ADDING GROWTH TO VALUE STOCKS IN INDIAN STOCK MARKET: AN EMPIRICAL ANALYSIS

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The present study aims to back test the strategy of adding growth to value stocks i.e. magic formula investing by Joel Greenblatt on the stocks listed on Bombay Stock Exchange (India) for the period of 15 years i.e. from 1996 to 2010. The stocks so attained through the formula have been held for the period of 12 months and 24 months each year. One sample t-test have been employed to examine the market adjusted performance of the formula and capital asset pricing model (CAPM), Fama and French model have been used to assess the performance of the formula on different risk loadings. The empirical results highlight that the magic formula stocks show significantly lesser returns than the market during the period of study. Moreover, Fama and French Model captured better variation in returns than CAPM, signifying the role of size and value effect in magic formula stocks. Further, the insignificant value of the intercept confirmed the lack of presence of excess returns in the formula after pricing all the risk factors.

Key words: Value Stocks, Magic Formula, Capital Asset Pricing Model, Fama and French Model

INTRODUCTION

Value and growth are the two most popular school of investing amongst the financial analysts and academicians. While the value investor invests in stocks which are disfavored by the market, hoping the market value of their equity will increase, the subscriber to the growth philosophy invests in stocks which are already popular in the market place, hoping their market value will increase further (Dirks and Magnusson, 2004). The topic of value and growth investing offers a shining example of the fruitful exchange of ideas between academic research and investment practice (Chan and Lakonishok, 2004). Ahmed and Nanda (2000) further observed that the two strategies; value and growth, instead of being mutually exclusive to each other, can complement

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each other in enhancing the returns of the investors. The information regarding the growth of certain financial attributes can be clubbed with the value returns, to enhance the returns of the portfolio. Thus, Joel Greenblatt (2006) in his seminal work entitled "The Little Book that Beats the Market" introduced the concept of magic formula which is aimed at buying stocks of good companies at bargain prices. The two components of the magic formula, depicted in the form of ratios are discussed as under:

Growth component: Return on capital- The return on capital ratio measures the efficiency of a business enterprise. It thus serves as the yardstick for evaluating the level of performance of an enterprise. This ratio makes an attempt to relate the profits generated by a firm to the total capital employed by firm. Return on capital is measured by calculating the ratio of pre-tax operating earnings (EBIT) to tangible capital employed. Therefore, return on capital= EBIT/ Tangible capital employed;

Where; Tangible capital employed= Net Working Capital + Net Fixed Assets (Greenblatt 2006).

***Value component: Earnings Yield*:** It is the reverse of the most commonly followed valuation metric price to earnings ratio. This ratio is used as a going concern method of valuing a stock. As long as the firm is a viable business entity, its real or going concern value is reflected in its profits. The ratio therefore links the earnings per share to the activity in the market (Hampton, 1994). Earnings yield is measured by calculating the ratio of pre-tax operating earnings (EBIT) to enterprise value. Thus, earnings yield= EBIT/ enterprise value;

Where; enterprise value= market value of equity + net interest-bearing debt (Greenblatt 2006).

The different researchers have attempted to examine the edge of Greenblatt's magic formula over market based indices and have found the evidence of considerable value premium generated by the formula (see, for example, Larkin, 2009; Persson and Selander, 2009; Goumas and Kallstrom, 2010; Pena et al., 2010; Vanstraceele and Allaeys, 2010; Sareewiwatthana, 2011; Blij, 2011). However, most of these studies relate to U.S. and other mature markets. For an emerging market like India, such evidence is almost negligible. Against this background, the present study aims to enrich the literature on value- growth strategies through examining the relevance of Greenblatt's Magic formula in Indian stock market.

The rest of the paper is organized as follows. Section 2 provides the relevant literature review. Section 3 describes the database and sample selection procedure. Section 4

outlines the research methodology. Section 5 discusses the empirical results and finally section 6 concludes the paper.

