Headline: Algorithmic Trading	Momentum trading strategies: A quantitative approach	
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Algorithmic Trading | Momentum trading strategies: A quantitative approach

Nitesh Khandelwal discusses how to use one of the most popular algorithmic trading strategies

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In the previous article of this series, you learnt the different types of execution strategies as well as their approaches. After reading this article, you will be able to trade using one of the most popular algorithmic trading strategies i.e. momentum trading strategies.

Why Momentum?

Richard Driehaus, one of the pioneers of Momentum trading strategy, founded the Driehaus Capital Management and reportedly delivered 30% compound returns in the first 12 years since its inception. And the outperformance of momentum strategy is also evident from the 212 years of US equity data.

What is momentum?

Momentum trading is an interesting strategy because of its very logic, which tells us to "buy high and sell higher". This style is contrary to value investing which advocates to "buy low". And yet it is seen working for a large part of stock markets history.

In simple language, momentum can be said as how fast an object moves. In the world of trading, we usually refer to the momentum of a price when we are defining a trading strategy. The basic premise is that if the price of a security is rising, it will continue to do so and vice versa.

Types of momentum trading

Momentum is found in different asset classes and across geographies. You can trade using momentum in two ways namely: time-series momentum and cross-sectional momentum.

Time-series Momentum

If the past returns of the securities are positively related to its future performance then it is known as time-series momentum.

That's very simple but why would such a thing continue to happen? This can happen due to slow diffusion, analysis and reaction of news information. For example, Asian Paints announced positive earnings on July 24, 2019, and the stock went up that day. And on the following trading days, it continues to move in a positive direction. This works due to the herding effect, which leads investors to jump on the bandwagon when a potential winner is identified.
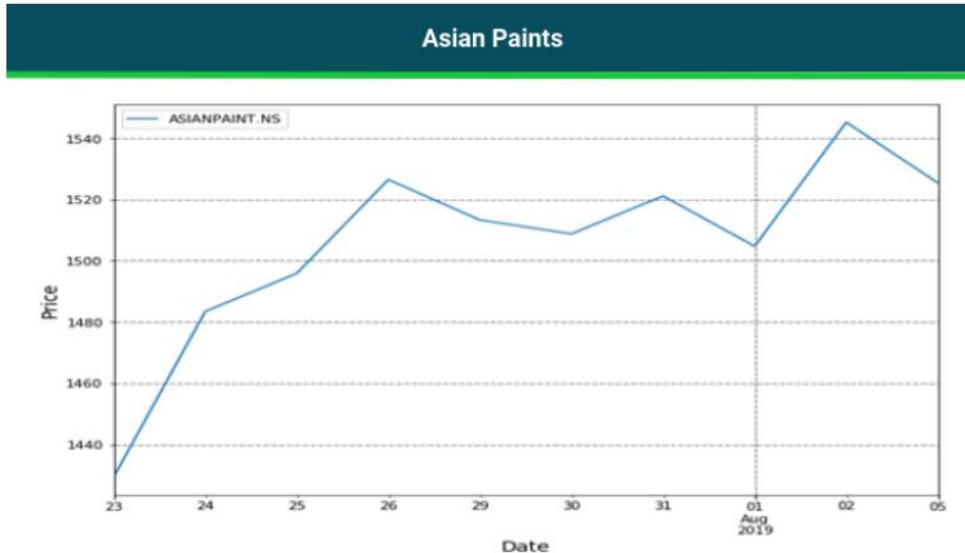

Figure: Asian Paints share price from Jul 23, 2019, to Aug 05. 2019
Source: Yahoo finance

