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Can portfolio returns exceed market return? An examination of the efficient market hypothesis for the Indian stock market

By Tamal Datta CHAUDHURI [a]
& Gulshan Kaur BHAMRAH [b†]

Abctract. The paper explores the possibility of forming portfolio of stocks that can generate returns higher than the market over a time period. Various principles are used for portfolio formation in the year 2013, and it is examined whether such portfolios have been able to generate excess returns over the next five years. Data has been used for Indian companies which are listed in the National Stock Exchange and Bombay Stock Exchange. Further, our sample consist of companies that have in operation over this period, have earned profits each year, and have consistently paid dividends in each of the years. The period under consideration has seen upswings and downswings, and it is our interest to explore whether our portfolios have been able to generate excess returns. Our results provide interesting insight into portfolio formation and also structuring of mutual funds.
Keywords. Portfolio, Price/earnings ratio, PEG ratio, Dividend yield, Net profit magrin, Excess returns.
JEL. G11, G14, G23, G24.

1. Introduction

The financial literature is replete with attempts in predicting stock prices. In contrast to the Efficient Market Hypothesis, researchers have identified various factors that can influence stock returns and hence have used them for prediction purposes. The quality of results has varied, but the efforts continued. Going back to Graham & Dodd (1934) where they disregarded the fact that "good stocks (or blue chips) were sound investments regardless of the price paid for them", they distinguished between speculation and investment, and consequently emphasized on factors like management quality, earnings, dividends, capital structure and interest cover. Their work focused on building a healthy portfolio and the characteristics of their constituents. Implicit in their work was the theme that it pays to be careful while choosing stocks

[a] Calcutta Business School, Diamond Harbor Road, Bishnupur –743503, 24 South Parganas, West Bengal, India.
☎. 9330387824 ✉. tamalc@calcuttabusinessschool.org
[b†] Calcutta Business School, Diamond Harbor Road, Bishnupur –743503, 24 South Parganas, West Bengal, India.
☎. 9135406729 ✉. bhamrahgulshan@yahoo.com

and there were fundamental factors that the investors should carefully consider.

There are a large number of financial sector players who use indicators of technical analysis to predict stock price movements. Their evaluation of overpriced or underpriced stocks is based on technical indicators like moving average, momentum, stochastics, percentage retracement, MACD, RSI etc. It is their belief that future stock prices can be predicted and accordingly portfolio can be constructed. As market prices contain all information, present and future, they base their decisions regarding buying and selling of stocks on patternsof their price movements.

The mutual fund industry sells funds to subscribers based on returns that they can deliver. Stock choice and market timing are two factors that they focus on, implying that they believe that proper construction of an equity portfolio can generate returns. Mutual fund schemes available in India like Systematic Investment Plan (SIP), where each month a specific amount is put into a specific fund, are publicized as instruments which can generate returns above market returns over a long period of time.

Best-selling books on stock picking advise on looking at fundamentals of companies. Books and papers on behavioral finance have identified human traits and their effects on stock price movements. Various econometric methods have been used for prediction through frameworks that incorporate volatility. In short, relentless attempts are being made to demonstrate that money can be made in the stock market, implying thereby that stock markets are inefficient

The purpose of this paper is to examine whether, based on certain parameters, it is possible to construct portfolio of stocks that can beat market returns. Accordingly, the plan of the paper is as follows. A brief literature survey is presented in Section 2. The methodology for the study is presented in Section 3. Section 4 presents the data and the results. Section 5 concludes the paper.

2. Literature review

Black & Scholes (1974) examine the effect of dividend policy on expected returns. They state that companies that declare higher dividend observe an increase in prices, and companies that reduce dividends face a temporary decline in prices. Investors find it difficult to understand that companies declare lower dividends to conserve funds for expansion purposes. They test the effect of dividend yield on expected return by considering a modified version of the CAPM model with dividend yield as an additional explanatory variable.

Basu (1977, 1983) analyzes the relationship between earnings yield, size and returns from common stocks and find that stocks with higher earnings to price, earned higher returns than those with low earnings to price. This result they obtained, even when the experiment was conducted for firms of various sizes.

