

Does Momentum Combined with High Book-to-Market Strategy Offer Better Returns to Small Investors in India

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Abstract

Momentum strategy proposed by Jegadeesh and Titman (1993, 2001) virtually became a benchmark for researchers in the area and even a suggestive strategy for practitioners. Similarly, investment strategies focused on buying stocks with high book-to-market ratio produced higher returns than growth stocks and this phenomenon too was observed nearly all over the world. This study focused combining these two widely celebrated investment strategies from stand point of a small investor who faces all sorts of transaction costs and trade restrictions. The objective was to see if combining the two strategies could improve his returns vis-à-vis pure momentum strategy. Because of the exchange imposed restrictions and huge costs associated with short selling, only long side of the trade was implemented with portfolio size restricted to top 15 stocks, both for pure momentum and momentum combined with high book-to-market strategy. Net returns figures were generated for all 16 combinations of 3,6,9, and 12 month portfolio formation and portfolio holding periods. Returns were adjusted for risks under Fama-French (1993) conditions to arrive at the actual returns added by the strategy. Results showed that the pure momentum strategy was profitable under shorter formation and shorter holding periods of 3 months. On combining the momentum with high book-to-market, noticeable improvement in returns was seen across all combinations of formation and holding periods. However, even now, the shorter formation and holding periods of 3 months produced the best returns. Amidst competing explanations for momentum and high book-to-market phenomenon, the authors call for deeper research to understand returns from momentum and book-to-market phenomenon and even the proportion thereof.

Keywords: Momentum, Book-to-market strategy, Investors, Returns, India.

Introduction

Continuation of returns from stocks and indices had long attracted the attention of researchers. However, the momentum strategy proposed by Jegadeesh and Titman (1993, 2001) virtually became a benchmark for researchers in the area and even a suggestive strategy for practitioners (see Chen, Chou, and Hsieh, 2015). In fact, such has been the importance of momentum in returns as it has been included as one of the risk premium factors in standard asset pricing models (see Carhart, 1997).

After Jegadeesh and Titman (1993) reported from US markets that taking long position in top decile and a short position in the bottom decile of companies sorted by their returns over past 3, 6, 9, and 12 months can result in abnormal profits of approximately 1% per month after holding each portfolio for 3, 6, 9, or 12 months, many other researches also reported similar findings from different markets. Notable among them are Rouwenhorst (1998) who found profits from a similar strategy in 12 European markets and Griffin, Ji, and Martin (2003) who found positive returns in 31 out of 39 international markets. Similarly, Chui, Titman, and Wei (2010); Hu and Chen (2011); Cakici, Fabozzi, and Tan (2013) tested and evaluated momentum across a wide range of markets and found consistent momentum returns. In Indian market also, Petr and Abdullah (2012); Bernard and Deo (2015) found evidence of momentum returns.

While momentum represents one of the strongest lines under the technical analysis thought of stock analysis, investment strategies based on book-to-market ratio have also been investigated quite often in finance literature. Since the classical book of Graham and Dodd (1934), investment strategies that focused on buying stocks with high book-to-market (called value stocks) produced higher returns than strategies based on growth stocks. Evidence showed a positive and relatively stronger correlation between the book-to-market ratio of a firm and its future stock performance. Many studies such as Rosenberg, Reid, and Lanstein (1984); Fama and French (1993, 1996); Lakonishok, Shleifer, and Vishny (1994); Piotroski (2000); Aggarwal and Wang (2006); Lopes and Galdi (2007); Aggarwal and Gupta (2009) documented the success of this strategy. In fact, the high book-to-market strategy is as revered as a suggestive strategy for practitioners as the momentum strategy.

