HAS MOMENTUM OUTPERFORMED THE INDIAN CAPITAL MARKET IN LONG RUN?

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ABSTRACT
Momentum and contrarian equity trading strategies are a subject of great academic interest in finance. In one of their initial studies, Jegadeesh and Titman (1993) have shown that momentum strategy worked in U.S. equity market and can provide extraordinary returns. Subsequent to this study, many researchers have worked on trading strategies in different markets primarily in developed markets of Europe and U.S. Some researchers carried the work to emerging markets as well like India and this study is an extension of the same. Long term momentum and contrarian profits are studied in this paper on the data of the constituent stocks of BSE 500 Index. Fama and French Three Factor Modal is implemented to identify if the returns from the above trading strategies are abnormal. The main finding has been that the returns seen after implementing momentum and contrarian strategies are significantly different from the return of BSE 500 index and also momentum strategy has outperformed the returns of contrarian strategy.
Keywords: Long Term Momentum Profits, Contrarian Profits, Equity Return, BSE 500, Fama and French Three Factor Model.

Introduction

One major area of research in finance has been the investment strategies and returns thereof.

The researchers have proved that by implementing certain trading rules, abnormal returns can be earned. The trading rules are the rules regarding buying and selling the stocks in predefined systematic manner. The trading strategies or rules can be divided in two major categories i.e. contrarian strategies and momentum strategies. The contrarian approach takes the assumption that the stock which has given low return in certain past period, will have reversal and give high returns in future. In momentum strategy, the assumption is made that the stocks which have given high returns in past will continue to give high returns for certain period.

The aim of portfolio management is to identify the risk and return characteristics of an individual security in the portfolio to minimize risk and maximize the overall gains. For managing a portfolio there are certain rules to identify the acceptable risk and required return from the portfolio. The investors are always interested in getting returns by implementing various strategies of portfolio management. Some important equity trading strategies in financial markets are Contrarian strategy and Momentum strategy. A stock is said to be in momentum, the price is heading north consistently and in momentum strategy this is believed that the said momentum will hold in future. In a Contrarian Strategy, the stock's price of the stock continuously goes down and are selected in the portfolio on the premise of reversal in the trend. In the present study the researcher has worked on the returns or profits of long-term momentum and contrarian strategies to find out if the returns are abnormal in the Indian capital market.

Literature Review

Momentum and Contrarian Strategies

In Contrarian strategy, the trades are done by investors on the concept that trend will change and stocks which are going down would do a better. De-Bondt, Thaler (1985) compared the returns of companies after making two groups a) Extreme Losers and b) Extreme Winners and found the stocks with lowest return in last three years have given high returns in next three to five years and the stocks with highest return in three years have given lower returns in next three to five years.De-Bendt, Weber (1999) have proved that contrarian strategy is profitable in the capital market of Germany. Jegadeesh, Titman (1993) found that strategies buying stocks that gave better return in past and selling stocks that give poor returns in past, performed better over three to 12 months period showing very high profits from Momentum strategy in the Capital Market of United States. Jegadeesh, Titman (1993) show that if the capital market is unable to adjust the information appropriately, then abnormal profits may be earned by implementing Contrarian strategy. In the portfolio constructed on the basis

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of short-term momentum strategy, they recorded 12.01 percent return for 6 months holding period of the portfolio. They found same results for the short contrarian strategy as well.

Asness (1997) found that the value and momentum trading rule has given abnormal profits on the data of US Markets including NASDAQ, NYSE and Amex. The reason behind momentum profits is still not known. The reason as tested in some researches were found out to be the underreaction of the stock market to the company specific information (Chan et al., 1996). It is proved that trading done on the basis of simple trading rules have resulted in abnormal profits.Hong, Lim, Stein (2000) have constructed their portfolio of big stocks and small stocks and show that small stocks have given extra normal profits. Avramov, Chordia, Jostova, Philipov (2007 have worked on portfolios constructed on the basis of credit risk. They found that momentum strategy has given significantly different profits compared with the market but not in the case of high-risk firms. Rouwenhorst (1999) have done extensive research on momentum strategy in different European markets and abnormal profits exist. Chordia, Shivakumar (2002) have shown that momentum profits can be predicted with the help of macroeconomic variables. Cooper, Gutierrez, Hameed (2004) found that if macro-economic variables are controlled then the effect of momentum disappears.

