Momentum and Contrarian Profitability: Insights from the Indian Stock Market under Alternative Approaches

Ms. Supriya Maheshwari[1], Prof. Raj S Dhankar[2]
[1]Research Scholar, Faculty of Management Studies, University of Delhi, India
[2]Professor, Faculty of Management Studies, University of Delhi, India

ABSTRACT

The study explored the effectiveness of momentum and long-term contrarian strategy in the Indian stock market using data from National Stock Exchange (NSE). The study further examined the similarities and difference in momentum and long-term contrarian profitability using multiple return computation method. The results from the study provide support in favor of both momentum and long-term contrarian strategy in the Indian stock market. The strong momentum and contrarian profits in the Indian stock market are not explained by biases and errors in return computation method as argued in International literature. Such results provide support in favor of momentum and long-term contrarian profitability in the Indian stock market. Earlier studies in the Indian context were primarily focused on testing momentum and contrarian profitability. The study enhances the current literature by empirically showing that such mispricing in the Indian stock market is not an outcome of faulty methodology.

Keywords: Momentum, Contrarian, Indian stock market, Buy and Hold Approach

1. INTRODUCTION

The apparent predictability in future stock returns and the related profitability of investment strategies has been a controversial as well as debatable issue over the past few decades. A number of studies, conducted over multiple stock markets, have reported results supporting the profitability of such investment strategies over differing investment horizon ranging from short to longer time period. Among these, momentum and long-term contrarian strategies have attracted considerable attention among the academicians as well as global practitioners. Both momentum and long-term contrarian strategy suggests predictable patterns in the future stock returns. While, momentum strategy involves taking advantage of momentum or continuation anomaly (Jegadeesh and Titman, 1993), long-term contrarian strategy entails overreaction or stock return reversal effect (DeBondt and Thaler, 1985).

The momentum strategy entails the purchase of past high performing stocks and selling low performing stocks taking advantage of stock continuation effect. The contrarian strategy based on long-term stock return reversal suggest buying of past low performing stocks and selling past high performing stocks. The evidences relating to profitability of momentum and long-term contrarian strategy are documented for varied stock market across the globe including US, UK and other European and Asian developed stock markets. In addition, profitability of these

strategies is not restricted to equity markets, rather strong returns are observed for other assets including bonds, currencies and commodities.

The profitability of momentum and long-term overreaction based strategy pose significant question on the validity of Efficient Market Hypothesis (EMH). As a result multiple explanations are proposed in the literature to explain these effects within the paradigm of EMH. However, none of these explanations were found to be satisfactory in explaining momentum and long-term contrarian profits. Moreover, there is no consensus among the existing literature regarding the best method for computation of returns from these strategies. The method employed for calculating the average returns for these strategies is a more delicate issue that might seem at first as conflicting empirical results has not able to attest whether the results holds true when different methods of return computation are employed. Such gap in the literature motivated the current research investigation addressing how different methods of return computation impact the robustness of the results.

The current study investigates the profitability of momentum and long-term contrarian strategy in the Indian stock market, one of the largest emerging markets. The study further evaluate whether the strong returns from these strategies are not due to use of inappropriate method of calculation of excess returns.

The remainder of the paper is as follows: Section 2 discusses the existing literature on momentum and long-term overreaction effect. Section 3 describe the empirical design of the study emphasizing data and methodology adopted followed by Section 4 with empirical results. Section 5 finally concludes the paper.

2. LITERATURE REVIEW

Long-term contrarian strategy is based on long-term overreaction effect that was first observed by Debondt and Thaler (1985). DeBondt and thaler (1985) documented a reversal phenomenon (known as overreaction effect) with the help of US data where long term past loser stocks outperformed the long term past winner stocks over a subsequent period of three to five years. They observed the NYSE monthly return data for the period 1926-1982 by focusing on stocks that have experienced either extreme capital gain or losses over the period of last five years. The methodology used by DeBondt and Thaler (1985) involved the construction of two portfolios: Winner and Loser. Empirical results of the study shows that on an average the loser portfolio outperformed the market by 19.6% and winner underperform the market by 5% generating a return differential of 24.6% (known as contrarian profits).

