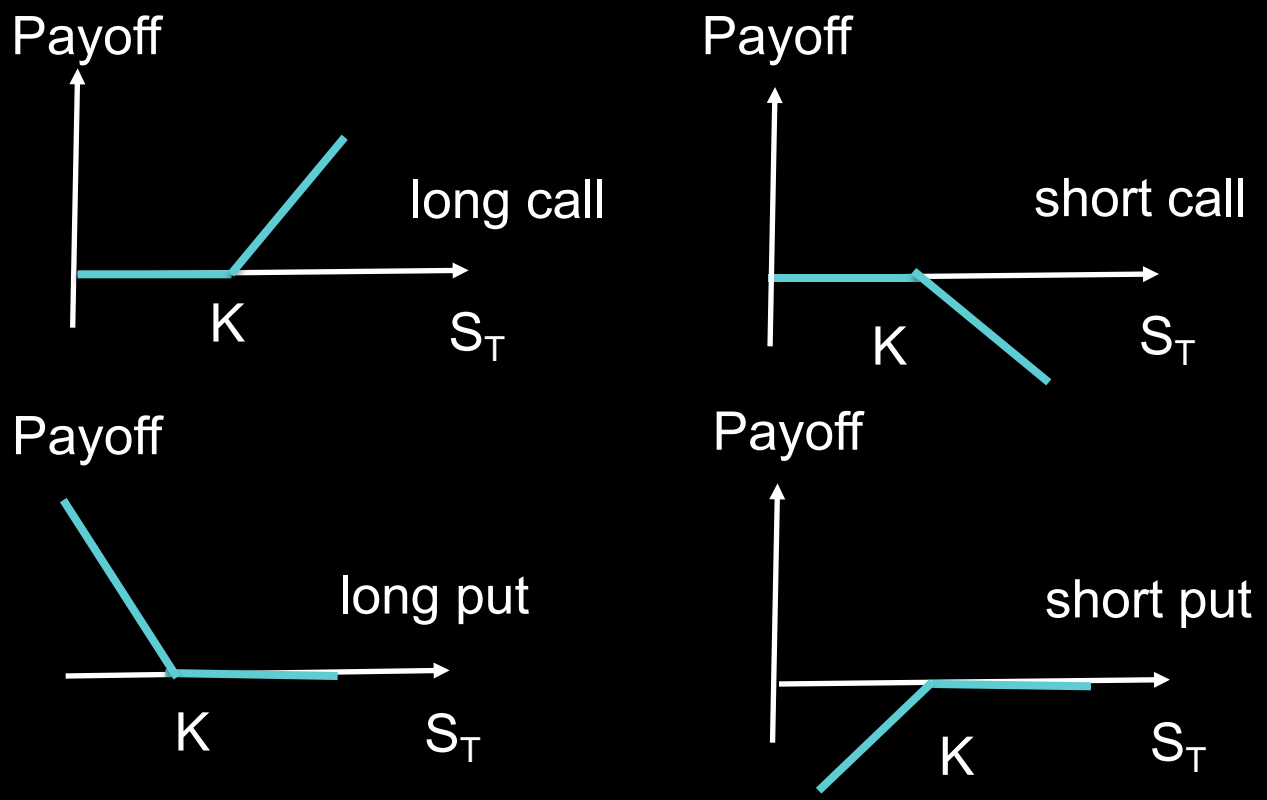
- Moneyness
  - ✓ In the money: Immediate exercise would generate a positive payoff.
  - ✓ At the money: Immediate exercise would generate no payoff.
  - ✓ Out of the money: Immediate exercise would generate no payoff.

Option

Moneyness	Call option	Put option
In the money	S>X	S<X
At the money	S=X	S=X
Out of the money	S<X	S>X

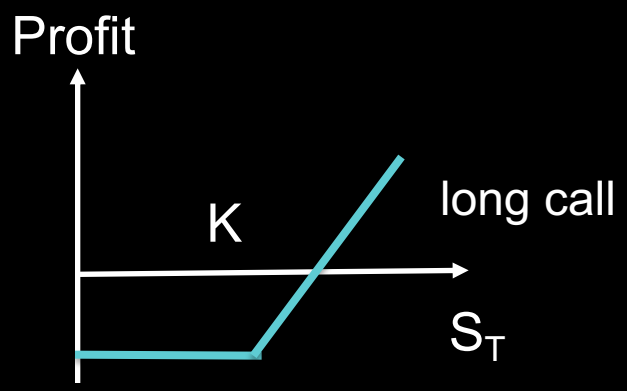
Option

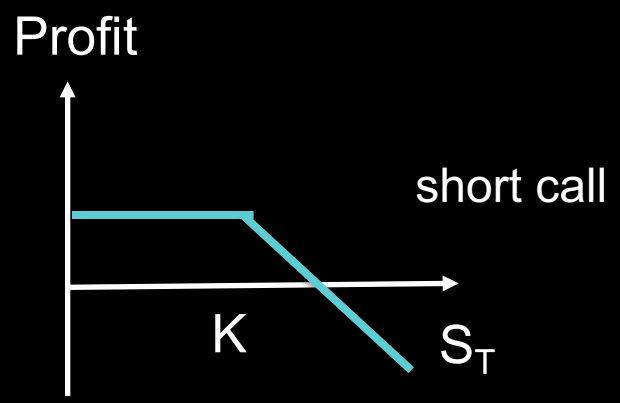
- Payoff:

