Contrarian and Momentum Strategies in the Indian Capital Market

Sanjay Sehgal and I Balakrishnan

The study attempts to evaluate if there are any systematic patterns in stock returns for the Indian market. The empirical findings reveal that there is a reversal in long-term returns, once the short-term momentum effect has been controlled by maintaining a one year gap between portfolio formation period and the portfolio holding period. A contrarian strategy based on long-term past returns provides moderately positive returns. Further, there is a continuation in short-term returns and a momentum strategy based on it provides significantly positive payoffs. The results in general are in conformity with those for developed capital markets such as the US.

Sanjay Sehgal is Reader in Finance at the Department of Financial Studies, University of Delhi, South Campus, Delhi, e-mail: alkas@vsnl.com

I Balakrishnan is a final year MBF student at the Indian Institute of Finance, Delhi, e-mail: ibkrish@rediffmail.com

Introduction

The mean-variance Capital Asset Pricing Model (or CAPM) developed by Sharpe (1964) and Lintner (1965) has been the most acceptable paradigm over time for determining expected return on any risky asset. The investment researchers and practitioners are, however, persistently involved in designing trading strategies that outperform the CAPM benchmark and hence provide extra-normal returns. Such extra-normal return strategies attempt to gain from probable stock market inefficiencies. One prominent CAPM anomaly has been addressed by De Bondt and Thaler (1985) relating to a pattern in long-term past returns. They document that stock portfolios with low long-term past returns (for the period three to five years) tend to outperform, in future, the portfolios with high long-term past returns for the US market. The investment strategies based on such a reversal in long-term past returns are commonly referred to as contrarian strategies. De Bondt and Thaler suggest that the contrarian strategy works owing to investor over-reaction to past information. Some researchers, however, suggest that the De Bondt and Thaler results can be explained by the systematic risk of the contrarian portfolios and the size effect (Chan, 1988; Ball and Kothari, 1989; and Zarowin, 1990).

Jagdeesh (1990) provides evidence of return reversals over very short-term periods (say a week or a month). He, however, insists that since such strategies are transaction-intensive and based on very short-term price movements, their apparent success may reflect presence of a short-term price pressure or lack of liquidity in the market rather than over-reaction. Lo and McKinley (1990) argue that a large portion of extra-normal returns shown by Jagdeesh is attributable to delayed stock price reaction to common factors.

Although contrarian investment strategies have received a lot of attention in recent years, a parallel body of literature on market efficiency focuses on relative strength or momentum strategies. Momentum strategies are based on continuation pattern in stock returns and imply buying past winners and selling past losers. For instance, Grimblatt and Titman (1989,

1991) show that a variety of mutual funds examined by them have a tendency of buying stocks that have increased in price over the past quarter of an year. Jagdeesh and Titman (1993) demonstrate that stocks with high short-term past returns (based on previous 3 to 12 months portfolio formation periods) continue to perform better in future than the stocks with low short-term past returns for the US market. They propose that the evidence is consistent with delayed stock price reaction to firm specific information.

Fama and French (1996) observe that momentum profits persist even when a multi-factor asset pricing model,[1] comprising of the market, size, and book equity to market equity factors replaces Sharpe-Lintner CAPM as a performance benchmark. Jagdeesh and Titman (2001) reconfirm the continuation in short-term US stock returns over an extended sample period compared to their 1993 study. They also demonstrate that behavioural models[2] proposed by Barberis, Shleifer, and Vishny (1998), Daniel, Hirshleifer, and Subrahmanyam (1998), and Hong and Stein (1999) tend to provide a partial explanation for the momentum anomaly.

The success of both the contrarian and momentum strategies, supported by empirical literature, that are conflicting in nature poses an explanatory problem. One possibility is that the abnormal returns realized by these trading strategies are spurious. Another possibility is that the discrepancy is due to the difference in the time horizons used in the trading rules. For instance, the contrarian investment strategy seems to work well empirically for long-term past returns and for very short-term past returns, while the momentum strategy provides strong positive results for short-term past returns. The time period classification in the investment strategy literature has been defined on the basis of the length of the portfolio formation periods. Investment strategies involving portfolio formation period of less than a month, between 3 to 12 months, and between 13 to 60 months are generally referred to as very short-term, short-

term, and long-term strategies respectively. The time specificity nature of the investment strategies is summarized in Box.