Jegadeesh and Titman (1993) had thrown a new light on the influential work of Debondt and Thaler (1985) and found evidence in favour of short term momentum effect and long term reversals in the US stock market. Jegadeesh & Titman (1993) was the first one to uncovered that, the strategy (known as momentum strategy) that buy stocks with high return over the past three to twelve months (Winners) and sell stocks with poor returns over the same time period (Losers), earn profits of around 1% per month over the following year. Jegadeesh and Titman (1993) observed strong momentum returns for strategies with formation and holding period ranging from 3 to 12 months.

The possibility of earning momentum and long-term contrarian profits are not restricted to US stock market. Both momentum and long-term contrarian strategy have been found to work in other international markets too. For example, Baytas and Cakici (1999) examined the seven developed US, Canadian, Japanese, French, Italian, German and UK stock markets and found strong evidence of long-term contrarian profits in two and three year period for all countries except USA and Canada. Similarly, Alonso and Rubio (1990) for Spanish stock market, Stock (1990) for German stock market, Campbell and Limmack (1997) and Andrikopoulous et al. (2011) for UK, Swallow and Fox (1998) for New Zealand Stock Exchange, Yao (2012) for US confirmed the presence of strong contrarian profits. As far as Asian stock markets are concerned, Fung (1999) for Honk Kong, Chou, Wei and Chung (2007) for Japanese and Dhankar and Maheshwari (2014) for the Indian Stock Market reported results in favor of long-term contrarian profitability. Similarly, strong momentum profits were observed for European and emerging markets (Rouwenhorst, 1998). Griffin, Ji and Martin (1993) investigated momentum profitability on a global scale, using data of 40 countries and observed momentum profitability all around the world. Similarly, Liu et al (1999) for UK, Hurn and Pavlov (2003) for Australia, Mengoli (2004) for Italy, Demir et al. (2004) and Phua et al. (2010) for Australia, Cheng and Wu (2010) for Honk Kong and Maheshwari and Dhankar (2015) for the Indian stock market reported strong momentum profits.

Number of explanation has been proposed in the literature to explain momentum and long-term contrarian strategy. However, among these the explanation based on biases in method used for computing returns is the focal point of the current study. The choice of method for computing excess returns might seem a delicate issue at first, however, it has been considered quite important, particularly when stock market anomalies such as long-term overreaction and momentum are considered. For example, Conrad and Kaul (1993) argued that contrarian strategy could spuriously exaggerate the contrarian profits when returns are calculated by arithmetical method suggested by DeBondt and Thaler (1985). They recommended the use of buy-and-hold approach where single period returns were compounded instead of adding together as suggested by arithmetical approach. Further, Dissanaike (1997) and Andrikopoulas et al. (2011) also reported results against the use of arithmetic method. Even though, Demir et al. (2004) observed notable differences in momentum return when the two methods were applied in the Australian stock market, the difference among the two were observed to be statistically non-significant. However, Jegadeesh and Titman (1993), Loughran and Ritter (1996), Ahmad and Hussain (2001) and Forner and Marhuenda (2003) reported similar results from buy-and-hold and arithmetic method for the US, Malaysian and Spanish stock market. Loughran and Ritter (1996) challenged the findings of Conrad and Kaul (1993) and provided evidence suggesting that once portfolios are selected, both return computational methods generate similar returns. Such contradictory evidences in the literature motivated the current research investigation addressing how different methods of return computation impact the robustness of the results using data from the Indian stock market.

3. DATA AND METHODOLOGY

3.1 Sample data

The sample used for the current study comprises of tradable stocks that are continuously trading on National Stock exchange (NSE) during the period January 1997 to March 2013. This sample

contains total of 328 stocks. Monthly adjusted closing price data for all the 328 stocks over the complete sample period was collected from CMIE Prowess database. The Nifty index is used as the proxy for the return on market portfolio.

3.2 Methodology

The most common approach to test momentum and long-term contrarian strategies involves constructing short term and long-term portfolios on the basis of past stock returns. The study also employs the same portfolio testing method as suggested by Jegadeesh and Titman (1993) using market-adjusted returns instead of raw returns.

