# What is Pair-Trading and how it works

Given there is a well-established relationship between the two companies, considering all else equal, if the stock price of entity 1 moves in a certain direction, then the stock price of entity 2 is also expected to make a similar move. If not, then there could be a trading opportunity.

Let's assume ICICI and HDFC are two such stocks. Now, for example, all else equal, on a given day, ICICI stock price moves up by X% then given the relationship, HDFC is also expected to move up at least y%, but for whatever reason, assume HDFC stayed flat. Then we can go ahead and claim that ICICI stock price has moved higher than expected when compared to HDFC's stock price.

In the arbitrage world – this translates to buying the cheaper stock i.e HDFC and selling expensive one i.e ICICI.

In a nutshell, this is the essence of 'Pair Trading'.

The relationship between the two companies in the pair might face anomalies at times. This causes the price of one stock to deviate from that of the other.

An anomaly in stock prices gives us an opportunity to trade. The anomaly can happen because of anything –

1. HDFC Bank announcing quarterly results – on an immediate basis this impacts HDFC more than ICICI, hence the price relationship between the two changes, only to be realigned later
2. Likewise with ICICI announcing its results
3. A top executive at one of these banks resigns, causing a minor dent in its stock price, while the other continues to trade regularly
4. Excessive speculation in stock 1 compared to stocks 2

Generally speaking, a price anomaly is a local event, which causes the stock price of one company reacts (or overreacts) compared to the other. I prefer to call it a local event because it affects only 1 company in our universe of two stocks J

So the relationship essentially sets the rules on how the two stock prices are related. Therefore, the bulk of the work in pair trading revolves around –

1. Identifying the relationship between two stocks
2. Quantifying their relationship
3. Tracking the behavior of this relationship on a daily basis
4. Looking for anomalies in the price behavior.

***The following is a quick description from Investopedia***

Pairs trading was first introduced in the mid-1980s by a group of technical analyst researchers that were employed by Morgan Stanley, the multinational investment bank and financial services company. The pairs trade strategy uses statistical and technical analysis to seek out potential market-neutral profits.

Market-neutral strategies are a key aspect of a pairs trade transaction. Market-neutral strategies involve long and short positions in two different securities with a positive correlation. The two offsetting positions form the basis for a hedging strategy that seeks to benefit from either a positive or negative trend.

A pairs trade strategy is based on the historical correlation of two securities. The securities in a pairs trade must have a high positive correlation, which is the primary driver behind the strategy's profits. A pairs trade strategy is best deployed when a trader identifies a correlation discrepancy. Relying on the historical notion that the two securities will maintain a specified correlation, the pairs trade can be deployed when this correlation falters.

When pairs from the trade eventually deviate—as long as an investor is using a pairs trade strategy—they would seek to take a dollar matched the long position in the underperforming security and sell short the outperforming security. If the securities return to their historical correlation, a profit is made from the convergence of the prices.

## Advantages and Disadvantages of Pairs Trade

When a pairs trade performs as expected, the investor profits; the investor is also able to mitigate potential losses that would have occurred in the process. Profits are generated when the underperforming security regains value, and the outperforming security's price deflates. The net profit is the total gained from the two positions.

There are several limitations for pairs trading. One is that the pairs trade relies on a high statistical correlation between two securities. Most pairs trades will require a correlation of 0.80, which can be challenging to identify. Second, while historical trends can be accurate, past prices are not always indicative of future trends. Requiring only a correlation of 0.80 can also decrease the likelihood of the expected outcome.

Now, let's look at the statistical analysis and ideas behind them for choosing a pair for trading.

Finding good pairs