**MFE5130 – Financial Derivatives**

**Class Activity (20-September-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.

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| 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 – 1.2*e*−(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:

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| --- | --- | --- | --- |
| **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 | −45.34*e*(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 | 1.2*e*(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.