At the end of each F-month (F=3,6 months for momentum and F=36 months for long-term contrarian strategy) formation period, stocks were ranked in ascending order on their cumulative market-adjusted return.

The stocks were then assigned to 1 of the 5 equally weighted portfolios where portfolio 1 represent 'loser' portfolio with the lowest performing stocks having lowest past F-month cumulated market adjusted return. On the contrary, portfolio 5 represent 'winner' portfolio with stocks having highest past F-month cumulated market adjusted return.

The portfolios are then held for next H holding months (H=3,6,9, 12 for momentum and H=12, 18, 24 and 36 for contrarian) giving a total of 8 momentum and 4 long-term contrarian strategies. The portfolios were rebalanced at the end of each formation period. Holding period returns (also known as cumulative excess return) are measured in two ways: arithmetic and buy-hold returns. The study prefers arithmetical return method as proposed by DeBondt and Thaler (1985) since arithmetic returns are portfolio additive. However, for robustness of the results, buy-hold returns of portfolios were also computed. A number of previous studies (Conrad and Kaul, 1993; Barber and Lyon, 1997; Dissanaike, 1997) suggested use of buy-hold returns. It has been argued in the literature that restricting the analysis to arithmetic return method may lead to incorrect inferences.

Cumulative excess return (CAR) of a portfolio over the holding period (T) is calculated as :

Using arithmetic return method: $$CAR = \sum_{t=1}^{T} AR_{P,t}$$

Using Buy-hold approach: $$CAR = \prod_{t=1}^{T}(1 + AR_{P,t}) - 1$$

Where, $AR_{p,t}$ is the market adjusted average return of portfolio (winner/loser) and T is the holding period.

Market adjusted average return of portfolio ($AR_{P,t}$) is calculated as:

$$AR_{P,t} = \sum_{i=1}^{n} \frac{1}{n} R_{i,t} ; \qquad t = 1, 2, 3 \dots H \ months; P= W/L$$

Where W and L denote the winner and loser portfolio, respectively, $R_{i,t}$ is the market adjusted return of security i, and n represents the total number of securities in each portfolio.

Using the CAR's from all the non-overlapping test periods, the average CAR (ACAR) are calculated for both winner and loser portfolio for each of the H-month of all the non-overlapping test periods.

$$ACAR_{P,t} = \frac{\sum_{j=1}^{N} CAR_{P,j,t}}{N} \; ; t = 1,2,3 \ldots .. H \; month$$

Where N is the total number of non-overlapping test periods.

Momentum strategy 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. On the other hand, long-term contrarian strategy entails long-term reversal in stock returns. Hence, the average differential between winner and loser (Winner-Loser) portfolio must be less than zero suggesting higher profits for loser as compared to winner portfolio. The statistical significance of the same is tested using parametric one sample 't-test'and non-parametric Wilcoxon sign test.

4. EMPIRICAL RESULTS

Table 1 present the result of monthly market adjusted returns of winner, loser as well as differential between them for various momentum and contrarian strategies using arithmetic return method proposed by DeBondt and Thaler (1985). Panel I and II report results for short to intermediate momentum strategy while panel III present result for long-term strategy. It is clear from Table 1 that over the formation period 3 and 6 months, the past high performing stocks (Winner) continue to outperform the past poor performing stocks (losers) over the next 3 to 12 months. However, over the longer time horizon of 36 months, the past low performing stocks (losers) reverse to outperform the past high performing stocks (winners). Though, significant contrarian profits are observed only over the formation and holding period of 36 months.

The profitability of momentum strategies in short-to-intermediate time horizon in the Indian stock market is consistent with the prior findings (Jegadeesh and Titman, 1993, 2001;) from the U.S. market, and (Rouwenhorst, 1998; Lui et al., 1999; Mengoli, 2004; Hurn and Pavlov, 2003; Demir et al., 2004; Phua et al., 2010; Cheng and Wu, 2010; etc.) for the European and other markets. Similarly, profitability of contrarian strategies over the long time horizon in the Indian stock market is also consistent with prior findings (DeBondt and Thaler, 1985; Alonso and Rubio, 1990; Stock, 1990; Campbell and Limmack, 1997; Andrikopoulous et al., 2011; Swallow and Fox, 1998; Yao, 2012; etc.) from the U.S. and other stock markets.