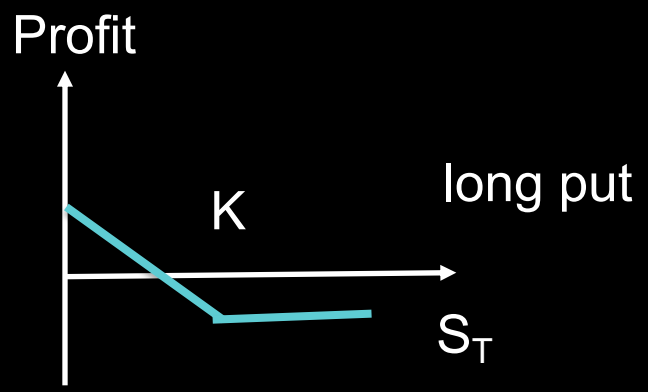


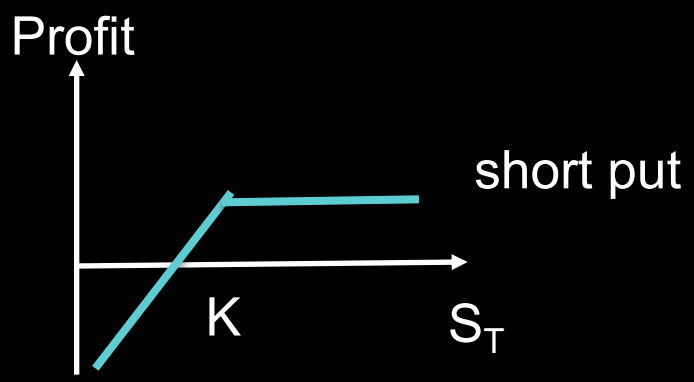
Option

- Profit:









Option

- Intrinsic Value:
  - ✓ The amount that it is in the money, and zero otherwise.
    - Intrinsic value of call option: C=max[0, S-X]
    - Intrinsic value of put option: P=max[0, X-S]

Option

- Time Value:
  - ✓ The difference between the price of an option (called its premium) and its intrinsic value is due to its time value.
  - ✓ Option value=intrinsic value + time value
    - 到期日之前: option value>intrinsic value
    - 到期日: option value=intrinsic value
    - Price of the option is more volatile than prices of underlying stock

Example

Consider a put option on Deter, Inc., with an exercise price of $45. The current stock price of Deter is $52. What is the intrinsic value of the put option, and is the put option at-the-money or out-of-the-money?

	Intrinsic Value	Moneyness
A.	$7	At-the-money
B.	$0	Out-of-the-money
C.	$0	At-the-money

√

Example

Which statement about option valuation is FALSE?

A. Prior to maturity, out-of-the-money options have no value.

B. The value of an option is its time value plus its intrinsic value.

C. The buyer of a call option contract can never lose more than the initial premium.

Option

- Put call parity:
  - ✓ $C+X/(1+r)^T=P+S$
  - ✓ $P=C+X/(1+r)^T-S$
  - ✓ $C=P+S-X/(1+r)^T$
  - ✓ $S=C+X/(1+r)^T-P$

Example

90-day European call and put options with a strike price of $45 is priced at $7.50 and $3.70. The underlying is priced at $48 and makes no cash payments during the life of the options. The risk-free rate is 5%. Calculate the no-arbitrage price of the call option, and illustrate how to earn an arbitrage profit.

Answer

Answer:

$C_0=P_0+S_0-X/(1+R_f)^T=\$3.70+\$48-\$45/1.0590^{365}=$

$\$7.24<\$7.5$

we should sell the call for $7.50 and buy the synthetic call for $7.24.

Option

- European options can be exercised only on the contract's expiration date.
- American options may be exercised at any time up to and including the contract's expiration date.
- Value美式≥Value欧式

Option

- Min value and Max value of options without dividend

Option	Min value	Max value
European call	$Max[\ 0\ ,\ S_t-X/(1+R_f)^{T-t}\ ]$	S_t
American call	$Max[\ 0\ ,\ S_t-X/(1+R_f)^{T-t}\ ]$	S_t
European put	$Max[\ 0\ ,\ X/(1+R_f)^{T-t}-S_t\ ]$	$X/(1+R_f)^{T-t}$
American put	$P_t \geq Max[\ 0\ ,\ X-S_t\ ]$	X

Option

- American call options
  - ✓ When the underlying makes no cash payments, no reason to exercise the call early.
  - ✓ When the underlying makes cash payments during the life of the option, early exercise can happen.
- American put options
  - ✓ Always exercise the put option early.

Example

A European stock index call option has a strike price of $1160 and a time to expiration of 0.25 years. Given a risk-free rate of 4%, if the underlying index is trading at $1,200 and has a multiplier of 1, then the lower bound for the option price is closest to:

A. $ 0.00　B. $28.29　C. $51.32 √

Answer

Solution : C

The lower bound on a European call is either zero or the underlying price minus the present value of the exercise price, whichever is greater.

$1200-($1160/1.04^0.25)=$51.32.

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