A Critical Assessment of the Relationship between P/E Ratio, RONW and ROCE: A Study of FMCG, IT and Banking Sectors

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Abstract

Stock investing requires careful analysis of financial data to find out the company's true worth. Valuation ratios and Return ratios can predict the share price performance, giving investors an opportunity to know if a stock is overvalued or undervalued. Data for the period from 2010 to 2020 is considered for the study. Price-Earnings ratio (P/E ratio), Return on Net Worth (RONW) and Return on Capital Employed (ROCE) for the top five companies in the FMCG, Banking, and IT sectors are taken for the study. The relationship between the identified variables has been analysed using correlation and linear regression techniques. The analysis reflects that there is a positive relationship between the P/E Ratio with RONW and ROCE for most of the companies in all three sectors. While many factors influence the investment decision, the P/E ratio is an important metric to consider. For the companies across the various sectors, it is evident that the ROCE and RONW have a very strong correlation and also exert influence on the P/E ratio. Therefore, a simple linear regression model is used to demonstrate the relationship between the P/E ratio and ROCE and P/E ratio and RONW. For all the companies across the sectors, a positive relationship is reflected between the P/E ratio and RONW and ROCE. It is essential to analyze the ratios together to get a comprehensive understanding of the financial performance of companies.

Keywords: Macroeconomic Variables, Overvalued Stock, Price-to-Earnings Ratio, Return on Capital Employed, Return on Net Worth, Stock Prices, Undervalued Stock

1. Introduction

Stock investment is one of the most effective ways for individuals to grow their money or double their investment. An investor must do a thorough analysis of various stocks based on numerous parameters before deciding on where to invest. The financial statements do not provide adequate figures and information to the investors. The figures in the financial statements need to project into context for a better understanding of the company's true worth to the investors.

Financial ratio analysis is derived from the financial statements, which gives investors a better understanding of the company's financial position and performance by comparing one component with the other component. The financial ratio helps the investors quickly decide on the right investment of stocks by comparing the performance of the company at the firm level and industry level by equating with the industry average.

Valuation ratios and Profitability ratios are the fundamental ratios used to assess the actual price of an

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investment in terms of earnings. Some of the market valuation metrics to evaluate the stocks are the Price-to-Earnings (P/E) ratio, Price-to-Book (P/B) ratio, Price/Earnings-to-Growth (PEG) ratio, Price-to-Sales (P/S) ratio, etc. and few return ratios include Return on Assets (ROA), Return on Equity (ROE)/Return on Net Worth (RONW), Return on Retained Earnings (RORE), Return on Capital Employed (ROCE) are the profitability indicators of the firm and represents the firm's productivity by comparing profit generated to total sales, total assets, total capital employed and equity. Valuation ratios and Return ratios can predict the share price performance, giving investors, an opportunity to know if a stock is overvalued or undervalued and helping the investors to figure out the best company in the industry to invest in.

2. Review of Literature

The research work conducted by Ogello (2014) identifies and analyses the relationship between the P/E ratio and returns of the 61 stocks listed on the Nairobi Securities Exchange for the period 2009-2013. The data on stock return P/E ratio and total assets is analysed using correlation, ANOVA and multiple regression. The study showed that there is an effect of the P/E ratio on stock returns, whether the P/E ratio is high or low affects the stock performance and there is an impact of total assets on stock returns. Calamar (2016) in his research work examines while choosing good stocks whether ROE should use as an important profitability metric for analysis. Correlation and Regression analyses were done to find out if ROE is a useful criterion for identifying companies that have the potential to provide attractive returns over long periods. Correlation analysis was performed between ROE and Intrinsic value and the growth rate. The study shows that ROE by itself is not a suitable standalone metric for investment decision-making. Valentin (2015) examines the key factors that determine the corporate performance of 46 listed companies on the Bucharest Stock Exchange for the period 2005-2011. As dependent variables, the Researcher considered two performance indicators: ROA (Return on Assets) and net profit margin. Independent variables for which the Researcher tested the impact on the dependent

variables are changes in turnover (%), change in fixed assets (%), change in net current assets (%), ROE (Return on Equity), EPS (Earnings Per Share), financial leverage, dividend yield, PER (Price-Earnings Ratio), sustainable growth rate, company size (calculated based on total assets) to know the relationship between two variable cluster analysis and multivariable regression model used. The results of the study undertaken in this paper indicated that company size positively affects performance measured by ROA, which proves to be a direct link with another indicator of financial performance, net profit margin. Change in current assets seems to hurt net profit margin. Regression results show a positive correlation between net profit margin and the following factors: the change in turnover, company size, dividend yield and Price-to-Earnings Ratio.

The research conducted by Aras and Yilmaz (2008) shows the relationship between stock returns and a Price-Earnings Ratio, dividend yield and market-to-book ratio for the period 1997 to 2003. For the study, the researcher has considered 12 emerging stock market returns. A multiple regression model has been used for analysis. The study highlights variant in the predictability of stock market returns in emerging stock markets. According to Shrimal and Kapil (2015), the best performance indicator to measure the performance is Market Value Added (MVA). The study examines the relationship between MVA (dependent variable) and profitability and valuation ratios (independent variables) like Gross Profit Margin (GPM), Net Profit Margin (NPM), ROCE, ROE, RONW, Earnings per Share (EPS), P/E ratio, Dividend Payout (D/P) ratio. The researcher has considered 23 listed CNX Nifty companies from the infrastructure sector for 2009-14. The researcher has used correlation, multiple regression, and Analysis of Variance (ANOVA) for the analysis of the data. The research shows the positive relationship between Market Value Added and financial ratios.