The results over the formation period of 3 and 6 months do not seem to differ dramatically from the U.S. and other international stock markets. For instance, Jegadeesh and Titman (1993) reported monthly momentum profits of 0.95% over formation-holding period equal to 6 months in the U.S. stock market which is comparable to monthly profits of 0.87% in the Indian stock market over the same strategy. Similarly, DeBondt and Thaler(1985) reported cumulative excess return (L-W) of 24.6%, for the long-term (36X36) contrarian strategy which is comparable to 21.3% in the Indian stock market. To summarize, the above results suggest existence of short-term momentum as well as long-term reversal effect in the Indian stock market. These results support the stock return predictability based on the past returns in Indian stock market, challenging the weak form of market efficiency.

For the robustness and comparison, the results using the compounded method are reported in Table 2. Striking similarities are observed among the results of both arithmetic and compounding

return method for both momentum as well as long-term contrarian profits. The similarity of the results can be seen among all the statistically significant momentum strategies. Interestingly, when compound method to measure abnormal return is used, long-term contrarian strategy generated even more impressive profits. The computed arithmetic returns of winner and loser portfolios are found to be smaller than buy-hold returns in 91% of the investigated cases. Moreover, differences among the returns as calculated from two different returns metric is found to be statistically non-significant using parametric two-independent sample-t test and non-parametric Mann-Whitney U test, as presented in Table 3. Nevertheless, the similarity between the results of two alternative methods suggests that momentum and long-term contrarian profits observed over the Indian stock market are not an outcome of inappropriate methodology. These results are in confirmatory with Loughran and Ritter (1996), Ahmad and Hussain (2001), Forner and Marhuenda (2003), Demir et al. (2004) who also reported similar results from buy-hold and arithmetic method in the U.S., Malaysian, Spanish and Australian stock market.

In addition, Figure 1 compares the ACAR of arbitrage portfolio over (3X6) and (6X6) momentum and (36X36) contrarian strategy as generated by arithmetic and the compounding buy-and hold alternative method. Similarity in results from different computational methods provides additional support in favour of momentum and long-term contrarian strategy in the Indian stock market. Hence, for both momentum and contrarian strategy, the change in the return computing method has no statistically significant impact on the profitability obtained in the Indian stock market.

Table 1: Summary Statistics of Past-Return Based Portfolios using Cumulative return method
Sample Period: January 1997 to March 2013

Panel-I

Formation Period : 3 months				
Average Cumulative Abnormal Return (ACAR)				
Portfolio	**Holding Period in months (H)**			
	H=3	**H=6**	**H=9**	**H=12**
Winner (W)	0.0389	0.0883	0.1254	0.1688
	(0.05)	(0.00)	(0.00)	(0.00)
Loser (L)	0.0269	0.0383	0.0766	0.1072
	(0.148)	(0.148)	(0.02)	(0.07)
Arbitrage (W-L)	0.0120	0.0500	0.0488	0.0616
t-statistics	0.871	2.410*	1.750**	1.990*
Wilcoxon Z statistics	1.246	3.236*	1.940**	2.282*
Monthly profits (%)	0.4000	0.8333	0.5422	0.5133

Panel-II

Formation Period : 6 months				
Average Cumulative Abnormal Return (ACAR)				
Portfolio	**Holding Period in months (H)**			
	H=3	**H=6**	**H=9**	**H=12**
Winner (W)	0.0493	0.0924	0.1343	0.1621
	(0.12)	(0.06)	(0.01)	(0.01)
Loser (L)	-0.0055	0.0336	0.0481	0.1003
	(0.825)	(0.384)	(0.30)	(0.077)
Arbitrage (W-L)	0.0548	0.0587	0.0862	0.0618
t-statistics	3.140*	1.94**	2.277*	1.430
Wilcoxon Z statistics	2.822*	2.175*	2.376*	1.78**
Monthly Profits (%)	1.8267	0.9783	0.9578	0.5150