It is commonly believed that two and two make five. Therefore, one may wonder what would happen to the returns from momentum strategy if its implementation was combined with the value strategy. In fact, considerable empirical research has focused identifying combined value and momentum effects in the U.S. and other developed markets. For example, Rouwenhorst (1999); Griffin, Ji, and Martin (2003); Chui, Titman, and Wei (2010); Hou, Karolyi, and Kho (2011), and Asness, Moskowitz, and Pedersen (2013), Cakici, Tang, and Yan (2016), among many others, reported evidence on the value and momentum effects in developed markets. But at the same time, it is also true that this line of research was largely confined to developed markets only. In the rare case where value and momentum are studied outside of U.S. equities, they are also typically studied in isolation - separate from each other. Even if the research was carried out in emerging or developing markets, it was done by grouping different markets into regions,

attention to individual markets remained scant (Cakici, Tang, and Yan, 2016).

The problem does not end here. Almost all the research has been carried out in a vacuum, devoid of the actual conditions in which a retail investor/ trader operates. Momentum investing, as originally proposed by Jegadeesh and Titman (1993), assumes a zero-cost trading strategy, which assumes away various market frictions, such as transaction costs, bid-ask spreads, and short-selling constraints. Carhart (1997) even reported the momentum trading turning unviable after incorporating the trading costs. Moreover, buying and selling hundreds of stocks could only be possible in lab conditions and not actual environment in which individual investors operate. In addition, short-selling (as required in the original momentum strategy) involves very high costs because of the associated collateral and margin requirements (for details of collaterals and margin requirements and other conditions for short-selling, visit the security lending and borrowing (SLB) section of www.nseindia.com), loan interest, and potential risk of a short squeeze or even non-availability of short-selling (for example, National Stock Exchange allows short-selling only on those stocks which are available under F&O section). Not only that; small investors face a significant downside risk on short selling of uncovered positions in the portfolio (Foltice and Langer, 2015). These factors make short selling, not only very costly but also very risky to the extent that it holds the potential of wiping out all the gains earned from the long leg of the trade.

In this article therefore, feasibility of a small investor profiting from momentum investing combined with value strategy has been examined. With a view to maintain practical utility of the study, only long side of the momentum trade has been taken up and value stocks have been identified through book-to-market ratio. In addition, all transaction costs have been duly incorporated.

Methodology

In this investigation, two distinct types of strategies have been employed: a pure momentum strategy and a pure momentum combined with value strategy; both are detailed below:

The pure momentum strategy was based on Jegadeesh and Titman (1993) study. Using closing prices of 31st December, 2009, all the companies listed on National Stock Exchange were arranged in descending order of their J trading month returns (J = 3, 6, 9, or 12; called as the portfolio formation period) and divided into deciles. For each period, the top decile (stocks with highest positive returns) was retained for further investigation. In this decile also, only those companies were retained which had a positive book-to-market ratio and the company did not delist

during the study period. Going by the dictates of Modern Portfolio Theory, which advocates a portfolio size of 12 to 18 stocks, for each portfolio formation period, top 15 stocks were retained as the constituents of the pure momentum portfolio and an equally weighted portfolio was created by making an investment of Rs 20,000/- in each stock. This portfolio was then held for a period of K trading months (K = 3, 6, 9, or 12; called as portfolio holding period) separately. This yielded a total of 16 portfolio formation-holding period combinations. Prices were duly adjusted for any dividends, stock split or stock dividends during the holding period. The process was repeated till 31st December, 2015.

The second strategy involved a combination of momentum and value strategy. To implement this strategy, the top performing decile for different formation periods (J = 3, 6, 9, or 12) were identified as above. The filters of positive book-to-market ratio and non-delisting during study period were also applied as above. The stocks which cleared these filters were then ranked on two different basis: on the basis of their returns during the formation period and on the basis of their book-to-market ratio. For each stock the two types ranks were then added and top 15 stocks were retained as the constituents of the combined momentum-value portfolio. As above, an equal investment of Rs 20,000 was made in each stock. The portfolio was then held for a period of K trading months (K = 3, 6, 9, or 12; called as portfolio holding period) separately, yielding a total of 16 portfolio formation-holding period combinations. Again the prices were duly adjusted for any dividends, stock split or stock dividends during the holding period. The process was repeated till 31st December, 2015.