A study by Pandey *et al.* (2019) shows the relationship between capital structure and profitability of 27 companies in the Textile Industry for the period 2005 to 2015. For the analysis of data, the researcher has

used statistical tools like correlation, regression and descriptive analysis to study the impact of independent variables such As Debt-Equity Ratio, Short-Term Debt Ratio, Long-Term Debt Ratio and interest coverage ratio independent variables on dependent variables such as return on assets, return on equity and return on capital employed. The results show that there is a positive relationship between capital structure and profitability. Shamsun *et al.* (2016) identify and analyse the relationship between the financial performances of the company and the market price of the company using valuation ratios such as EPS, Net Asset Value (NAV) and ROCE. For the study, the research has considered pharmaceutical and chemical industry listed companies on the Dhaka stock exchange. Multiple regression analysis is used to find the relationship between the financial performance of the company and the market price of the share. The study reveals that there is no significant relationship between financial performance metrics and the market price of the share.

Dayag and Trinidad (2019) identify the importance of the P/E ratio in analysing the stock performance of the Philippines' top 10 banks. The study was conducted to show the relationship between the P/E ratio and macro-economic factors such as inflation rate, interest rate, GDP rate, stock market indices and firm-level performance indicators like ROE, D/P ratio, P/B ratio, EPS. The data has been analysed using descriptive statistics, correlation and a multiple regression model. The results highlight ROE has negatively affected the P/E ratio. Pattabiraman and Shyam (2013) multiple-price-to-book ratio and stock returns. The researcher has considered the top 100 BSE-listed companies from various sectors for the last five years. The study shows that ROCE is an important tool and has an influence on valuation ratios. In addition to that, ROCE has both positive and negative impacts on stock returns for various companies. The researcher Maniar (2014) identifies and analyses the common valuation metrics followed in India to evaluate the performance of the company. The standard pricing multiples such as P/E ratio, Earnings Before Interest, Taxes, Depreciation and Amortization (EBITDA), P/B ratio, and P/S ratio are used to value the securities listed on National Stock Exchange (NSE). Regression and Correlation models

were used for analyses of the data. The results show apart from price multiples such as ROE to value the stock, the investors use return, growth and dividend pay-out and beta to value the stock.

Liem and Basana (2012) analyse the low PE portfolio of stocks and high PE portfolio of stocks and their impact on stock performance for 45 listed companies on Indonesia stock exchanges. For the study of descriptive statistics, ANOVA and regression are used to evaluate the data. The results show the buy and hold signal based on short-term returns and long-term returns. The low P/E portfolio should behold for the short term and the high P/E portfolio should be held for the long term (above one year). The results also showed there is a difference in low and high P/E portfolios in stock term return but there is indifference for long-term stock returns.

The previous research papers have been referred to understand the need for the current study. Most of the research papers highlight the relationship between valuation metrics like P/E ratio, EPS, P/B ratio, D/P ratio, etc., and indicators like firm-level variables, ROA, ROE and Return on Investment (ROI), stock performance, stock market indices across the globe. The survey also helped in understanding the research methodology and statistical tools used to analyse the data. The current research specifically focuses on the relationship between the P/E ratio and two important profitability metrics RONW and ROCE for the top five large-cap companies listed in NSE from three sectors viz. FMCG, IT and Banking.

3. Conceptual Framework

Figure 1 shows the conceptual framework of the present study. It shows the determining factor used as the dependent variables and independent variables of the study. PE ratio is considered a dependent variable and RONW and ROCE as independent variables. The Regression analysis is carried out to know the impact of the dependent variable on independent variables. This research may help the investors by signalling overvalued and undervalued stocks. Return ratios have an impact on the PE ratio. If RONW and ROCE

increase, the PE ratio also increases and if the PE ratio increases it means investors are willing to pay more for those stocks with higher returns to the shareholders.

4. Research Methodology

Data for the period from 2010 to 2020 is considered for the study. Price-Earnings ratio (P/E ratio), Return on Net Worth (RONW) and Return on Capital Employed (ROCE) for the top five companies in the FMCG, Banking and IT sectors are taken for the study. Trends of P/E ratio, RONW and ROCE trends are studied sector-wise and linear regression analysis is carried out to ascertain the relationship between P/E ratio, ROCE and RONW for each of the five companies in a particular sector.

5. Data Analysis

5.1 Analysis of the FMCG Sector

P/E, RONW and ROCE trends of the top five companies in the FMCG sector are presented in Figures 2, 3 and 4 respectively. The five companies in the FMCG sector selected are HUL, Godrej, Dabur, Marico and P and G. Simple and Multiple Linear Regression analysis is carried out using SPSS to study the relationship between P/E ratio, ROCE and RONW. The summary model output is presented in Table 1. The Normal Q-Q plot and residuals vs. fitted plot are shown in Figures 5 and 6.

