[Frequently Asked Questions]

Arbitration

Subject: Business Economics

Course: B. A. (Hons.), 6th Semester,
                                      Undergraduate

Paper No. & Title: Paper – 611
                                      International Finance

Unit No. & Title: Unit – 1
                                      Introduction to the
                                      Foreign Exchange Market
                                      and Fundamental Issues

Lecture No. & Title: Lecture – 3
                                      Arbitration

Frequently Asked Questions

Q1. Explain arbitraging with a practical example.

A1. Arbitrage Example

Take this simple example. Suppose an identical security trades in two different places, London and Tokyo. For simplicity, let's say it's a stock, but it doesn't really matter.

The table shows a snapshot of the price quotes from the two sources. At each tick, we see a price quoted from each one.

Time	London Price	Tokyo Price	Difference	London Desk	Tokyo Desk
08:05:00	54.32	54.32	0.00		
08:05:01	54.31	54.31	0.00		
08:05:02	55.20	55.10	0.10	Sell 10 @ 55.20	Buy 10 @ 55.10
08:05:03	55.80	55.70	0.10	-	-
08:05:04	55.85	55.75	0.10	-	-
08:05:05	54.32	54.32	0.00	Buy 10 @ 54.32	Sell 10 @ 54.32
08:05:06	54.33	54.33	0.00		
08:05:07	53.76	53.76	0.00		
08:05:08	53.89	53.89	0.00		
08:05:09	53.56	53.56	0.00		
08:05:10	53.00	53.00	0.00		
Lock in				**8.80**	**-7.80**
Net risk free profit				**1.00**	

At 8:05:02 the arbitrageur sees that there is a divergence between the two quotes. London is quoting a higher price, and Tokyo the lower price. The difference is 10 cents. At that time, the trader enters two orders, one to buy and one to sell. He sells the high quote and buys the low quote.

Because the arbitrageur has bought and sold the same amount of the same security, theoretically he does not have any market risk. He has locked-in a price discrepancy, which he hopes to unwind to realize a riskless profit.

Now he will wait for the prices to come back into sync and close the two trades. This happens at 8:05:05. He reverses out of the two positions and the final profit is $1 less his trading fees.

Not a huge profit, but it took just three seconds and did not involve any price risk.

Arbitrage is a bit like "picking pennies". The opportunities are very small. This is why you have either to *do it big or do it often*.

Before the days of computerized markets and quoting, these kinds of arbitrage opportunities were very common. Most banks would have a few "arb traders" doing just this kind of thing.

Q2. What is cross broker arbitrage?

A2. Cross-broker Arbitrage

Arbitrage between broker-dealers is probably the easiest and most accessible form of arbitrage to retail FX traders.

To use this technique you need at least two separate broker accounts, and ideally, some software to monitor the quotes and

alert you when there is a discrepancy between your price feeds. You can also use software to back-test your feeds for arbitrageable opportunities.

A mainstream broker-dealer will always want to quote in step with the FX interbank market. In practice, this is not always going to happen. Variances can come about for a few reasons: Timing differences, software, positioning, as well as different quotes between price makers.

Q3. What is Arbitraging?

A3. Arbitrage is the technique of exploiting inefficiencies in asset pricing. When one market is undervalued and one overvalued, the arbitrageur creates a system of trades that will *force a profit* out of the anomaly.

Q4. What is the difference between arbitraging and value trading?

A4. Arbitrage and Value Trading Are *Not* the Same

In understanding this strategy, it is essential to differentiate between *arbitrage* and trading on valuation.

You will often hear people say that when a security is undervalued or overvalued an "arbitrageur" can buy it or sell it and hence *hope* to profit when the price comes back to fair value.

The keyword here is *hope*. This is not true arbitrage. Buying an undervalued asset or selling an overvalued one is *value trading.*

Q5. Explain what is spread giving an example.

A5. Spreads

When arbitraging, it is critical to account for the spread or other

trading costs. That is, you need to be able to buy high and sell low. In the example above, if *Broker A* had quoted 1.3038/1.3048, widening the spread to 10 pips, this would have made the arbitrage unprofitable.

The outcome would have been:

Entry trade: Buy 1 lot from A @ 1.3048 / Sell 1 lot to B @ 1.3048

Exit trade: Sell 1 lot to A @ 1.3049 / Buy 1 lot from B @ 1.3053

Profit: -4 pips

In fact, this is what many brokers do. In fast moving markets, when quotes are not in perfect sync, spreads will blow wide open. Some brokers will even freeze trading, or trades will have to go through multiple requotes before execution takes place. By which time the market has moved the other way.

Q6. With the help of an example explain arbitraging currency futures.

A6. Arbitraging Currency Futures

Anywhere you have a financial asset derived from something else, you have the possibility of pricing discrepancies. This would allow arbitrage. The FX futures market is one such example.

Suppose we have the following quotes:

- GBP/USD spot rate =1.45
- 12-month GBP/USD futures contract trades at 1.44
- 12-month interest on USD is 1.5%
- 12-month interest on GBP is 3%

A financial future is a contract to convert an amount of currency at a time in the future, at an agreed rate. Suppose the contract size is 1,000 units. If you buy one GBP/USD contract today, in 12-months time, you will receive £1,000 and give $1,440 in return.

The arbitrageur thinks the price of the futures contract is too high. If he sells one contract, he will have to deliver GBP 1,000 in 12-months time, and in return will receive USD 1,440.