Another example is Vodafone Idea share price. It continued moving in downward direction after reporting a loss of INR 4873.9 crore on 26 July 2019.
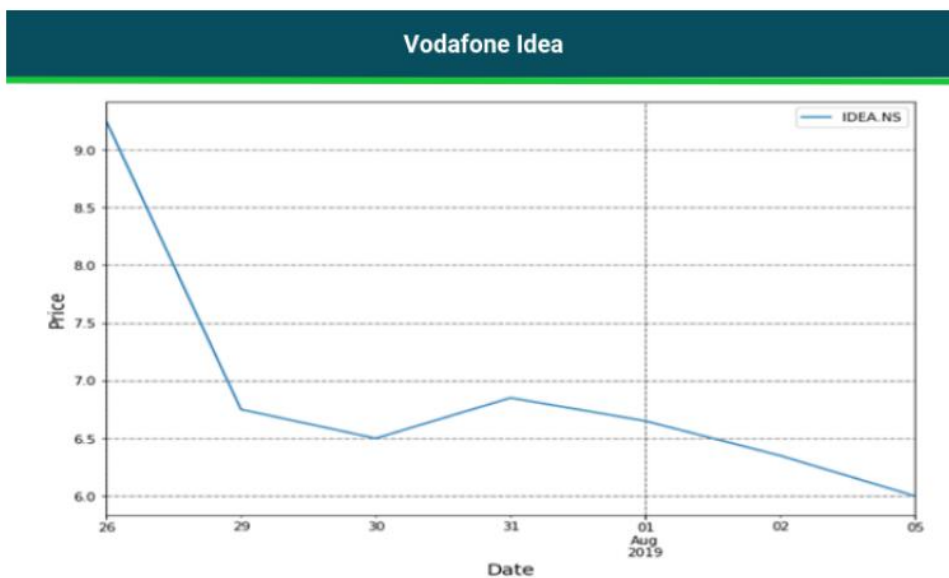

Figure: Vodafone Idea share price from Jul 26, 2019, to Aug 05. 2019
Source: Yahoo finance

This is a well-known strategy used by many hedge funds and is known as post–earnings-announcement drift (PEAD). In this strategy, as you would have inferred, post the earnings announcement the stock continues to drift towards the earnings surprise.

However, momentum is not only seen during earnings season. There are other reasons which cause momentum. It can be due to forced sales and purchase of assets by mutual funds, hedge funds, and/or pension funds. For example, when the composition of Nifty changes, the ETFs which are tracking Nifty are forced to buy or sell the stocks as per the change, it often contributes to momentum in those stocks.

In the budget announced in the first week of July 2019 there was an increase in FPI surcharge. This led to selling in India markets by FPI causing a downward momentum on Nifty.

FIIs Flow

	FII Rs Crores		
Date	Gross Purchase	Gross Sales	Net Purchase / Sales
Total	92246.74	109116.87	-16870.13
31-Jul-2019	5,935.22	7,432.29	-1,497.07
30-Jul-2019	4,523.09	5,167.68	-644.59
29-Jul-2019	3,439.74	4,144.16	-704.42
26-Jul-2019	3,275.78	4,779.04	-1,503.26
25-Jul-2019	6,135.47	6,262.12	-126.65
24-Jul-2019	4,130.62	5,524.33	-1,393.71
23-Jul-2019	4,226.12	6,834.09	-2,607.97
22-Jul-2019	3,415.71	5,332.62	-1,916.91
19-Jul-2019	4,791.13	5,741.28	-950.15
18-Jul-2019	4,104.11	5,508.97	-1,404.86
17-Jul-2019	3,813.78	3,830.75	-16.97
16-Jul-2019	3,709.45	4,154.44	-444.99

Figure: A snapshot of the FII outflow in the month of July 2019
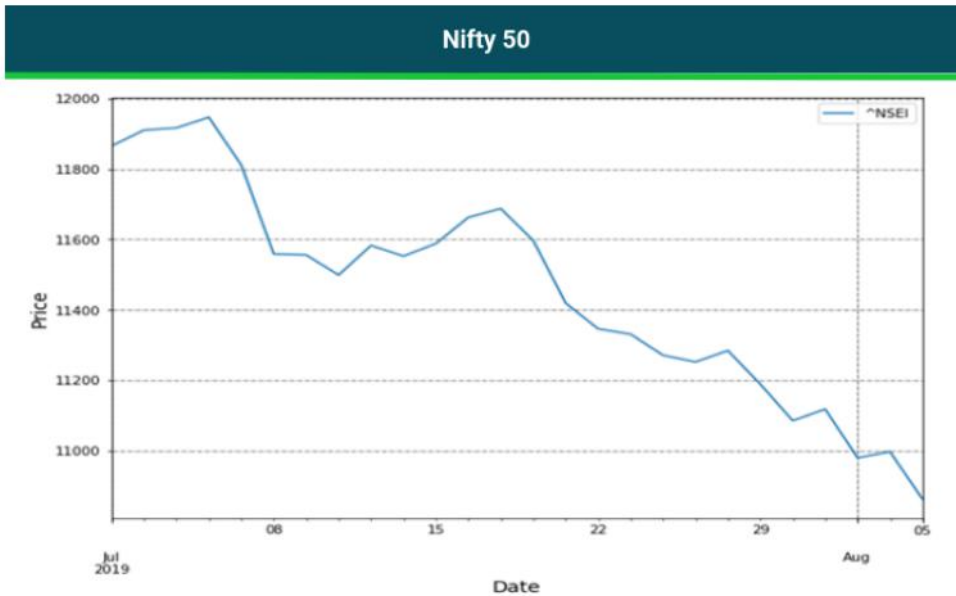Source: Moneycontrol

