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MOMENTUM STRATEGY AND BOMBAY STOCK EXCHANGE

Polak Petr
(Corresponding author)
FBEPS, University Brunei Darussalam
(Brunei Darussalam)
Dr., Ph.D., Associate Professor
e-mail: petr.polak@ubd.edu.bn
Ejaz Abduallah
School of Business and Economics,
Swansea University
(United Kingdom)
M.Sc., Ph.D. Student
e-mail: pavouk@mail.com

Abstract. Short term momentum effect claims that recent past winners tend to outperform the market whereas recent past losers tend to underperforms the market. Therefore by definition it challenges the efficient market hypothesis, which is of the view that future returns cannot be predicted by using past returns. This study examines whether short term momentum effect challenges the efficient market hypothesis or not. Momentum effect has been found in almost all the stock exchanges in the world and documented in the financial literature by many well-known scholars. For this purpose, Bombay Stock Exchange (BSE) has been chosen and stock prices of BSE 100 index have been downloaded for the period starting from 24 June, 2006 and ending on 24 June, 2011 to perform momentum calculations. BSE has been selected because of its rapidly growing nature. Many leading articles have mentioned Bombay Stock Exchange as one of the fastest emerging capital stock market in the world.

Short term momentum anomaly has been found in Bombay Stock Exchange. Price momentum strategy gives abnormal returns, if implemented in BSE. Average monthly return from BSE is 12.05% which is higher than many leading stock markets of the world for instance NYSE, AMEX, and LSE etc. It is also noticed that winners are outperforming the losers. The above findings are in line with the findings of existing literature. Trading volume based momentum strategies only work when high trading volume and low trading volume based strategies will be used in combination with each other. The notion that "BSE is an emerging market" has also been tested. Returns of momentum strategy from Bombay Stock Exchange and Karachi Stock Exchange have been compared and found that BSE gives more returns than KSE. It has been confirmed from this finding that BSE is the emerging stock market in the region.

Keywords: Bombay Stock Exchange, Karachi Stock exchange, efficient market hypothesis, momentum strategies, zero cost momentum portfolio, systematic risk.

1. Introduction

It has been argued time and again that whether capital markets are efficient or not. The efficient capital market phenomenon rose to surface when Fama in 1970, in an article, wrote about efficient market hypothesis. Fama was the first author who

formally developed the efficient capital market phenomenon and came up with the term efficient market hypothesis (EMH). He divided EMH into three forms i.e. weak form EMH, semi strong form EMH and strong form EMH. According to EMH, markets are efficient and when any new information hits the market, prices absorb this information and reflection of this particular new information can be seen in the prices. Similarly new information is available to all the investors at the same time, free of cost and past returns cannot be used to predict future returns. As a result, no group of investors can earn abnormal returns and is able to beat the market consistently. EMH assumes that the buyers and sellers in the capital market are rational; one piece of information is independent of other piece of information and claims that past prices cannot be used to predict future prices. The proponents of EMH believe that an investor cannot predict future prices on the basis of past prices of stocks or earn above average abnormal returns unless this investor possesses any inside information.

Since EMH's rise in the financial literature, the opponents of the EMH are claiming that futures returns can be predicted by using past returns information. There are many phenomena that have been introduced by the opponents of efficient market hypothesis to challenge EMH. These phenomena are known as anomalies in financial literature. Some of the famous anomalies are long term reversals, short term momentum effect, post earnings announcement drifts etc. However, the topic for discussion here is short term momentum effect.

There is a lot of empirical evidence in the literature of finance that has proved the existence of momentum effect in capital markets. Momentum anomaly has been confirmed in NYSE and AMEX in USA by Jegadeesh and Titman (1993). Its presence has also been confirmed by Rouwenhorst (1998) in twelve stock markets of Europe. Chui, Titman, and Wei (2000) also confirm the momentum effect in six Asian stock markets. Rouwenhorst (1999) conducted his study on momentum on twenty emerging stock markets and found that momentum is present in 17 out of twenty economies. Griffin, Ji, and Martin (2002) conducted study on momentum on forty stock exchanges which belong to Africa, America, Asia and Europe and found the existence of momentum in all forty stock markets.

Above empirical evidence confirms that momentum effect is present in almost all stock exchanges from around the world. In some countries it is weak and in some countries it is strong. This study has been motivated by the notion that "whether short term momentum effect challenges the efficient market hypothesis or not".

Bombay Stock Exchange has been chosen to examine the above statement and index is BSE 100 index. Prime reason to choose BSE for momentum study is that there is no such direct short term momentum effect study has been conducted on above mentioned stock exchange. Although Griffin, Ji, and Martin (2002) and Rouwenhorst (1999) have done this type of study on Bombay stock market. But, it was not a full fledge study. In both studies there were 39 and 19 other stock markets included by the authors to examine the momentum effect. Most of the momentum work has been done on stock markets of USA and Europe, for instance, Ellis and Thomas (2004) sought the presence of momentum effect on London Stock Exchange. Moreover, it is necessary to seek whether momentum phenomenon exists in the BSE

or not. Furthermore, BSE is a rapidly growing and emerging stock market in the world. It is interesting to see that up to what extent price momentum strategy can be exploited in BSE to earn positive abnormal returns. In addition to this, it is also essential to examine whether momentum effect is strong or weak relative to momentum effect in other developing stock markets. All above reasons created a space in financial literature to carry out momentum study on Bombay Stock Exchange. Apart from all these reasons, it also interests to see the comparison between the returns from price momentum strategy of two developing but growing stock exchanges i.e. Bombay Stock Exchange and Karachi Stock Exchange.

2. BSE and Indian economy

Bombay Stock Exchange is the prime stock market of India and one of the rapidly growing markets from Asia which is ready to mark itself as one the biggest global stock market on the map of the world. Bombay Stock Exchange limited which is known as, BSE in recent times, was established as" The Native Share & Stock Brokers' Association" in 1875. It is the oldest stock exchange in Asia. It has been giving its services to corporate sector of India for past 135 years. As of February 2010, total capitalization of stocks listed on BSE stand on USD 1.28 trillion. Its total capitalization takes BSE in the top 10 list of global stock exchanges based on capitalization. Total of 4900 companies have been listed on the BSE, which makes it first stock exchange in the world to register that many companies and 5th in the world to handle and manage most number of daily transaction through BOLT system. BOLT is an abbreviation of BSE online trading system and it was developed to handle hundreds of thousands of transactions efficiently and effectively.

Indian economy in general and Indian stock market in particular is ideal to invest for domestic as well as international investor due to number of reasons. Indian stock markets in particular and Indian economy in general are growing at a very rapid rate. It can be confirmed from various reports issued by banks like Asian Development Bank. In a report "Asia Capital Markets Monitor" issued by Asian Development Bank, ASB claims that the equity market in India is booming. Equity market in India now stands at $600 bn and it is the third largest equity market in Asia after China and Hong Kong. It is very encouraging that Govt. of India understands that their capital markets and economy are growing and they are supporting this growth by making such changes in the rules and regulations which are beneficial for the domestic as well as international investors.