RELEVANT LITERATURE REVIEW

After the publication of the formula in 2006, the series of research were conducted examining the potency of the magic formula e.g. Larkin (2009) compared and analyzed the performance of the magic formula on US stocks and observed that strategies like EBIT (earnings before interest and taxes) to enterprise value and return on capital, EBIT to enterprise value alone and earnings yield alone provided higher returns with lesser standard deviation than the benchmark returns.. Further, Persson and Selander (2009) backtested joel Greenblatt's magic formula in Nordic Region for the period of 10 years i.e. from Jan 1998- Jan 2008 and employed capital asset pricing model, Fama and French model for analyzing the returns. They found that intercept was not significant when tested against both the models on 5% level of significance. The portfolio showed compounded annual growth rate of 14.68% during the 10 year period as compared to its benchmark (9.28% for MSCI Nordic and 4.23% for S&P 500) and the transaction cost further lowered the growth rate to 11.98%.

Further, Goumas and Kallstrom (2010) backtested Joel Grennblatt's Magic Formula in Swedish stock market for the period March 1999- Jan 2010. In order to measure the portfolio performance, different measures like sharpe ratio, treynor ratio and Fama and French three factor model were used and they found an annual excess return of 14.1% through investment on the basis of magic formula. Pena et al. (2010) examined the performance of magic formula ratios in Spanish stock market for the period Jan 1991-Dec 2004. Fama and French model was used to capture the differences in returns caused by differences in fundamentals. They found that Fama and French model provided better estimate of expected returns than CAPM.

Vanstraceele and Allaeys (2010) tested different value investing strategies like magic formula by Greenblatt, Joseph Piotroski's nine point scoring mechanism, Benjamin graham's net current asset value and their own ERP5 model and their combinations on Eurozone stock market for the period of 10 years i.e. 1999-2009. They observed that over the long term, all the value investing strategies yielded greater return than the market and by combining different value screening methods like ERP 5 and Piotroski's F- score, magic formula and Piotroski's F- score, the investor can augment his returns. Further, Sareewiwatthana (2011) tested basic value investing rules based on price to

book value, price to earnings ratio, dividend yield, return on equity and the magic formula ratios in the stock exchange of Thailand for the period of 15 years i.e. from Jan 1996- Dec 2010. He found that the portfolios so formed significantly outperformed the market and the portfolios formed on the basis of Greenblatt's magic formula significantly beat the Thai market during the period tested. Blij (2011) back tested magic formula on the stocks listed on US stock market for the period 1988 to 2009 and found the evidence of statistically significant excess returns generated by the magic formula.

From the above literature we observe that the profitability of the magic formula has been explored in US and other mature markets. The Indian stock market, however, has become comparable to other mature markets in terms of a number of parameters. The present study therefore makes an attempt to examine the profitability of the magic formula on the stocks listed on Bombay Stock Exchange for the period spanning from 1996 to 2010. In particular the key objectives of the present study are:

- To examine the market adjusted performance of magic formula stocks
- To analyze the presence of abnormal returns in excess of market risk factor
- To analyze the presence of abnormal returns in excess of size and value risk factor

DATABASE AND SAMPLE SELECTION

Universe of the study comprises of the stocks listed at Bombay Stock Exchange and the study is conducted over the period of 15 years i.e. 1996- 2010. The magic formula involves a series of steps for screening stocks. At first, out of all listed stocks at Bombay Stock Exchange, the stocks that have market capitalization greater than 50 million dollars are selected in order to avoid the riskiness and illiquidity associated with nano caps. In the next step, we drop the stocks of financial firms because the economic meanings of accounting numbers used in the study may differ between financial and non-financial firms. In the third step, the utility stocks have also been excluded to avoid potential confounding effects of government regulations on results (Bae and Kim, 1998). Further, from the remaining stocks, we calculated the return on capital (i.e., EBIT / tangible capital employed) and earnings yield (EBIT / enterprise value), and ranked the companies on the basis of said ratios. In the final step, the ranks given to the different companies are clubbed, and on the basis of clubbed rankings, top 30 stocks (or companies) are selected. This procedure has been repeated every year

The data regarding different accounting and financial variables has been collected for the financial year end i.e. 31 March (financial closing month in India), every year from PROWESS, database maintained by Centre for Monitoring Indian Economy (CMIE). However the portfolio of the stocks meeting the different criteria has been formed at the end of 30th June every year, in order to make sure that all the information regarding the fundamentals is available at the time of portfolio formation and the results are predictive in nature. It thus avoids the look ahead bias in the study.

