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SEASONALITY IN MOMENTUM PROFITS: EVIDENCE FROM THE INDIAN STOCK MARKET

Supriya Maheshwari*, Raj S. Dhankar**

Abstract *The paper investigates Indian momentum profitability along with its performance stability round the year using the stock price data from National Stock Exchange (NSE). Results show evidence in favour of momentum profitability over the sample period from 1997 to 2013. Moreover, the momentum performance is not specific to any particular month suggesting no influence of calendar on momentum anomaly in the Indian stock market, though momentum strategies performed differently in different calendar months, with particularly strong negative returns in the month of May. However, no statistically significant difference was observed among the mean monthly momentum returns across calendar months.Contrary to the US market findings, no January or similar April seasonality is observed in the Indian momentum profits suggesting some unique characteristics of Indian momentum profitability. In nutshell, the results from the study suggest support in favour of practical implementation of momentum strategies throughout the year in the Indian stock market.*

Keyword: *Momentum Effect, Indian Stock Market, Calendar Effect, January Effect, April Effect*

INTRODUCTION

Momentum-based investment strategy that calls to take long position on the top performing stocks and short position on the worst performing ones have established consistent profitability over short to medium time horizon. This is supported by plethora of studies that documents economically and statistically significant momentum profits across global equity markets. As a result, the momentum phenomenon has a profound impact on both academic as well as investment community. While, academic community still struggles to understand the causes of momentum anomaly, momentum filters and strategies are widely used components of global fund managers and investors.

Jegadeesh and Titman's (1993) seminal work is widely accepted as the proposition of momentum profitability in the modern finance. Since then it has been widely replicated over different stock markets of different regions and time periods and has consistently reported results in favour of momentum profitability. A number of explanations have been put forward to explain excess momentum profits. In broad terms, some of these explanations tried to explain the momentum effect within the paradigm of Efficient Market Hypothesis (EMH). These include explanations based on risk differential (Conrad & Kaul, 1998), industry returns (Moskowitz & Grinblatt, 1999), macroeconomic factors (Chordia & Shivakumar, 2002) as well as to overall market conditions (Cooper, Gutierrez & Hameed, 2004). However, the above explanations find it difficult to explain the effect completely. Failure of risk based explanations has motivated researchers to explain the effect based on various behavioural based explanations. Some of these include overreaction as well as underreaction based behavioural models (such as Daniel, Hirshleifer & Subrahmanyam, 1998; Barberis, Shleifer & Vishny, 1998; Hong & Stein, 1999; Grinblatt & Han, 2002).

The momentum effect is further deepened by the presence of seasonality in momentum profits. The seasonal pattern in monthly stock returns was first observed by Rozeff and Kinney (1976) who document that stock returns deviate in accordance to calendar time. Similar seasonal patterns were observed by Keim (1983) in size effect and DeBondt and Thaler (1985) in long-run return reversal effect where strong size as well as return reversal premium was observed in the month of January in the US stock market. However, contrary to these findings, momentum effect is observed to be a non-January effect with minimum momentum profits in the month of January. Jegadeesh and Titman (1993) and others observed that past winners outperformed past losers in all the months, except January in the US stock markets. In addition, momentum returns were found to be strongest in the months of April, November and December that changes to strong reversal in the month of January. Such findings suggest non-stability in momentum profitability across calendar months in the US stock market.

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Indian stock market is no exception when it comes to interest in momentum profitability. While at face, majority of the studies have provided evidence in favour of momentum profitability, none of them have explored seasonality in the same. There are several reasons to explore seasonal patterns in the momentum profitability. First, if distinct seasonality exists in the Indian momentum profits then it has direct implication for professional momentum investors. Second, seasonality in momentum profits may help in understanding the driving force behind the momentum profits. Finally, documenting similar seasonal patterns in Indian momentum profits with those of US market helps in understanding the aspects of momentum effect that are similar in US and other global stock markets. It is for these reasons the current study extents the literature by providing further insights into momentum profitability in the Indian stock market. The study focusses on investigating the stability of momentum performance across different calendar months. The study examined the famous January effect in momentum profits in the Indian stock market.

The article is organised as follows. Second section provides a brief review of the relevant literature, while third section presents the data and testing methodologies. The empirical results of the study are presented and discussed in fourth section, followed by conclusion in fifth section.

REVIEW OF LITERATURE

In recent times, a significant body of literature has evolved that examined the stock return predictability in developed as well as developing stock markets. Such findings contradict the Efficient Market Hypothesis (EMH) that proposes stock market efficiency asserting impossibility to predict the market. Such empirical findings that reject or purport to reject the EMH were classified as 'anomalies'. Over the last few decades number of such anomalies was identified including value effect, size effect, seasonality effects, long-run reversal effect and momentum effect. A brief review of some of these anomalies is presented henceforth.

EMH has been often questioned by the documentation of various seasonal patterns in stock returns. A number of empirical evidences indicate that stock returns deviate (high or low) in specific time of week, month or year. It has been documented, for example, average stock returns on Monday are lower than average returns on rest of the week days (French, 1980; Gibbons & Hess, 1981). Similarly, higher positive returns on the trading day prior to the holiday (Ariel, 1990) as well as on the last trading day of the month (Ariel, 1987) were reported. However, seasonality in the stocks returns in the month of January is premier among all the seasonal patterns.