World Bank announced that in 2010 India would grow at the rate of 8%. This figure is very encouraging for India as China is growing at the rate of 7.7% and if India would have achieved that rate, it would leave China far behind in terms of growth. Many credible and leading indices such as ABN Amro's Purchasing Managers' Index (PMI), UBS' Lead Economic Indicator (LEI), and Nomura's Composite Leading Index (CLI) are of the view that hiring in India is increasing and cement and steel industry is progressing. The size of Indian economy is US$ 1.3 trillion which makes it the 8th biggest economy of the world. Future predications about Indian economy are very courageous. It is predicted that by 2013 Indian economy crosses the mark of US$ 3.8 trillion and it will make it the third largest economy in the world after United States of America and China. Currently, India is

growing at the rate of 8.75% and it is also predicted that, for the next ten years India is going to grow at the rate of 9% to 10%.

India is the second largest population based country in the world. The average age in country is 25 years or below. Therefore domestic as well as foreign industry can take the advantage of youth in terms of using them to bring innovation, generate new ideas and start new businesses. This large population can also be used as demographic dividend. As, due to large number of population, supply of labour is higher, this will lower the demand and ultimately lower the wages. By paying low wages, producers will be able to sell products at lower prices which in turn boost the overall economy in general and stock market in particular, because, more companies would like to take benefit of lower wages, so more companies will be registered by Bombay stock exchange. This demographic dividend could be prime reason to attract foreign investment in India by India.

3. Literature review

This literature review sheds the light on momentum strategies that are being followed in the present universe of stock markets. The main focus of this review is on price momentum strategies but literature on earnings momentum strategies in connection with price momentum strategies have also been considered. Short term momentum effects poses great challenge to efficient market hypothesis. This literature examine momentum phenomenon for the stock markets of Australia, Asia, Africa, Europe, Middle East and US.

Jegadeesh (1990) and Lehmann (1990) document the proof of short term reversal. Authors in their separate papers show that stocks that yield positive returns in their previous week or month of trading generate sufficient above average positive returns in future. But these abnormal returns cannot be attributed to the overreaction of investors rather these returns are the result of pressure of short term price movements or shortage of liquidity in the stock market. Jegadeesh and Titman (1991) support this interpretation by providing the evidence on the relationship between short-term return reversals and bid ask spread. Lo and MacKinlay (1990) also verify the evidence provided by Jegadeesh (1990) and Lehmann (1990) that abnormal returns are the result of late reaction of stock to other factors and it is not overreaction that causes abnormal returns. However, short term reversals considered being the opponent of short term momentum effect but it was later denied by Jegadeesh and Titman (1993).

Recently momentum strategies have received considerable attraction in trading literature but early literature focuses more on buying past winners and selling past losers. As Levy (1967) argue that stocks that performed well in last 27 weeks have earned significant abnormal return. Jegadeesh (1990) and Lehmann (1990) argue that despite the significance of momentum strategies most mutual fund manager still use old strategies that they tend to buy such stocks that have performed well in the past quarter.

Jegadeesh and Titman (1993) examine the impact of short-term momentum effect on stock markets. They take returns from two stock markets in United States i.e. NYSE and AMEX. They collect stock returns for the period starting from 1965 and ending on 1989. They adopt strategy in which they buy such stocks that have

performed very well in the past and sell those stocks that have performed worst in the past. They reach to a conclusion that if such stocks are to be held for the period of 3 to 12 months, they produce positive returns. However, they find that profitability is not the result of systematic risk but it is due to reaction of stock prices to ordinary factors. Thereby they refute the findings of Jegadeesh (1990) and Lehmann (1990), Jegadeesh and Titman (1991) and Lo and MacKinlay (1990). However, this delay or reaction to price movements still exists but it can be attributed to firm-specific information. They find that price changes that become predictable after the holding period of 3 to 12 months are not permanent, so the predicting power of momentum strategy is limited to 12 months. They also uncover the fact that stocks that earned abnormal return from momentum strategies tend to incur losses after two years of the formation of a portfolio. An interesting finding comes to know that similar trends have been observed by author in earning momentum strategies. One explanation they find in explaining profits from momentum strategy is that investors who buy past winners and sell past losers cause the prices to deviate from their base price on temporary basis and create overreaction in the stock market. This finding is in line with the finding of DeLong, Shleifer, Summers, and Waldman (1990) who see the impacts "positive feedback traders" on the prices of stock market. They believe that market does not overreact to the information which has short-term impact on the firm but market does react to the information which has long term impact on the firm's future. They further argue that this overreaction or under reaction is completely and solely dependent on nature of information and how investor perceives it. For example, one investor may think of earnings forecast as big news and overreact to this information whereas other investor may think of some other news as more substantial news. But, they fail to explain behaviour phenomenon of investors in their research paper and they are also of the view that their findings are not ultimate and there may be other factors that can explain the results of their findings.

Bulkley and Nawosah (2005) examine whether short term momentum phenomenon can be explained by cross section dispersion of stock returns or not? Conrad and Kaul (1998) explain that expected returns vary greatly across stocks. Conrad and Kaul (1998) argue that stocks that are expecting high returns both during the formation period and holding period will outperform the market. Evidence of above argument is given by Lo and MacKinley (1990) but it is further elaborated by Jegadeesh and Titman (1993) and extended by Conrad and Kaul (1998). Fama and French (1996) and Grundy and Martin (2001) inspect this argument using the three factor model developed by Fama and French but interestingly they find the presence of momentum even after exerting control on expected return. Jegadeesh and Titman (2001) rejected the approach of usage of model in determining expected return but they take an assumption that returns are different across different stocks, they keep on varying and determined rationally. But, there is one similarity between returns from standard asset pricing model and returns from short-term momentum effect i.e. returns from both sources do not possess the quality of time variation. These returns are random and different for different stocks. Grundy and Martin (2001) argue that three factor model cannot explain momentum.

Bulkley and Nawosah (2005) take the sample from three stock exchanges of

United States i.e. NYSE, AMEX and NASDAQ. Their sample period consists of January 1962 to December 2001. They also include the stocks that became de-listed during the long span of time. They adopt a methodology that is adopted by Jegadeesh and Titman (2001). They find that their results are in line with the results reported in the available literature i.e. holding period of 3 to 12 months result in abnormal returns. They reach to a finding that when no control is imposed on returns, the momentum strategy tends to exhibit similar results as exhibited in the paper by Jegadeesh and Titman (2001). But, momentum goes away when control for cross section dispersion is imposed by assuming that expected return of each stock is the average return in the sample period. But, this average return must be determined with great care and caution. Finally the conclude that cross section dispersion of expected return can explain momentum as this indication is already given by Lo and MacKinley (1990), Jegadeesh and Titman (1993) and Conrad and Kaul (1998).