Banz (1981) explores the relationship between size, as represented by market capitalization, and market yields. The study found that smaller firms have had higher risk adjusted returns, on average, than larger firms. Chan *et al.,* (1991) tried to explain returns from Japanese stocks in terms of earnings yield, size, book to market ratio, and cash flow yield and found significant relationship between these variables.

Fama & French (1988) explore the relationship between dividend yields and expected stock returns. Considering the dividend discount model, which has expected returns and discount factors involved, they show that dividend yields explains less than five per cent of variances in returns. As the time increases, the effect of dividend yields increases, and this is due to high autocorrelation of expected returns.

Jaffe, Kiem & Westerfield (1989) examine the effect of size and earnings to price ratio on stock returns. Their study focusses on the effect of the month of January, compared to other months. Further, they focus on small firms and turnaround firms.

Fama & French (1995) try to relate earnings from stocks with ratio of book value to market price (BE/ME) and size. Their contention is that low BE/ME stocks generate higher returns than high BE/ME stocks. Further, high BE/ME stocks signal poor earnings and low BE/ME stocks signal strong earnings.

Campbell & Shiller (1998) investigate whether stock prices can drift away from fundamentals like dividends or earnings for long periods, and whether there would be a tendency for prices to correct so as to keep the relationship between them at normal levels. In relation to the efficient market hypothesis, they test whether dividend price ratio or any other valuation ratio has the ability to predict future stock price movements.

Senyigit &Ag (2014) examine the effect of three independent variables namely P/E ratio (price to earnings ratio), P/B ratio (price to book ratio), and D/E ratio (debt to equity ratio) on stock returns in Turkey. For their sample and the time period under consideration, they did not find any significant relationship between the variables.

For further references, the reader can refer to Datta Chaudhuri, Ghosh & Eram (2016) where for prediction of stock returns, the explanatory variables (inputs/features) considered are Price-Earnings (P/E) Ratio, Price to Book Value (P/BV) Ratio, Debt Equity Ratio (DER), Interest Coverage Ratio (ICR), Gross Profit Margin (GPM), Dividend Pay-Out Ratio (DPR), Extent of Promoter Holding of Shares (EPH), Sectoral Returns (SR) and Volume (V). The paper uses variables that have been tried in the literature, but in a machine learning framework, where no linearity assumption is made and where there is continuous learning.

3. Methodology

For portfolio formation, the attributes of companies that we focus in this paper are Size as represented by Sales and Market Capitalization, P/E ratio, Market to Book value, Net Profit Margin, Dividend Yield and PEG ratio.

The following presents how we have constructed the different portfolios, on the basis of the attributes.

a. The data is for the period 2013 to 2018

b. We have considered only manufacturing companies that are listed in the Indian stock exchanges, have made profits in all the years mentioned above, and have declared dividends

c. We have then ranked these companies by sales, to represent size, from smallest to largest, and have only focused on companies of sales of Rs.100 crore or more.

d. From this subset of companies, we have chosen the top 100 companies and the bottom 100 companies.

e. For each of these 100 companies, we have ranked them by the attributes and considered the lowest decile and the highest decile by the attributes.

f. We have considered these as our portfolios, and compared their returns with market returns.

Once the data is in place, we have estimated equation 1 for various portfolios constructed on the basis of the parameters mentioned above.

$$(r_p - r_{f)} = \alpha + \beta\ (r_m - r_f)$$

where r_p is the returns from the portfolio, r_f is the risk free rate, r_m is market returns, α represents excess returns, and β is the measure of systematic risk. If for any of the portfolios, the relationship generates a positive significant value of α, we can say that that the portfolio so constructed has been able to generate returns above the market.

We also perform the same exercise for portfolios constructed on the basis size represented by market capitalization. We perform separate exercises for large cap, mid cap and small cap companies as classified by the Bombay Stock Exchange. In this case, some banks were selected in the some of the portfolios.

For the regression, we collected daily data from 2014 to 2018 on market prices of the stocks in the respective portfolios. We computed monthly returns from the stocks and also monthly returns of the market index, NIFTY. For portfolio returns, we took the weighted average of the returns of the stocks in the portfolio, where each stock was given the same weight.