A study by Rozeff and Kinney (1976) observed significant seasonality in U.S. stock market returns. The average returns observed in the month of January was approximately 3% higher than the average monthly returns calculated over rest of the year. Such higher performance of stocks in the month of January is known as January effect in the academic literature. The January effect was further supported by Gultekin and Gultekin (1983), Kato and Schallheim (1985) and Agrawal and Tandon (1994) for stock markets other than U.S. Due to such regularity and publicity of January effect, a large number of scholars and researchers studied the effect and offered various explanations for the same. One of the strongest hypotheses put forward to explain the unexpected higher returns in the month of January is known as 'tax-loss selling' hypothesis. According to this hypothesis, at the end of financial year (December for U.S. stock market) investors generally sell those stocks that have declined in value over the year to realize their capital losses. However, the same stocks are repurchased after the turn of the year, putting an upward pressure on the prices of the stocks, generating higher returns in the month of January. Another rationale proposed to explain January effect is based on window dressing which is related to institutional trading. Window dressing is generally referred to the act of sale and purchase of losing and winning firms, respectively, at the end of financial year by institutional investors to present their portfolios more soundly. Nevertheless, none of these hypotheses, till date, provided satisfactory explanation for the observed January effect.

Another important stock market anomaly that gained much of the interest in academic as well as investment community is 'Momentum Effect' that is also considered as the most robust anomaly. Momentum effect in financial literature is generally used to characterize short term trend continuation pattern in which stock prices moves in the same direction over a period of 3 to 12 months.

The first and the most striking evidence of momentum effect was observed by Jegadeesh and Titman (1993) using the data from the US stock market. Using the data from New York Stock Exchange (NYSE) and American Stock Exchange (AMEX) for the study period from 1965 to 1989, Jegadeesh and Titman (1993) observed that stocks with high returns over the past 3 to 12 months continue to outperform the stocks with low returns over the same period. As a result, it is profitable to buy stocks with high return over the past 3 to 12 months (known as Winners) and sell stocks with poor returns (known as Losers) over the same time period, to earn excess returns. In documenting momentum profitability, Jegadeesh and Titman (1993) reported average monthly differential between winner and loser portfolios over the holding period. They reported results for 32 strategies with the formation and holding period from 3 months to 12 months. For example, a 6X6 strategy, i.e. 6-month formation and 6-month holding period, generates a monthly differential return, also known as momentum profit, of 1% on an average in the US stock

market. Following the empirical work of Jegadeesh and Titman (1993), a number of empirical studies documented the momentum profitability in the US stock market (Chan, Jegadeesh & Lakonishok, 1996; Conrad &Kaul, 1998; Karolyi & Kho, 2004; Gutierrez & Kelly, 2008).

The possibility of earning momentum profits was not restricted to the US stock market. Momentum strategies have been found to work in other international markets too. Rouwenhorst (1998, 1999) finds similar momentum patterns for European and emerging stock markets. Chui, Titman and Wei (2003) examined momentum profits across eight Asian markets including Honk Kong, Indonesia, Japan, Korea, Malaysia, Singapore, Taiwan, and Thailand. More recently, Asness, Moskowitz and Pedersen (2013) presented evidence in favour of momentum premium across eight diverse markets and asset classes. In addition, strong momentum profits were observed by Lui, Strong and Xu (1999) for UK, Mengoli (2004) for Italy, Phua, Chan, Faff and Hudson (2010) for Australia, Cheng and Wu (2010) for Honk Kong, Li, Qiu and Wu (2010) for Chinese stock market.

Motivated by the mammoth evidences in favour of momentum profitability, a few researchers have tried to investigate momentum profitability in the Indian stock market. Sehgal and Balakrishnan (2002) reported strong momentum profitability in the Indian stock market over the sample period from July 1989 to March 1999. Similar results were obtained by subsequent studies by Ansari and Khan (2012), Sehgal and Jain (2012) and Dhankar and Maheshwari (2014) for the more recent time period. While at face value, these findings appear to be consistent, suggesting strong momentum profitability, none of these studies has evaluated the stability of momentum profits across the year in the Indian stock market. No prior efforts have been made to test seasonality patterns in the Indian momentum profits.

Since seasonality in equity returns are well documented, it is important to test the monthly stability of various stock market anomalies. A number of papers have reported strong seasonality in momentum returns. Jegadeesh and Titman (1993) observed strong seasonal patterns in momentum returns, wherein, momentum strategies losses around 7%, on an average, in the month of January while positive momentum returns were observed for the rest of the year. The non-profitability of momentum profits in the month of January was attributed to the high positive returns of losers in the month of January. In their follow up study, Jegadeesh and Titman (2001) confirmed strong January seasonality in momentum returns for the US stock market. Similar results were also observed by Grundy and Martin (2001) and Yao (2012) who also reported strong negative momentum returns in the month of January as against positive momentum returns over rest of the year for the US stock market. Grinblatt and Moskowitz (2004) argued that high (low) momentum profits in the month of December (January) can be attributed to tax loss selling. Similar argument was given by Jegadeesh and Titman (2001) who attributed weak momentum return in the month of January to strong January effect among losers. Due to strong January effect of losers, higher returns were observed for loser stocks as compared to winner stock causing reversal in stock returns in the month of January. Such seasonal pattern in momentum returns is not restricted to US market. Griffin, Xi and Martin (2003) observed negative January momentum returns in Africa, Europe, Asia as well as American stock markets. Antoniou, Lam and Paudyal (2007) observed notable seasonality in European stock markets. Durand, Limkriangkrai and Smith (2006) also observed negative returns in the month of July for Australian stock market, wherein July is the first month of new financial year, mimicking the January effect of US.