5.2 Analysis of the Banking Sector

P/E, RONW and ROCE trends of the top five public sector banks are presented in Figures 7, 8 and 9 respectively. The five banks selected for the study are State Bank of India (SBI), Bank of Baroda (BoB), Punjab National Bank (PNB), Bank of India (BOI) and Canara Bank. Regression analysis is carried out to study the relationship between P/E ratio, ROCE and RONW and Table 2 summarises the model output. Further, residual analysis is shown in Figures 10 and 11.

5.3 Analysis of the IT Sector

P/E, RONW and ROCE trends of the top five companies in the IT sector are presented in Figures 12, 13 and 14 respectively. The five companies selected for the study are TCS, Infosys, Wipro, HCL and Tech Mahindra. Regression analysis is carried out to study the relationship between P/E ratio, ROCE and RONW and Table 3 summarises the model output. Further, residual analysis is shown in Figures15 and 16.
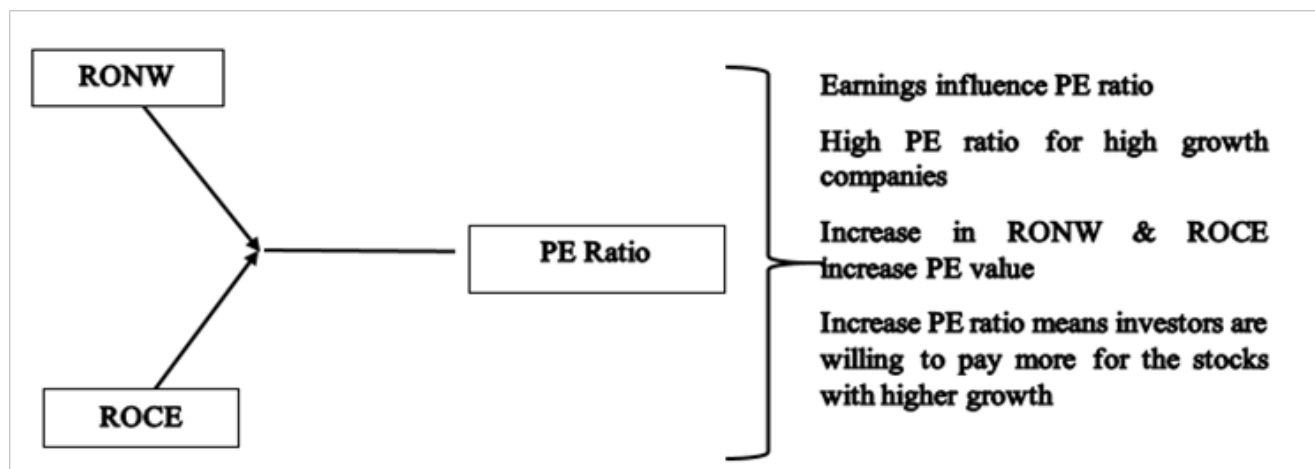
Figure 1. Conceptual framework of the study.

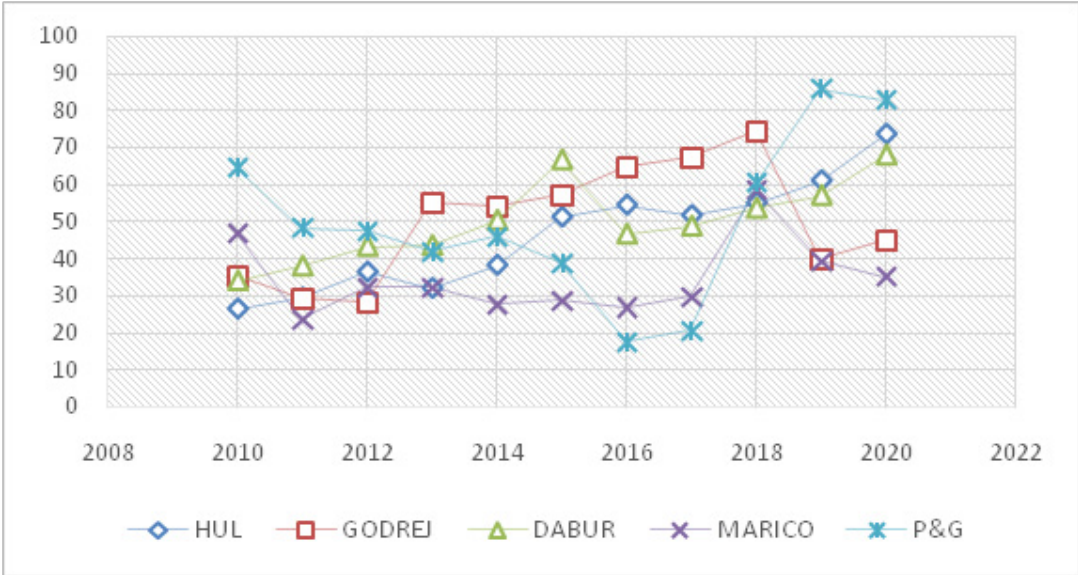Source: Authors preparation.

Figure 2. P/E trend for top five companies in the FMCG sector.