However, the financial volatility is increasing around the world, where countries such as Greece, Spain and Ireland are all jeopardous markets for businesses to enter as per Barth, Li and Prabgavivadhana (2011). The financial volatility is resulting in fluctuating currencies, which make transactions between countries a vital phase. The risk of being a multinational corporation is growing and hedging becomes increasingly fundamental for border-crossing organizations as described by Polak, Robertson and Lind (2011).

Chan, Jegadeesh, and Lakonishok (1996) further argue that momentum strategy; either based on past returns or earnings surprises, exploit under reaction of investors in stock markets. They collect the sample from NYSE, AMEX and NASDAQ stock markets. The time period of research starts from January 1977 and ends on January 1993. They rank stocks according to either past returns or earning news basis. This paper has successfully explained the two living puzzles i.e. stocks' historical returns and current earnings surprise. They also find that earnings momentum strategies result in lesser profits than price momentum strategies. They also find that stocks yield high momentum returns in first year but returns become average in second and third year. This finding presents a challenge to notion that momentum strategy yields higher returns with lower risk. They conclude that investors do not react to information quickly but they gradually respond to new information and prices adjust gradually, as analysts show laziness in adjusting their earnings forecast, this thing of analysts make market participants more sluggish which causes more delayed response.

Most studies have been done on US stock markets in the field of momentum phenomenon. A few but useful studies have been done on stock markets outside United States. Like Rouwenhorst (1998) does a study of momentum on eleven stock markets and find that short term momentum effect is present in eight European stock markets. Schiereck, De Bondt and Weber (1999) examine the stock market of Germany and confirm the presence of momentum in that stock market. Liu, Strong and Xu (1999) study the stock market of United Kingdom for momentum purposes and find the evidence of momentum in that market. Chui, Titman and Wei (2000) and Hameed and Yuanto (2001) study the presence of momentum strategies in the stock markets of Asia and confirm the presence of momentum phenomenon in Asian stock

markets excluding Japan. Rouwenhorst (1999) does a study on momentum which is very unique. This study is done on 20 emerging stock markets located in the continents of Asia, Africa, Middle East, Europe and Latin America. Although almost all countries yielding higher momentum returns but six countries yield significant momentum returns. Some authors also try to explain the momentum anomaly through behavioural models.

Bhattacharya et al. (2000) conduct a study on the stock market of Mexico and find that corporate news does not make sufficient differences to prices. News neither causes volatility in stock prices nor yield abnormal returns because inside traders have the unlimited access to inside information and these pieces of information have already been absorbed by stock prices. The impacts on the prices are nullified when companies make this information public. Authors also check other variables like level of corruption and information distribution networking system of a country to analyze the profit of momentum strategies. They study the stock markets of Australia, Canada, France, Germany, Hong Kong, Japan, Malaysia, Singapore, South Korea, Taiwan, and United Kingdom. They collect the data on returns and earnings momentum for the period starting from January 1987 and ending on December 2001. In order to find the connection between momentum and other information network they collect country specific data from a number of sources. Data on corruption obtained from the Corruption Perception Index. Similarly data on insider trading and durability, efficiency and transparency of judicial system and accounting standards come from the methods originated by Beny (1999) and La Porta et al. (1998). They find that earnings momentum is positive for the stock markets of Australia, Canada, France, Germany, Hong Kong, and the United Kingdom and vice versa for countries like Malaysia, South Korea, Japan, Singapore, or Taiwan. The latter five countries report positive earnings, but these earnings are not statistically and economically significant. They also find that countries reporting high earnings momentum result in strong profits from price momentum strategy. They also find that countries that exhibit positive earnings have the signalling power to predict future returns. This finding is in line with Barberis, Shleifer and Vishny (1998), Daniel, Hirshleifer and Subrahmanyam (1998) and Hirshleifer (2001). They also uncover that countries that have high level of corruption, their stock markets experience weak momentum because in such countries investors' protection laws are weak and are not implemented in true letter and spirit. Countries where investor is less protected, chances of insider trading increase dramatically. In these markets, prices adjust speedily to the information possessed by insider traders which make the short term momentum effect weaker. Finally they conclude that price momentum strategies and earnings momentum strategies are related to each other and they depend on information dissemination network of a country.

4. Methodology

Stock exchange and Index that have been chosen for the implementation of momentum strategies are Bombay Stock exchange and BSE 100 index. The software which is used to download the data of BSE 100 index is DataStream. Data comprises of monthly prices of shares of all the companies listed on BSE 100 index. Downloaded data gives three major components. The first part is date, second part is

the name of the company, third component is the code of stock of each company and last but important component is share prices. The time period for the data starts from 24th June, 2006 and ends on 24th June, 2011. This data is than exported to MS Excel. There are total 5022 observations. Share prices are in local currency of India i.e. Rupees. But for sake of momentum strategy, prices are converted into returns. Returns are taken instead of prices because they are unit free and can be used for comparison purposes. To convert returns from prices, MS Excel software has been used. The formula which has been used to convert prices into returns is as follows:

$$Price = \frac{Pricet - Pricet - 1}{Pricet - 1} \quad (1)$$

Whereas the Pricet-1 and Pricet are the prices of a share of each stock of 1st of the current month and 1st of the next month respectively. In order to calculate the returns of 5022 observations, above formula is used in excel software. Once this formula is written in MS Excel, it is dragged down to all observations to determine returns. Some returns are negatives whereas some returns are positive.

MS Excel will be used for momentum strategy calculations. For each momentum strategy, as a first step there is a need to have formation period J and holding period K. In a formation period, we observe the performance of stocks in terms of returns for some particular months to make a decision whether to hold it or not. Based on the information from formation period, stocks will be held for some particular months. This is known as holding period. Formation period and holding period can be same or different in terms of number of months. For instance, J and K are of 3 months. It means J will start from January and ends on March. K will start from April and ends on June. In the J period, we take average of returns of three months of each stock. There will be many stocks depending on the stock market that is taken. Some stocks will give positive returns while others will give negative returns. In this strategy, a winner's portfolio and a loser's portfolio are formed. Winners' portfolio will contain at least 10 stocks that have performed extremely well in the formation and holding period. Losers' portfolio will contain at least 10 stocks that have performed extremely worst in the formation period and holding. By, using sort function 10 extreme winners and 10 extreme losers from the formation period will be selected and both portfolios will be made. There will be only twenty stocks i.e. 10 winners and 10 losers. It means that the performance of two portfolios will be judged on the basis of 3 month average returns and matched with formation period performance for analytical purposes. Same method will be used for other price momentum strategies which have different J and K.

By product of simple momentum strategy is zero cost momentum strategy. Zero cost momentum strategy means taking long position in winners portfolio and going short in loser portfolio or simply means winners minus losers. The results from zero cost momentum strategy will be used to analyze the performance of BSE 100 Index over the same time period.