It is clear from above studies that seasonality in momentum returns is not just a US phenomenon but is observed in markets other than US. The current study examines such seasonality patterns in momentum returns using the sample from the Indian stock market.

OBJECTIVES OF THE STUDY

The present study examines the momentum profitability in the Indian stock market along with its performance stability round the year. Globally, momentum profits are often criticised on its stability. Few international studies suggested instability of momentum returns throughout the year and strong seasonal patterns are observed in momentum returns for US and other developed stock markets. Momentum strategies are generally coined as non-January US investment strategy that generates strong losses in the month of January as compared to high profits over remaining months of the year. Based on such arguments, the study examines such seasonality patterns in Indian momentum returns by focussing on January and April (analogous to US January effect) seasonality.

DATA AND RESEARCH METHODOLOGY

The study analyses the opportunity and stability of momentum profitability in the Indian stock market, which is considered as one of the fastest growing emerging stock market. Indian stock market is a vibrant emerging stock market that possesses characteristics of both developed as well as emerging stock market. It occupies a prominent place not only among the Asian market but on the global stage. The Indian stock market has undergone a sea change over the last few decades. The introduction of online trading system, dematerialisation, rolling settlement as well as new and sophisticated instruments has led to the larger trading volumes. In the recent times, Indian stock market

is considered as one of the most technologically driven market in the world and is at par with the standards of other developed stock markets. Unlike many other emerging stock markets that focuses heavily on one or two industry sectors, Indian stock market provides investment opportunities across a wide range of sectors from financial to energy, automotive to pharmaceutical to banking. With growing number of market participants, high growth in trading volume, market capitalisation and listed companies, reduction in transaction costs, improvement in transparency and strong regulatory system, Indian stock market has earned high respect and interest amongst the global community of investors. To be concise, Indian stock market is a distinct market and hence provides an excellent out of sample test to test the robustness and profitability of momentum profits.

Sample Data

The sample of the study comprises of monthly stock price data of listed companies on National Stock Exchange (NSE). Monthly adjusted closing price data of 328 stocks, having complete data over the sample period, was collected over the period from January 1997 to March 2013. The data obtained for the study was collected from CMIE Prowess database. The Nifty index is used as the proxy for the return on market portfolio.

Methodology

Momentum Strategies

The most common and well adopted method to test momentum profitability is to form portfolios based on past stock returns. The study also employs the same portfolio testing method as suggested by Jegadeesh and Titman (1993). However, instead of using raw returns, the study uses market adjusted returns. The study form portfolios based on the past F-months (formation period) cumulative stock returns and hold the same for the next H-months (holding period), where F take the value of 3 and 6 months while H is restricted to 6, 9 and 12 months. There are 6 strategies in total. For better representation, the strategies are represented as FXH. For example, 3 month formation period and 6 months holding period strategy is represented as 3X6 strategy. The procedure adopted for testing momentum strategies are as follows:

- At the beginning of each month market adjusted returns for each stock was calculated using the formula $U_{i,t} = R_{i,t} - R_{m,t}$
- Where $R_{i,t}$ and $R_{m,t}$ are the arithmetic return of stock 'i' and market, respectively.
- For each stock 'i', cumulative market adjusted return over the past F months (F=3 or 6) was calculated.
- Based on these cumulative returns, stocks were arranged in ascending order. The top 20% stocks were grouped together to form equal weighted 'winner' portfolio while bottom 20% were grouped together as equal-weighted 'loser' portfolio.
- The average monthly returns for both the portfolios over next H months (H= 6, 9 and 12) were calculated after skipping a month between formation and holding period.

The portfolios were rebalanced at the end of each formation period. Momentum profits proposed continuation pattern in stock returns. As a result the average return of winner portfolio in holding period must be greater than the average return of loser portfolio during the same period. To say differently, the average differential between winner and loser (Winner- Loser) portfolio (also known as momentum return) must be greater than zero. The statistical significance of the same is tested using one sample 't-test'.

Seasonality in Momentum Returns

The study also calculate the time series average returns of both winner and loser portfolio. Further seasonality effect in momentum profits is tested using dummy variable regression method with the following regression equation:

$$R_{pt} = \alpha + bD_t + \varepsilon_t$$

where, R_p refers to the market adjusted excess return on past return portfolio in the month t; D_t is the dummy factor (D_t =1 for seasonality month and D_t = 0 for non-seasonality months). ; α is the regression intercept that refers to the average market-adjusted return for the non-seasonality months; b is the slope coefficient that measures the difference between the average market-adjusted return of seasonality month with that of non-seasonality months; εt is the residual error term.

EMPIRICAL RESULTS

Momentum Strategies

Table 1 reports the results of monthly market adjusted returns of winner, loser as well as differential between them for various momentum strategies. The winner and loser portfolio were constructed on the basis of two formation period i.e. 3 and 6 months. For both formation periods, three different holding periods were considered ranging from 6 to 12 months, generating 6 different combinations of momentum strategies.