Panel III

Formation Period : 36 months				
Average Cumulative Abnormal Return (ACAR)				
Portfolio	**Holding Period in months (H)**			
	H=12	**H=18**	**H=24**	**H=36**
Winner (W)	0.1019	0.1573	0.1922	0.2742
	(0.20)	(0.13)	(0.07)	(0.04)
Loser (L)	0.1158	0.2459	0.2913	0.5124
	(0.140)	(0.05)	(0.04)	(0.12)
Arbitrage (W-L)	-0.0140	-0.0886	-0.0991	-0.2382
t-statistics	-0.264	-1.302	-1.243	-2.20*
Wilcoxon Z statistics	-0.175	-1.334	-1.098	-2.11*
Monthly Profits (%)	-0.1167	-0.4922	-0.4129	-0.6617

*Statistically significant at 5% level
**Statistically significant at 10% level.

This table presents ACAR of winner, loser and arbitrage portfolio (W-L) using buy-hold compounding return metric using NSE sample data. The p-statistics of winner and loser portfolio are reported in parentheses (). The null hypothesis of t-statistics and Wilcoxon sign Z statistics is H_o : ACAR (A) = 0.

Table 2: Robustness Check of Momentum and Long-Term Contrarain Profits using Differential Return Metric (Buy and Hold).

Panel I

Formation Period : 3 months				
Average Cumulative Abnormal Return (ACAR)				
Portfolio	**Holding Period in months (H)**			
	H=3	**H=6**	**H=9**	**H=12**
Winner (W)	0.0381	0.0918	0.1343	0.1847
	(0.08)	(0.00)	(0.00)	(0.00)
Loser (L)	0.0276	0.0418	0.0854	0.1208
	(0.156)	(0.141)	(0.026)	(0.01)
Arbitrage (W-L)	0.0105	0.0500	0.0488	0.0639
t-statistics	0.730	2.197*	1.518	1.880**
Wilcoxon Z statistics	1.369	3.350*	1.993*	2.319*

Panel II

Formation Period : 6 months				
Average Cumulative Abnormal Return (ACAR)				
Portfolio	**Holding Period in months (H)**			
	H=3	**H=6**	**H=9**	**H=12**
Winner (W)	0.0491	0.0985	0.1429	0.1777
	(0.017)	(0.08)	(0.002)	(0.01)
Loser (L)	-0.0044	0.0378	0.0545	0.1148
	(0.859)	(0.370)	(0.314)	(0.083)
Arbitrage (W-L)	0.0536	0.0607	0.0884	0.0629
t-statistics	3.011*	1.826**	1.990*	1.130
Wilcoxon Z statistics	2.665*	2.058*	2.437*	1.960*

Panel III

Formation Period : 36 months				
Average Cumulative Abnormal Return (ACAR)				
Portfolio	Holding Period in months (H)			
	H=12	H=18	H=24	H=36
Winner (W)	0.1190	0.1842	0.2052	0.2955
	(0.172)	(0.151)	(0.119)	(0.09)
Loser (L)	0.1322	0.3150	0.3716	0.7441
	(0.07)	(0.06)	(0.04)	(0.02)
Arbitrage (W-L)	-0.0132	-0.1308	-0.1664	-0.4486
t-statistics	-1..22	-1.366	-1.564	-2.167*
Wilcoxon Z statistics	-1.44	-1.490	-1.255	-1.760**

*Statistically significant at 5% level

**Statistically significant at 10% level.

This table presents ACAR of winner, loser and arbitrage portfolio (W-L) using buy-hold compounding return metric using NSE sample data. The p-statistics of winner and loser portfolio are reported in parentheses (). The null hypothesis of t-statistics and Wilcoxon sign Z statistics is H_o : ACAR (A) = 0.

Table 3: Comparison of returns from different return metric method.