CAPM model will be used to examine whether returns of zero cost momentum strategies are forced by winners portfolio having high systematic risk than that of losers portfolio or due to manager's performance by taking short positions in a losers

portfolio. In order examine the above relationship CAPM is run in E-VIEWS through following regression function.

$$Rp - Rf = \alpha p + \beta p(Rm - Rf) + \varepsilon \qquad (2)$$

where, Rp – monthly return of a portfolio.

Rf – risk free rate.

Rm – return of stock index or market return.

(*Rm - Rf*) – Risk premium.

In order to conduct this analysis, risk free rate and market returns have been downloaded from Datastream for the period starting from 24th June 2011 and ending on 24th June 2011. Market rate is taken as return of the index of BSE 100 index and it is obtained by using the same mentioned above. *Rf* is a 12 month T-bill. Alphas and betas of portfolios are obtained by using e-views.

Returns are not affected only by prices; they are also affected by trading volume. Momentum strategies are not only driven by returns, they are also dominated by trading volume, earnings and industry sector. Here, momentum strategies based on trading volume will be implemented and their impact will be examined in the analysis part. To examine the trading momentum strategies, first trading volume of all the companies listed in an index must be obtained. For this purpose, monthly trading volume has been obtained from DataStream for the period starting from 24th July 2006 and ending on 24th July 2011. To download it from DataStream, code "vo" is used and its unit is in 1000. But, trading volume can be defined here as an average daily turnover in percentage. Turnover is defined as number of shares traded of a particular stock on stock exchange divided by total number of shares outstanding of that particular stock. Total numbers of outstanding shares are downloaded from DataStream using the code "NOSH" for the time period same as of trading volume. Trading volume is calculated for each formation period for each stock. The same stock is held for certain time period i.e. K. Each stock listed on index is sorted at the start of each month based on trading volume over the previous J formation period. Once the stocks are sorted based on the trading volume, their corresponding returns have been written against the sorted stocks based on trading volume. Stocks in the index are divided into two main groups of trading volume i.e. stocks based on high trading volume and stocks based on low trading volume. It would help to create winner-losers portfolios based on high trading volume and low trading volume and to analyse the returns of the above two based on high and low trading volume. High trading volume portfolios will be denoted by Vh and low trading volume will be donated by Vl. There will be 20 stocks in Vh and 20 stocks in Vl.

14 companies have been excluded from the index as they were listed after the start of the period in price momentum strategies. Similarly, in trading momentum strategies, 21 companies have been excluded from the index because either they their prices were missing or trading volumes were missing or they were listed after the starting period.

4. Analysis of empirical results – Bombay and Karachi stock exchanges

In the last part of the analysis returns results from price momentum strategies of two stock exchanges have been matched up, considered and analyzed. These two stock exchanges are Bombay Stock Exchange and Karachi Stock Exchange. Both

stock exchanges are developing stock exchanges. It will be interesting to see how momentum strategies work in both stock exchanges. It will also be appealing to observe and analyze the returns differences in both stock exchanges.

Table 1. Returns Results from Price Momentum Strategies

Table1 represents the average monthly returns from and for 16 price momentum strategies of BSE 100 index for the period starting from 24, June 2006 and ending on 24, June 2011. In the table 1, holding period is taken horizontally whereas formation period is taken vertically. First column consists of winners and loser. Column 3 to column 6 contains average monthly returns of winner portfolios, loser portfolios and winner-loser portfolio for their respective formation and holding period. T-stat shows that whether returns are statistically significant or not. Column on extreme right represents the average monthly return from momentum strategies for the winner-losers portfolios of J3, J6, J9 and J12 respectively. The last value in the extreme right column represents the average monthly return of all the winner-loser portfolios.

Here it can be confirmed that returns are statistically significant at 5% level of significance. The average monthly return is 12.05% which is higher than other previous studies done by scholar, for instance, Jegaedeesh and Titman (1993) and Ellis and Thomas (2004). One reason could be given that; all the above researchers examined the momentum effect on the stock exchanges of developed countries like NYSE, AMEX and LSE. The stock exchanges of all such countries are developed, have been saturated and offered normal returns. Whereas, emerging stock markets, like BSE 100 index is a stock market of a developing country. India is growing and emerging economy and attracts huge and enormous foreign investment. That is why BSE has more room to offer returns which are abnormal as compared to returns of stock exchanges of developed economies. One of the important aspects to be noticed in the table 1 is that winners were earning much higher return than losers in general. This finding is in line with Jegaedeesh and Titman (1993) and Ellis and Thomas (2004). Another interesting thing to note that momentum strategy j3k3 is earning return which is higher than average returns from all other momentum strategies. Winner portfolio in j3k3 strategy is earning 12% return which is also higher than the returns earned by all the winners in the winner-loser portfolios in all 16 momentum strategies. Similarly the return earned by losers' portfolio is highest amongst all the returns earned by losers in the winners –losers' portfolio in all the sixteen momentum strategies. It is also obvious that in the returns from w-l portfolios, winners have contributed in return more than the losers. Although, taking long positions in the winner portfolios have increased returns but actual boost to returns has been given by going short in the losers. For example, in the J3K3 strategy, going short have earned return almost 5.5% whereas long positions in winners have earned almost 12% return which makes a total of approximately 17% return. And, this pattern could be observed throughout the table 1 which meant that throughout the formation and holding period, winners have been contributing much more in returns than the losers but in fact losers are giving actual boost to the W-L portfolios. Similarly in j12k12, total return is 9.54% in which winners have contributed almost 8% in return. Similarly, from top to bottom in the table 1, total return of each W-L portfolio is almost stable. Although it is decreasing but this decrease is very minor or ignorable.

All the winners in portfolios have outperformed the losers' portfolio and losers' portfolios have negative returns which boosted the overall returns of a portfolio by going short. This piece of evidence confirms the momentum effect in BSE. It also conforms with the finding of Ellis and Thomas (2004) that going short in losers can boost the return of a portfolio and it denies the findings of other researchers like Jegadeesh and Titman (1993) who claim that losers continuously underperform the market and winner portfolio, generates positive returns and increase the cost of zero cost momentum strategies.

The most successful momentum strategy is j3k3 which is giving 17% return. It means that the momentum strategy with less holding and formation period will result in abnormal positive returns in BSE. This finding does not stand with the finding of Jegadeesh and Titman (1993) and Ellis and Thomas (2004) who found out that j12k3 momentum strategy is more profitable. One possible explanation could be given is that the momentum strategy was conducted on developed stock markets i.e. NYSE, AMEX and FTSE 100. Whereas, BSE is a developing and emerging stock market and small formation and holding period would result in increased abnormal return.

As it is already mentioned that returns from 16 momentum strategies are positive and losers are earning negative return, thereby boosting the returns of a portfolio. Interestingly this finding is also in line with the findings of Rouwenhorst (1998) who examined momentum effect on 12 European countries. Another interesting thing is that Rouwenhorst (1998) found out that j12k3 momentum strategy was resulting in higher returns as the same found out by Jegadeesh and Titman (1993) and Ellis and Thomas (2004). It means that BSE functions differently than stock exchanges of United States and Europe. And, same explanation could be held here that BSE is a developing stock exchange whereas European and US markets are developed and saturated.