The results from Table 1 suggest presence of strong momentum profitability in the Indian stock market. For all the investigated momentum strategies, past winner portfolio

Table 1: Momentum Portfolio Returns

Strategy	Winner (W)	Loser (L)	Momentum Return (W-L)
3X6 (F=3; H=6)	1.4717* (4.213)	0.6383 (1.463)	0.8333* (2.410)
3X9 (F=3; H=9)	1.3933* (4.700)	0.8511* (2.314)	0.5422** (1.750)
3X12 (F=3, H=12)	1.4067* (5.445)	0.8933* (2.818)	0.5133* (1.990)
6X6 (F=6; H=6)	1.5400* (2.943)	0.5600 (0.883)	0.9783* (1.985)
6X9 (F=6; H=9)	1.4922* (3.614)	0.5344 (1.044)	0.9578* (2.277)
6X12 (F=6; H=12)	1.3508* (3.740)	0.8358* (2.030)	0.5150 (1.430)

Table 1 presents average monthly market adjusted returns for winner, loser and momentum (W-L) portfolio for the period 1997 to 2013 over six different momentum strategies. The portfolios are equally weighted. The figure in parenthesis '()' show the t-values

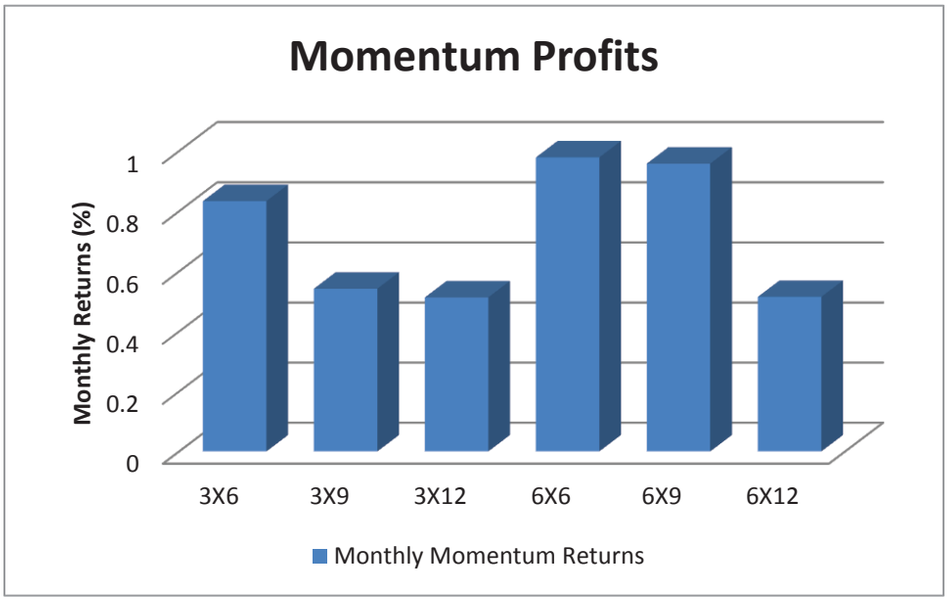
*Statistically significant at 5% level

**Statistically significant at 10% level.

generate higher return as compared to past loser portfolio, generating positive return differential among them. These results are in accordance with the global (Jegadeesh & Titman, 1993; Rouwenhorst, 1998; Mengoli, 2004, etc.) as well as domestic literature (Sehgal & Balakrishnan, 2002; Ansari & Khan, 2012; Dhankar & Maheshwari, 2014) that provide support in favour of momentum profitability. However, not all the six momentum strategies are observed to generate statistically significant momentum profits in the Indian stock market. The t-statistics suggests that momentum returns of all the strategies except 6X12 are statistically significant. Therefore, the null hypothesis of equality of return between winner and loser portfolio is rejected for 3X6, 3X9, 3X12, 6X3 and 6x6 momentum strategies.

The most successful strategy is the one that select stocks based on their performance over past 6 months and hold them for the next 6 months (6X6), with monthly gain of 0.978% in the Indian stock market. The Indian monthly momentum return of 0.978% (from 6X6 strategy) is comparable to the 0.95% momentum return from US stock market (Jegadeesh & Titman, 1993) from the same momentum strategy. Figure 1 pictorially represents the monthly momentum returns from different momentum strategy in the Indian stock market. Moreover, the large portion of momentum profits in the Indian stock market comes from the winning stocks. Looking at the winner and loser column of all the investigated strategies, it is clear that profits for momentum strategies are driven by long positions in winner portfolios and hence strong

Fig.1: Momentum Profits of Different Strategies



momentum returns in the Indian stock market are merely due to good performance of past winning stocks.

Seasonality in Momentum Profits

To explore the seasonality effect in momentum profits, the dummy regression methodology is adopted. The seasonality is examined in the months of January as well as April. In addition to the January seasonality (as reported in global studies), April seasonality in momentum returns is also tested since most often in the Indian stock market April effect is considered as analogous to January effect of the US stock market (Sehgal, 2005; Tripathi, 2008; etc.). Since April is first month of financial year in India, as compared to January for the US stock market, April effect in the Indian stock market is considered parallel to US January effect. Hence, it is important to broaden the test for the month of April as Indian financial year regime may have its own seasonal regularities.For robustness test, the study further tests the momentum returns for all the calendar months.

The empirical results regarding the seasonality of momentum profits in the month of January, using the dummy variable regression are presented in Table 2. As documented in the literature, lower momentum returns in the month of January are expected as compared to the non-January months.It is clear from Table 2 that there exists some seasonality in the Indian stock market. Both past winner and loser stocks are found to generate lower returns in the month of January as compared to non-January months in all the investigated momentum strategies (as b<0). However, the difference among the same is found to be statistically non-significant for majority of the cases as suggested by lower t-values of slope coefficient 'b'. Even though, for half of the investigated momentum strategies, lower momentum returns are observed in the month of January, the difference between January and non-January momentum returns is found to be statistically non-significant. The null hypothesis (b=0) is failed to be rejected for all the investigated momentum strategies, and it is concludes that momentum returns in the month of January are not statistically significantly different from that of other months in the Indian stock market.