Moskowitz, Grinblatt (1999) found that the reason of industry momentum can be because of cross-autocorrelation in the stocks of the same industry. Hong, Torous and Valkanov (2007) found that the leaders in the industry remains for two months which is same for cross industry momentum as well. Grinblatt, Titman, Wermers (1995) found the 77 percents funds use the momentum strategy and this number is higher in case of growth fund managers than other funds. Burch, Swaminathan (2001**)** show that different financial institutions like Insurance Firms, Banks, Investment advisors use momentum strategy for doing investment in equity.

Indian Scenario

Sehgal, Balakrishnan (2002) find short term momentum profits in India. Sehgal, Balakrishnan (2004) find that the abnormaility of return not explained by CAPM model is explained by Fama, French Three Factor Model. Ananthanarayanan (2004) has not found the existencece of contrarian and momentum strategies being employed by foreign investors in Indian market. Sehgal, Balakrishnan (2008) found high momentum profits in India for single stocks and on characteristic-sorted portfolios. Some studies are also done in Indian Equity markets like and Vander et al. (2003), Barry et al. (2002), Rouwenhorst (1999),), Fama, French (1998), Claessens et al. (1998), Patel (1998) etc. and they show similar results to developed markets. Researcher has not find any extensive study on long term momentum profits in India.

Objectives

1.) To know the medium and long term profitability of Contrarian and Momentum strategy in Indian Equity Market.
2.) To estimate the significance of difference in profits of momentum and contrarian strategies with the Index return.
3.) To implement Fama and French Three Factor Modal to identify if the returns of Momentum and Contrarian strategies are abnormal.

Hypothesis

1. H0: The profit from Contrarian strategy is not significantly different for long holding period from index returns.
   H1: The profit from Contrarian strategy is significantly different for long holding period from index return.
2. H0: The profit from momentum strategy is not significantly different for long holding period from index return.
   H1: The profit from momentum strategy is different for long holding from index return.
3. H0: Returns from implementing different trading strategies are normal. In Three Factor Model, ($\alpha p = 0$)
   H1: Returns from implementing different trading strategies are not normal. In Three Factor Model, ($\alpha p \neq 0$)

Research Methodology

Type of Data and Sources

The data used in the study is secondary and comprises of monthly observations:
(i) Share prices adjusted for stock splits, stock dividends and rights issues,
(ii) Market Capitalization and
(iii) Book Value

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of the constituent stocks of BSE 500 Index.
(The period of data covered is 11 years from January 2012 to December 2022. The data has been extracted through Prowess, the CMIE database).
(vi) Monthly, 91 days Treasury bill rate from RBI.
(The 91 days Treasury bill rate data has been collected from handbook on Indian Economy, published by RBI on monthly basis).
Design/methodology – The research design is to first construct portfolios implementing different trading strategies and then compare their returns with the Index return i.e. BSE 500. BSE500 is largest index available in BSE and covers 93% capitalization of BSE, therefore the researcher has picked BSE500 index in this study for choosing stocks for portfolios and also for comparison of returns.
The researcher has implemented a buy and hold strategy to form the various non overlapping equally weighted portfolios implementing different trading strategies. The index return is the return from an equally weighted portfolio of all constituent stocks of BSE 500 index for a particular holding period. For calculation of return of a particular portfolio, the researcher has considered only those stocks in the portfolio which were available to at the beginning of the period i.e. at the time of ranking in BSE 500 index and the data available of these stocks varies from 203 stocks in January 2012 to 496 in December 2022. The trading strategies implemented in this research work are as follows:

Momentum and Contrarian Strategy
The method of portfolio construction is similar to Jegadeesh and Titman (1993), a pure momentum strategy is buying winner stocks and selling loser stocks and a pure contrarian strategy is buying loser stocks and selling winner stocks.

