

An Empirical Study of Financial Ratios Affecting Stock Returns in the Indian Stock Market

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Abstract: Stock market returns are the profit/loss the investors generate out of their investment in the stock market. These returns are dependent on various micro-economic and macro-economic factors. The present study analyses the micro-economic factors (financial ratios) that affects stock return which will provide a parameter for investors to decide about their investment. For the purpose of empirical study 12 firms of Fast Moving Consumer Goods (FMCG) sector and 6 firms of pharmaceutical sector which are trading on the NSE (National Stock Exchange) is selected and is studied for the period 2010-2017. The effect of financial ratios namely, DPS (Dividend Per Share), EPS (Earning Per Share), CR (Current Ratio), QR (Quick Ratio), ROE (Return on Equity), ROA (Return on Asset), DER (Debt to Equity Ratio), PBV (Price to Book Value), DPR (Dividend Pay-out Ratio), DYR (Dividend Yield Ratio) on stock returns is analysed using panel data analysis. This study uses Panel Vector Auto Regression Model (PVAR). In order to specify the appropriate estimation method of our PVAR Models, we employed Hausman test. Accordingly, our PVAR Models are estimated with fixed effects. The study found out that the price-book value, dividend per share has a significant impact on stock returns. The results of Wald test showed that there is a short run relationship between PBV, EPS, DPS, ROA and SR.

Key words: Stock returns, dividend per share, price to book value, return on asset, panel VAR Model, specify

INTRODUCTION

The stock market is a primary indicator of country's development and economic strength. It is a place where one can buy, sell and trade stocks. An investor commits his money on stocks with an expectation of a future financial returns. The stock returns are affected by macro-economic and micro-economic factors. The macro-economic factors are those factors which is related to the broad economy. Examples are inflation, gross domestic product, unemployment interest rate investments etc. which are the key indicators of economic performance.

The micro-economic factors refers to financial ratios which are determined by analysing the company's financial performance. Investing on stocks require an accurate analysis of financial data to find out company's financial worth. Thus, ratio analysis is very essential for investment decisions as it helps to know the performance of company and also makes it easy for investors to compare companies of the same sectors and to make decision on the best investment option. The basic aim of investors from investing in company's stock is to raise profits which are attained by stock returns of companies. The essential element in selecting the sound investments

decisions is the stock return. Furthermore, any investor in selecting their best investment decision is to achieve stock returns with more efficiently, competently and a lesser amount of risk. Yet, the investors must need information about those stock returns of companies that can increase profits. The information about the company's stock is based on both internal and external information of that company whereas the internal information is illustrated in its financial reports such as balance sheet, cash flow statement and profit and loss statement. The outside information of companies are available in the stock exchange market. Consequently, the internal factors can affect the stock returns. Furthermore, external information determines the stock prices in the stock exchange market and has influence on investment decisions made by investors (Muvungi *et al.*, 2017). Financial ratios are one of the financial statement analysis methods used by financial analysts. They use financial statements analysis in order to study the ability of financial ratios in predicting the stock returns. Furthermore, financial ratios are calculated from financial reports which are considered as appropriate indices that can be used to facilitate the sound investment decisions by investors and benefit the users of financial reports in order to inspect financial ratios of companies (Karami and

Talaei, 2013; Guloglu *et al.*, 2016; Suresh and Bharathi, 2018). In the age of globalization, the investors are smart and risk averse by investing in stocks of high market capitalization companies. Without stock return predictability, the investors are not able to make sound investment decisions which can lower the investor's confidence. The objective of the current study is to examine the impact of selected financial ratios on stock returns in the National Stock Exchange (NSE) listed FMCG and pharmaceutical sector companies.

Literature review: The association of stock returns with numerous allied variables has been discussed and researched by research scholars over the years. A brief write up highlighting such notable work which studied the impact of stock returns with other financial ratios follows: (Hjalmarsson, 2010) tested for the predictability of stock return using four variables namely, Earnings-Price ratios (EP), short interest rates, Dividend Price (DP) and the term spread. The data of the study includes 20,000 monthly observations from 40 international markets which includes 24 developed and 16 emerging economies. A new methods for predictive regressions is developed by him for the panel data as he found the results of standard fixed effects measures suffer from extreme size misinterpretation in the stock return regression. The results show that the term spread and short interest rate are quite powerful predictors of stock return in the developed markets. A Generalised Least Squares techniques (GLS) is applied by Kheradyar *et al.* (2011) to evaluate the predictive regressions in the form of multiple and simple models of panel data sets. It is found that book to market ratio has higher predictive power than dividend yield and earning yield in the Malaysia stock exchange. By applying panel data regression analysis, Zeytinoglu *et al.* (2012) studied the influence of market based ratios on the stock returns of insurance companies in Turkey. Among (Price to Earnings ratio) P/E, (Earnings Per Share) EPS and (Market to Book) M/B ratio, it is found that the market based ratios has explanatory power on the changes in current stock returns and the stock returns of one period ahead. Karami and Talaei (2013) assessed the correlation between financial ratios (including capital gain, book to market value, dividend yield, price to earnings) and its impact on stock returns of the companies listed on the Tehran Stock Exchange by using multiple and simple linear regression tests. Book to market ratio and capital gain showed a significant effect on stock return. Using binary logistic regression model, Abrokwa and Nkansah (2015) examined the factors that significantly affects the performance of 30 large market capitalization company's stock actively traded on Indian Stock Market. He observed that, percentage change in price-book value, net sales, price-cash earnings per share, sales-net assets, price-earnings per share, book value, cash price-earnings