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Figure: The Nifty50 price in the month of July 2019
Source: Yahoo finance

That's amazing, isn't it? But the important question is how can you identify which securities or asset classes will have momentum and for how long will it persist? One of the most widely used methods is to calculate the past 12 months returns skipping the most recent months of security. Then, buy that security if the returns are positive and sell that security if the returns are negative. And hold this position for a month. Other methods to identify momentum are

Moving Average

Usually, a 200-day moving average is considered a good timeframe to analyse the trend of a security price. If the security price is above 200-day moving then buy the security and if the security price is below the 200-day moving average then sell the security. Another well-known indicator is a cross-over of 50-day and 200-day moving average to signify the positive and negative momentum.

2. **Breakouts**

Breakouts can signal the start of a momentum. If the price of a security has been contained in a certain range and makes new highs, then it is a positive breakout and you can buy the security. Similarly, if the price of a security makes new lows then it is an indication of negative momentum and you can sell the security.

However, these methods need to be complemented by mathematical and statistical tests such as Hurst exponent and variance ratio test to select the right securities. Also, the holding period varies based on the strategy and the security you are trading. You can use technical analysis, correlation analysis or machine learning techniques to determine the optimal holding period.

Cross-sectional momentum

We have covered about time-series momentum. However, more sophisticated traders use cross-sectional momentum. In this, the past relative returns of a set of securities are positively related to future relative performance. A very simple illustration is if HDFC Bank has outperformed Sun Pharma last year then the hypothesis is that HDFC Bank is likely to continue to outperform Sun Pharma this year. The below graph shows how HDFC Bank has outperformed Sun Pharma over the last three years.
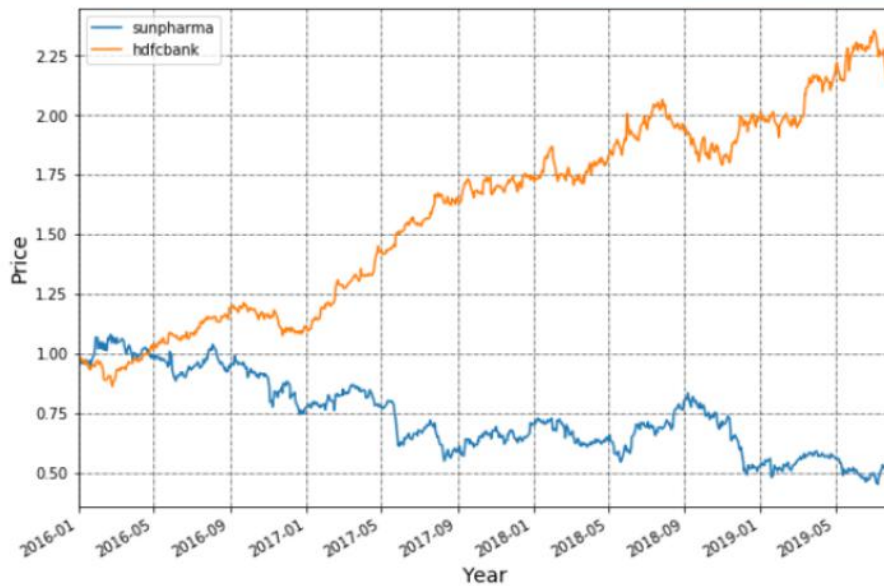
Sun Pharma and HDFC Bank