4. Results

The results are presented in Tables 1, 2, 3 and 4.

a. Table 1 suggests that when the companies are ranked in increasing order of sales, if we consider the largest 100 companies, then rank them as per the PEG ratio, the P/E ratio, P/B ratio, NPM, and Dividend Yield, the respective portfolios consisting of first and last decile of these companies, have not generated returns greater than the market returns. From the regression, we did not get a significant value of α. These companies feature in most mutual funds, most of them are part of NIFTY representing market

sentiment, and are also mostly sought after by individual investors. They are stable companies with established products. For such set of companies to generate above market returns would has been difficult.

Table 1. *Regression Results for Top 100 Companies in terms of Sales*

Parameter	Estimated α	Estimated β	R^2
PEG ratio			
First decile	0.151248	0.967066	0.237544
	(1.489683)	(4.250874)	
Last decile	0.017138	1.027406	0.495642
	(0.282177)	(7.549687)	
PE ratio			
First decile	0.106188	1.140572	0.289429
	(1.01395)	(4.860502)	
Last decile	0.003414	0.78474	0.493945
	(0.073346)	(7.524105)	
PB ratio			
First decile	0.142375	1.116254	0.313144
	(1.469626)	(5.142245)	
Last decile	0.020405	0.599794	0.372116
	(0.446924)	(5.862917)	
NPM			
First decile	0.082961	1.334974	0.326393
	(0.738186)	(5.301287)	
Last decile	-0.01134	0.57334	0.336908
	(-0.24057)	(5.428539)	
DIVIDEND YIELD			
First decile	0.04522	0.659885	0.229433
	(0.638083)	(4.155626)	
Last decile	0.109834	1.135464	0.328866
	(1.155483)	(5.331129)	

Notes. Figures in brackets indicate t-values.
Source. Authors' own construction

b. It is of interest to note from Table 2 that of the stocks in the bottom 100 companies, when ranked in terms of the different parameters and two portfolios formed consisting of the first and last decile of companies, these portfolios havegenerated more than market returns over the period 2013 to 2018. When PEG ratio is considered, the regression results for both the first and last decile of companies have generated positive significant α. This is also true for dividend yield. For P/E ratio, P/B ratio and NPM, regression for the first decile of companies has generated positive significant α. We can infer that portfolio of smaller companies have been able to generate returns higher than the market.

Table 2. *Regression Results for Bottom 100 companies in terms of Sales*

Parameter	Estimated α	Estimated β	R^2
PEG ratio			
First decile	0.20915	1.142582	0.273839
	(1.918221)**	(4.676756)	
Last decile	0.16469	0.829949	0.227309
	(1.836612)**	(4.130663)	
PE ratio			
First decile	0.179566	0.927386	0.200806
	(1.656237)*	(3.817474)	
Last decile	0.121678	0.517796	0.093536
	(1.288141)	(2.446403)	
PB ratio			
First decile	0.208145	0.769389	0.112695
	(1.645253)*	(2.714126)	
Last decile	0.07404	0.613396	0.196014
	(1.017044)	(3.760391)	
NPM			
First decile	0.216685	0.781017	0.1162
	(1.716683)**	(2.761467)	
Last decile	0.051593	0.533153	0.118337
	(0.604985)	(2.790124)	
Dividend Yield			
First decile	0.129733	0.570196	0.161085
	(1.701344)**	(3.337199)	
Last decile	0.173241	0.674023	0.12299
	(1.642499)*	(2.85198)	

Notes. Figures in brackets indicate t-values.
Source. Authors' own construction

Table 3.*Regression Results for Market Leaders*

Parameter	Estimated α	Estimated β	R^2
SECTOR Leaders			
First quintile	0.117462	0.839067	0.326171
	(1.662055)*	(5.29861)	
Last quintile	0.067977	0.813906	0.451836
	(1.293962)	(6.914312)	

Notes: Figures in brackets indicate t-values.
Source: Authors' own construction

c. The portfolios for Table 3 were constructed by taking market leaders, in terms of sales, from various sectors in India, and then forming two portfolios with the lowest sales and highest sales. These portfolios have sectoral diversification and the companies are leaders in their fields. Interestingly, we observe that the lowest quintile companies have been able to generate above market returns.

d. Since our focus was not on systematic risk, we have not made any comment on Estimated β. Observation will show that they are in each case statistically significant.

e. As we move from highest 100 companies to lowest 100 companies the values of R^2 declined. The association with the market fell. However, for market leaders, the R^2 was the highest.

