Financial Mathematics

MATH 5870/6870[1]
Fall 2021

Le Chen

lzc0090@auburn.edu

Last updated on

August 5, 2021

Auburn University
Auburn AL

[1] Based on Robert L. McDonald's *Derivatives Markets*, 3rd Ed, Pearson, 2013.

Chapter 2. An Introduction to Forwards and Options

Chapter 2. An Introduction to Forwards and Options

§ 2.1 Forward contracts

§ 2.2 Call options

§ 2.3 Put options

§ 2.4 Options are insurance

§ 2.5 Summary of forward and option positions

§ 2.6 Problems

§ 2.1 Forward contracts

§ 2.2 Call options

§ 2.3 Put options

§ 2.4 Options are insurance

§ 2.5 Summary of forward and option positions

§ 2.6 Problems

Chapter 2. An Introduction to Forwards and Options

$$\{\text{long}, \text{short}\} \quad \times \quad \{\text{forward}, \text{call}, \text{put}\}$$

$$||$$

$$\text{six positions}$$

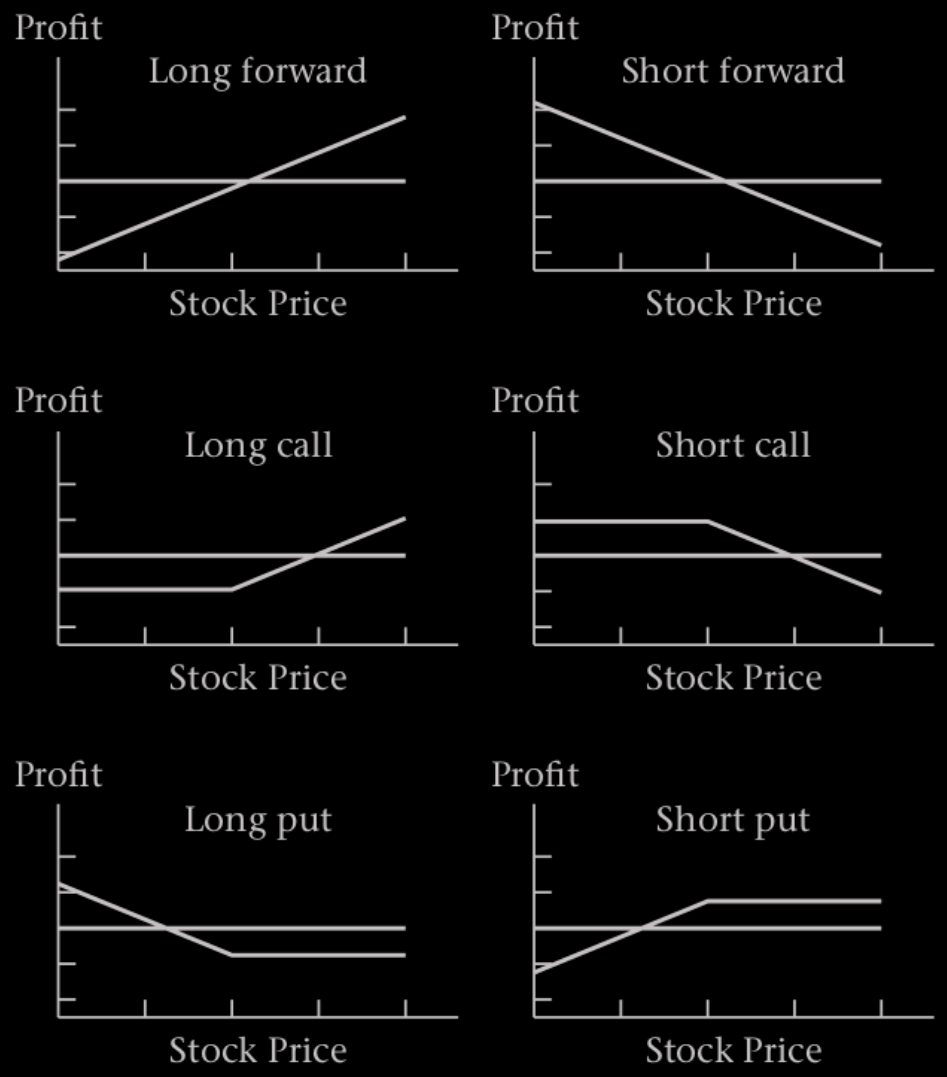
Maximum possible profit and loss at maturity for $\{\text{long}, \text{short}\} \times \{\text{forward}, \text{call}, \text{put}\}$

Position	Maximum Loss	Maximum Gain
Long forward	$-$Forward price	Unlimited
Short forward	Unlimited	Forward price
Long call	$-\text{FV}(premium)$	Unlimited
Short call	Unlimited	$\text{FV}(premium)$
Long put	$-\text{FV}(premium)$	Strike price $-$ $\text{FV}(premium)$
Short put	$\text{FV}(premium) -$ Strike price	$\text{FV}(premium)$

[5]

[5] $FV(\cdot)$ denotes the function that returns the future value.

Profit diagrams for $\{\text{long}, \text{short}\} \times \{\text{forward}, \text{call}, \text{put}\}$



Summary of positions for $\{\text{long}, \text{short}\} \times \{\text{forward}, \text{call}, \text{put}\}$

Derivative Position	Position with Respect to Underlying Asset	Asset Price Contingency	Strategy
Long forward	Long (buy)	Always	Guaranteed purchase price
Short forward	Short (sell)	Always	Guaranteed sale price
Long call	Long (buy)	$>$ Strike	Insures against high price
Short call	Short (sell)	$>$ Strike	Sells insurance against high price
Long put	Short (sell)	$<$ Strike	Insures against low price
Short put	Long (buy)	$<$ Strike	Sells insurance against low price