Such results contradict the findings of Jegadeesh and Titman (1993, 2001), Grundy and Martin (2001), Yao (2012) and others, who reported significantly lower momentum returns in the month of January as compared to non-January months.

Table 2:January Seasonality Effect and Results of Dummy Variable Regression

Formation Period: 3, Holding Period: 6; Representation: (3X6)					
Portfolio	**A**	**t(α)**	**b**	**t(b)**	**Adj R2**
Winner (W)	0.0173	3.695*	-0.0314	-1.944**	0.014
Loser(L)	0.0087	1.533	-0.0291	-1.481	0.006
Momentum return (W-L)	0.0086	2.391*	-0.0023	-0.186	-0.005
Formation Period: 3, Holding Period : 9; Representation: (3X9)					
Portfolio	**A**	**t(α)**	**b**	**t(b)**	**Adj R2**
Winner (W)	0.0161	3.478*	-0.0291	-1.822**	0.012
Loser(L)	0.0107	1.904**	-0.0290	-1.513	0.006
Momentum return (W-L)	0.0053	1.636	0.0003	0.028	-0.005
Formation Period: 3, Holding Period: 12; Representation: (3X12)					
Portfolio	**A**	**t(α)**	**b**	**t(b)**	**Adj R2**
Winner (W)	0.0163	3.303*	-0.0295	-2.450*	0.013
Loser(L)	0.0100	1.844**	-0.0280	-1.455	0.005
Momentum return (W-L)	0.0058	1.944**	-0.0012	-0.124	-0.005
Formation Period: 6, Holding Period : 6; Representation: (6X6)					
Portfolio	**A**	**t(α)**	**b**	**t(b)**	**Adj R2**
Winner (W)	0.0172	3.502*	-0.0212	-1.265	0.0030
Loser(L)	0.0076	1.266	-0.0230	-1.158	0.0010
Momentum return (W-L)	0.0095	1.820**	0.0026	0.149	-0.005
Formation Period: 6, Holding Period: 9; Representation: (6X9)					
Portfolio	**A**	**t(α)**	**b**	**t(b)**	**Adj R2**
Winner (W)	0.0161	3.343*	-0.0173	-1.027	0.000
Loser(L)	0.0086	1.431	-0.0239	-1.134	0.001
Momentum return (W-L)	0.0070	1.608	0.0065	0.399	-0.004

Formation Period: 6, Holding Period: 12; Representation: (6X12)					
Portfolio	**A**	**t(α)**	**b**	**t(b)**	**Adj R2**
Winner (W)	0.0148	2.984*	-0.0234	-1.780**	0.006
Loser(L)	0.0090	1.559	-0.0229	-1.151	0.001
Momentum return (W-L)	0.0057	1.402	-0.0004	-0.003	-0.005

*Statistically significant at 5% level
**Statistically significant at 10% level.
The period analysed is from January, 1997 to March, 2013. The market-adjusted returns of winner, loser and Momentum return (W-L) portfolios are regressed using the dummy variable regression:Rpt= α + b Dt + εt. . The monthly returns of Nifty index areused as a proxy of the market portfolio. The dummy variable Dt =1 in the month of January and 0 in non-January month.

Table 3: April Seasonality Effect and Result of Dummy Variable Regression

Formation Period :3, Holding Period : 6; Representation: (3X6)					
Portfolio	**A**	**t(α)**	**b**	**t(b)**	**Adj R2**
Winner (W)	0.0100	2.288*	0.0520	3.205*	0.047
Loser(L)	0.0022	0.404	0.0507	2.532*	0.027
Momentum return (W-L)	0.0082	2.304*	0.0017	0.140	-0.005
Formation Period :3, Holding Period : 9; Representation: (3X9)					
Portfolio	**A**	**t(α)**	**b**	**t(b)**	**Adj R2**
Winner (W)	0.0091	2.0243*	0.0570	3.564*	0.058
Loser(L)	0.0047	0.8535	0.0440	2.219*	0.058
Momentum return (W-L)	0.0057	1.909**	0.0001	0.017	-0.005
Formation Period : 3, Holding Period : 12; Representation: (3X12)					
Portfolio	**A**	**t(α)**	**b**	**t(b)**	**Adj R2**
Winner (W)	0.0097	2.178*	0.0505	3.168*	0.045
Loser(L)	0.0040	0.723	0.05.3	2.549*	0.028
Momentum return (W-L)	0.0057	1.909**	0.0001	0.017	-0.005
Formation Period: 6, Holding Period : 6; Representation: (6X6)					
Portfolio	**A**	**t(α)**	**b**	**t(b)**	**Adj R2**
Winner (W)	0.0113	2.362*	0.0499	2.950*	0.039
Loser(L)	0.0014	0.240	0.0517	2.467*	0.026
Momentum return (W-L)	0.0093	1.896**	-0.0017	-0.009	-0.005
Formation Period: 6, Holding Period : 9; Representation: (6X9)					
Portfolio	**A**	**t(α)**	**b**	**t(b)**	**Adj R2**
Winner (W)	0.0107	2.264*	0.0490	2.964*	0.041
Loser(L)	0.0025	0.421	0.0500	2.441*	0.026
Momentum return (W-L)	0.0082	1.751**	-0.001	-0.100	-0.005
Formation Period : 6, Holding Period: 12; Representation: (6X12)					
Portfolio	**A**	**t(α)**	**b**	**t(b)**	**Adj R2**
Winner (W)	0.0080	1.874**	0.0510	2.667	0.049
Loser(L)	0.0031	0.538	0.0500	2.475*	0.026
Momentum return (W-L)	0.0055	1.378	0.0001	0.065	-0.005

*Statistically significant at 5% level
**Statistically significant at 10% level.
The period analysed is from January, 1997 to March, 2013. The market-adjusted returns of winner, loser and (W-L) portfolios are regressed using the dummy variable regression:Rpt= α + b Dt + εt. . The monthly returns of Nifty index are used as a proxy of the market portfolio. The dummy variable Dt =1 in the month of April and 0 in non-April months.