The empirical evidence on investment strategies has been mainly concentrated on matured capital markets. However, for a universal validation of these strategies, there is a need for an out of sample evidence especially relating to emerging stock markets. In this paper, we examine if there is evidence of reversal effect and momentum effect for the Indian market and whether trading strategies based on these effects provide abnormal returns. The issue of sensitivity of contrarian and momentum strategies to the selection of time horizon has also been investigated. The evaluation of the investment strategies shall throw light on investor behaviour. For instance, if investors under-react or over-react to stock market information, then trading strategies that select stocks based on past returns will exist. This has a direct implication for the state of efficiency of a given stock market.

The empirical findings suggest that there is a weak reversal of long-term past returns in the Indian equity market, while the short-term past returns tend to exhibit a strong continuation pattern. Moreover, time-specific investment strategies based on such patterns in the stock returns do provide extra-normal returns.

Testable Hypotheses

The paper examines the following hypotheses:

- Long-term losers outperform long-term winners in future (long-term contrarian strategy).

- Short-term losers outperform short-term winners in future (short-term contrarian strategy).

- Long-term winners continue to provide higher returns than long-term losers (long-term momentum strategy).

Box: Trading Strategies and Investment Horizon

Time Horizon	Portfolio Formation Period	Trading Strategy	Action	Empirical Support
Very Short-term	1 Week to 1 Month	Contrarian	Buy Past Losers - Sell Past Winners	Jagdeesh (1990), Lo and McKinley (1990) Jagdeesh and Titman (1993, 2001)
Short-term Long-	3-12 Months 13-60	Momentum	Buy Past Winners - Sell Past Losers Buy Past Losers -Sell	De Bondt and Thaler (1985, 1987)
term	Months	Contrarian	Past Winners	

- Short-term winners continue to outperform short-term losers in future (short-term momentum strategy)-

Data

The data comprises of month-end share prices for 364 companies that form part of the CRISIL-500 index from July 1989 to March 1999. The CRISIL-500 is a broad-based and value-weighted stock market index which gives representation to 97 industry groups. The sample companies account for a major portion of the market capitalization and trading volume for the Indian market. They are, hence, fairly representative of the general market performance.

The share price information, collected from Capital Market Line Software, has adjusted for capitalization changes such as bonus, rights, and stock splits to make the price series comparable over time. The share capitalization information is obtained from the Bombay Stock Exchange (BSE) website. Moreover, the price series have been converted into monthly return series so that they are compatible for further research. The stock returns have been estimated using only the capital gain component. The dividend information has been consciously ignored as the stock market indices in India, including the BSE National Index used in the study, exclude dividends while computing index values. The inclusion of dividends in stock returns would have introduced a bias in regression results which involve stock returns and index returns as dependent and explanatory variables respectively.

The BSE National Index has been used as a surrogate for aggregate economic wealth. The BSE National Index is the broad-based and the value weighted market proxy constructed on the lines of Standard & Poor of USA. The implicit yields on the 91-day treasury bills are employed as risk-free surrogate, as is the common practice in investment literature. The data source for T-bills is the *Report of Currency and Finance,* an annual publication of the Reserve Bank of India.

Generally, fairly long series of stock returns are desirable for performing evaluation of investment strategies. However, the study period has been restricted owing to the fact that continuous long-term price information for the sample companies is not available with us. Nonetheless, we feel that a 10-year sample period is sufficient to detect any visible patterns in stock returns especially in light of the thinness of trading problem in the Indian market.

Long-term Past Returns and the Investment Strategies

In June of each year t (starting from 1992), the sample securities are ranked in an ascending order on the basis of their average returns for the past 36 months (July 1989 to June 1992 for the first time). The ranked securities are then used to form five equal portfolios. While portfolio P, contains the bottom 20 per cent securities and is called "losers' portfolio," portfolio P_5 contains the top 20 per cent securities and is termed as "winners' portfolio." The equally-weighted monthly returns are then estimated for the five portfolios from July of year t to June of t+1, and the portfolios are reformed in June of t+1 based on new rankings. The resultant portfolios represent long-term i month/j month investment strategy where i is the portfolio formation period (36 months in the present case) and j is the portfolio holding period (12 months in our case).

The mean returns for the five portfolios based on long-term past returns are shown in Table 1 (Panel A). The long-term returns seem to follow a continuation pattern. The simple annualized mean returns for the losers' portfolio (PJ and the winners' portfolio (P_5) are -0.24 per cent and 5.45 per cent respectively.

Next, the extra-normal returns for the five portfolios are estimated using the familiar market model equation,

$$RP.-RF, = \alpha + \beta (R_{Mt}-R_{Ft})+e_t$$

Where

$R_{pt} - R_{ft}$ = excess returns on the portfolio formed on past returns.