RESEARCH METHODOLOGY

The value premium attained through investing in value stocks is concentrated up to two years of portfolio formation only (Yen et al., 2004). The present study therefore takes 12 months, 24 months as the holding period of stocks screened through the formula. While measuring the returns of portfolio we include the capital appreciation component as well as the dividends distributed by the stocks because the total return available to an investor in the stock market is the summation of capital appreciation and dividend income. The raw returns have been computed for 12 month, 24 month using the following formula:

$$R_{jt} = \left(\frac{p_{jt} - p_{jt-1}}{p_{jt-1}} \right) + \left(\frac{d}{p_{jt-1}} \right) \quad (1)$$

Where,

R_{jt} = Monthly rate of return for share j in month t.

p_{jt} = Adjusted closing price of share j at the end of month t.

p_{jt-1} = Adjusted closing price of share j at the end of month t-1.

d_{jt} = Cash dividend received of j[th] share during month t taken from ex- dividend date.

Then, annual stock returns (12 months holding period) are calculated as:

$$AR_{jt} = \sum_{t=1}^{12} R_{jt} \quad (2)$$

Where, AR_{jt} = the annual return of each share j at the end of each year t (t= 1996, 1997,…., 2010)

In case of 24 months holding period, the annualized rate of return is computed using the following formula:

$$AR_{jt} = \left(1 + \sum_{t=1}^{24} R_{jt} \right)^{1/2} - 1 \quad (3)$$

Monthly return on market portfolio (proxied by BSE SENSEX) has been calculated using equation (1) except that in place of closing adjusted share prices, closing Index Values have been taken. Similarly, The annual return of the market portfolio in case of 12 months holding period, 24 months holding period has been calculated using equation (2), equation (3) respectively. In order to calculate the market adjusted returns, the market returns are deducted from raw returns. If any stock which has been a part of the portfolio lacks further information regarding closing prices, then the last available price is used to calculate the return. However, if any stock gets delisted during the holding period, then that stock is included in the study in order to avoid the survivorship bias and is assigned the return of -100%, if no information regarding the amount received on delisting is available.

In order to analyze the performance of stocks arrived at after meeting different principles, we made use of following analytical tools:

One sample t-test- To examine the significance of the market adjusted return of the stocks meeting the criteria, one sample t-test has been employed. The null hypothesis to study the significance of market adjusted returns is:

H_0: Market adjusted returns=0

Further, to assess the volatility and the abnormal returns generated, if any, we use capital asset pricing model.

Asset pricing model: It is used to estimate the difference between the estimated expected return by time series average and the expected return predicted by pricing model. The difference is called as intercept or Jensen alpha which is estimated by regressing monthly returns of the portfolio against the market returns during the period of June 1996 to June 2010 by following time series equation:

$$R_{pt} - R_{ft} = \alpha_p + \beta_p \left(R_{mt} - R_{ft}\right) + e_{pt}$$

Where, R_{pt} is the return of portfolio p at time t, R_{ft} is the rate of return on a risk-free asset, α_p is the intercept term, R_{mt} is the rate of return on the market index, β_p is the coefficient loading for the excess return of the market portfolio over the risk-free rate, and e_{pt} is the error term for portfolio p at time t.

Fama and French model: According to this model, the expected return on a portfolio in

excess of the risk free rate is explained by the sensitivity of its return to three factors: (i) the excess return on the market portfolio, (ii) the difference between the return on a portfolio of small (S) stocks and the return on a portfolio of large (B) stocks (SMB) and (iii) the difference between the return on a portfolio of high (H) book to market stocks and the return on a portfolio of low (L) book to market stocks (HML) (Bundoo, 2008). The time series regression equation for Fama & French model is:

$$R_{pt} - R_{ft} = \alpha_p + \beta_p (R_{mt} - R_{ft}) + s_p (SMB) + h_p (HML) + e_{pt}$$

Where :R_{pt} is the return on portfolio p in period t, R_{ft} is the risk-free rate, α_p is the intercept term, β_p is the coefficient loading for the excess return of the market portfolio over the risk-free rate, s_p is the coefficient loading for the excess average return of portfolios with small equity class over portfolios of big equity class, h_p is the coefficient loading for the excess average returns of portfolios with high book-to-market equity class over those with low book-to-market equity class, and e_{pt} is the error term for portfolio p at time t.