Portfolio		Holding Period in months (H)			
		H=3	H=6	H=9	H=12
Formation Period = 3 months					
Winner (W)	ACAR (Arithmetic Return Method)	0.0389	0.0883	0.1254	0.1688
	ACAR (Buy-Hold Return Method)	0.0381	0.0918	0.1343	0.1847
	t-statistics	0.042 (0.966)	-0.112 (0.911)	-0.220 (0.826)	-0.330 (0.742)
	Mann-Whitney U Statistics	1970 (0.944)	1897 (0.901)	1808 (0.788)	1781 (0.921)
Loser (L)	ACAR (Arithmetic Return Method)	0.0269	0.0383	0.0766	0.1072
	ACAR (Buy-Hold Return Method)	0.0276	0.0418	0.0854	0.1208
	t-statistics	-0.025 (0.980)	-0.090 (0.928)	-0.176 (0.860)	-0.227 (0.821)
	Mann-Whitney U Statistics	1957 (0.893)	1887 (0.901)	1849 (0.953)	1755 (0.813)
Arbitrage (W-L)	ACAR (Arithmetic Return Method)	0.0120	0.0500	0.0488	0.0616
	ACAR (Buy-Hold Return Method)	0.0105	0.0500	0.0488	0.0639
	t-statistics	0.075 (0.941)	-0.002 (0.99)	-0.002 (0.998)	-0.045 (0.964)

	Mann-Whitney U Statistics	1955 (0.886)	1894 (0.889)	1828 (0.868)	1759 (0.830)
Formation Period = 6 months					
Winner (W)	ACAR (Arithmetic Return Method)	0.0493	0.0924	0.1343	0.1621
	ACAR (Buy-Hold Return Method)	0.0491	0.0985	0.1429	0.1777
	t-statistics	0.008 (0.994)	-0.131 (0.896)	-0.155 (0.878)	-0.235 (0.815)
	Mann-Whitney U Statistics	471 (0.894)	466 (0.838)	445 (0.941)	439 (0.871)
Loser (L)	ACAR (Arithmetic Return Method)	-0.0055	0.0336	0.0481	0.1003
	ACAR (Buy-Hold Return Method)	-0.0044	0.0378	0.0545	0.1148
	t-statistics	-0.030 (0.977)	-0.074 (0.941)	-0.092 (0.927)	-0.163 (0.871)
	Mann-Whitney U Statistics	480 (0.994)	471 (0.894)	435 (0.824)	430 (0.767)
Arbitrage (W-L)	ACAR (Arithmetic Return Method)	0.0548	0.0587	0.0862	0.0618
	ACAR (Buy-Hold Return Method)	0.0536	0.0607	0.0884	0.0629
	t-statistics	0.050 (0.960)	-0.044 (0.965)	-0.036 (0.971)	-0.015 (0.988)
	Mann-Whitney U Statistics	474 (0.927)	478 (0.972)	437 (0.848)	436 (0.836)
Formation Period = 36 months					
		H=12	H=18	H=24	H=36
Winner (W)	ACAR (Arithmetic Return Method)	0.1019	0.1573	0.1922	0.2742
	ACAR (Buy-Hold Return Method)	0.1190	0.1842	0.2052	0.2955
	t-statistics	-0.109 (0.914)	-0.174 (0.864)	-0.084 (0.934)	-0.108 (0.915)
	Mann-Whitney U Statistics	83 (0.960)	72 (1.00)	65 (0.713)	58 (0.898)
Loser (L)	ACAR (Arithmetic Return Method)	0.1158	0.2459	0.2913	0.5124
	ACAR (Buy-Hold Return Method)		0.3150	0.3716	0.7441
	t-statistics	-0.100 (0.921)	-0.363 (0.721)	-0.391 (0.700)	-0.692 (0.497)
	Mann-Whitney U Statistics	84 (1.00)	69 (0.887)	68 (0.843)	57 (0847)
Arbitrage (W-L)	ACAR (Arithmetic Return Method)	-0.0140	-0.0886	-0.0991	-0.2382
	ACAR (Buy-Hold Return Method)	-0.0132	-0.1308	-0.1664	-0.4486
	t-statistics	-0.009 (0.993)	0.359 (0.724)	0.506 (0.618)	0.901 (0.382)
	Mann-Whitney U Statistics	83 (0.960)	66 (0.755)	65 (0.713)	54 (0.699)