per share, PBIDT-sales can categorize companies up to 74% level of accuracy into two categories (good or poor) depending on their rate of return. A panel regression analysis is used to analyse and interpret panel data by Anwaar (2016) and Din (2017) to investigate the impact of financial ratios by using firm's performance variables on stock returns. Among net profit margin, ROE, EPS, ROA and quick ratio, ROA and net profit showed a notable and positive impact on stock returns. Reddy and Parabn (2017) and Dutta *et al.* (2012) evaluated the relationship between EVA, traditional measures such as (Return on Equity) ROE, (Return on Asset) ROA, (Dividend Per Share) DPS and (Earnings Per Share) EPS and stock returns. The results indicate a positive relationship of stock returns with EVA and the traditional measures of performance measurement. But the study did not find any evidence indicating significant impact of these variables on the stock returns. Also, it was found that EVACE, ROA and ROE do Granger cause stock returns.

MATERIALS AND METHODS

Data description and research methodology: The study uses secondary data for the analysis. A sample of 18 companies, i.e., 12 companies of FMCG sector and 6 companies of pharmaceutical sector listed on the National Stock Exchange is considered for the study period 2010-2017. The required data pertaining to the financial ratios (independent variables) CR, QR, BV, PBV, DPS, DYR, EPS, DER, ROA and ROE have been extracted from the website www.moneycontrol.com. The stock return (dependent variable) is calculated by using the formula:

$$((P_1/P_0)+D)/P_0$$

Where:

P_0 = Initial stock price

P_1 = The ending stock price

D = The Dividends

A descriptive panel data research design is adopted for the study and it is analysed with the help of EVIEWS10 (statistical tool). The study is based on fixed effect model and vector auto regression model for panel data. Firstly multi-colinearity test was done among the independent variables in order to avoid the adverse effect of variables in the regression estimates (Prajwal and Suresh, 2017). Unit root test among the variables was done to check if the variables are non-stationary at level and at first difference they become stationary. Pedroni co-integration test was conducted to test for the existence of long-term co-integration between the variables. As we found that there was no co-integration between the dependent and independent variables, PVAR Model is adopted for the analysis. To choose the appropriate regression model between fixed and random effect models, Hausman test

was employed. Accordingly, PVAR Model is estimated with the fixed effects. The present study aims to analyse the impact of price to book value, dividend per share, return on asset, earnings per share, on stock returns.

Multi-colinearity test: was conducted among the independent variables as the multi co-linearity may adversely affect the regression estimates. As it was found that the multi-colinearity exists between the variables, it is reduced to four variables namely, PBV, DPS, EPS and ROA.

Unit root test: It was conducted to check whether the variables are non-stationary and possess a unit root. After examining the stationarity of data with the Levin, Lin and Chu test, it can be stated that all our variables are non-stationary at level and at first difference they become stationary. The test was executed with a significance level of 5%.

Pedroni co-integration test: A panel co-integration test recommended by Petcharabul and Romprasert (2014) and Taneja (2010) is applied in the study to test for the existence of a long-term co-integration among stock returns and the independent variables. If the variables are co-integrated, the residuals will be $I(0)$ and if the variables are not co-integrated then the residuals will be $I(1)$. As the results showed that no co-integration exists between the dependent and independent variables, panel VAR Model is chosen to analyse the data.