Source: Authors calculation based on information retrieved from www.moneycontrol.com.
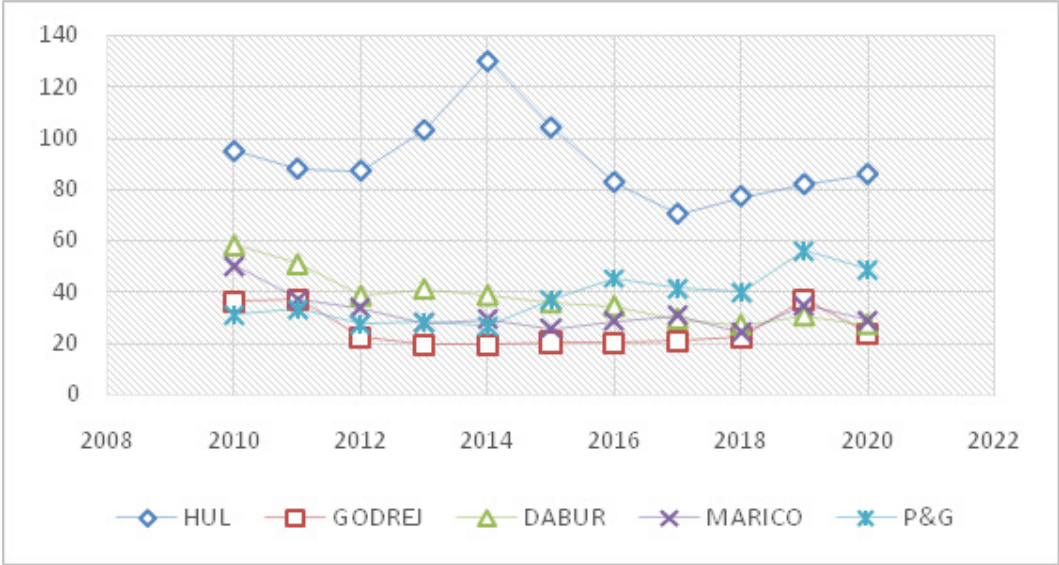

Figure 3. RONW trend for top five companies in the FMCG sector.

Source: Authors calculation based on information retrieved from www.moneycontrol.com.
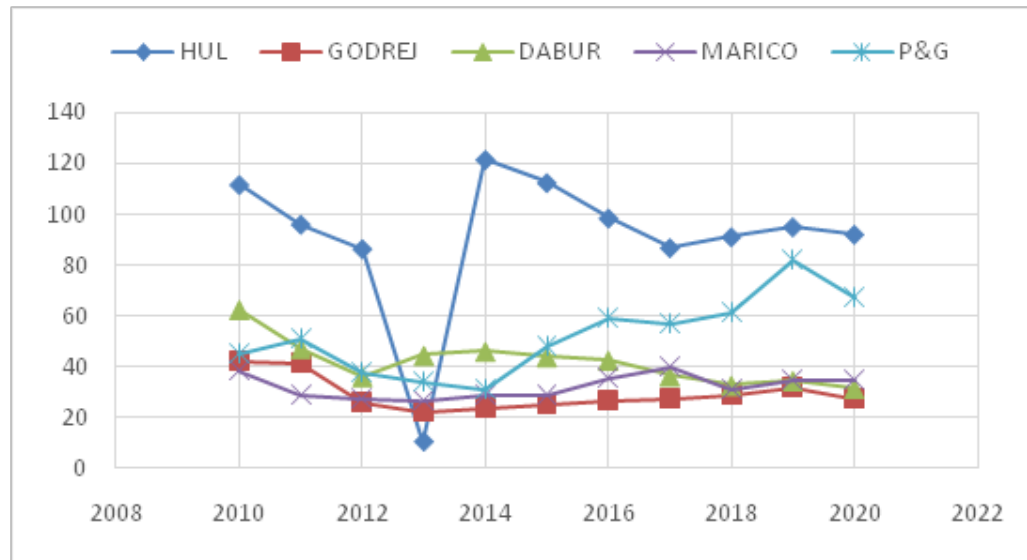
Figure 4. ROCE trend for top five companies in the FMCG sector.

Source: Authors calculation based on information retrieved from www.moneycontrol.com.

Table 1. Summary output of Multiple Linear Regression Analysis for the FMCG Sector

Company	Multiple-r (PE with ROCE & RONW as predictors)	Adjusted-r^2	p-value from ANOVA	VIF	Simple r-ROCE& RONW	Simple r		Adjusted r^2		p-value from ANOVA	
						PE and ROCE	PE and RONW	PE and ROCE	PE and RONW	PE and ROCE	PE and RONW
HUL	0.505	0.089	0.266	1.05	0.219	0.046	0.480	0.098	0.154	0.887	0.114
GODREJ	0.751	0.468	0.024*	7.01	0.926**	0.641	0.742	0.353	0.550	0.025*	0.006*
DABUR	0.838	0.703	0.004*	8.97	0.943**	0.756	0.834	0.529	0.665	0.004*	0.001*
MARICO	0.408	0.018	0.401	1.42	0.545	0.357	0.361	0.040	0.043	0.254	0.249
P and G	0.545	0.141	0.205	13.69	0.963**	0.454	0.355	0.127	0.039	0.138	0.257

*Significance at 5%, **Significant Correlation p-values between ROCE & RONW

Source: Author calculation.