Winner stocks and loser stocks are found by sorting the stocks as per their return in the ranking period. Unlike the Jegadeesh and Titman (1993), other than buying winner and selling loser stock as pure momentum strategy, here the researchers have taken the returns of buying only winner stocks as momentum strategy and buying only loser stocks as contrarian strategy, because short selling is not allowed in Indian Equity Markets except for intraday.

The different momentum and contrarian trading strategies are based on *j* months ranking and *k* months holding of the portfolios. If *t* is the formation date of any portfolio for return calculation, then different ranking periods *j* are *t-3, t-6, t-9, t-12, t-24, t-36* and *t-60* months and accordingly different holding periods *k* are *t+12, t+24, t+36* and *t+60* months. For this study, consideration is taken for only those stocks which were present at the beginning of the period i.e. at the time of ranking in BSE 500 and the data available of these stocks varies. The steps of portfolio formation are as follows:
i). First the returns of individual stocks are calculated by using MS Excel for different ranking periods *j*, which are 3,6,9 12,24,36 and 60 months, for all the stocks in the Index by using the model (1).
ii). After calculating the returns of all the stocks in the index for different ranking periods *j*, stocks are arranged in ascending order at the beginning of each holding period i.e. *t*, as per their returns in the ranking period *j* (*t-12, t-24, t-36* and *t-60* months) and these stocks are divided in four quartiles. The first quartile comprises the loser stocks and the fourth quartile consists of winner stocks.
iii). The winner portfolio is constructed by buying the fourth quartile i.e. the winner stocks portfolio and loser portfolio is constructed by buying the first quartile i.e. losers stocks portfolio. The stocks in the portfolio are kept equally weighted.
iv). After constructing the portfolios, the stocks are hold for *k* months i.e. ,24,36 and 60 months and the return from the portfolio is calculated using MS Excel with the help of model (2).
v). Returns of different holding periods are also calculated for BSE 500 index, in the equally weighted portfolio consisting all the available stocks in the BSE 500 index at a particular time period *t* using model (1) and model (2).
Model (1)
$R_{i,k} = \underline{(P_{i,k} - P_{i,t})} \quad P_{i,t}$
Where, $R_{i,k}$= Return of Stock *i* in the holding period *k*,
$\underline{P}_{i,t}$ = Price of Stock *i* at the beginning of the holding period,
$\underline{\ }P_{i,k}$ = Price of the stock *i* at the end of the holding period.

Model (2)
$Rp,k = \sum_{k}^{N} Ri,k/N$
Where, Rp,k = Return of Portfolio *p*,
$R_{i,k}$ = Return if individual stocks in the portfolio *p* ,
N = No. of stocks in portfolio.

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vi). Using Descriptive Statistics, the returns of the entire portfolio implementing Momentum and Contrarian Strategy are compared with the returns from investing in all stocks of BSE 500 altogether.
vii). t test at 95% significance level has been used to test the significance of the difference in returns between momentum strategy and BSE 500 and contrarian strategy and BSE 500.

Model:(3)
(Fama, French Three Fcator Model)
$R_{pt} - R_{ft} = \alpha_p + \beta_p(R_{mt}-R_{ft}) + \gamma_p SMB_t + \delta_p HML_t + \varepsilon_{pt}$
Where R_{pt} is the holding period return from implementing a trading strategy.
R_{ft} is the risk free rate observed at the beginning of each period. (RBI 91days Treasury Bill rate is used as risk free rate).
R_{mt} is the market return involving all stocks.

SMB_t is the difference between the returns of the portfolio of big size firms minus returns from the portfolio of small size firms portfolio.