One of the explanations proposed by Jegadeesh and Titman (1993) for the negative return in the month of January is due to the strong January effect among losing stocks. If the proposed explanation of Jegadeesh and Titman (1993) is considered valid, then negative momentum return in the month of April is expected for the Indian stock market. According to Sehgal (2005) and Tripathi (2008), the January effect of U.S. is analogous to the April effect in India.

The empirical results regarding the seasonality of momentum profits in the month of April using the dummy variable regression is presented in Table 3. As discussed above, lower momentum returns in the month of April as compared to the non-April months are expected in the Indian stock market. However, it is clear from Table 3, both past winner and loser portfolio generates statistically higher returns in the month of April in comparison to non-April months for all the momentum strategies (as b>0). The slope coefficients (b) of both winner and loser portfolio in all the momentum strategy are observed to be statistically significant. Similarly, in majority of the investigated momentum strategies (except 6X6 and 6X9), higher momentum returns are observed in the month of April as compared to non-April months. Nevertheless, none of 'b' values are observed to be statistically significant. Hence, due to lower t-statistics of 'b', the null hypothesis is failed to be rejected for the momentum profits. Hence, in the Indian stock market, the momentum returns in the month of April are statistically not different from that of the remaining months of the year.

The results of the study suggest that seasonal effect observed by Jegadeesh and Titman (1993, 2001) and others are restricted to the U.S. stock market only, and loser stocks January effect related explanation cannot be accepted in the Indian stock market. Though it is important to point out here that in the Indian stock market there exist strong seasonality in the returns of both winner and loser stocks, wherein both generate significantly higher returns in the month of April.

Further, the study broadened the seasonality tests to investigate the behaviour of momentum returns for all the calendar months of the year. In order to test the seasonality in momentum returns in the months other than January and April, monthly momentum profits are calculated for all calendar months with the formation-holding period of3 and 6 months. The calendar months momentum profits are then tested for being significantly different. The difference between the mean monthly momentum and contrarian profits is calculated using parametric one way ANOVA F-test (analysis of variance F-test).

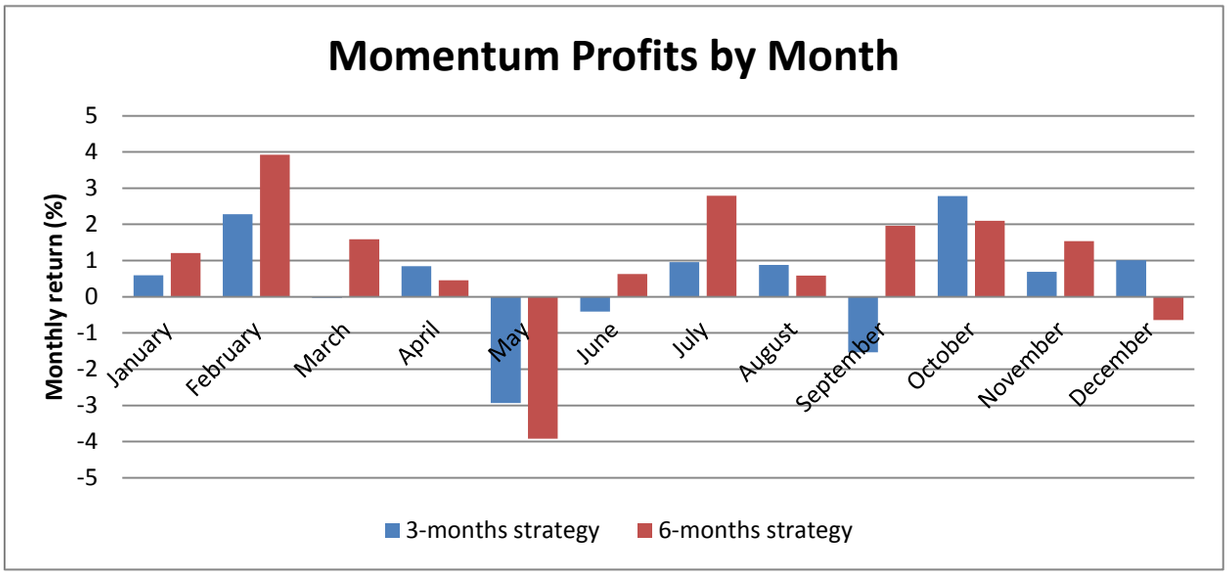
As can be observed from Table 4, the average monthly momentum profits for each of the 12 calendar months appear to fluctuate considerably. A pictorial representation of these results is presented in Fig. 2. The highest momentum profit from 3 months and 6 months formation period strategies is observed in the month of October and February, respectively. The higher momentum profits in October and February could be attributed to general positive market sentiments in these months. Prior Indian studies have suggested higher market returns in these months as compared to remaining months of the year (Pandey, 2002; Dash & Dutta, 2011). Contrarily, minimum momentum profits (negative) are observed in the month of May in the Indian stock market. Lower momentum profits in the month of May could be attributed to the overall low market sentiments in this month (Ray, 2012). Moreover, lower momentum returns in the month of May can also be related to famous May effect which is based on well-known market timing strategy, " Sell in May and go away", where investors close their positions in the month of May. However, these variations in monthly momentum profits over the sample period are not statistically different as predicted by lower values of parametric F-test. The F-value is found to be 0.782 over 3 months and 1.198 over 6 months formation period. Both values are found to be non-significant as predicted by higher value of p-values. These results imply that there is no significant difference in mean monthly momentum profits among different months and hence, momentum effect is not an outcome of any seasonality effect in the Indian stock market.

