MFE5130 – Financial Derivatives

Class Activity (25-September-2019) (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

Suppose the current stock price is \$45.34 and the continuously compounded interest rate is 5%. The stock pays dividend of \$1.20 in three months. You observe a 9-month forward contract with forward price \$47.56. Is there an arbitrage opportunity on the forward contract? If so, describe the strategy to realize profit and find the arbitrage profit.

Solution

The theoretical forward price = $(45.34 - 1.2e^{-(0.05)(0.25)})\, e^{(0.05)(0.75)} = 45.84$.

Now, the observed forward price is higher than the theoretical one. To have the arbitrage profit, we short the forward and long the synthetic forward as follows:

Transactions	**Cash Flows**		
	$t = 0$	$t = 0.25$	$t = 0.75$
Short one forward	0	0	$47.56 - S_{0.75}$
Buy one share of the stock	–45.34	0	$S_{0.75}$
Borrow \$45.34 at $t = 0$	45.34	0	$-45.34e^{(0.05)(0.75)} = -47.07$
Receive the dividend (\$1.2) at t =0.25	0	1.2	0
Lend \$1.2 at $t = 0.25$	0	–1.2	$1.2e^{(0.05)(0.5)} = 1.23$
Total	0	0	1.72

This position requires no initial investment, has no stock price risk, and has a strictly positive payoff. We have exploited the mispricing with a pure arbitrage strategy.