Transaction Costs

Though transaction costs (bid-ask spread, commissions, trading fees etc.) play a vital role in ensuring market efficiency, an accurate estimation of these actual costs could be herculean task (Shleifer and Vishny, 1997) as transaction costs not only vary over time but also depend on the size of transaction and the type of investor/ trader. Due to absence of any information regarding bid-ask spreads on NSE website, proxies were considered. Following Capelle-Blancard and Chaudhury (2001), this study assumed the bid-ask spread to be equal to 0.75% of the reported transaction price.

Apart from bid-ask spread, additional transaction costs were considered from the point of view of retail investor who trades through a broker. After carrying out a pilot survey of brokerage houses in Ludhiana city, the following costs were included:

- Brokerage-@ 0.05% on the transaction price on both sale and purchase of stock
- Service tax on brokerage-different rates were charged

as per the following

1st January 2010 to 31st Mar 2012-10.30%

1st April 2012 to 31st May 2015-12.36%

1st May 2015 to 14th Nov 2015-14.00%

15th Nov 2015 onwards-14.50%

- Stamp duty, Exchange charges, SEBI charges-@ 0.013% of the transaction price on both sale and purchase of stock
- Securities Transaction Tax (STT)- @ 0.10% of transaction price on both sale and purchase of stock

Per cent net returns from each portfolio were calculated as follows:

$$R_{jk} = [(P_s - P_p - TC) / P_p] \times 100$$

Where, R_{jk} = Percentage return from a portfolio with j months formation and k months holding period

P_p = Purchase price for the portfolio

P_s = Selling price for the portfolio

TC = Transaction costs

Risk Adjustment of Returns

The three factor model proposed by Fama and French (1993), which is widely accepted as being consistent with market equilibrium, was deployed for performance attribution. The following regression equation, which attributes excess returns to three systematic risk factors, namely market returns, size and value factors was utilised:

$$R - R_f = \alpha + \beta (R_m - R_f) + \lambda (SMB) + \delta (HML) + \epsilon$$

Here R is the return from the long portfolio during time t (portfolio and time subscripts have not been shown); R_m is the return from broad market based index, R_f is the risk free rate of return, α is the return left unexplained or the value added by the trading / investment strategy, popularly known as Jensen's Alpha (Jensen, 1967); β is the measure of exposure of portfolio returns to broad market excess returns ($R_m - R_f$); λ is the measure of exposure of portfolio returns to size factor (SMB); δ is the measure of exposure of portfolio returns to value factor (HML) and finally; ϵ is the regression residual (for details of these risk factors, see Fama and French, 1993). Methodology used by Aggarwal and Gupta (2016) was applied for construction of market, size and value factors.

Data Analysis

Ordinary least squares regression was applied to carry out the analysis using following equations:

$$(R_i - R_{fi}) = a + b (R_{mi} - R_{fi}) + s (SMB_i) + h (HML_i) + e_i$$

$$\text{or } a = (R_i - R_{fi}) - b(R_{mi} - R_{fi}) - s(\text{SMB}_i) - h(\text{HML}_i) - e_i$$

Where

R_i = Average return from the momentum portfolio during i th combination of formation and holding period

R_{mi} = Return from the market portfolio during holding period of the i th combination of formation and holding period

R_{fi} = Risk free rate of return during holding period of the i th combination of formation and holding period

b = Measure of exposure to market

s = Measure of exposure to size factor

h = Measure of exposure to value factor

SMB_i = Returns from size portfolio during holding period of the i th combination of formation and holding period

HML_i = Returns from value portfolio during holding period of the i th combination of formation and holding period

a = Jensen's Alpha or returns due to the momentum strategy

e_i = Random error term

For the purpose of analysis, total returns index for Nifty, which includes the effect of dividends was used as a proxy for market returns and MIBOR rates were used as a proxy for risk free rate of return.