HML_t is the difference between the returns of the portfolio of high book to market equity stocks portfolio and low book to market equity stocks portfolio.
The values of $(R_{mt}-R_{ft})$, SMB_t and HML_t are regressed against the value of $R_{pt} - R_{ft}$ to know the values of intercepts $\alpha_p, \beta_p,$ and δ_p. ε_{pt} is the error factor and has a very negligible value. The steps to calculate SMB_t and

HML_t are as follows:
Step 1: The stocks are sorted at beginning of each year in two groups independently. In the first group, the stocks are sorted as per their capitalization as Big Stocks and Small Stocks.
Steps 2: On the other side the stocks are sorted in three groups independently as per their Book to Market Equity ratio (BE/ME) in Low BE/ME, medium BE/ME and high BE/ME.
Step 3: Six styled portfolios are constructed with the intersection of above portfolios as follows:
Three Factor Modal Portfolios

	Low BE/ME	Medium BE/ME	High BE/ME
Big(B)	R_{BL}	R_{BM}	R_{BH}
Small(S)	R_{SL}	R_{SM}	R_{SH}

Table 1: Three Factor Model Variables
$SMB_t = (R_{SL}+R_{SM}+R_{SH}-R_{BL}-R_{BM}-R_{BH})/3$
$HMLt = (R_{SH}+R_{BH}-R_{SL}-R_{BL})/2$

Data Analysis
For analysis purpose, the researcher has divided the holding periods in two categories:
a) Medium-term holdings: 12 months and 24 months
b) Long-term holdings: 36 months and 60 months.

Medium term period: 12 months holding
The highest return for 12 months holding period is by winner stocks for 9 months ranking and 12 months holding period i.e. momentum strategy is working for 12 months holding. The S.D. is highest for loser stocks portfolio in the medium term period as well.

	3--12	6—12	9--12	12-12	24-12	36-12	60-12
Winner	59%	65%	66%	54%	64%	41%	34%
Loser	38%	38%	43%	42%	54%	66%	59%
Winner-Loser	20%	27%	23%	17%	10%	-25%	-25%
BSE 500	49%	47%	53%	43%	61%	45%	45%

Table 2: Annualized Return for 12 Months Period

For 12 months holding, the best combination of ranking and holding period in momentum strategy is 9 months ranking and 12 months holding and in contrarian strategy is 36 months ranking and 12 months holding. One interesting fact from the above data is that the momentum strategy is outperforming the market return with the short term and medium term ranking while contrarian strategy is outperforming the market return when it is in combination with long term ranking periods. This finding is supporting the results of De-Bondt and Thaler (1984:1986), where they suggested that the loser stocks of last three years outperform the winner stocks in the next five years.

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The standard deviation of contrarian strategy (1.34) is much higher than the standard deviation of momentum strategy (0.14). the range of the stock returns is also very high in case of contrarian strategy when compared to momentum strategy.

This is clear from figure 4 that, the returns from both of the strategies are almost same but the contrarian strategy is riskier than the momentum strategy. so if the investor is ready to take a higher risk can go for contrarian strategy.

24 months holding

For 24 months holding period, the best performing strategy is for Loser stocks, i.e. contrarian strategy is working in medium period. Here the S.D. is highest for winner stocks. For medium term holding, the researcher is not able to find any trends as for both of the holding periods, the type of portfolios are different.

Strategy	3--24	6--24	9---24	12--24	24--24	36--24	60--24
Winner	62%	64%	68%	62%	57%	65%	104%
Loser	52%	48%	53%	51%	67%	49%	109%
Winner-Loser	10%	16%	15%	11%	-11%	16%	-5%
BSE500	59%	54%	69%	50%	55%	61%	100%

Table 3: Annualized return for 24 months holding period

For 24 months medium term holding, the best performing strategy is with 60 months holding loser stocks. For short term ranking the winner stocks are performing better and for long term ranking loser stocks are performing well. So it can be said that here again short term momentum and long term contrarian strategy is in play. The best performing combination for winner stocks is 60 months ranking and 24 months holding, and for losers stocks also 60 months ranking and 24 months holding is the best combination. It is clear from the figure 5 that the returns from loser stocks and winner stocks are outperforming the market return and the difference between the returns of these two types of stocks is also not high. The direction of the return is same from both types of stocks.