One other finding is that average return of j3k3, which is a short formation and holding period, is higher than the average returns of strategies with relatively longer formation and holding periods like j6k6, j9k6 and j12k12. It gives rise to the argument that average return goes down gradually as the formation period and holding period increase and vice versa.

Now pre crisis and post-crisis returns from momentum strategies will be examined through **Graph 1**. Bars in the blue colour show pre crisis returns and post crisis return are shown by the red bars.

Here, it is assumed that financial crisis reached to its surface on 1st of January 2008. It is necessary to remember once again that time period for momentum strategies is 24th, June 2006 to 24th, June 2011. In June, 2006 return is 17.57% which is very high. Similarly, momentum strategies keep giving positive returns for all the strategies up till j12k6 like before crisis, returns are 14% or 13%. But, this financial crisis does make a little dent to BSE in particular and Indian economy in general. Although returns went down after the crisis but this decrease was very minor and negligible. For instance before crisis, j12k3 strategy and j12k6 strategy give returns of 11% and 10.76% respectively and after crisis j9k12, j12k9 and j12k12 momentum strategies give almost 10% return. Momentum strategies are workable in Indian stock market particularly after the financial crisis.

Zero cost momentum portfolios and their relation with systematic risk

A zero cost portfolio is a difference between winners' returns and losers' returns or it can be explained as going long in winners and taking short positions in losers. In order to examine, whether returns of zero cost portfolio are driven by systematic risk of winners i.e. beta or the portfolio manager's performance i.e. alpha, an analysis of risk factor is required. The best model that has been chosen to examine the risk factor is CAPM. CAPM has already been used many scholars like Jegadeesh and Titman (1993) and Ellis and Thomas (2004) in their research papers for momentum strategies purpose. It is for the first time CAPM has been used to test the risk factor of stocks listed on Bombay Stock Exchange. As explained in methodology, following regression has been run and betas and alphas have been calculated using e-views.

$$Rp - Rf = \alpha p + \beta p(Rm - Rf) + \acute{\varepsilon}$$

Table 2. Momentum Strategy J3K3

In the table 2 above, alpha represents the Y-intercept or it measures the performance of a manager. Beta is the slope of the regression line and it describes the risk associated with the portfolio relative to the market portfolio which is BSE 100 index. T-state and p value explain the significance of betas and alphas whereas R2 will tell whether return of a portfolio has been explained by BSE 100 index or not. In this table 2 each portfolio has 540 observations.

Beta describes the responsiveness of a stock with respect to the market. It also describes the volatility of the stock. The beta of winner portfolio is negative with respect to market beta i.e.1, which, means that if market performs well, winner portfolio will perform worst. The beta of a loser portfolio is not even close to market beta 1 but it is positive and the beta of W-L portfolio is also less than market beta. It means that loser portfolio and W-L portfolio are not volatile and won't react abruptly in case of an increase or decrease in returns of a market. But, one thing to be observed is that alphas of winner and W-L portfolios are very high and alpha of loser portfolio is in minus. This finding confirms that return of this portfolio, which is 17.57%, is not boosted by taking long position in winner and taking excessive systematic risk. This boost in return is the result of going short in losers. This finding lends its support to the fact that high return can be earned by not taking unnecessary systematic risk. This finding again is in line with the findings of Jegadeesh and Titman (1993) and Ellis and Thomas (2004). This phenomenon can also be explained from another view point.

In j3k3 strategy, return of this particular W-L zero cost portfolio is 17.57%. The value of alpha here is 17, value of t-stat is 17.82 which is significant. P value reaffirms this significance. Here, beta of this zero cost portfolio is 0.0115 and but it is not statistically significant as it can be seen by the t-stat and P value because P value is greater than 0.05.

This portfolio shows that alpha or Y-intercept is higher. It means that return of this portfolio is because of the performance of the manager of portfolio or Y-intercept. Return is not boosted by taking excessive systematic risk because value of beta is very small. It shows that stock does not move with the market portfolio. R2 is 0.000248 which is very low and it further confirms the finding that return of this particular portfolio is not explained by BSE 100 index. It leads to the findings that

return of j3k3 zero cost portfolio has been boosted by alpha and not by taking too much systematic risk.

Above explanation can be held for all momentum portfolios in BSE. Tables for other picky momentum strategies have been provided in appendix to get a generic view. Almost same phenomenon can be observed in these strategies without any exception for instance alphas of winner and W-L are positive, whereas alphas of losers are negative and all alphas are statistically significant which mean that returns are boosted by not taking more risk. But, betas of winners, losers and W-L portfolios are less than the market beta or negative and not statistically significant which indicate that systematic risk is less relevant. Similarly values of R2 are low which mean that returns are not explained by BSE 100 index. All these values of alphas and betas in all momentum strategies confirm that returns have been boosted by not taking excessive risk. Returns can be increased by going short in loser portfolio. But, one interesting finding is that as the formation period increases, betas of the portfolios becomes negative and values of alphas decrease but at a very slow rate. One interpretation of the finding is that that betas become negative when formation period increases as formation or evaluation period increases, stocks in the portfolios do not follow the market portfolio rather they go in the direction against the market. Similarly when value of alphas decreases at a minor rate, when formation period increases, manager's role become important in the performance of a portfolio. The consistency in the portfolios results confirms that returns can be earned without taking excessive risk but it does not mean that beta factor or systematic risk attached with the stocks become irrelevant. It has its own importance as manager will always need value of beta factor or systematic risk for making decision of going long in the winner portfolio or taking short position in the loser portfolio.

Momentum strategies and trading volume

As written in the methodology section, those momentum strategies can be based on stock prices and returns but these strategies can also be based on trading volume. In this section of analysis, returns results from trading volume momentum strategies will be analysed. Results from trading volume have been categorised into returns from high trading volume and returns from low trading volume. Firstly, results from high trading volume momentum strategies (Vh) will be discussed.

Table 3. Returns from Vh Momentum Strategies

The table 3 above presents the return from winner portfolio, loser portfolio and W-L portfolio resulting from high trading volume momentum strategies. Horizontally holding period has been taken where as formation period has been taken vertically. Results from trading volume are very interesting. It is important to remember that winners and losers have been chosen on the basis of number of shares traded of a particular stock in stock market or trading volume.

This table 3 shows that going long in winner portfolio, based on trading volume, will generate low return. For instance, the highest return in the table 3 is 2.2% per month produced by J9K3 strategy. Most of the returns of winners' portfolios are around 1.5% to 2%. This leads to one important finding that the stock whose numbers of shares have been traded largely in a stock market will not necessarily produce higher returns. This finding stands against the finding of Ellis and Thomas (2004).