We organized the securities into 6 groups/ portfolios as SL, SM, SH, BL, BM, and BH, formed from the crossway of the two size and three book equity to market equity groups. For example, the portfolio BL consists of stocks that are in the big size group and the low book to market group (Homsud et.al, 2009). SMB (small minus big) is calculated by deducting the simple average of the monthly returns of the three big size portfolios (BL, BM, BH) from the average of the three small size portfolios (SL, SM, SH). The factor related to value i.e., high minus low (HML) is found out by calculating the difference between the simple average of the returns on the two high book to market portfolios (SH and BH) and the two low book to market portfolios (SL and BL).

EMPIRICAL RESULTS AND DISCUSSION

The Table 1 shows the market adjusted performance of the magic formula portfolio across the period of 15 years as under:

Table 1 showing the results of the significance of market adjusted returns of magic formula stocks

Year	No. of stocks	12 months holding period				24 months holding period			
		Mean	Std. Dev.	T-Value	P-Value	Mean	Std. Dev.	T-Value	P-Value
1996	30	-35.2539 (9.19603)	50.36873	-3.834	.001***	-32.1388 (5.78353)	31.67768	-5.557	.000***
1997	30	-6.4221 (9.48069)	51.92790	-.677	.504	2.9719 (6.48535)	35.52172	.458	.650
1998	30	29.5087 (10.36856)	56.79093	2.846	.008***	4.6573 (7.15350)	39.18135	.651	.520
1999	30	-15.2952 (11.17447)	61.20508	-1.369	.182	-.2183 (7.68972)	42.11832	-.028	.978
2000	30	-17.3766 (8.39524)	45.98265	-2.070	.047**	19.4430 (4.17733)	22.88018	4.654	.000***
2001	30	45.7322 (10.63169)	58.23216	4.301	.000***	-1.7062 (5.34210)	29.25987	-.319	.752
2002	30	8.6665 (5.60998)	30.72715	1.545	.133	-41.3020 (4.27352)	23.40703	-9.665	.000***
2003	30	-104.9448 (7.02606)	38.48334	-14.937	.000***	6.0849 (4.67027)	25.58012	1.303	.203
2004	30	28.1559 (7.70598)	42.20741	3.654	.001***	-16.3275 (5.42685)	29.72406	-3.009	.005***
2005	30	-19.0573 (10.59156)	58.01235	-1.799	.082*	-18.8063 (5.33142)	29.20140	-3.527	.001***
2006	30	-14.0471 (7.50721)	41.11867	-1.871	.071*	17.2493 (3.82847)	20.96941	4.506	.000***
2007	30	-13.9480 (11.73136)	64.25529	-1.189	.244	14.4857 (4.58151)	25.09396	3.162	.004***
2008	30	23.6319 (4.79706)	26.27460	4.926	.000***	-11.9558 (5.15858)	28.25471	-2.318	.028**
2009	30	46.8784 (6.81399)	37.32176	6.880	.000***	9.2275 (4.28409)	23.46493	2.154	.040**
2010	30	-18.0854 (7.73986)	42.39297	-2.337	.027**	-13.3116 (4.97389)	27.24311	-2.676	.012**
Across the period	**450**	-4.1238 (2.83332)	60.10158	-1.456	.146	-3.1397 (1.62346)	34.43879	-1.934	.054*

Note: Significance at: p-values * , 0.10, * * , 0.05 and * * * , 0.01
Standard error of mean has been reported in parenthesis

From the table 1 we notice that in case of 12 months holding of magic formula portfolio, the mean market adjusted return has been negative in years; 1996, 1997, 1999, 2000, 2003, 2005, 2006, 2007 and 2010. The mean returns of the magic formula portfolio are however significantly lesser than the market returns in 6 years; 1996, 2000, 2003, 2005,