The Simple Linear Regression models based on the above analysis are as follows:

    For Godrej, PE = 90.492-1.394*ROCE   (1a)

    PE = 83.595-1.316*RONW   (1b)

    For Dabur, PE = 87.393-0.910*ROCE   (2a)

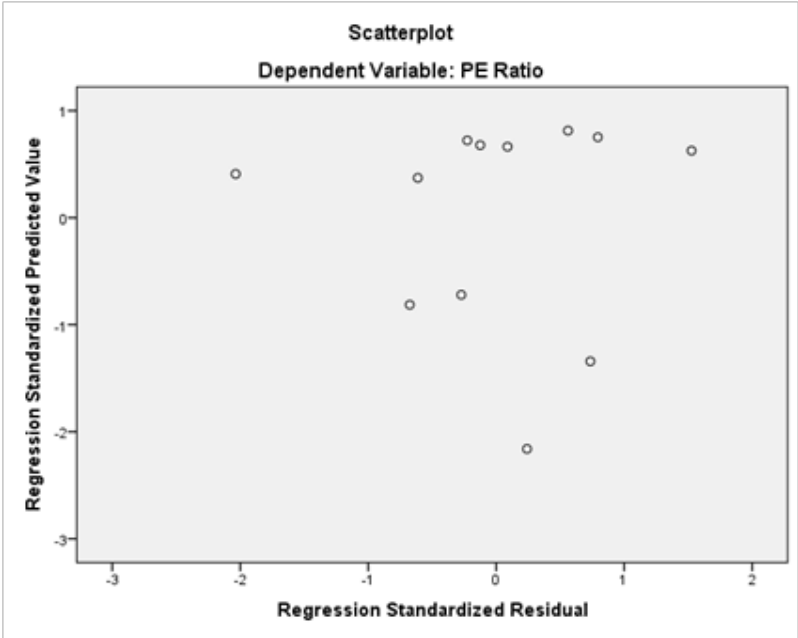   PE = 85.007-0.941*RONW   (2b)

Figure 5. Residual vs. fitted plot.
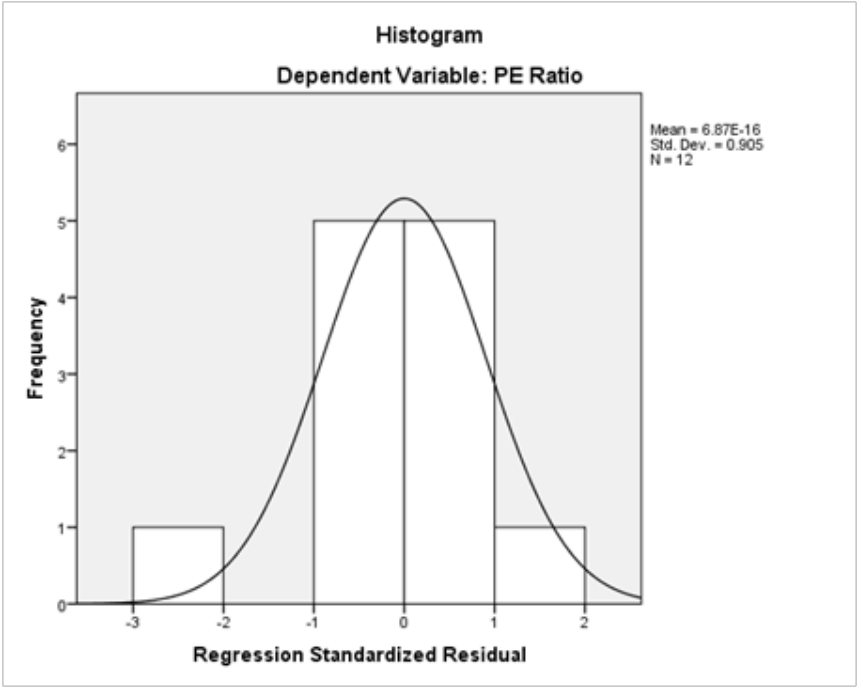
Source: Author calculation.

Figure 6. Histogram of residuals.
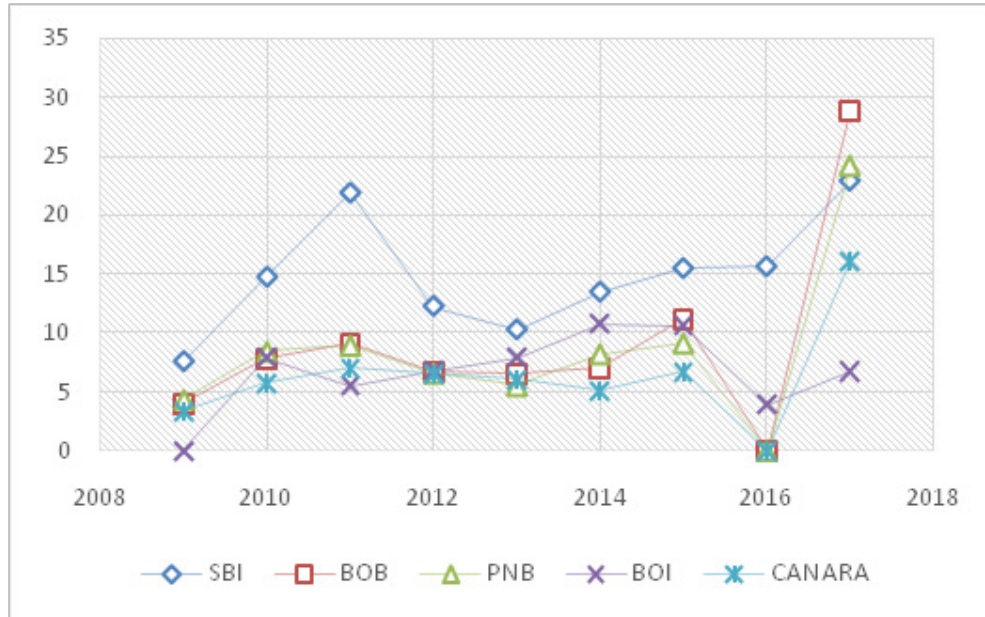
Source: Author calculation.