Table 4: Momentum Returns across Different Months

Month	3-months Formation	Month	6-months Formation
January	0.5980	January	1.2066
February	2.2800	February	3.9214
March	-0.0259	March	1.5930
April	0.8415	April	0.4542
May	-2.9367	May	-3.9223
June	-0.4081	June	0.6304
July	0.9543	July	2.7929
August	0.8833	August	0.5871
September	-1.5361	September	1.9588
October	2.7867	October	2.0983
November	0.6900	November	1.5414
December	1.0138	December	-0.6389
F-stat (ANOVA)	0.782 (0.658)	F-stat (ANOVA)	1.198 (0.292)

In nutshell, the result from the study suggests lack of seasonality in momentum profits in the Indian stock market. Hence, the type of seasonal patterns in momentum profits observed in the US stock market cannot be observed in the Indian stock market. The absence of any seasonality effect in momentum profits provides support for practical implication of momentum strategies in the Indian stock market.

Fig. 2: Momentum Profits across Different Months



CONCLUSION

The financial literature is replete with evidence of momentum profits across the globe. Providing support to the previous international as well domestic studies, the current study provide support in favour of momentum profitability in the Indian stock market over the time period from 1997 to 2013. While most of the previous studies on the Indian stock market focus on investigating momentum profitability, this study investigates monthly stability by examining seasonality patterns in momentum profitability. In contrast to the previous international studies, the study document that calendar effects have no statistically significant influence on momentum profits in the Indian stock market. Contrary to the US market findings, no January or similar April seasonality is observed in the Indian momentum profits. Though, momentum strategies performed differently in different calendar months, with particularly strong negative returns in the month of May. However, no statistically significant difference was observed among the mean monthly momentum returns across calendar months. Hence, seasonal disparity in momentum returns cannot be labelled as seasonality in the standard connotation.

The results obtained in the study suggest that some aspects of the Indian momentum profitability, especially seasonal patterns, are different from those previously observed in the US and other international stock markets. This is quite encouraging and interesting for future research on the topic, since majority of the times the findings from the US and other developed stock markets are replicated across the globe. The Indian stock market data can be used as aunique out-of-test to check the power of various theoretical as well as empirical models developed based on US findings to explain momentum profits.

Nevertheless, the overall results from the study provide support in favour of stability of momentum profits across calendar months of the year in the Indian stock market. Hence, absence of any seasonality effect in momentum profit provides support in favour of practical implication of momentum strategies by global as well as domestic investors throughout the year in the Indian stock market. The investment strategy relatively changed when one observes the returns of short-term past winner and loser portfolios individually, wherein strong seasonality is observed. Short-term winner and loser portfolios generate significantly higher returns in the month of April. Hence, it is more profitable to implement long (or buy) side momentum strategy in the month of April in the Indian stock market, suggesting that long-side momentum investors can improve their returns by timing their investments in the Indian stock market. Such findings provide support in favour of momentum investing in India and provide strong suggestions for stock market practitioners including mutual funds, analysts, investment banks and companies who constantly drill themselves to develop profitable investment strategies. It is worth to mention here that the current study failed to account for trading or implementing cost of momentum strategies in the Indian stock market. Since, every investment strategy may incur some trading cost; it is of high possibility that some of the momentum profits may get eliminated after adjusting for transaction cost. Therefore, a further research will be beneficial to validate the practical implementation of momentum strategy in the Indian stock market. In nutshell, research on momentum profitability in the Indian stock market still has some momentum.

REFERENCES

Agrawal, A., & Tandon, K. (1994). Anomalies or illusions? Evidence from stock markets in eighteen countries. *Journal of International Money and Finance,* 13(1), 83-106.

Ansari, A. V., & Khan, S. (2012). Momentum anomaly: Evidence from India. *Managerial Finance,* 38(2), 206-223.

Antoniou, A., Lam, H. Y. T., & Paudyal, K. (2007). Profitability of momentum strategies in international markets: The role of business cycle variables & behavioural biases. *Journal of Banking and Finance,* 31, 955-972.

Ariel, R. A. (1987). A monthly effect in stock returns. *Journal of Financial Economics,* 18(1), 161-174.

Ariel, R. A. (1990). High stock returns before holidays: Existence and evidence on possible causes. *The Journal of Finance,* 45(5), 1611-1626.

Asness, C. S., Moskowitz, T. J., & Pedersen, L. H. (2013). Value and momentum everywhere.*The Journal of Finance,* 68(3), 929-985.

Barberis, N., Shleifer, A., & Vishny, R. (1998). A model of investor sentiment. *Journal of Financial Economics,* 49(3), 307-343.

Chan, K., Jegadeesh, N., & Lakonishok, J. (1996). Momentum strategies.*The Journal of Finance, 51*(5), 1681-1713.

Cheng, J. W., & Wu, H. F. (2010). The profitability of momentum trading strategies: Empirical evidence from Honk Kong. *International Review of Economics and Finance,* 19, 527-538.