f. In all the above exercises, the companies were initially ranked by sales, and then portfolios were constructed on the basis of different parameters. In Table 4 we report regression results for companies based on market capitalization. We consider the companies that are listed in the Bombay Stock Exchange (BSE) Large Cap Index, the BSE Mid Cap Index and the BSE Small Cap Index. In each of these indices we take the first and the last quintile of companies and form six portfolios, ranked by the parameters E/P, Dividend Yield and Net Profit Margin (NPM). Our regression results show that portfolios formed on the basis of E/P could not generate positive significant α. In terms of dividend yield, it is the portfolio of companies belonging to the highest quintile in the large cap sector that has generated greater than market returns. When portfolios are formed on the basis of NPM, the top quintile of all the mid cap and large cap companies have generated significant positive α. The value of α for the top decile in the small cap segment is marginally significant. The results indicate that business efficiency matters for portfolio choice.

Table 4. *Regression Results for Portfolios based on Market Capitalization*

Market capitalization wise companies	Estimated α	Estimated β	R^2
E/P			
Small cap			
Top	-0.05844	1.2465	0.2761
	(-0.498)	(4.704)	
Bottom	0.032105	1.092378	0.2945
	(0.326525)	(4.92067)	
Mid cap			
Top	0.016657	1.191129	0.390879
	(0.192623)	(6.1007)	
Bottom	-0.01325	0.99878	0.372182
	(-0.1756)	(5.8637)	
Large Cap			
Top	-0.00406	1.010083	0.40823
	(-0.0574)	(6.3254)	
Bottom	-0.00281	0.869688	0.334895
	(-0.03948)	(5.4041)	
DIVIDEND YIELD			
Small cap			
Top	-0.03154	1.687465	0.479586
	(-0.32308)	(7.310929)	
Bottom	0.058154	1.271123	0.515122
	(0.848977)	(7.84969)	
Mid cap			
Top	-0.00742	1.631825	0.536691
	(-0.08809)	(8.19673)	
Bottom	0.014007	1.024492	0.59121
	(0.296022)	(9.158727)	
Large Cap			
Top	0.085126	1.295771	0.730491
	(1.947218)**	(12.53819)	
Bottom	0.028667	0.931945	0.555735
	(0.619401)	(8.517795)	

NPM			
Small cap			
Top	0.157043	1.601625	0.450209
	(1.597455)*	(6.891641)	
Bottom	0.085033	1.26634	0.498401
	(1.205068)	(7.59145)	
Mid cap			
Top	0.137844	1.161103	0.573335
	(2.477655)**	(8.828252)	
Bottom	0.061681	1.04918	0.60409
	(1.307419)	(9.407344)	
Large Cap			
Top	0.135057	1.085057	0.710293
	(3.508869)**	(11.92486)	
Bottom	0.004665	0.940477	0.581291
	(0.105233)	(8.973351)	

Notes. Figures in brackets indicate t-values.
Source. Authors' own construction

The list of companies belonging to the portfolios discussed above, are available from the authors on request.

5. Conclusion

The objective of the paper was to explore whether portfolios of stocks could be constructed which would deliver returns higher than the market. The basis of constructing the portfolios were size, Price/Earnings ratio, Market Price/Book Value ratio, Net Profit Margin, Dividend Yield, PEG ratio and Earnings to Price ratio. Our portfolios were constructed in the year 2013, and their performance was evaluated over a fiveyear period from 2014 to 2018. Our results show that for the largest companies in terms of sales, the portfolios could not generate above market returns for any of the parameters. Whereas, for the smallest of the companies, some of the portfolios could deliver excess returns.

It is interest to note that portfolios formed with market leaders in different industries, could deliver excess returns. Thus, leadership needs to be taken into consideration for portfolio formation.

When we controlled for market capitalization to represent size, we found that portfolios formed from largest cap companies on the basis of dividend yield or net profit margin, generated above market returns. Thus, companies with highest market capitalization, that are liquid, efficient and dividend paying are preferred by investors.

Overall, we laid out certain principles for portfolio formation, and our results are specific for a certain period of time. We observed that certain portfolios could generate above market returns, whereas some didn't. It would be our endeavor now to examine on what basis various equity mutual funds in India choose their portfolio and whether focused funds like dividend yield funds are better than funds based on market capitalization or on size.

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