Findings

In this section, returns, net of all transaction costs, from both the investment strategies, that is the pure momentum strategy and momentum combined with value strategy have been presented. The returns presented hold for different combinations of portfolio formation period ($J = 3, 6, 9, 12$

months) and portfolio holding period ($K = 3, 6, 9, 12$ months) and have been annualised to facilitate comparison. In addition, Jensen's Alpha, that is the return added by the momentum strategy after adjusting for the risks under Fama-French (1993) conditions has also been shown for all combinations.

Table 1 shows selected summary statistics for the returns from portfolios based on Jegadeesh and Titman (1993) pure momentum strategy for different combinations of portfolio formation and portfolio holding periods. As discussed earlier the portfolios consisted of stocks with only positive returns during the portfolio formation period. As seen in the table, shorter formation and shorter holding periods are best suited to this strategy as highest mean return of 21.09% were produced by the portfolio with 3 months formation and 3 months holding period; closely followed by 3 months formation and 6 months holding period at 20.78% with marginal reduction in the standard deviation. For longer portfolio formation periods of 6, 9, or 12 months, the net returns were much for all holding periods; to the extent that negative returns of 8.02% were produced by a portfolio with 12 month formation and holding period. Jensen's Alpha, which represents the actual value added by the investment/trading strategy after adjusting for risks taken up in the asset pricing model (here, Fama-French, 1993), also paints an almost similar scenario. Highest Alpha of 12.47% ($p < 0.01$) was produced by the portfolio with 3 months formation period and 3 months holding period; trailed at 11.17% ($p < 0.01$) by the portfolio with 6 months holding period. In fact, the 3 month holding period produced significant positive Alpha across all lengths of formation periods; though it was much smaller for larger formation periods. Larger holding periods, especially 9 months and 12 months, either produced insignificant Alpha or negative significant Alpha. This brings forward one clear conclusion that pure momentum strategy, with only long leg of the trade and due adjustment for all types of transaction costs, can reward investors with significant returns in India. However, this holds good only for short holding periods.

Table 1: Annualised returns from pure momentum strategy

Mean returns for different combinations of portfolio formation and holding period have been shown. Figures in parenthesis show the standard deviation of returns.

Formation period (J months)	Parameter	Holding period (K months)			
		3	6	9	12
3	Returns net of transaction costs (%)	21.09 (58.21)	20.78 (55.12)	12.38 (35.51)	8.22 (22.28)
	Jensen's Alpha (%)	12.47*	11.17*	2.03 ^{NS}	-0.23 ^{NS}

6	Returns net of transaction costs (%)	11.26 (53.25)	7.89 (48.69)	5.04 (30.34)	1.84 (20.11)
	Jensen's Alpha (%)	7.15*	4.53**	1.88**	0.07 ^{NS}
9	Returns net of transaction costs (%)	9.05 (51.10)	7.22 (47.53)	4.01 (32.21)	1.49 (18.48)
	Jensen's Alpha (%)	3.55*	2.22**	0.09 ^{NS}	-0.13**
12	Returns net of transaction costs (%)	10.00 (43.43)	5.09 (42.46)	2.66 (33.25)	-8.02 (17.52)
	Jensen's Alpha (%)	2.93*	1.94 ^{NS}	1.04 ^{NS}	-2.33*
* p<0.01; ** p< 0.05; NS non significant					