Fixed effect and random effect model: Panel data regression models are used to analyse the impact of independent variables on stock returns. According to Allison, "In a fixed effects model, the unobserved variables are permitted to have any relationship with the observed variables. The Fixed effects models restraints for the effects of time-invariant variables with time-invariant effects. In a random effects model, the unobserved variables are presumed to be non-correlated with (or statistically independent of) all the observed variables" (Williams, 2015). Fixed and random effect regression model:

$$Y_{it} = \alpha + \beta X_{it} + \varepsilon_{it} \quad (1)$$

Where:

Y_{it} = Dependent variable

X_{it} = Independent variables

i and t = Subscripts refers to $i = 1, 2, \dots$, sections and $t = 1, 2, \dots$, time periods

α and β = Coefficients of the model

ε_{it} = Error term of the model

RESULTS AND DISCUSSION

Descriptive analysis: provides the summary of the data set used in the present study. During the study period it was found that stock returns has reached maximum of 0.0572 and minimum of -0.0019 with the mean 0.0098. The average value of current ratio and quick ratio is 1.7144 and 1.4850. Return on asset has reached maximum of 39.520 and minimum of 16.960. Dividend per share has reached maximum of 389 from minimum of 0 which means most of the companies decreases its dividends to reduce its debts. Dividend pay-out ratio and dividend ratios has reached maximum of 298.55 and 389 from 0 which means most of the companies retain their earnings towards the development of their firm instead of paying to stake holders. Price to book value ratio examines the market capitalisation in relation to the book value of a company as shown in its balance sheet. It is found that price to book value is found to have a minimum value of 2.51. However, value investors often consider stocks with P/B ratio < 3 (Table 1).

Pedroni residual co-integration test:

- Dependent variable: SR PBV DPS EPS ROA
- Trend assumption: no deterministic intercept or trend
- Null hypothesis: co-integration does not exist among the variables
- Alt. hypothesis: co-integration exists among the variables

According to Table 2, majority p-values of Pedroni tests indicate that no co-integration exists among the variables. Therefore, we employ PVAR Models instead of panel co-integration models. However, the panel unit root tests shows that all variables we consider are stationary in first differences. As the probability of 7 outcomes is more than 5% level of significance, null hypothesis is accepted. Hence, it shows that co-integration does not exist between the dependent and independent variables and do not have long run relationship.

Table 1: Descriptive statistic of all the dependent and independent variables

Variables	Mean	Median	Maximum	Minimum	SD
SR	0.0098	0.0073	0.0572	-0.0019	0.0098
CR	1.7144	1.4850	6.1600	0.4400	1.0021
QR	1.1486	0.9150	4.2400	0.2600	0.7326
ROA	17.127	16.960	39.520	3.8400	8.0209
ROE	31.586	25.105	142.01	7.2900	25.322
EPS	28.199	17.950	133.31	2.6600	27.538
DPS	11.197	5.3750	389.00	0.0000	34.848
DPR	35.949	30.235	298.55	0.0000	32.274
DYR	1.0322	0.8616	5.8219	0.0000	0.8214
DER	0.6399	0.4567	3.0411	0.1186	0.5490
PBV	12.039	9.8950	51.040	2.5100	10.012

Table 2: Pedroni co-integration test results

Alt. hypothesis; common AR co-efficient within dimension	Statistic	Probability	Weighted statistic	Probability
Panel V-statistic	-36667.68	1.0000 I(1)	-4.160180	1.0000 I(1)
Panel rho-statistic	2.154070	0.9844 I(1)	3.131976	0.9991 I(1)
Panel PP-statistic	-8.44944	0.0000	1.031071	0.8487 I(1)
Panel ADF-statistic	-6.72274	0.0000	1.1399	0.8728 I(1)
Alt. hypothesis; individual AR co-efficient between dimension				
Group rho-statistic	4.738197	1.000 I(1)		
Group PP-statistic	-10.19982	0.0000		
Group ADF-statistic	-7.253301	0.0000		

I(1) shows residuals are not co-related

Table 3: Hausman test results

Test summary	χ^2 statistic	χ^2 df	Probability
Cross-section random	22.951000	10	0.0109*

*The level of significance at 5%

Hausman test: When the panel data is analysed with fixed and random effects model, one of the models will be inconstant. Hence, the best model must be chosen between the two. In order to specify the appropriate estimation method of our PVAR Models, we employed Hausman test. The result of Hausman test shows that the fixed effect model is appropriate.

- Null hypothesis: random effect model is appropriate
- Alt. hypothesis: fixed effect model is appropriate

From the Table 3, it is clear that the p-value of the Hausman test is lesser than 5% level of significance. Hence, null hypothesis is rejected and alternative hypothesis is accepted. It can be concluded that the results of random effect is statistically insignificant and we use fixed effect model for the estimation.