Similarly in the above table, losers are ranked on the basis of trading volume. Losers are not producing negative returns. So there is no point or benefit of going short in the losers' portfolio as they will not boost the return of W-L portfolio. So it is advisable to go long even in losers' portfolio particularly in the portfolios like j3k9, j3k12, j6k6, j6k9, j6k12, j9k6, j9k9 and for all j12 strategies.

If long position is taken in winner and short position is taken in the loser portfolio, this will result in halt in return. In other words returns cannot be boosted by going long in winners and taking short position in losers. For instance, in a j3k3 strategy, winner portfolio is giving return of 2% whereas loser portfolio is giving positive return of 1.6% which means that if long and short positions are taken in portfolios than W-L return will decrease to 0.49%. This return is lower than the return earned by the winner of j3k3 strategy. This momentum strategy is not suitable 3 to use as it reduces the returns. Although this strategy is still generating positive returns, but there are some strategies that results into losses like strategies mentioned above. For instance, in j6k9 strategy, winner portfolio earns 1.4226% but interestingly loser portfolio earns return 2.067854% which is greater than the returns earned by a winner portfolio as a result W-L portfolio earns -0.64525%. This return is negative. This strategy is not only unsuitable but also harmful to use as it will incur much losses to the overall portfolio. This trend is consistent throughout the table 3 and observable through various formation and holding periods. This table 3 leads to a finding that in BSE, trading volume momentum strategies are not workable and it is harmful to use such momentum strategies on trading volume basis as it will halt and hurt the profits of W-L portfolios. This finding stands against the finding of Ellis and Thomas (2004).

Now results from low trading volume (Vl) momentum strategies will be discussed. The table below shows the result from low trading volume.

Table 4. Returns from Vh Momentum Strategies

The table 4 above presents the return from winner portfolio, loser portfolio and W-L portfolio resulting from low volume momentum strategies. Horizontally holding period has been taken whereas formation period has been taken vertically. Results from trading volume are out of the ordinary and very similar to results from high trading volume momentum strategies. It is important to remember that winners and losers have been chosen on the basis of number of shares traded of a particular stock in stock market or trading volume.

This table 4 presents that adopting long position in winner portfolios will generate low return, for instance, the highest return in the table 4 is 2.67% per month produced by J9K3 strategy. By chance, it is the same strategy that produces highest return in high trading volume. Most of the returns of winners' portfolios are around 1.5% to 2.5% with few exceptions. This leads to one important finding that the stocks whose numbers of shares traded are low in numbers in a stock market will not essentially guarantee higher returns.

Likewise in the above table, losers are selected on the basis of trading volume. Losers are not serving their purpose of producing negative returns. There is a strong reason of zero investment in losers' portfolio as they will halt the boost in the returns of W-L portfolios. So it is prudent to go long even in losers' portfolio.

If long position is taken in winner and short position is taken in the loser portfolio, this will result in halt in return. For instance, in a j6k9 strategy, winner portfolio is giving return of 2.663948% whereas loser portfolio is giving positive return of 2.295599% which mean that if long and short positions are taken in portfolios than W-L return will decrease to 0.368349%. This return is lower than the return earned by the winner portfolio of j6k9 strategy. This momentum strategy is not suitable to use as it reduces and decreases the returns. Although this strategy is still generating positive returns, but there are some strategies that results into losses. For instance, in j9k6 strategy, winner portfolio earns 2.100165 but interestingly loser portfolio earns return 2.650058 which is greater than the returns earned by a winner portfolio as a result W-L portfolio earns -0.54989. This return is negative. This strategy is harmful to use as it will incur much losses to the overall portfolio. This trend is consistent throughout the table 4and observable through various formation and holding periods. This table 4 leads to a finding that in BSE, trading volume momentum strategies are not workable and it is harmful to use such momentum strategies on trading volume basis as it will halt and hurt the profits of W-L portfolios. This finding stands against the finding of Ellis and Thomas (2004).

Now returns results from high trading volume strategies and low trading volume strategies are merged in a one table and their results will be analysed and discussed. It will be interesting to examine what kind of results trading strategies produce if high and low volume trading strategies will be used in combination.

Table 5. Returns results from high and low trading volume momentum strategies

The above table 5 has been presented to analyze how high and low trading volume momentum strategies can be used in combination to gain positive returns. For instance, in j3k3 strategy, going long in winners of both high and low trading volumes will produce positive returns. In the same strategy, it is beneficial to go short in loser portfolios. By doing so, W-L portfolio based on high and low trading volume momentum strategy will produce positive returns. In this strategy, winners have outperformed the losers. This trend can be seen in other strategies as well like j3k6, j3k9, j6k3, j6k6, j9k3, j9k6, j9k9, and j9k12. But, this trend is not consistent in the table 5 for instance, in j3k12 strategy, going long in winners and taking short positions in losers' portfolio will hurt the profits of W-L portfolio based on high and low trading volume momentum strategy and this strategy will produce negative returns. Strategies like j6k9, j6k12, j12k3, j12k6, j12kl9 and j12k12 fall under this category. One important observation is that as the holding or formation period increases, W-L portfolios based on high and low trading volume momentum strategy start producing negative returns like j6k9, j6k12, j12k3, j12k6, j12kl9 and j12k12. To the contrary, as the holding or formation period decreases, W-L portfolios based on high and low trading volume momentum strategy start producing positive returns like j3k6, j3k9, j6k3, j6k6, j9k3, j9k6, j9k9, j9k12.

In Bombay Stock Exchange, it is not suitable, feasible and advisable to use high volume and low volume momentum strategies separately as they will be produce disastrous returns and bring the overall returns of W-L portfolios of all strategies drastically down. But, if trading strategies are used in combination with each other

carefully keeping in mind short formation and holding period, they can ensure positive returns, boost profits and increase the overall returns of W-L portfolios of all strategies not sharply but slowly.

In the last section, returns of momentum strategies from two developing stock exchanges have been presented for purpose of mere comparison between the two to examine which stock exchange has strong momentum effect. Therefore returns of j3k3, j6k6, j9k9 and j12k12 have been determined, analyzed and following table has been prepared to examine the above statement.

Table 6. Price momentum returns from BSE and KSE

This table 6 represents the average monthly returns from and for 4 price momentum strategies of BSE 100 index and KSE 100 INDEX for the period starting from 24th, June 2006 and ending on 24th, June 2011. In the table 6, holding period is taken horizontally whereas formation period is taken vertically. First column consists of winners and loser. Column 3 to column 9 contain average monthly returns of winner portfolios, loser portfolios and winner-loser portfolio for their respective formation and holding period for BSE 100 index and KSE 100 INDEX. Returns of both stock exchanges are statistically significant at 5% level of significance.