Figure: The HDFC Bank and Sun Pharma price from Jan 2016 to Jul 2019
Source: Yahoo finance and QuantInsti GitHub

Factors to select the securities

Before you start trading using cross-sectional momentum, it is important that you select the right set of securities to trade-in. Some of the factors to consider are:

Volume: Since momentum trading is short term, you have to make sure that the securities you are pursuing are in demand. It won't help you if you are in possession of security which has no takers or illiquid. High volume ensures that you will be able to enter and exit a trade without much slippage.

Volatility: It is better to have a security which is volatile so that there is ample room for price movement. Also, it helps in keeping the transaction cost factor negligible as compared to the potential risk/reward.

After you have identified the right set of securities, you need to create two sets of portfolios. Buy the portfolio which is expected to outperform and sell the portfolio which is expected to underperform.

How to decide which securities will be part of which portfolio?

You can form these portfolios based on the recent price performance of the securities. You can complement these by adding fundamental factors to it. For example, form a portfolio of securities with positive price performance and strong fundamentals such as high return on equity, low debt to equity ratios and another portfolio of securities with negative price performance and poor fundamentals such as low return on equity and high debt to equity ratios.

You can also learn more about these techniques through this free hands-on course on Momentum trading at Quantra. Also, you can access many sample strategies and back-test various trading strategy types including momentum trading using real daily & minute level market data on Quantra Blueshift, without any cost. Below is a snapshot of the sample backtesting results from the course.
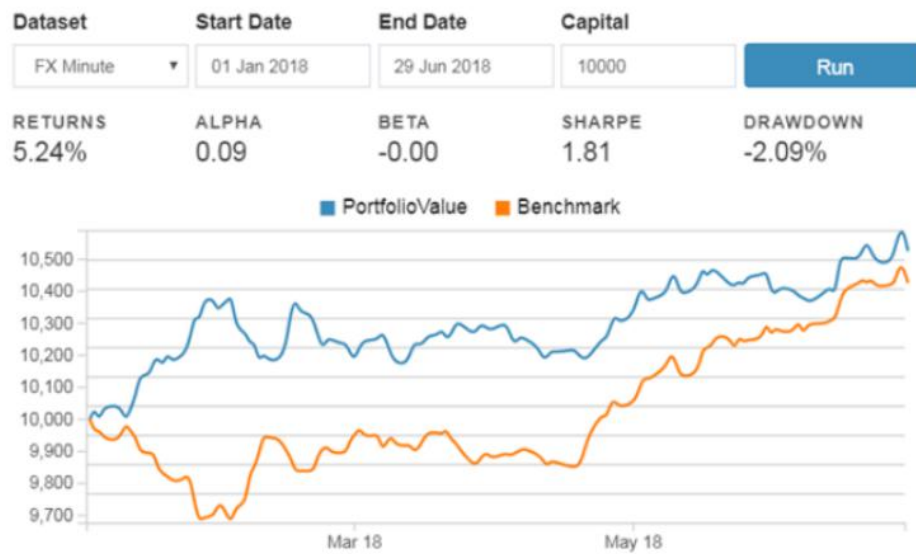
Figure: Backtest performance of cross-sectional momentum strategy
Source: Momentum trading course on Quantra

Momentum trading style looks promising but as with all form of trading, it has risk. Always remember to keep a strict exit point. Depending on the risk appetite, different people will exit the trade at different points of time. But once you have decided, stick to the price point as the trend can reverse without prior intimation and you would be forced to exit the trade. You should have a proper risk management framework to safeguard your capital.

In the upcoming articles, we'll be covering more trading strategies and implementation aspects related to them. We really hope that it helps all who are looking to #GoAlgo!

The author is the co-founder of QuantInsti, a Quantitative &Algorithmic trading training institute that offers Executive Programme in Algorithmic Trading (EPAT) and dozens of interactive self-paced courses through Quantra.

This article is part of a series where we will be covering various aspects of Quantitative & Algorithmic Trading, including the strategies across various asset classes, techniques, infrastructure requirements, regulations and skills required in this domain.