MFE5130 – Financial Derivatives

Class Activity (11-December-2018) (Solution)

Important Notes:

1. This class activity is counted toward to your class participation score. **Fail** to hand in this class activity worksheet in the class will receive **0 score** for that class.
2. **0 mark** will be received if you leave the solution blank.

Name:	Student No.:

Problem 1

The table below describes 4 newly issued options and lists their prices in the right-most column. All of the options expire in 1 year. The underlying asset for the options is Stock X.

Type of option	Barrier	Strike	Price
Knock-in call	54	50	6.40
Knock-in call	57	50	10.35
Knock-out call	57	50	5.14
Knock-in put	54	50	1.65

Determine the price of a newly issued 1-year knock-out call on Stock X with a barrier of \$54 and a strike of \$50.

Solution

For a given barrier, the parity relationship can be used to find the value of the ordinary call option. Since we have the value of both the knock-in call and the knock-out call options when the barrier is \$57:

$$\text{Knock-in option} + \text{Knock-out option} = \text{Ordinary option}$$

$$10.35 + 5.14 = 15.49.$$

Therefore an ordinary call option with a strike price of \$50 has a value of \$15.49. We can apply the parity relationship again, this time with the barrier set to \$54:

$$\text{Knock-in option} + \text{Knock-out option} = \text{Ordinary option}$$

$$6.4 + \text{Knock-out option} = 15.49$$

$$\text{Knock-out option} = 15.49 - 6.4 = 9.09.$$