In a j3k3 strategy, winner portfolio of BSE is giving 12% return whereas winner portfolio of KSE is giving 7.7% return. Similarly loser portfolio of BSE is giving more return than the loser portfolio of KSE. Clearly it is more beneficial to go for W-L portfolio in BSE than to go for the same portfolio in KSE. This style or trend can be observed throughout the table 6 irrespective of the formation and holding period. It gives rise to an interesting finding that momentum affect is relatively stronger in the stock market of India which further leads to another observation that that an international investor must prefer the Bombay Stock Exchange over Karachi Stock Exchange when it comes to invest on the basis of momentum strategy. Another explanation for the strong momentum effect can be given is that India and Pakistan are both developing countries but Indian economy is growing at a rapid rate whereas Pakistan's economy is growing at a slow rate. India's population and area are greater than that of Pakistan which means that India can attract more foreign investment than Pakistan and that is why Bombay Stock Exchange is offering more return relatively to Karachi Stock Exchange.

5. Conclusion

The purpose of this paper is to find whether capital markets in South Asia are efficient or not. Existence of momentum effect in a stock exchange would raise concerns about the efficient capital market and put serious question on efficient market hypothesis introduced by Fama in 1970. This report examines the short term momentum effect anomaly in Bombay Stock Exchange and tries to find out whether momentum anomaly exists in BSE or not. The prime reason to choose BSE for the examination and verification of momentum phenomenon is because of its emergence as one of the biggest stock exchange on the map of the world. It is the first stock exchange to register 4900 companies. It would be interesting to see how momentum phenomenon behaves in this market and does it give more returns in developing stock market like BSE?

Momentum phenomenon has been found and documented by many researchers. In the late 1980's and early 1990's much work has been done on short term momentum effect. But most of the research was done on stock markets located inside United States of America. For instance, Jegadeesh and Titman (1993) examine the impact of short-term momentum effect on stock market. They take returns from two stock markets in United States i.e. NYSE and AMEX. They reach to a conclusion that if stocks are to be held for the period of 3 to 12 months, they produce positive returns. But, in late 1990's many researcher did momentum research on stock markets located outside USA. In this case, one of the pioneer works was done by Griffin, Ji and Martin (2004). Griffin, Ji and Martin (2004) examine the global momentum strategies from portfolio view point. They collect data on stock returns and earnings momentum of 40 countries and for the period starting from February 1975 and ending on February 1995. They find that going short in momentum strategy results in fewer returns whereas taking long position is more profitable. They also find that price momentum strategies are implemented globally and yield significant returns.

Data of share prices, risk free date, market rate, trading volume and number of shares outstanding has been gathered for the period starting from 24th June, 2006 and ending on 24th June, 2011. After the careful analysis, it can be confirmed that momentum effect has been found in Bombay stock exchange. It is found that in a price momentum strategy, the average monthly return is 12.05% which is much higher than other previous studies done by scholars. It is also found that winners were earning much higher return than losers in general. All the winners in portfolios have outperformed the losers' portfolio and losers' portfolios have negative returns which boosted the overall returns of a portfolio by going short. Financial crisis does make a little dent to BSE in particular and Indian economy in general. Although returns went down after the crisis but this decrease was minor and negligible. Momentum strategies are workable in Indian market particularly after the financial crisis.

It is also examined that whether returns have been earned due to excessive systematic risk or manager's performance. All values of alphas and betas in all momentum strategies confirm that returns have been boosted by not taking excessive risk. Returns can be increased by going short in loser portfolio. But, one interesting finding is that as the formation period increases, betas of the portfolios becomes negative and values of alphas decrease but at a very slow rate. Beta has its own importance as manager will always need value of beta factor or systematic risk for making decision of going long in the winner portfolio or taking short position in the loser portfolio.

Momentum strategies can be based on stock prices and returns but these strategies can also be based on trading volume. It is found that in high trading volume based momentum strategies, the stock whose numbers of shares have been traded largely in a stock market will not necessarily produce higher returns. Similarly stock whose numbers of shares have been traded low in a stock market will not necessarily produce higher returns. This leads to a finding that in BSE, trading volume momentum strategies are not workable and it is harmful to use such momentum strategies on trading volume basis as it will halt and hurt the profits of W-L portfolios. In Bombay Stock Exchange, it is not advisable to use high volume and

low volume momentum strategies separately as they will be produce disastrous returns .But, if trading strategies are used in combination with each other carefully keeping in mind short formation and holding period, they can ensure positive returns to W-L portfolios.

When momentum returns from two developing stocks markets are compared, it is found that it was more beneficial to go for W-L portfolio in BSE than to go for the same portfolio in KSE. This style or trend can be observed from the table irrespective of the formation and holding period. It gives rise to an interesting finding that momentum affect is relatively stronger in the stock market of India which further leads to another observation that an international investor must prefer the Bombay Stock Exchange over Karachi Stock Exchange when it comes to invest on the basis of momentum strategy.

The stock exchanges of all developed countries are developed, have been saturated and offered normal returns. Whereas, emerging stock markets, like BSE 100 index is stock market of a developing country. India is growing and emerging economy and attracts huge and enormous foreign investment. That is why BSE has more room to offer returns which are abnormal as compared to returns of stock exchanges of developed economies.

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Table 1. Returns Results from Price Momentum Strategies

Formation period (J)		Holding Period (K)				
		3	6	9	12	
Winner	3	12.07697	10.41463	9.539249	8.818806	
Loser		-5.49457	-4.10145	-3.0774	-2.35878	
Winner- Loser		17.57153	14.51609	12.61665	11.17759	13.97046
t-stat		**18.66141**	**19.52341**	**20.52909**	**21.17234**	
Winner	6	10.41463	9.879564	8.612665	8.612665	
Loser		-4.10145	-3.42831	-2.14796	-2.14796	
Winner- Loser		14.51609	13.30787	10.76063	10.76063	12.3363
t-stat		**19.52341**	**19.59246**	**20.18133**	**20.49211**	
Winner	9	9.539249	9.226265	8.830148	8.280233	
Loser		-3.0774	-2.71212	-2.30973	-1.92095	
Winner- Loser		12.61665	11.93838	11.13988	10.20119	11.47402
t-stat		**20.52909**	**20.18133**	**19.99907**	**20.13692**	
Winner	12	8.818806	8.612665	8.280233	7.861861	
Loser		-2.35878	-2.14796	-1.92095	-1.65254	
Winner- Loser		11.17759	10.76063	10.20119	9.514404	10.41345
t-stat		**21.17234**	**20.49211**	**20.13692**	**20.18559**	
						12.04856

Table 2. Momentum Strategy J3K3; Formation period J=3

Holding period	A	SE	t-stat	p-value	B	SE	t-stat	p-value	R^2
K=3									
Winner	11.3893	1.333775	8.539175	0	-0.08695	0.139521	-0.6232	0.5358	0.007275
Loser	-6.0851	0.747915	-8.13611	0	0.083454	0.078564	1.062237	0.2929	0.020846
W-L	17.0177	0.954687	17.82542	0	0.011509	0.100284	0.114761	0.9091	0.000248