Chordia, T., & Shivakumar, L. (2002). Momentum, business cycle, and time-varying expected returns. *The Journal of Finance,* 57(2), 985-1010.

Chui, A. C., Titman, S., & Wei, K. J. (2010). Individualism and momentum around the world. *The Journal of Finance,* 65(1), 361-392.

Conrad, J., & Kaul, G. (1993). Long-Term market overreaction or biases in computed returns?*The Journal of Finance,* 48(1), 39-63.

Cooper, M. J., Gutierrez, R. C., & Hameed, A. (2004). Market states and momentum. *The Journal of Finance, 59*(3), 1345-1365.

Daniel, K., Hirshleifer, D., & Subrahmanyam, A. (1998). Investor psychologyand security market under- and overreactions. *The Journal of Finance,* 53(6), 1839-1885.

Dash, M., & Dutta, A. (2011). Seasonality and market crashes in Indian stock market. *Asian Journal of Finance & Accounting,* 3(1), 174-184.

DeBondt, W. F., & Thaler, R. (1985). Does the stock market overreact? *The Journal of Finance,* 40(3), 793-805.

Dhankar, R. S., & Maheshwari, S. (2014). A study of contrarian and momentum profits in Indian stock market. *International Journal of Financial Management,* 4(2), 40-54.

Durand, R. B., Limkriangkrai, M., & Smith, G. (2006). Momentum in Australia-A note. *Australian Journal of Management,* 31, 355-364.

French, K. (1980). Stock returns and the weekend effect. *Journal of Financial Economics,* 8(1), 55-69.

Gibbons, M. R., & Hess, P. (1981). Day of the week effects and asset returns.*The Journal of Business, 54*(4), 579-596.

Griffin, J. M., Ji, X., & Martin, J. S. (2003). Momentum investing and business cycle risk: Evidence from pole to pole. *The Journal of Finance,* 58(6), 2515-2547.

Grinblatt, M., & Han, B. (2005). Prospect theory, mental accounting and momentum.*Journal of Financial Economics,* 78(2), 311-339.

Grinblatt, M., & Moskowitz, T. J. (2004). Predicting stock price movements from past returns: The role of consistency and tax-loss selling. *Journal of Financial Economics,* 71(3), 541-579.

Grundy, B. D., & Martin, J. S. (2001). Understanding the nature of the risks and the source of the rewards to momentum investing.*Review of Financial Studies,* 14(1), 29-78.

Gultekin, M. N., & Gultekin, N. B. (1983). Stock market seasonality : International evidence. *Journal of Financial Economics,* 12(4), 469-481.

Hong, H., & Stein, J. C. (1999). A unified theory of underreaction, momentum trading , and overreaction in asset markets. *The Journal of Finance,* 54(6), 2143-2184.

Jegadeesh, N., & Titman, S. (1993). Returns to buying winners and selling losers: Implications for stock market efficiency. *The Journal of Finance,* 48(1), 65-91.

Jegadeesh, N., & Titman, S. (2001). Profitability of momentum strategies: An evaluation of alternative explanations. *The Journal of Finance,* 56(2), 699-720.

Karolyi, G. A., & KHo, B. C. (2004). Momentum strategies: Some bootstrap tests. *Journal of Empirical Finance,* 11(4), 509-536.

Kato, K., & Schallheim, J. S. (1985). Seasonal and size anomalies in the Japanese stock market. *Journal of Financial and Quantitative Analysis*, 20(2), 243-260.

Lui, W., Strong, N., & Xu, X. (1999). The profitability of momentum investing. *Journal of Business Finance & Accounting,* 26(9-10), 1043-1091.

Mengoli, S. (2004). On the source of contrarian and momentum strategies in the Italian equity market. *International Review of Financial Analysis,* 13, 301-331.

Moskowitz, T. J., & Grinblatt, M. (1999). Do Industries Explain Momentum. *Journal of Finance*, 54, 1249-1290.

Pandey, I. M. (2002). Seasonality of monthly stock returns: The Indian evidence. *Journal of Applied Finance,* 8(6), 53-67.

Phua, V., Chan, H., Faff, R., & Hudson, R. (2010). The influence of time, seasonality and market state on momentum: Insights from the Australian stock market. *Applied Financial Economics,* 20(20), 1547-1563.

Ray, S. (2012). Investigating seasonal behavior in the monthly stock returns: Evidence from BSE sensex of India. *Advances in Asian Social Science,* 2(4), 560-569.

Rouwenhorst, K. G. (1998). International momentum strategies. *The Journal of Finance,* 53(1), 267-284.

Rouwenhorst, K. G. (1999). Local return factors and turnover in emerging stock markets. *The Journal of Finance,* 54, 1439-1464.

Rozeff, M. S., & Kinney, W. R. (1976). Capital market seasonality: The case of stock returns. *Journal of Financial Economics,* 3(4), 379-402.

Sehgal, S. (2005). *Asset pricing in Indian stock market.* India: New Century Publications.

Sehgal, S., & Balakrishnan, I. (2002). Contrarian and momentum strategies in the Indian capital market.*Vikalpa,* 27(1), 13-19.

Sehgal, S., & Jain, S. (2012). Short-term prior return patterns in stocks and sector returns: Evidence for BRICKS markets. *Investment Management and Financial Innovations,* 9(1), 93-114.

Tripathi, V. (2008). *Size effect in Indian stock market.* New Delhi: Serials Publication.

Yao, Y. (2012). Momentum, contrarian, and the January seasonality.*Journal of Banking & Finance,* 36, 2757-2769.