

## Session 27

### Too good to be true? Pure Arbitrage

#### Test

- Which of the following do you need for pure arbitrage?
  - Two assets that have identical cash flows over time.
  - The two assets trade at different prices at the same point in time.
  - The trading costs for trading the two assets is less than the pricing difference.
  - At some point in time in the future, the price difference is guaranteed to disappear.
  - All of the above
- To get a storable commodity on a future date at a fixed price, you can buy a futures contract. If futures contracts are unavailable, which of the following sets of actions will allow you to create an equivalent position.
  - Borrow money for the contract period, buy the underlying asset today and store the asset until the future date.
  - Borrow money for the contract period and sell short the underlying asset, agreeing to deliver on the future date.
  - Sell short the underlying asset until the future date and lend the proceeds for the contract period.
  - Buy the underlying asset today and lend money for the contract period.
  - None of the above
- Which of the following is the arbitrage relationship for the futures price on a stock index?
  - Futures Price = Spot price
  - Futures Price = Spot price (1 + Riskless rate - Dividend Yield)
  - Futures Price = Spot price (1 - Riskless rate + Dividend Yield)
  - Futures Price = Spot price (1 + Riskless rate + Dividend Yield)
  - Futures Price = Spot price (1 - Riskless rate - Dividend Yield)Explain why.
- Assume that you are looking at a list of call and put options traded on a stock. If the stock price is \$36, which of the following options offers an immediate arbitrage profit?
  - Call with a strike price = \$40 and option value = \$3
  - Put with a strike price = \$40 and option value = \$3
  - Call with a strike price = \$30 and option value = \$8
  - Put with a strike price = \$30 and option value = \$4
  - None of the above
- Assume that you do find two "identical" assets trading at different prices at the same time in two different markets. Which of the following may be an impediment to profiting from pure arbitrage?
  - The assets may not be identical.
  - Trading on one of the markets may not be allowed.

- c. Transactions costs may exceed the pricing difference
- d. There may be no guarantee that the pricing difference will close at some point in time.
- e. All of the above

### Solution

1. Which of the following do you need for pure arbitrage?
  - a. Two assets that have identical cash flows over time.
  - b. The two assets trade at different prices at the same point in time.
  - c. The trading costs for trading the two assets is less than the pricing difference.
  - d. At some point in time in the future, the price difference is guaranteed to disappear.
  - e. All of the above**

*Explanation: For pure arbitrage, you need two identical assets that you can trade at different prices at the same time, with a guarantee that the prices will converge at some point in the future.*

2. To get a storable commodity on a future date at a fixed price, you can buy a futures contract. If futures contracts are unavailable, which of the following sets of actions will allow you to create an equivalent position.
  - a. Borrow money for the contract period, buy the underlying asset today and store the asset until the future date.**
  - b. Borrow money for the contract period and sell short the underlying asset, agreeing to deliver on the future date.
  - c. Sell short the underlying asset until the future date and lend the proceeds for the contract period.
  - d. Buy the underlying asset today and lend money for the contract period.
  - e. None of the above

*Explanation: If you borrow money and buy the commodity today, you have guaranteed that you will have the commodity on the future date and there is no uncertainty (since you have locked in the price and know what interest rate you will have to pay on your borrowed money & your storage costs).*

3. Which of the following is the arbitrage relationship for the futures price on a stock index?
  - a. Futures Price = Spot price
  - b. Futures Price = Spot price (1 + Riskless rate - Dividend Yield)**
  - c. Futures Price = Spot price (1 - Riskless rate + Dividend Yield)
  - d. Futures Price = Spot price (1 + Riskless rate + Dividend Yield)
  - e. Futures Price = Spot price (1 - Riskless rate - Dividend Yield)

Explain why.

*Explanation: You can borrow money and buy the stock index today to create an equivalent position to buying the index future. The cost of the borrowing will be offset partially by the dividends you receive on the index. To prevent arbitrage, the futures prices has to be equal to the cost of creating the equivalent position.*

4. Assume that you are looking at a list of call and put options traded on a stock. If the stock price is \$36, which of the following options offers an immediate arbitrage profit?

- a. Call with a strike price = \$40 and option value = \$3
- b. Put with a strike price = \$40 and option value = \$3**
- c. Call with a strike price = \$30 and option value = \$8
- d. Put with a strike price = \$30 and option value = \$4
- e. None of the above

*Explanation: Buy the put for \$3, exercise immediately to make a profit of \$4 (Stock price – Strike price) and pocket the profit of \$1.*

5. Assume that you do find two “identical” assets trading at different prices at the same time in two different markets. Which of the following may be an impediment to profiting from pure arbitrage?
- a. The assets may not be identical.
  - b. Trading on one of the markets may not be allowed.
  - c. Transactions costs may exceed the pricing difference
  - d. There may be no guarantee that the pricing difference will close at some point in time.
  - e. All of the above**

*Explanation: The best laid plans of arbitrage can be thrown off by any of these choices.*