He does the following calculations:

To deliver £1,000, the arbitrageur needs to deposit £970.45 now for 12-months @ 3%.

He can borrow in US dollars the amount, $1407.15 at 1.5% interest.

He can convert this to £970.45 at the spot rate. The cost of the deal is $1407.15 + $21.27, 12-months interest @ 1.5% ($1,428.41).

The above deal would create a synthetic futures contract that would convert £1,000 to $1428.41 in 12-months time. The cost today is USD 1,428.41.

From this, he knows that the 12-month futures price should really be 1.4284. The market quote is too high. He does the following trade:

Sell one futures contract @ 1.44.

Create the synthetic futures deal as above

At the end of 12-months, under the contract he delivers the £1,000 and receives $1,440. Using the money, he pays back his loan of $1407.15, plus $21.27 interest. He makes a riskless profit of:

USD 1,440 – USD 1,428.41 = USD 11.59

Notice that the arbitrageur ***did not*** take any market risk at all. There was no exchange rate risk, and there was no interest rate risk. The deal was independent of both and the trader knew the profit from the outset.

Q7. What are value trade alternatives?

A7. Value Trade Alternatives

Seeing the futures contract was overvalued, a value trader could simply have sold a contract hoping for it to converge to fair value. However, this would not be an arbitrage. Without hedging, the trader has exchange rate risk. And given the mispricing was tiny compared to the 12-month exchange rate volatility, the chance of being able to profit from it would be small.

As a hedge, the value trader could have bought one contract in the spot market. But this would be risky too because he would then be exposed to changes in interest rates because spot contracts are rolled-over nightly at the prevailing interest rates. So the likelihood of the non-arb trader being able to profit from this discrepancy would have been down to luck rather than anything else, whereas the arbitrageur was able to lock-in a guaranteed profit on opening the deal.

Q8. Explain cross currency arbitrage with an example.

A8. Cross-currency arbitrage

Trading text books always talk about cross-currency arbitrage, also called triangular arbitrage. Yet the chances of this type of opportunity coming up, much less being able to profit from it are remote.

With triangular arbitrage, the aim is to exploit discrepancies in the cross rates of different currency pairs.

For example, suppose we have:

Broker A

EUR/USD = 1.3000

GBP/USD = 1.6000

This means we should have the cross rate: GBP/EUR = 1.6000 / 1.3000 = 1.2308

Suppose Broker B quotes GBP/EUR at 1.2288. From the above the arbitrageur does the following trade:

Buy 1.2288 EUR @ 1.300×1.2288 USD from Broker A

Buy 1 GBP @ 1.2288 EUR from Broker B

Sell 1 GBP @ 1.6 USD to Broker A

His profit is 1.6 USD – 1.3 x 1.2288 USD = .00256 USD

Of course, in reality the arbitrageur could have increased his deal sizes. If he trades standard lots, his profit would have been 100,000 x .00256 or $256.

Q9. Explain how Electronic Markets Reduce Price Anomalies?

A9. Electronic Markets Reduce Price Anomalies

Arbitrage plays a crucial role in the efficiency of markets. The trades *in themselves* have the effect of converging prices. This makes "gaps" disappear so removing the opportunities of risk free profits.

Over the years, financial markets have becoming increasingly efficient because of computerization and connectivity. As a result, arbitrage opportunities have become fewer and harder to exploit.

At many banks, arbitrage trading is now entirely computer run. The software scours the markets continuously looking for pricing inefficiencies on which to trade. For the "ordinary trader", this makes finding exploitable arbitrage even harder.

Nowadays, when they arise, arbitrage profit margins tend to be wafer thin. You need to use high volumes or lots of leverage, both of which increase the risk of something getting out of control. The collapse of hedge fund, LTCM is a classic example of where arbitrage and leverage can go horribly wrong.

Some brokers forbid clients from arbitraging altogether, especially if it is against them*. Always check their terms and conditions. Beware because some brokers will even back test your trades, to check if your profits have coincided with anomalies in their quotes.*

Forbidding arbitraging is shortsighted in my opinion. Seeing a "no arbitrage" clause should raise red flags about the broker concerned. Arbitrage is one of the linchpins of a fair and open financial system.

Without the threat of arbitraging, broker-dealers have no reason to keep quotes fair. Arbitrageurs are the players who push markets to be more efficient. Without them, clients can become captive *within a market rigged against them.*

Q10. Write a note on challenges to the arbitrage trader.

A10. Challenges to the Arbitrage Trader

Arbitraging can be a profitable low risk strategy when correctly used. Before you rush out and start looking for arbitrage opportunities, there are a few important points to bear in mind.

Liquidity discount/premiums – When checking an arbitrage trade, make sure the price anomaly is not down to vastly different liquidity levels. Prices may discount in less liquid markets, but this is for a reason. You may not be able to unwind your trade at your desired exit point. In this case, the price difference is a liquidity discount, not an anomaly.

Execution speed challenge – arbitrage opportunities often require rapid execution. If your platform is slow or if you are slow entering the trades, it may hamper your strategy. Successful arb traders use software because there are a lot of repetitive checks and calculations.

Lending/borrowing costs – Advanced arbitrage strategies often require lending or borrowing at near risk free rates. But once fees are added, traders outside of banks cannot lend or borrow at anywhere near risk free rates. This invalidates many arbitrage opportunities.

Spreads and trade costs – Always factor in all trading costs from the start