The main objective of this research was to check for profitability of a pure momentum strategy when implemented in combination with high book-to-market strategy and to see if this combination could make the investors better off when compared with pure momentum strategy. Selected summary statistics for the returns to a combined momentum and high book-to-market strategy are presented in Table 2. Combining high book-to market strategy with pure momentum seemed to fetch better returns to the investors as there was a noticeable increase in the means returns for all holding periods with 3 month formation period. For example, for 3 month holding period, the returns increased from 21.09% to 23.13% while the standard deviation fell from 58.21% to 50.51%. Similar, rise in mean returns along with fall in the standard deviation was seen for other holding periods also. Significant improvement was also seen in Jensen's Alpha which rose from 12.47% to 14.87% (p<0.01 for both). For other holding periods also there was an increase in the Jensen's Alpha,

though its value was statistically insignificant for a 12 month holding period. Similar trend was also seen for 6 month formation and different holding periods. However, one thing that remains noticeable is that the basic structure of returns was retained. Shorter formation and shorter holding periods were found to be best suited even after combining the momentum with value strategy. Jensen's Alpha also presented similar trend as despite an improvement in the value of Alpha all across the table, shorter formation and holding periods produced higher and significant Alpha values.

This leads us to two conclusions: combining momentum with high book-to-market strategy can definitely bring a significant improvement in the performance of momentum strategy. However, this improvement holds good for relatively shorter formation and holding periods; reemphasising that Indian market does not offer long term momentum returns.

Table 2: Annualised returns from momentum combined with value strategy

Mean returns for different combinations of portfolio formation and holding periods have been shown. Figures in parenthesis show the standard deviation of returns.

Formation period (J months)	Parameter	Holding period (K months)			
		3	6	9	12
3	Returns net of transaction costs (%)	23.13 (50.51)	21.65 (51.22)	13.22 (34.08)	9.23 (21.56)
	Jensen's Alpha (%)	14.87*	11.85**	4.02**	0.11 ^{NS}

6	Returns net of transaction costs (%)	13.14 (51.18)	9.28 (50.14)	6.34 (34.11)	2.98 (21.32)
	Jensen's Alpha (%)	8.98*	5.45**	2.08**	0.88 ^{NS}
9	Returns net of transaction costs (%)	9.95 (48.25)	8.26 (47.54)	4.84 (38.54)	2.84 (19.85)
	Jensen's Alpha (%)	4.85*	3.15**	0.88 ^{NS}	0.09 ^{NS}
12	Returns net of transaction costs (%)	9.14 (44.24)	5.23 (44.89)	3.28 (42.06)	1.24 (18.28)
	Jensen's Alpha (%)	2.98 ^{NS}	2.16 ^{NS}	1.26 ^{NS}	1.27 ^{NS}
* p<0.01; ** p< 0.05; NS non significant					

Literature offers two competing explanations of the momentum returns – the risk-based (for example see, Jegadeesh and Titman, 1993; Fama and French, 1996; Grundy and Martin, 2001; Chordia and Shivakumar, 2002; Griffin, Ji, and Martin, 2003; Liu and Zhang, 2008) and the behavior-based (for instance see, Barberis, Shleifer, and Vishny, 1998; Hong, Lim and Stein, 2000; Grinblatt and Moskowitz, 2004; Israel and Moskowitz, 2013). The risk based explanation for momentum premium argues that economic risks that affect company investment and growth rates can impact the long-term cash flows and dividends offered by the company that actually generate momentum patterns. The idea is that high-momentum stocks face greater cash flow risk because of their growth prospects or face greater discount rate risk because of their investment opportunities, causing them to face a higher cost of capital and therefore, a higher expected return. The behavioral models on the other hand, typically explain momentum as either an under-reaction or delayed overreaction. In the case of under-reaction, information travels slowly into prices for a variety of reasons such as investor conservatism, inattentiveness, liquidity issues, or disposition effect—the tendency to sell winners too quickly and hold onto losers too long. In the case of overreaction, investors may chase returns, providing a feedback mechanism that drives prices even higher (Asness, Frazzini, Israel, and Moskowitz, 2014).

In case of high book-to-market stocks also different explanations for value premium have been proposed in the extant literature. These include risk compensation (Fama and French, 1996; Vassalou and Xing, 2004); market inefficiency arising out of factors such as small-cap stocks (Kothari, Shanken, and Sloan, 1995; Loughran 1997), stocks with greater short-sales constraints (Nagel 2005), and

stocks with lower institutional ownership (Phalippou 2007). Data-snooping biases (Conrad, Cooper, and Kaul, 2003) stocks being neglected (Griffin and Lemmon, 2002) and greater divergence in investors' opinions (Doukas, Kim, and Pintails, 2004) have also been found to be plausible reasons behind mispricing of these stocks.