Table 3. Returns from Vh Momentum Strategies

Formation period (J)	Holding Period (K)			
	3	6	9	12

Winner	3	2.08265	2.151111	1.656181	1.764789
Loser		1.596058	1.719183	2.008279	1.86212
Winner- Loser		0.486592	0.431928	-0.3521	-0.09733
Winner	6	2.151111	1.710848	1.4226	0.762592
Loser		1.719183	1.770297	2.067854	1.443131
Winner- Loser		0.431928	-0.05945	-0.64525	-0.68054
Winner	9	2.189566	1.848657	0.890712	1.308398
Loser		1.613553	1.861388	0.911051	1.054135
Winner- Loser		0.576013	-0.01273	-0.02034	0.254263
Winner	12	1.764789	0.762592	0.743788	0.605825
Loser		1.86212	1.443131	1.736792	1.954666
Winner- Loser		-0.09733	-0.68054	-0.993	-1.34884

Table 4. Returns from Vh Momentum Strategies

		Holding Period (K)			
Formation period (J)		3	6	9	12
Winner	3	1.68802	1.745257	1.918362	2.558772
Loser		2.53198	2.563084	2.285224	2.249619
W-L		-0.84396	-0.81783	-0.36686	0.309154
Winner	6	1.745257	1.413298	2.663948	1.423207
Loser		2.563084	2.846068	2.295599	1.707464
W-L		-0.81783	-1.43277	0.368349	-0.28426
Winner	9	2.674045	2.100165	1.281743	1.38785
Loser		2.180854	2.650058	1.483953	1.598627
W-L		0.493191	-0.54989	-0.20221	-0.21078
Winner	12	2.558772	1.423207	1.772871	1.928411
Loser		2.249619	1.707464	1.458834	1.52716
W-L		0.309154	-0.28426	0.314037	0.401251

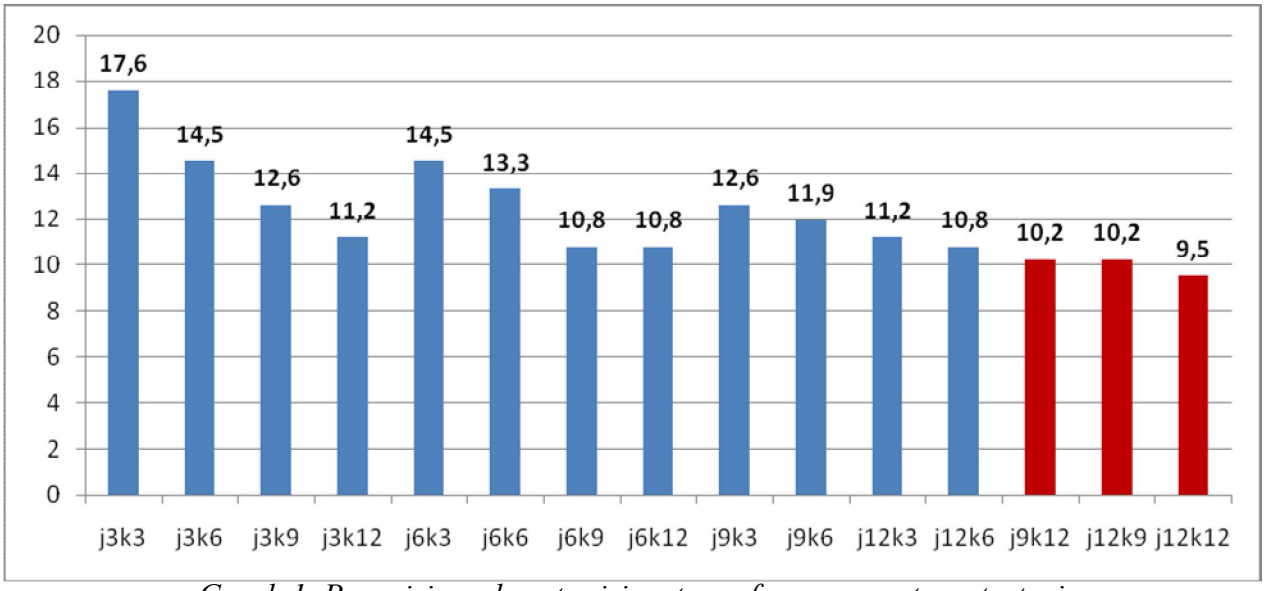
Table 5. Returns results from high and low trading volume momentum strategies

		Holding Period (K)											
J		3			6			9			12		
		Vh	vl	vh-vl	Vh	Vl	vh-vl	Vh	vl	vh-vl	Vh	Vl	vh-vl
W	3	2.08	1.69	0.39463	2.15	1.75	0.4059	1.656	1.92	-0.262	1.76	2.56	-0.79398
L		1.6	2.53	-0.9359	1.72	2.56	-0.8439	2.008	2.29	-0.277	1.86	2.25	-0.3875
W-L		0.49	-.84	1.33055	0.43	-0.8	1.2498	-0.35	-.37	0.0148	-0.1	0.31	-0.4064
W	6	2.15	1.75	0.40585	1.71	1.41	0.2975	1.423	2.66	-1.241	0.76	1.42	-.66062
L		1.72	2.56	-0.8439	1.77	2.85	-1.0758	2.068	2.3	-0.228	1.44	1.71	-.26433
W-L		0.43	-.82	1.24975	-.06	-1.4	1.3733	-0.65	0.37	-1.014	-0.7	-.28	-.39628

W	9	2.19	2.67	-0.4845	1.85	2.1	-0.2515	0.891	1.28	-0.391	1.31	1.39	-0.0794
L		1.61	2.18	-0.5673	1.86	2.65	-0.7887	0.911	1.48	-0.573	1.05	1.6	-0.5444
W- L		0.58	0.49	0.08282	-.01	-0.5	0.5372	-0.02	-0.2	0.1819	0.25	-.21	0.46504
W	12	1.76	2.56	-0.794	0.76	1.42	-0.6606	0.744	1.77	-1.029	0.61	1.93	-1.3225
L		1.86	2.25	-0.3875	1.44	1.71	-0.2643	1.737	1.46	0.278	1.95	1.53	0.42751
W- L		-0.1	0.31	-0.4065	-0.6	-0.3	-0.3963	-0.99	0.31	-1.307	-1.3	0.4	-1.7500

Table 6. Price momentum returns from BSE and KSE

		Holding Period (K)							
		3		6		9		12	
Formation J		BSE	KSE	BSE	KSE	BSE	KSE	BSE	KSE
W	3	12.077	7.703						
L		-5.495	-6.69						
W- L		17.572	14.4						
T-stat		**18.66**	**28.94**						
W	6			9.88	6.98				
L				-3.4	-4.3				
W- L				13.3	11.2				
T-stat				**19.6**	**43.58**				
W	9					8.83	5.73		
L						-2.3	-3.5		
W- L						11.1	9.26		
T-stat						**19.99**	**41.36**		
W	12							7.9	4.68
L								-2	-3.2
W- L								9.5	7.91
T-stat								**20.18**	**34.13**



Graph 1. Pre crisis and post crisis returns from momentum strategies