2006 and 2010. The magic formula portfolio shows larger returns than the market portfolio in years; 1998, 2001, 2002, 2004, 2008 and 2009. Out of these years, the mean return of the magic formula portfolio is significantly larger than the market portfolio in 1998, 2001, 2004, 2008 and 2009. Thus out of 15 years period, only in 5 years the mean returns of the magic formula portfolio are significantly larger than the market portfolio. Thus across the period of 15 years, the mean market adjusted return of the magic formula portfolio (no doubt insignificant), is lesser than the market portfolio by 4.1238%. Thus the performance of the magic formula stocks in case of 12 months holding period in Indian stock market could not be considered substantial.

In case of holding of magic formula portfolio for 24 months, we notice that the mean market adjusted return of the portfolio has been lesser than zero in years; 1996, 1999, 2001, 2002, 2004, 2005, 2008 and 2010. Further, out of these 8 years, the return of the said portfolio has been significantly lesser than the market in 6 years; 1996, 2002, 2004, 2005, 2008 and 2010. The average return of the magic portfolio has been larger than market in years; 1997, 1998, 2003, 2006, 2007 and 2009. Thus only in 4 years the returns of the magic formula portfolio has been significantly larger than the market portfolio out of 15 year period in case of 24 months holding of the magic formula stocks.

Thus across the period of 15 years, the magic formula portfolio yields the mean market adjusted return of -3.139% which is significant at 10% level of significance. Thus extending the holding period of magic formula portfolio further diminishes its performance. Table 2 reports the results of returns in excess of market risk factor determined through asset pricing model as under:

Table 2: Panel A showing the results of capital asset pricing model in case of 12 months holding period

Dependant variable	f-value ANOVA	α_p		β_p		Adjusted r^2	DW
		coefficient	t-val	coeff	tval		
SL	3.24 (0.07)*	.759 (1.044)	.727 (.468)	1.104 (.613)	1.80 (.073)*	0.017	2.06
SM	2.129 (.146)	-.151 (.914)	-.165 (.869)	.864 (.592)	1.459 (.146)	0.011	2.00
SH	6.09 (.014)**	.316 (1.116)	.283 (.777)	1.615 (.654)	2.469 (.014)**	0.033	2.04
BL	4.468 (.035)**	.510 (.911)	.560 (.576)	1.312 (.620)	2.11 (.035)**	0.024	2.03
BM	1.389 (.240)	.600 (.997)	.601 (.548)	.739 (.627)	1.17 (.240)	0.007	1.99
BH	2.487 (.116)	.558 (1.037)	.538 (.591)	.972 (.616)	1.577 (.116)	0.013	1.979
Panel B showing the results of capital asset pricing model in case of 24 months holding period							
SL	4.464 (0.035)**	.512 (.640)	.800 (.424)	0.664 (0.314)	2.112 (0.035)**	0.0123	1.998
SM	5.349 (.021)**	.342 (.608)	.562 (.575)	.179 (.078)	2.313 (.021)**	0.015	1.911
SH	7.851 (.005)***	1.004 (.733)	1.369 (.172)	.989 (.353)	2.801 (.005)***	0.0214	2.12
BL	7.358 (.006)***	.504 (.584)	.863 (.389)	.882 (.325)	2.712 (.007)***	0.0201	2.07
BM	5.390 (.021)**	.937 (.668)	1.402 (.162)	.198 (.085)	2.322 (.021)**	0.015	2.084
BH	5.911 (0.01)**	1.082 (.693)	1.562 (.119)	.818 (.336)	2.431 (.015)**	0.0162	2.067

Note: Significance at: p-values * , 0.10, * * , 0.05 and * * * , 0.01
Standard error of the coefficients have been reported in parenthesis

The table 2 shows the results of capital asset pricing model which takes market as the independent variable and 6 portfolios (SL, SM, SH, BL, BM, BH) as dependent variables. The capital asset pricing model helps us to determine the expected returns of the portfolio by adequately pricing the systematic risk factor i.e. beta in the model and then compares the actual returns with the expected return of the portfolio to determine the presence of abnormal returns (alpha).