*significant at 5%

**significant at 10%

The current table compares the ACAR of Winner; Loser and Arbitrage portfolios measured using two different return metric methods: Arithmetic return method and buy-hold return metric method using the NSE sample data. Parametric two-sample t test is used to test the significance of difference among the returns calculated using two different return metric methods. The alternative non-parametric Mann-Whitney U test is also used. The corresponding p values are presented in ().
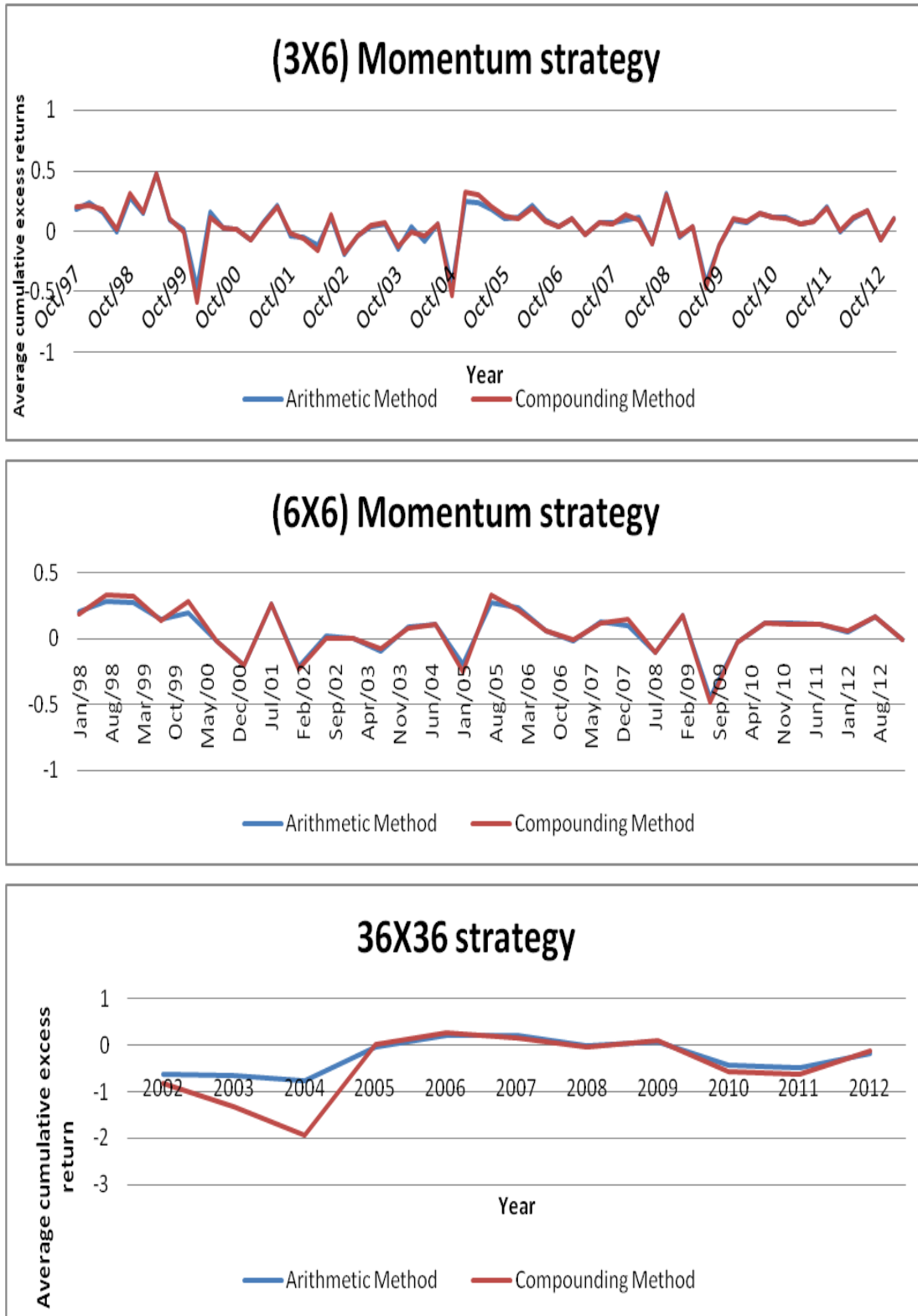
Figure 1: Comparison of momentum and long-term contrarian profits using different return metric