Figure 7. P/E trend for companies in the Banking sector.

Source: Author's calculation based on data retrieved from www.moneycontrol.com.
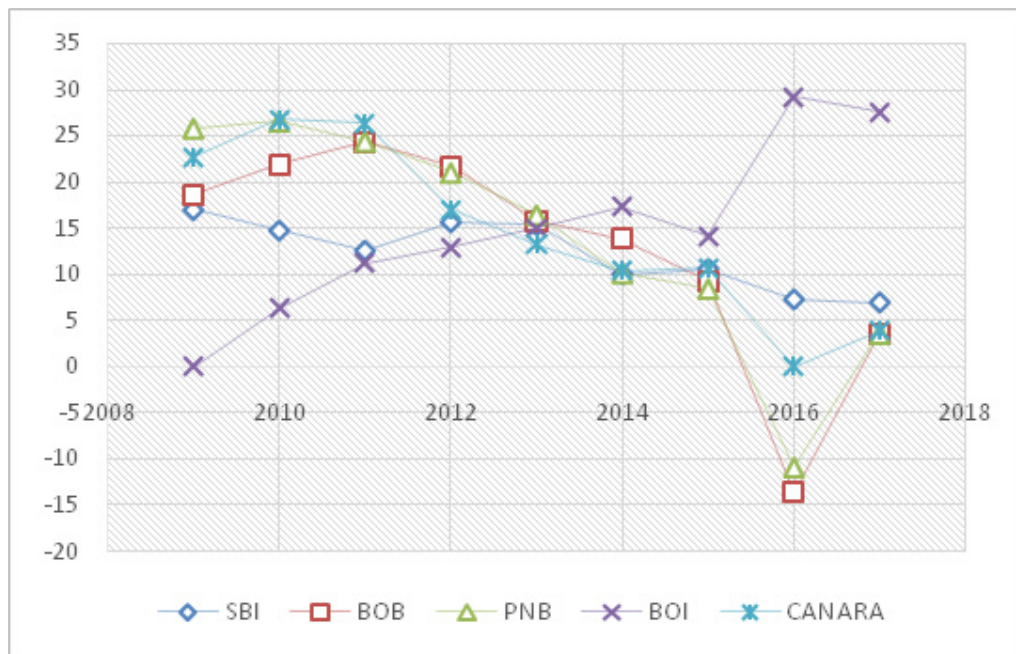

Figure 8. RONW trend for companies in the Banking sector.

Source: Author's calculation based on data retrieved from www.moneycontrol.com.
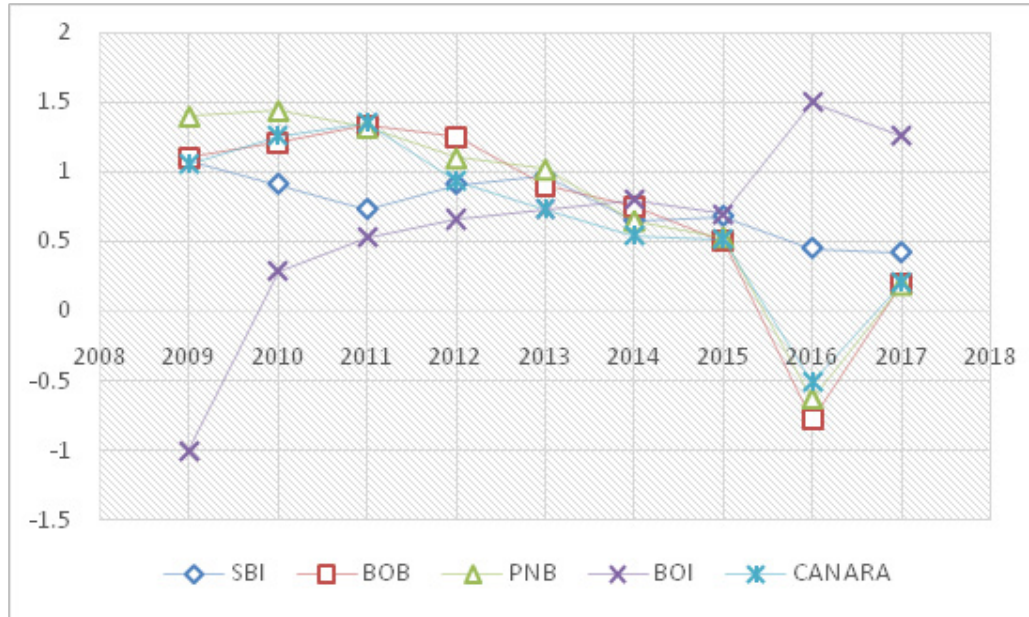
Figure 9. ROCE trend for companies in the Banking sector.