$R_{Mt}-R_{ft}$ = excess returns on the market factor.

$\alpha + \beta$ = estimated parameters.

E_t = error term.

Alpha (the intercept value) is expected to be close to zero. However, a significantly positive (negative) alpha implies superior (inferior) performance. The market model results are shown in Table 1 (Panel B). The alpha differential between P_5 (winners' portfolio) and P, (losers' portfolio) is .0047 per month (t-value=4.61) which is statistically significant at 5 p'er cent level, providing support for momentum strategy in the long run. The findings for long-term past returns are in contrast with those for the US market. As mentioned earlier, De Bondt and Thaler document success of contrarian invest-

Table 1: Results for Portfolios Based on Long-term Past Returns

Long-term past return strategy

    i months/j months: 36 months/12 months

    where i is the portfolio formation period and j
    is the portfolio holding period

    P_1 is the portfolio with the lowest long-term past returns and

    P_5 is the portfolio with the highest long-term past returns

Panel A Mean Returns on Portfolio Based on Long-term Past Returns

Portfolio	P_1	P_2	P_3	P_4	P_5
Mean Return	-.0002	-.0004	-.0025	.0017	.0045

Panel B
Market Model Results for Portfolio Based on Long-term Past Returns
$$R_{Pl}-R_{Fl} = \alpha + \beta\,(R_{Ml}-R_{Fl}) + e_i$$

Portfolio	Alpha	SE-a	T-a	Beta	SE-P	T-p	R^2
P_1	.0022	.007	.327	.764	.074	10.31	.574
P_2	.0017	.005	.330	.677	.058	11.57	.629
P_3	-.0002	.004	-.034	.751	.050	15.17	.744
P_4	.0041	.005	.854	.759	.053	14.24	.720
P_5,	.0069	.006	1.217	.752	.063	11.97	.645

ment strategy for the US market. Fama and French (1996), however, show that long-term returns may spuriously exhibit a continuation pattern of the momentum effect in short-term returns which more than offsets the reversal effect in long-term returns. Following their suggestion, we skip one year between portfolio formation period and portfolio holding period to avoid the impact of momentum effect, if any, in the short-term returns.

In June of each year t, the sample securities are ranked on the basis of their average returns for the past 36 months. The ranked securities are then clubbed into five portfolios. The equally-weighted returns for the five portfolios are estimated in each month from July of year t+1 to June of the year t+2, and the portfolios are re-formed in June of t+1. P, and P_5 are again losers' and winners' portfolio respectively.

The mean returns for the five portfolios seem to follow a reversal pattern shown in Table 2 (Panel A) as is normally expected. The simple annualized mean returns for the P, (losers') portfolio is 8.64 per cent, while similar value for the P, (winners') portfolio is 2.16 per cent. The market model results (Panel B)

support a contrarian investment strategy for the Indian market involving long-term returns. The alpha differential between losers' portfolio and winners' portfolio is .0056 per month which is statistically significant at 5 per cent level with a t-value of 4.67.

Thus, long-term returns in India display a reversal pattern when an year is skipped between portfolio formation and portfolio holding periods. Further, contrarian investment strategy based on long-term past return provides moderately positive returns.

Short-term Past Returns and the Investment Strategies

We next form portfolios based on short-term past returns following an i months/j months strategy where i, the portfolio formation period, is pegged at 12 months and j, the portfolio holding period, is also kept at 12 months.

In June of each year t, the sample securities are ranked on the basis of their average returns over the past 12 months. The ranked securities are then sorted into five portfolios. The equally-weigh ted returns on the five portfolios are then calculated each month

Table 2: Results for Portfolios Based on Long-term Past Returns Skipping One Year

Long-term past return strategy

  i months/j months: 36 months/12 months

  Skipping one year between the portfolio formation and portfolio holding periods

  where i is the portfolio formation period and
j is the portfolio holding period

  P_1 is the portfolio with the lowest long-term past returns and

  P_5 is the portfolio with the highest long-term past returns

Panel A

Mean Returns on Portfolios Based on Long-term Past Returns Skipping One Year

Portfolio	P_t	P_2	P_3	P_4	P_5
Mean Return	.0072	.0016	.0028	.0050	.0018

Panel B

Market Model Results for Portfolios Based on Long-term Past Returns Skipping One Year

$$R_{p,}-R_{Ft} = a+P(R_{Mr}R_{F,})+e_t$$

Portfolio	Alpha	SE-a	T-a	Beta	SE-fl	T-0	R^2
P,	.0059	.007	.836	.679	.080	8.45	.516
P	.0002	.006	.036	.695	.061	11.43	.661
P	.0012	.006	.200	.795	.070	11.38	.659
T>	.0035	.006	.601	.750	.066	11.30	.656
P,	.0003	.007	.052	.727	.076	9.63	.580

from July of each year t to June of year t+1 and the portfolios are re-formed in June of t+1.