The table 2 shows that in case of 12 months holding of magic formula stocks, the F-Value of ANOVA which measures the goodness of the fit of the model has been insignificant in case of SM, BM, BH portfolios. Thus the corresponding results of alpha, beta are unpersuasive in such a case. Further, the F-Value of ANOVA has been significant in case of SL, SH, BL portfolios showing the goodness of fit of the model. The value of the beta coefficients in these case cases is quite high (SL-1.104, SH-1.615, BL-1.312). It therefore suggests that if the overall market rises or falls by 1%, the magic formula portfolio consisting of stocks with small size and low book to market ratio will rise or fall by 1.104%. The magic formula stocks therefore show larger volatility than the market in case of 12 months holding period. The value of Durbin Watson statistic (DW) is close to 2 in all cases showing no problem of autocorrelation in the data.

Panel B of table 2 shows that when the holding period of the said portfolio is extended from 12 months to 24 months, the ANOVA value is significant in all 6 portfolios depicting the fitness of the model. Also, the value of beta is significant in all 6 cases showing that market factor captures the variation in overall returns. It is important to mention that the value of beta in case of 24 months holding period is lesser than 1 in all 6 portfolios showing the lesser volatility of magic formula stocks than the market portfolio. Thus we find that magic formula generates highly volatile stocks when they are held for the period of 12 months. However, we extend their holding period to 24 months, the portfolio becomes lesser volatile than the market. Thus extending the holding period, tends to decrease the riskiness involved in the stocks.

The average adjusted R-square of the CAPM model is very low in case of 12 months holding period is 2.47% and in case of 24 months holding period is 1.33%. It therefore suggests that market factor has a very little role in explaining the variation in overall returns. Also, the Jensen alpha (α_p) as discussed above explains the difference between the portfolio's actual return and expected return, has been insignificant in all the cases in both the holding periods, thereby implying the absence of any abnormal returns of the magic formula. Further, table 3 reports the results of Fama and French model

Table 3: Panel A showing the results of Fama and French model in case of 12 months holding period

Dependant variable	f-value ANOVA	α_p		β_p		s_p		h_p		Adjusted r^2	DW
		coefficient	t-val	coeff	tval	coeff	tval	Coefft-	t-val		
SL	12.265 (.000)***	.968 (.958)	1.010 (.314)	.063 (.121)	.516 (.607)	1.001 (.183)	5.457 (.000)***	-.196 (.127)	-1.549 (.123)	0.159	1.869
SM	5.939 (.001)***	.059 (.879)	.067 (.946)	.063 (.111)	.566 (.572)	.618 (.168)	3.673 (.000)***	.289 (.116)	2.484 (.014)**	0.076	1.992
SH	21.856 (.000)***	.741 (.962)	.770 (.442)	.094 (.122)	.768 (.444)	1.059 (.184)	5.756 (.000)***	.820 (.127)	6.443 (.000)***	0.259	1.998
BL	.487 (.691)	.471 (.915)	.515 (.608)	.068 (.116)	.588 (.557)	-.058 (.175)	-.331 (.741)	-.126 (.121)	-1.043 (.298)	-0.009	2.008
BM	1.184 (.317)	.599 (.996)	.601 (.549)	.114 (.126)	.902 (.368)	-.148 (.191)	-.774 (.440)	.181 (.132)	1.371 (.172)	0.003	2.015
BH	17.873 (.000)***	.698 (.915)	.763 (.446)	.037 (.116)	.321 (.748)	-.117 (.175)	-.667 (.506)	.858 (.121)	7.090 (.000)***	0.220	1.854
Panel B showing the results of Fama and French model in case of 24 months holding period											
SL	18.443 (.000)***	.751 (.601)	1.251 (.212)	.116 (.076)	1.524 (.128)	.706 (.107)	6.589 (.000)***	-.155 (.081)	-1.920 (.056)*	0.127	1.932
SM	14.363 (.000)***	.212 (.582)	.364 (.716)	.172 (.074)	2.325 (.021)**	.405 (.104)	3.905 (.000)***	.411 (.078)	5.264 (.000)***	0.100	1.966
SH	58.581 (.000)***	.670 (.605)	1.106 (.269)	.122 (.077)	1.587 (.113)	.814 (.108)	7.536 (.000)***	.962 (.081)	11.851 (.000)***	0.325	2.014
BL	2.879 (.036)**	.441 (.582)	.758 (.449)	.107 (.074)	1.450 (.148)	-.262 (.104)	-2.523 (.012)**	.010 (.078)	.122 (.903)	0.015	1.955
BM	13.338 (.000)***	.669 (.642)	1.042 (.298)	.202 (.082)	2.472 (.014)**	-.444 (.114)	-3.875 (.000)***	.317 (.086)	3.678 (.000)***	0.093	2.123
BH	55.453 (.000)***	.523 (.576)	.907 (.365)	.101 (.073)	1.386 (.167)	-.370 (.103)	-3.601 (.000)***	.893 (.077)	.512 (.000)***	0.313	1.851