Source: Author's calculation based on data retrieved from www.moneycontrol.com.

Table 2. Summary output of Multiple Linear Regression Analysis for the Banking Sector

Company	Multiple-r (PE with ROCE & RONW as predictors)	Adjusted-r^2	p-value from ANOVA	VIF	Simple r-ROCEand RONW	Simple r		Adjusted r^2		p-value from ANOVA	
						PE and ROCE	PE and RONW	PE and ROCE	PE and RONW	PE and ROCE	PE and RONW
SBI	0.847	0.624	0.022	48.94	0.99**	0.742	0.676	0.486	0.379	0.022*	0.046*
BOB	0.061	0.328	0.989	53.89	0.99**	0.032	0.030	0.142	0.142	0.935	0.940
PNB	0.031	0.332	0.997	12.46	0.99**	0.031	0.031	0.142	0.142	0.938	0.937
BOI	0.743	0.404	0.090***	6.98	0.92**	0.496	0.249	0.138	0.072	0.175	0.518
CANARA	0.698	0.317	0.135	12.98	0.96**	0.099	0.096	0.132	0.132	0.799	0.805

*Significance at 5%, **Significant Correlation p-values between ROCE and RONW, ***Significance at 10%

Source: Author's calculation.

The Simple Linear Regression models based on the above analysis are as follows:

For SBI, PE = 27.066-16.025*ROCE   (3a)

PE = 25.980-0.897*RONW   (3b)

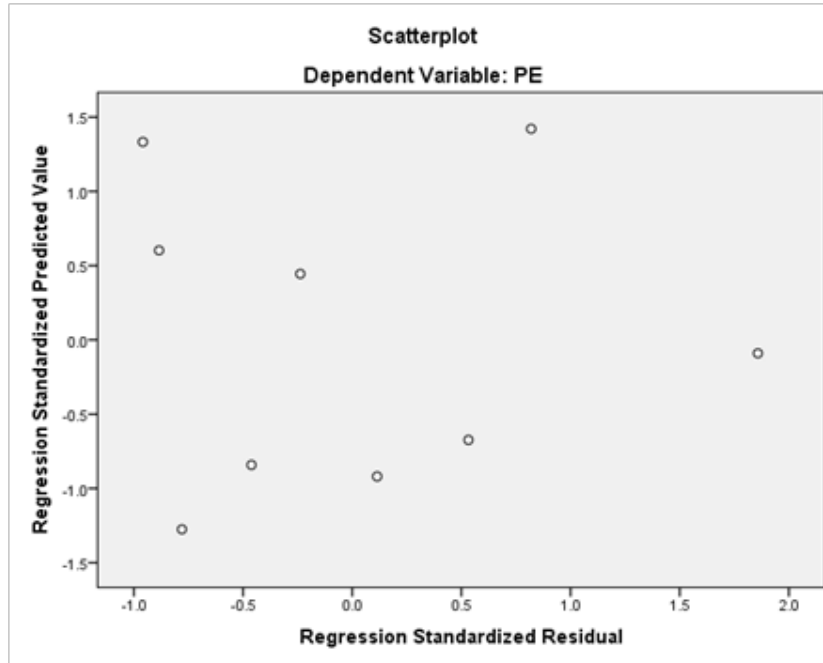**Figure 10.** Residual vs. fitted plot.
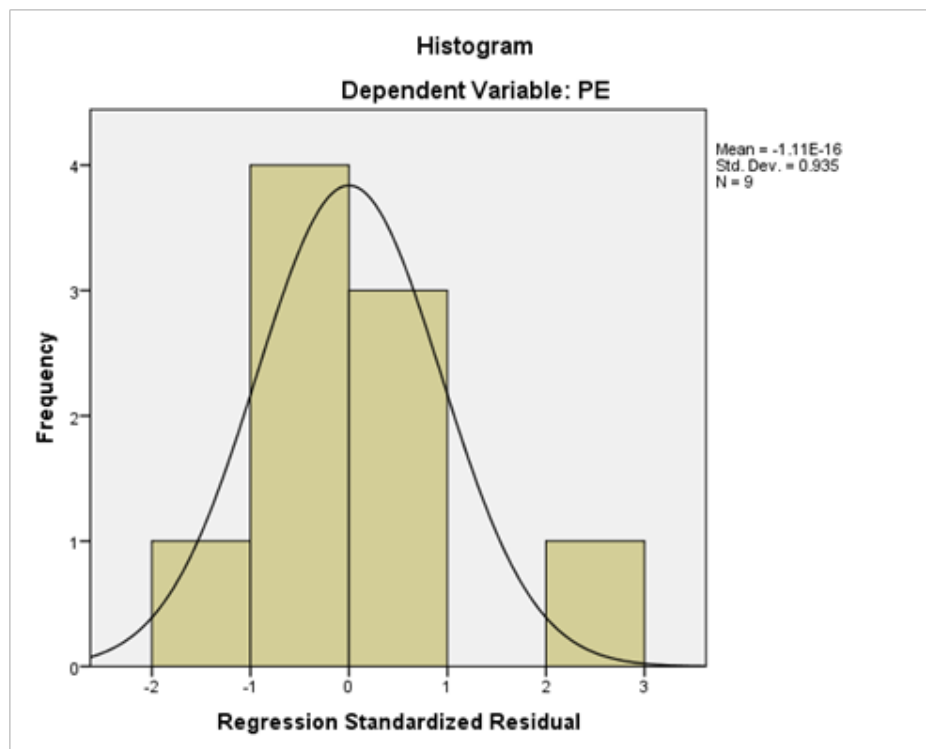
Source: Authors calculation.