The simple annualized mean returns for the five portfolios exhibit a continuation pattern as shown in Table 3 (Panel A). This is in conformity with the findings of Jagdeesh and Titman (1993). The annual mean returns for P, (losers') portfolio and P_5 (winners') portfolio are 12.12 per cent and 27.24 per cent respectively. Further, the investment strategy based on momentum effect in short-term past returns provides significantly positive pay-offs as shown by market model results in Table 3 (Panel B). The alpha differential between P_5 and P, is .0127 per month (t-value = 15.11) which is statistically significant at 5 per cent level. The empirical findings as a whole imply a strong momentum effect in short-term returns for the Indian market.

Concluding Remarks

The empirical results suggest a continuation of long-term returns. It is however, possible that the findings are affected by a short-term momentum effect which may have more than offset the reversal pattern, if any, in the long-term returns. This is confirmed by the fact

that long-term returns do exhibit a reversal pattern once the short-term moment is controlled by skipping one year between portfolio formation and portfolio holding periods. The contrarian trading strategy based on long-term returns provides moderately positive payoffs.

Further, the short-term returns show a continuation pattern and the investment strategy based on momentum effect provides significantly high returns.

In sum, the empirical findings suggest a weak reversal pattern in long-term returns and a strong continuation pattern in short-term returns for the Indian market. The results are in conformity with those for the developed markets such as the US. The systematic pattern in stock returns may have been caused by investor's over/under reaction to past information. Alternatively, they may point at an omitted factor in returns. The study points at probable stock market inefficiencies especially relating to the momentum factor.

The findings shall be of special interest to mutual fund managers, investment companies, and practitioners who are persistently endeavouring to device strategies that generate extra-normal returns. For

Table 3: Results for Portfolios Based on Short-term Past Returns

Short-term past return strategy

      i months/j months: 12 months/12 months

      where i is the portfolio formation period and

      j is the portfolio holding period

      P_1 is the portfolio with the lowest short-term past returns and

      P_5 is the portfolio with the highest short-term past returns

Panel A

Mean Returns on Portfolios Based on Short-term Past Returns

Portfolio	P_1	P_2	P_3	P_4	
Mean Return	.0101	.0058	.0075	.0126	.0227

Panel B

Market Model Results for Portfolios Based on Short-term Past Returns

$$R_{Pl}-R_{Ft} = \alpha + \beta (R_{Mt}-R_J)+e_t$$

Portfolio	Alpha	SE-α	T-α	Beta	SE-P		R^2
P_1	.0034	.007	.520	.777	.054	14.31	.692
P2	-.0003	.005	-.065	.719	.039	18.38	.785
P_3	.0011	.004	.255	.740	.037	20.18	.817
P_4	.0044	.004	1.071	.766	.034	22.65	.849
P_5	.0161	.005	2.942	.773	.045	17.24	.766

instance, the fund managers and investment analysts can form portfolios based on short-term past returns and then invest in the winners' portfolio (portfolio comprising of stocks that provide the highest short-term past returns). They can rebalance the portfolio at the end of each year. The resultant investment strategy would provide a return that is higher than a passive strategy that could be formed by combining the market index with the risk free proxy to construct a portfolio, for an equivalent risk level. Such a momentum strategy will not require any special stock selection skills or market timing abilities. Instead, a simple trading rule based on short-term pattern in stock returns shall result in superior performance.

    The results also pose a research problem for the empiricists who may attempt to explain the sources of economic profits provided by trading strategies. Hence, an empirical evaluation of multi-factor asset pricing models may be required in the Indian context to verify if rational explanation could be provided for such trading anomalies which pose a challenge to standard CAPM.

Notes

1. Fama and French (1993) proposed a three-factor model comprising of a market factor and two other factors that mimic for size and value effects in returns. They show that their three-factor empirical model captures much of the cross-sectional variations in stock returns that are missed by one-factor CAPM.

2. Barberis, Shleifer and Vishny (1998), Daniel, Hirshleifer, and Subrahmanyam (1998), and Hong and Stein (1999), present behavioural models that are based on the idea that momentum profits arise because of inherent biases in the way that investors interpret information.

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