Note: Significance at: p-values * , 0.10, * * , 0.05 and * * * , 0.01
Standard error of the coefficients have been reported in parenthesis

As evident from table 3 that the F-value of the ANOVA in case of 12 months holding period has been significant in all the factor portfolios except the portfolio BL, BM. However, in case of 24 months holding period, F-value of ANOVA has been significant in all the cases. The coefficients of size factor (s_p) for 3 small size portfolios are positive and statistically significant and negative for 3 big size portfolios in three factor regression, which signifies that the small firms load positively on SMB while big firms load negatively on SMB in multifactor regression confirming the presence of size effect which means that firms with small market capitalization exhibit returns that on average significantly exceed those of firms with large capitalization (Bondoo 2008). We further note from the value coefficient (h_p) that the high book to market portfolios (value stocks) load positively on HML factor and low book to market portfolios load negatively on HML in three factor regression. These results confirm the presence of value premium i.e., firms with high book to market ratios exhibit returns that on average significantly exceed those of firms with low book to market ratios in both the holding periods.

In addition, the market risk factor is insignificant in all the factor portfolios showing that the common variation in magic formula stock returns is explained by the presence of size effect and the value effect and not due to market risk factor in case of 12 months holding of magic formula stocks. In case of 24 months holding period, the market factor has been significant only in SM, BM portfolios. Rest all the portfolios show insignificant

coefficient loading on market risk factor.

We note that for all 6 portfolios i.e., S/L, S/M, S/H, B/L, B/M, and B/H, the average adjusted R^2 of magic formula portfolio is 11.8% in case of 12 months holding period and 16.21% in case of 24 months holding period. The value of R- square is much higher than the CAPM model with market risk factor as only independent variable. Thus the three factor model has more explanatory power than CAPM.

The above tables also show that the intercept (α_p) for all the portfolios in three factor regression is positive but statistically insignificant. A significant and positive estimated abnormal return implies that the asset or portfolio has performed abnormally well based upon the risk exposure to the various systematic factors (market risk, size, and value). The insignificant alpha therefore implies the lack of presence of extraordinary returns of the magic formula in both the holding periods.

CONCLUSION

The present study was aimed at examining the performance of a strategy in Indian stock market which clubs growth component to value stocks known as magic formula strategy. The study did not find any convincing evidence of the profitability of such a strategy in Indian stock market. The extension of the holding period of the stocks selected through the strategy further deteriorated their performance. It could be due the fact that the portfolio does not comprise value stocks merely. The growth component added to the value stocks restricts the performance to small period only. Graham and Dodd (1934) stated that the stocks which are at present evidencing high growth in certain financial attributes are unlikely to be able to sustain it to the extent expected by market. The stocks that have risen in past due to good fundamentals (past winners), however, underperform the past losers due to correction of the mispricing phenomenon (De Bond and Thaler, 1987). Fama and French model revealed that size and value effect played more dominant role than market in explaining the variation in overall returns. Thus, the required return on magic formula should price for the risk factors i.e. size and value, before estimating the excess returns. The presence of abnormal returns however could not be ascertained in any of the holding period. Thus the magic formula portfolio is not profitable in context of Indian stock market.

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