Although, any conclusive agreement regarding the reasons behind momentum, book-to-market effect or a combination of the two is yet to be arrived at, yet for a retail investor the distinction does not hold any relevance. This is so because both the risk and non-risk based explanations offer some economic reason for the premium to exist as well as persist. The small investor is more than happy if combining momentum with book-to-market effect can enhance his profits. Of course, for better understanding of this phenomenon, dissection of returns into momentum and high book-to-market returns, deeper research is required to be conducted and provides a fertile ground for future researches.

Conclusion

Momentum strategy proposed by Jegadeesh and Titman (1993, 2001) virtually became a benchmark for researchers in the area and even a suggestive strategy for practitioners. In fact, momentum in returns garnered so much attention that it was included as one of the risk premium factors in standard asset pricing models.

While momentum represents one of the strongest lines under the technical analysis thought of stock analysis, investment strategies based on book-to-market ratio have also been investigated quite often in finance literature. Investment strategies that focused on buying stocks with high book-to-market ratio produced higher returns than growth stocks. This phenomenon too was observed nearly

all over the world. In fact, the high book-to-market strategy is as revered as a suggestive strategy for practitioners as the momentum strategy.

This study focused combining these two widely celebrated investment strategies. Although, evidence on the performance of this combination exists in literature, it is largely restricted to US and other developed markets only. Moreover, almost every research has been carried out in a vacuum, devoid of the actual conditions, especially in terms of transaction costs and trade restrictions, in which a retail investor/ trader operates. Results of such researches thus hardly carry any value for the common investor/ trader.

This research addressed the profitability of a momentum strategy combined with high book-to-market strategy vis-à-vis a pure momentum strategy from the stand point of a common investor after incorporating all sorts of transaction costs and trade restrictions. Because of the exchange imposed restrictions and huge costs associated with short selling, only long side of the trade was implemented with portfolio size restricted to top 15 stocks, both for pure momentum and momentum combined with high book-to-market strategy. Net returns figures were generated for all 16 combinations of 3,6,9, and 12 month portfolio formation and portfolio holding periods. Returns were adjusted for risks under Fama-French (1993) conditions to arrive at the actual returns added by the strategy.

Results showed that the pure momentum strategy was suitable only for shorter formation and shorter holding periods as 3 months formation and 3 months holding period portfolio produced the highest returns of 21.09%; closely followed by 3 months formation and 6 months holding period at 20.78% with slight reduction in the standard deviation. For longer portfolio formation periods, whether 6 months, 9 months, or 12 months, the net returns were far lower or even negative across all holding periods. Jensen's Alpha, under Fama-French (1993) conditions also presented similar picture as highest Alpha of 12.47% ($p < 0.01$) was produced by a portfolio with 3 months formation period and 3 months holding period; closely followed by 11.17 ($p < 0.01$) for a 6 months holding period. On combining the momentum with high book-to-market, noticeable improvement in returns was seen across all combinations of formation and holding periods. Jensen's Alpha also presented similar scenario. For example, for a 3 months formation and 3 months holding period, the net returns of jumped from 21.09% to 23.13% and the Jensen's Alpha improved from 12.47% to 14.87%. However, even now, the shorter formation and holding periods produced the best returns.

This brings forth one clear conclusion that even after accounting for all transaction costs and trade restrictions, small investors can profitably exploit pure momentum;

combining with high book-to-market strategy can bring significantly better returns. However, all these hold good only for short portfolio formation and portfolio holding periods. To understand this phenomenon better and dissection of returns into momentum and high book-to-market returns, deeper research is required to be conducted and this provides a fertile ground for future researches.

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