Arbitrage Opportunity in Stock Markets – Making Risk Free Profits

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ABSTRACT

Arbitrage is an opportunity to buy goods or asset in a cheaper market and sell the same in expensive markets and pocket the difference in prices. If executed well, arbitrage trades are almost risk free. Arbitrage is described as risk free because participants are not speculating on market movements. Instead, they bet on the mis-pricing of a share/asset that has happened between to related markets.in this article, author tries to explain how arbitrageur gets opportunity in future and option market and generate risk-free profit.

Keywords: Arbitrage, Future, Spot, Option

I. INTRODUCTION

Buying in one market (say, spot market) and simultaneously selling in another market (say, futures market) to make risk free profits when there is substantial mismatch between two prices is called arbitrage. Arbitrage is described as risk free because participants are not speculating on market movements. Instead, they bet on the mis-pricing of a share/asset that has happened between to related markets. In short, when you earn by selling and buying same security at different rates in different markets, it is called Arbitrage. In the most basic form delivery positions can be hedged by having a counter position in the futures market. The big point to note is inequality of price across markets provides arbitrageurs an opportunity to profit. This price differential is a consequence of the natural process of buying and selling a stock *(or its derivative)* which may be available for trading on more than one market. It is a highly technical field. Market's mis-pricing is taken advantage by traders to make risk free gains. Say for example, assume you live by a coastal city with abundant supply of fresh sea fish; hence the rate at which fish is sold in your city is very low, let's say Rs.100 per Kg. The neighboring city which is 125 kms away has a huge demand for the same fresh sea fish. However, in this neighboring city the same fish is sold at Rs.150 per Kg.

Given this if you can manage to buy the fish from your city at Rs.100 and manage to sell the same in the neighboring city at Rs.150, then in process you clearly get to pocket the price differential that is Rs.50. Maybe you will have to account for transportation and other logistics, and instead of Rs.50, you get to keep Rs.30/- per Kg. This is still a beautiful deal and this is a typical arbitrage in the fish market. If you can do this every day i.e. buy fish from your city at Rs.100 and sell in the neighboring city at Rs.150, adjust Rs.20 towards expenses then Rs.30 per Kg is guaranteed risk free profit. However, arbitrageur should keep in mind the following aspect before taking position like firstly, transaction charges and brokerage eats away the majority of arbitrage profit. Investors should always account for them before taking the arbitrage position. Secondly, sometimes spot price and future price do not converge on expiry date. Thirdly, as soon as a company announces a dividend, the stock futures accounts for it by going ex-dividend, even before the stock becomes ex-dividend. In such a scenario, spot price and future price will not converge on expiry date leading to very less (which will be eaten away by transaction charges) or zero arbitrage profit. Hence, whenever the future price is trading at significant discount to the spot price, investors should double check the reason before taking the arbitrage position.

II. LITERATURE REVIEW

Yadav and Pope (1990) further noted that mean arbitrage profits were positive when initially the futures contracts were underpriced, however, the mean arbitrage profits were negative when futures contracts were initially overpriced. They also noted that first order auto correlation coefficient of mispricing were negative, which is obvious in the presence of an effective link between the cash and futures markets.

Yadav and Pope (1990) and Neal (1996) also found that since the sign of mispricing revert to every new information shock, therefore, early unwinding option may prove to be a better option for arbitrageurs to book extra normal profits.

Yadav and Pope (1990) observed that additional profits arising out of rollover or early unwinding were a significant proportion of the total arbitrage profits and often exceeded the arbitrage profits arising from simple hold till expiration strategy. They further mentioned that additional profits imply a heavy transaction cost discount and should generate substantial arbitrage activity even when futures prices are within the transaction cost bounds.

Neal (1996) consistent with Brennan and Schwartz (1990) found that arbitrage trade was a positive function of absolute deviation from fair value and of the directional volatility.

III. THE TWO RULES OF ARBITRAGE.

There are two rules of arbitrage.
Rule 1. Buy spot and sell futures – if the actual futures price is greater than the theoretical futures price.
Rule 2. Buy futures and sell spot- If the actual futures price is lower than the theoretical futures price.

Suppose, the price of Reliance is Rs. 1000 on the day of execution and the Reliance futures is trading at Rs. 1030. On expiry, assuming Reliance closes at Rs. 970. (Contract end after 1 month)

Spot Market Price is Rs.1000	**Future traded at Rs. 1030**
Buy 10 shares at Rs.1000	**Sell 10 shares at Rs.1030**
Is amount Rs.10000	**Is amount 10300**
After 1 month close at Rs. 970	**After 1 month close at Rs.970**
Sell 10 shares at Rs. 970	**Buy 10 shares at Rs.970**
Is amount Rs. 9700	**Is amount Rs.9700**
Loss: Rs. 300	**Profit: Rs.600**

Actual Profit: Rs. 300

Arbitrage: Overpriced futures: buy spot, sell futures

Say for instance, ABC Ltd. trades at Rs.1000. One month ABC futures trade at Rs.1025 and seem overpriced. As an arbitrageur, you can make riskless profit by entering into the following set of transactions.

1. On day one, borrow funds; buy the security on the cash/spot market at 1000.

2. Simultaneously, sell the futures on the security at 1025.

3. Take delivery of the security purchased and hold the security for a month.

4. On the futures expiration date, the spot and the futures price converge. Now, unwind the position.

5. Say the security closes at Rs.1015. Sell the security.

6. Futures position expires with profit of Rs.10.

7. The result is a riskless profit of Rs.15 on the spot position and Rs.10 on the futures position.

8. Return the borrowed funds.

When does it make sense to enter into this arbitrage? If your cost of borrowing funds to buy the security is less than the arbitrage profit possible, it makes sense for you to arbitrage.