Long term holding: 36 months holding

For 36 months holding period, the best performing strategy is 24 months ranking for losers stocks portfolio i.e. contrarian strategy. Here again the riskiest strategy is with contrarian strategy. Winner stocks have been able to outperform the market return for all ranking and holding combinations but this is not same with the loser stocks. the loser stocks are not showing better returns than market return for short term ranking combinations. So this can be said that loser stocks are performing better when combined with long term rankings.

	3-36	6-36	9-36	12-36	24-36	36-36	60-36
WINNER	82%	65%	73%	90%	91%	88%	93%
LOSER	96%	76%	77%	88%	118%	67%	117%
WINNER-LOSER	-13%	-11%	-5%	-1%	-27%	21%	-24%
BSE 500	74%	70%	66%	69%	89%	75%	113%

Table 4: 36 Months Holding Return

For 36 months long-term holding period, the best performing strategy is loser stocks and 24 months ranking. Here the trend is changed as loser stocks are performing better than winner stocks for both short term ranking and long-term ranking period. Clearly, contrarian strategy has outperformed the momentum strategy and BSE500 returns.

60 Months Holding

For 60 months holding period, the highest return is given by winner stocks for ranking period 9 months., but the winner stocks portfolio is the most risky portfolio for 5 years holding.

Table 1: Annualized returns for 60 months holding period

Strategy	3--60	6-60	9--60	12--60	24--60	36--60	60--60
Winner	172%	151%	230%	96%	60%	175%	110%
Loser	113%	117%	136%	125%	110%	175%	215%

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Winner-Loser	59%	34%	94%	-29%	-50%	0%	-105%
BSE 500	122%	116%	143%	104%	130%	150%	201%

Table 5: 60 Months Holding Return

For 60 months long term holding period, the best return is from loser stocks and 60 months ranking. For short term ranking, winner stocks are performing better than loser stocks and BSE500 while for medium term ranking and long term ranking, loser stocks are showing better returns.

For winner stocks, the best combination is 9 months ranking and 60 months holding and for loser stocks it is 60 months ranking and 60 months holding. This is evident from figure 7 that winner stocks are showing better returns for short term ranking period and loser stocks are showing better returns in combinations with long term ranking periods.

So, it may be concluded that winner stocks perform better in combination with shorter ranking periods while loser stocks perform better with the combination long term ranking periods. Loser stocks outperform both the winner stocks and market return for medium term an long term holdings, and winner stocks are able to outperform both the market return and loser stock's return for short term holding periods.

Hypothesis 1:
Out of 49 different ranking and holding period combinations of strategies implementing buying only winners i.e. a momentum strategy, the winners portfolio has outperformed BSE 500 portfolio in 34 strategies, but only in 7 strategies the significance of difference is significant and BSE 500 portfolio has given better returns in 15 strategies. The returns where momentum strategy is outperformed BSE500 returns significantly are 9-3, 9-6, 3-9, 6-9, 9-9, 3-12, 6-12, and 9-12. It is clear that momentum strategy has shown significantly different returns up to 12 months holding period only. It is not working for long term holding periods. The researcher accepts H0 for only these 7 strategies and accepts H1 for other 42 strategies.

Hypothesis 2:
Out of 49 different strategies implementing buying only losers i.e. a contrarian strategy, the losers portfolio has outperformed BSE 500 portfolio in only 20 strategies and BSE 500 portfolio has given better returns in 29 strategies, and 6 times the difference in returns is significant. Based on the above analysis, the researcher accepts H0 and rejects H1.

500 except in the last phase where BSE 500 has given the highest returns.