5. CONCLUSION & IMPLICATIONS

The study evaluates the momentum and long-term reversal effect in the Indian stock market over the sample period January 1997 to March 2013. The focus of the study is to test whether the profits from these strategies is due to errors in return computational method. The results from the study present convincing evidence that statistically significant short term momentum and long-term overreaction effect existed in the Indian stock market. The empirical analysis of both momentum and long-term contrarian profits suggest that changes in return computation method does not alter the momentum and long-term contrarian profitability in the Indian stock market. The difference between buy-hold returns and arithmetic returns were found to be small and statistically insignificant.

The findings from the study provide important implication, not only for the Indian stock market, but for stock markets in general, as they provide additional empirical evidence suggesting that both momentum and long-term contrarian strategies are not an outcome of faulty methodology. The findings of the study also provide useful evidences for the investment community. The investment companies, mutual fund managers, retail investors could improve their investments by using momentum strategy in short term wile contrarian strategy in long-term in the Indian stock market. However, there are fewer things that remained to be explored. The notion of implementable momentum and long-term contrarian strategies need to be dwelled further as the study ignored the transaction cost involved in implementing these strategies.

REFERENCES

Ahmad, Z., & Hussain, S. (2001). KLSE long run overreaction and the Chinese new year effect. *Journal of Business Finance and Accounting, 28*(1-2), 63-105.

Andrikopoulos, P., Arief, D., & Pagas, P. (2011). The time-varying nature of the overreaction effect: Evidence from the UK. *International Journal of Banking and Finance, 8*(2), 1-35.

Barber, B. M., & Lyon, J. D. (1997). Detecting long-run abnormal stock returns: The empirical power and specification of test statistics. *Journal of Financial Economics, 43(3)*, 341-372.

Baytas, A., & Cakici, N. (1999). Do markets overreact: International evidence. *Journal of Banking and Finance, 23*, 1121-1144.

Campbell, K., & Limmack, R. (1997). Long-term overreaction in the UK stock market and size adjustments. *Applied Financial Economics, 7*(5), 537-548.

Chou, P.H., Wei, K. J., & Chung, H. (2007). Sources of contrarian profits in the Japanese stock market. *Journal of Empirical Finance, 14(3)*, 261-286.

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

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

Demir, I., Muthuswamy, J., & Walter, T. (2004). Momentum returns in Australian equities:The influences of size, risk, liquidity and return computation. *Pacific-Basin Finance Journal, 12(2)*, 143-158.

Dhankar, R. S.,& Maheshwari, S. (2014). A study of contrarian and momentum profits in Indian stock market. *International Journal of Financial management, Volume 4, No 2, 40-54*

Dissanaike, G. (1997). Do stock market investors overreact. *Journal of Business Finance & Accounting, 24*(1), 27-49.

Forner, C., & Marhuenda, J. (2003). Contrarian and momentum strategies in the Spanish stock market. *European Financial Management, 9*(1), 67-88.

Fung, A. K.W. (1999). Overreaction in the Honk-Kong stock market. *Global Finance Journal, 10*(2), /223-230.

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.

Hurn, S., & Pavlov, V. (September 2003). Momentum in Australian stock returns. *Australian Journal of Management, 28*(2), 141-155.

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.

Loughran, T., & Ritter, J. R. (1996). Long-term market overreaction: The effect of low priced stocks. *The Journal of Finance, 51*(5), 1959-1970.

Maheshwari, S., & Dhankar, R. S. (2015). Seasonality in momentum profits: evidence from the Indian stock market. *Journal of Commerce & Accounting Research*, *4(3),* 8-18.

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

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.

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.

Stock, D. (1990). Winner and loser anomalies in the German stock market. *Journal of Institutional and Theoretical Economics, 146*(3), 518-529.

Swallow, S., & Fox, M. A. (1998, March). Long run overreaction on the New Zealand stock exchange. *Commerce Division discussion paper, 48*. Lincoln University. Commerce Division. Retrieved December 24, 2011, from http://hdl.handle.net/10182/866.

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