Arbitrage: Underpriced futures: buy futures, sell spot

Say for instance, ABC Ltd. trades at Rs.1000. One month ABC futures trade at Rs. 965 and seem underpriced. As an arbitrageur, you can make riskless profit by entering into the following set of transactions.

1. On day one, sell the security in the cash/spot market at 1000.

2. Make delivery of the security.

3. Simultaneously, buy the futures on the security at 965.

4. On the futures expiration date, the spot and the futures price converge. Now unwind the position.

5. Say the security closes at Rs.975. Buy back the security.

6. The futures position expires with a profit of Rs.10.

7. The result is a riskless profit of Rs.25 on the spot position and Rs.10 on the futures position.

IV. Types of Arbitrage Strategy

There are basically two types of cash and future arbitrage strategy:

Day Strategy – In this strategy, the arbitrager tends to square up on the same day when the difference between cash and future price shrinks. For example, say the Reliance share cash price is Rs 1000 and the futures price is Rs 1010. Since the markets are at times very choppy, the cost of carry between the futures and spot varies. Supposing one initiates a trade at a cost of carry of Rs 10. Whenever the difference shrinks to Rs 5 to 6 in the same day, the arbitrager reverses the position.

Monthly Strategy – In this strategy, the arbitrager enters the arbitrage position at the beginning of the month and holds it till the expiry day. On the expiry day, when the cash and future prices converge, he closes both the positions pocketing the price difference at the beginning of the month as the profit. For example, say the Reliance spot price is Rs 1000 and futures is at Rs 1010, with 28 days to expiry of the futures contract. Arbitrager will keep this arbitrage position open till the expiry day when the spot and futures start trading at parity. Once the prices converge, he will close both the positions and keep Rs 10 – Transaction charges as risk free profit.

Arbitrage Opportunity When Currency Futures Contracts are Mispriced

Forward Rate Mispricing	Actions to take today	Actions at expiration of futures contract
If futures price > $0.65625 e.g. $0.67	1. Sell a futures contract at $0.67 per Deutsche Mark. ($0.00) $ 0.00 2. Borrow the spot price in the U.S. domestic markets @ 5%. (+$0.65) + $ 0.65 3. Convert the dollars into Deutsche Marks at spot price. (-$0.65/+1 DM) - $ 0.65/+ 1 DM	1. Collect on Deutsche Mark investment. (+1.04 DM) 1.04 DM 2. Convert into dollars at futures price. (-1.04 DM/ +$0.6968) -1.04 DM to + $ 0.6968 3. Repay dollar borrowing with interest. (-$0.6825) **Profit = $0.6968 - $0.6825 = $ 0.0143**

	4. Invest Deustche Marks in the German market @ 4%. (-1 DM) - 1 DM	
If futures price < $0.65625 e.g. $0.64	1. Buy a futures price at $0.64 per Deutsche Mark. ($0.00) $ 0.00 2. Borrow the spot rate in the German market @4%. (+1 DM) + 1 DM 3. Convert the Deutsche Marks into Dollars at spot rate. (-1 DM/+$0.65) - 1 DM/ $ 0.65 4. Invest dollars in the U.S. market @ 5%. (-$0.65) - $ 0.65	1. Collect on Dollar investment. (+$0.6825) $ 0.6825 2. Convert into dollars at futures price. (-$0.6825/1.0664 DM) - $ 0.6825 /+1.0664 DM 3. Repay DM borrowing with interest. (1.04 DM) **Profit = 1.0664-1.04 = 0.0264 DM** - 1.04 DM + 0.0264 DM

V. Arbitrage Opportunity in Option Trading Strategy

Long term investor is happy to sell a stock upon achieving a certain strike price. In such a scenario, he could sell (write) call options at that price and profit to the extent of the premium he receives. In case the stock closes above the strike price, his profit will be limited to the premium. Ideally, he would hope that the stock closes just a little below the strike price. Let me explain with an example:

Reliance Industries is trading at Rs. 940 a share. You buy 1000 shares. RIL's call option expiring 30 October 2014 with a strike price of 960 is trading at Rs. 11.45. You sell 4 lots (RIL lot size – 250 shares) and net Rs. 11,450 (i.e. 250*11.45). If the stock rises above 960, the call buyer will exercise his option and you will have to pay to the extent it rises above Rs. 960. You can sell your stock and pay him, no matter how much it rises, since you have actual delivery position, you will be able to pay him. However, your upside will be capped to a maximum of Rs. 31.45 (Rs. 960 – Rs. 940 + Rs. 11.45).

In case RIL falls from here, you would have reduced your average buy price by Rs. 11.45. You can assume that you purchased 1000 shares for Rs. 927.55. Next month, you can again collect call option premium and basically repeat this until when the stock suddenly jumps in a few days at which time you will have to exit with whatever little profit you make.

VI. Conclusion

Traders perform conversions when options are relatively overpriced by purchasing stock and selling the equivalent options position. When the options are relatively underpriced, traders will do reverse conversions or reversals. In practice, actionable option arbitrage opportunities have decreased with the advent of automated trading strategies. There could be a million ways to earn from an arbitrage opportunity like buying a stock in NSE and selling the same in BSE or vice-versa but cross selling across exchanges in India is not allowed. Still you can earn from such cross market arbitrage opportunities if you find price difference on the two exchanges and you have actual delivery position in the underlying stock, to sell in one market as you buy in the other. This is possible only if you had the underlying stock in your holding from an earlier period of time, i.e. before the day on which you spot the price difference across the 2 exchanges.

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