Hypothesis 3 tests Fama and French Three Factor Modal, implemented in conditions of BSE, to identify if the return reversal is explained by value factor and size factor in Indian equity market. Fama French model states that expected returns on a portfolio is a function of three factors: market, size and value factors.

The Fama and French model is represented by
$R_{pt} - R_{ft} = \alpha_p + \beta_p(R_{mt}-R_{ft}) + \gamma_p SMB_t + \delta_p HML_t + \varepsilon_{pt}$
Where R_{pt} is the holding period return from implementing a trading strategy.
R_{ft} is the risk free rate observed at the beginning of each period. (in this study the researcher has used RBI 91days Treasury Bill rate as risk free rate).
R_{mt} is the market return involving all stocks.

SMB_t is the difference between the returns of the portfolio of big size firms minus returns from the portfolio of small size firms portfolio.

HML_t is the difference between the returns of the portfolio of high book to market equity stocks portfolio and low book to market equity stocks portfolio.

	Winner 12--12	Loser 12--12	Winner-Loser
A	0.110184	-0.36197	0.40427
t stat	0.982329	-1.94229	1.474015
p value	0.34705	0.078136	0.168511
Regression Statistics			

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Multiple R	0.953719	0.906371	0.460486
R Square	0.90958	0.821509	0.212047
Adjusted R Square	0.88492	0.77283	-0.00285
Standard Error	0.250291	0.415856	0.612006

Table 6: Summary of 3 factor modal statistics

H0: ($\alpha p = 0$)

H1: ($\alpha p \neq 0$)

Value of α_p is greater than 0 but statistically not significant in following strategies:

Winner stocks $\alpha = 0.11$, $p = 0.35$

Loser Stock, $\alpha = -0.36$, $p = 0.08$

Winner-Loser stocks $\alpha = 0.40$, $p = 0.17$

Here in above strategies, three factor model is predicting more than normal returns not explained by size and value factor, but the values of α is not significant. Hence H0 is accepted in above strategies and H1 is rejected.

Findings

a) For medium term holding i.e. 12 months and 24 months holding, the trend is similar to short term holdings. The winner stocks have performed better than loser stocks and BSE500 for short term rankings while loser stocks are performing better for long term rankings. But the best return is from losers a stock i.e. in medium term contrarian strategy is in play. But the significance difference is there only in case of momentum strategy for 12 months holding period. It can be said that momentum strategy is working for medium term holdings and contrarian strategy is not working for medium term holdings.

b) For long term holding periods i.e. 36 months and 60 months holding, loser stocks portfolio is the best performing portfolios. The researcher can say that for long term holding contrarian strategy has outperformed momentum and BSE500, but the difference in returns are not significant. Hence it can be said that neither momentum nor contrarian strategy is working in Indian equity market for long term holding periods.

c) A pure momentum or pure contrarian strategy i.e. (winners minus losers stocks portfolio) is not able to produce better returns than Index hence is not working in Indian equity market.

d) This is clear from data analysis that momentum strategy is performing in Indian equity market for up to 12 months holding and ranking periods. So, momentum is basically a short-term phenomena in Indian equity market. Contrarian strategy is underperforming the market returns in short term and is not able to produce significantly different returns in long term, hence contrarian strategy is not performing in Indian equity market.

Conclusion

In Indian context, where the equity markets are not that much efficient as compared to U.S. and E.U. equity markets, the two equity trading strategies viz. contrarian and momentum strategy are showing significantly different returns from the Index i.e. BSE 500. The results for these strategies are different in Indian context from the studies done on developed markets in the form that momentum strategy is successful for very short term ranking and holding period while contrarian strategy is successful for longer ranking and holding periods. The reasons for such significant difference in returns are another issue of research to be explored. The most interesting finding of this study has been the extraordinary returns of winner stocks i.e. momentum portfolio. On an average, the momentum strategy has given very high returns as compared to contrarian strategy. With this study, the anomaly of momentum strategy continues in Indian Equity Markets as well.

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