The econometric model: In our specific models we use the panel VAR approach which includes the lagged independents into the estimation of the “dependent”. The equations is of that form, assuming a 2 lag length is optimal. The modified panel regression model for the study is:

$$R_{it} = \alpha_i + \beta_1 SR_{it-1} + \beta_2 SR_{it-2} + \beta_3 PBV_{it-1} + \beta_4 PBV_{it-2} + \beta_5 DPS_{it-1} + \beta_6 DPS_{it-2} + \beta_7 EPS_{it-1} + \beta_8 EPS_{it-2} + \beta_9 ROA_{it-1} + \beta_{10} ROA_{it-2} + \epsilon_{it} \quad (2)$$

Where:

- R_{it} = Stock Returns of in year t
- α_i = An unobserved individual effect
- $\beta_1 - \beta_{10}$ = The 10 coefficients of respective variables
- ϵ_{it} = The error term

- Null hypothesis: independent variables do not influence the dependent variable (stock return)
- Alt. hypothesis: independent variables influence the dependent variable (stock return)

Table 4: Estimation results of PVAR Model using stock return as dependent variable

Variables	Co-efficient	SE	t-statistic	Probability
C	0.01911	0.00697	2.74053	0.0080
SR _{t-1}	-0.386264	0.27899	-1.38448	0.1712
SR _{t-2}	0.309935	0.21590	1.43549	0.1562
PBV _{t-1}	-0.000560	0.00028	-1.95148	0.0555*
PBV _{t-2}	0.000563	0.00033	1.67609	0.0988*
DPS _{t-1}	0.001102	0.00048	2.29347	0.0252*
DPS _{t-2}	-0.001419	0.00067	-2.10862	0.0390*
EPS _{t-1}	0.000565	0.00010	-0.55066	0.5838
EPS _{t-2}	0.000174	0.00012	1.43538	0.1562
ROA _{t-1}	0.000243	0.00026	0.91515	0.3637
ROA _{t-2}	-0.000836	0.0002	-2.98392	0.0041

*Results R²: 0.655465; Prob (F-statistic) 0.000001; Akaike info criterion -7.151527; Durbin Watson stat 2.000039; *The significance level at 5 and 10%

Table 4 shows the results of PVAR fixed effect model. It is assumed that 2 lags is optimum as the value of Akaike information criterion becomes the lowest. The coefficient of determination (R²) is 65.54% which means that the 65.54% variations in stock returns are explained by financial ratios. The closer the value of R² to 1 the better the regression line describe the connection between dependent and independent variables. The probability associated with the F-statistic is 0.000001 which can support the validity, usefulness and statistical significance of the model. The model specification including stock return as a dependent variable indicates that it is not under the influence of its own lags. More precisely it can be said that stock returns have a deterministic way of impact on itself in future periods. The co-efficient of the variable PBV from lag 1 and 2 is statistically significant which means if one unit increases in price to book value, the stock returns will increase by 0.055 units in lag period 1 and by 0.0988 units in lag period 2. If the dividend per share increases by one unit the stock returns will increase by 0.0011 units in the lag period 1 but decreases by 0.0014 units in lag period 2 because the company may reduce its dividend to reduce its debt. It is found that the DPS is statistically significant from lag 1 and 2. If there is an increase in one unit of earning per share the stock returns increases by 0.0005 units in lag period 1 and by 0.0001 in lag period 2 but it is observed that EPS is not statistically significant. Hence, it can be said that change in EPS does not have impact on stock

Table 5: Results of Wald test

Test statistic	Values	df	Probability
F-statistic	2.656215	(8.62)	0.0142*
Chi-square	21.24972	8	0.0065*

*The level of significance at 5%

return. The co-efficient of return on asset is found to have a negative impact on stock return. This is may be due to the improper utilisation of capital by the company. It is found that if there is an increase in one unit of ROA, the stock return decreases by 0.008 and it is statistically significant.

Wald test:

- Null hypothesis: there is no short-run relationship among the variables
- Alt. hypothesis: there is a short-run relationship among the variables

Table 5 shows the results of Wald test. Since, the probability of the test is <5% level of significance, null hypothesis is rejected and alternative hypothesis is accepted. Therefore, the results show that there is a short run causality running from PBV, DPS, EPS, ROA to stock returns.

CONCLUSION

Financial ratios provides vital metrics for the investors who are looking to valuate companies stocks for investment. These ratios are derived from past data and are used in most of the studies and analysis. In this context, the impact of financial ratios on stock returns is examined using panel VAR Model. Hausman test was employed in order to choose the appropriate regression estimate model. Accordingly fixed effect model was used for the analysis. The results shows that price to book value, dividend per share has a significant impact on stock returns. It is found that earning per share do not have an individual impact on stock returns. Even though return on asset is found statistically significant, it has a negative influence on stock returns due to the inability of the companies to utilise its capital. In order to test if there is a short run relationship between the dependent and independent variables and to test if the explanatory variables in the model are significant Wald test was conducted. The results shows that there is a short-run causality between the variables and are significant. It is also found that 65.54% variations in stock returns are explained by dividend per share, earnings per share, return on asset and price to book value ratios. Hence, it

can be said that company's financial ratios namely, DPS, PBV, ROA impact the stock returns and these ratios can be a parameter for investors to decide about their investment.

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