Figure 11. Histogram of residuals.
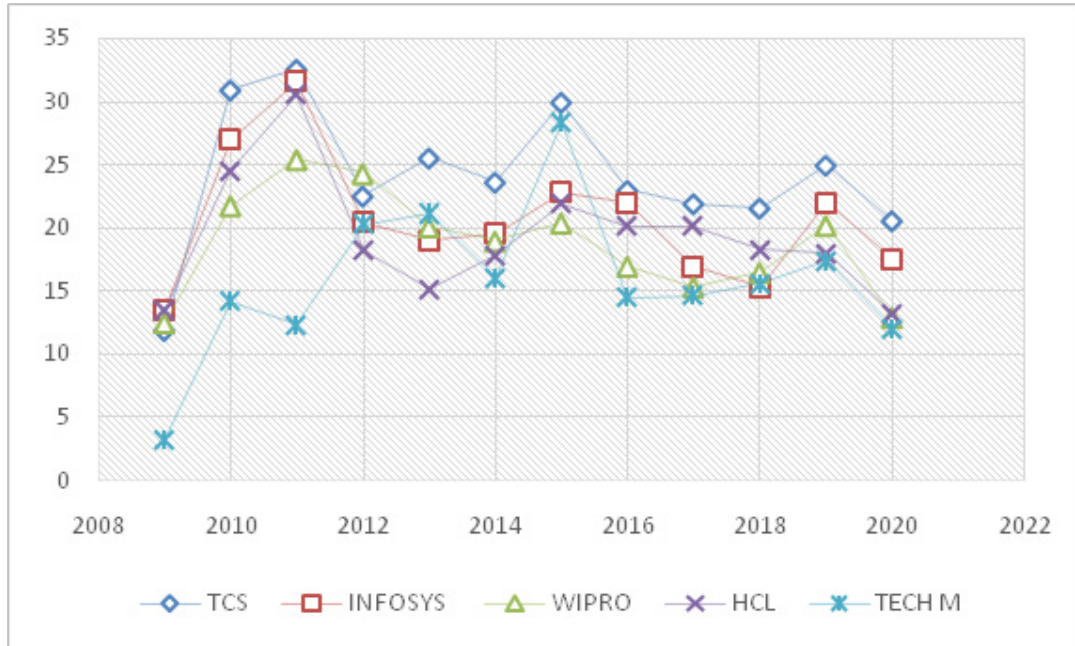
Source: Authors calculation.

Figure 12. P/E trend for companies in the IT sector.

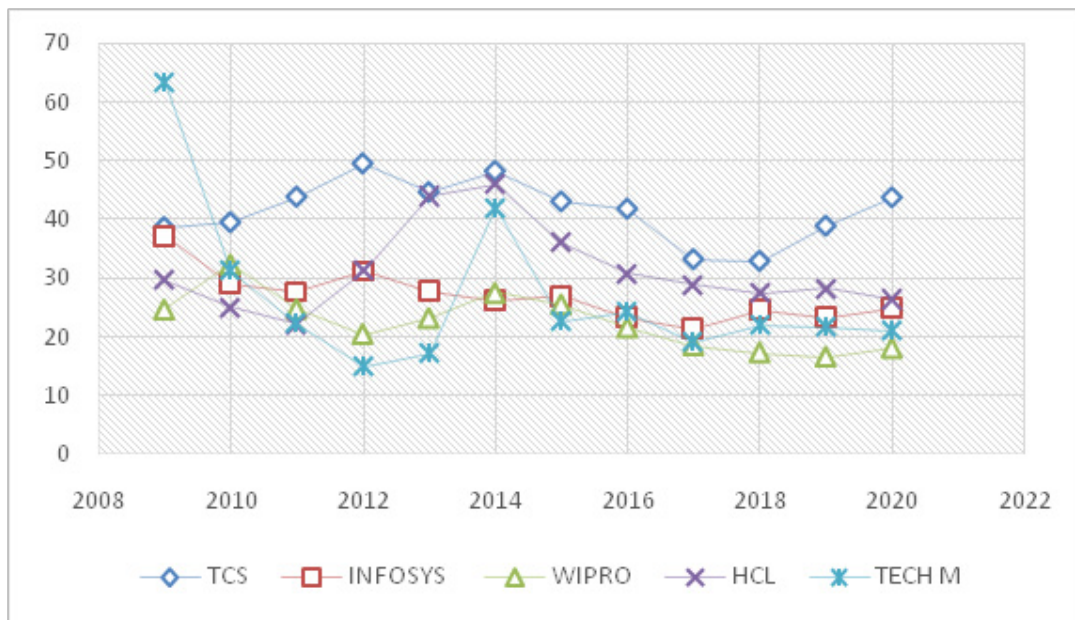Source: Authors calculation based on the data retrieved from www.moneycontrol.com.

Figure 13. RONW trend for companies in the IT sector.

Source: Authors calculation based on the data retrieved from www.moneycontrol.com.
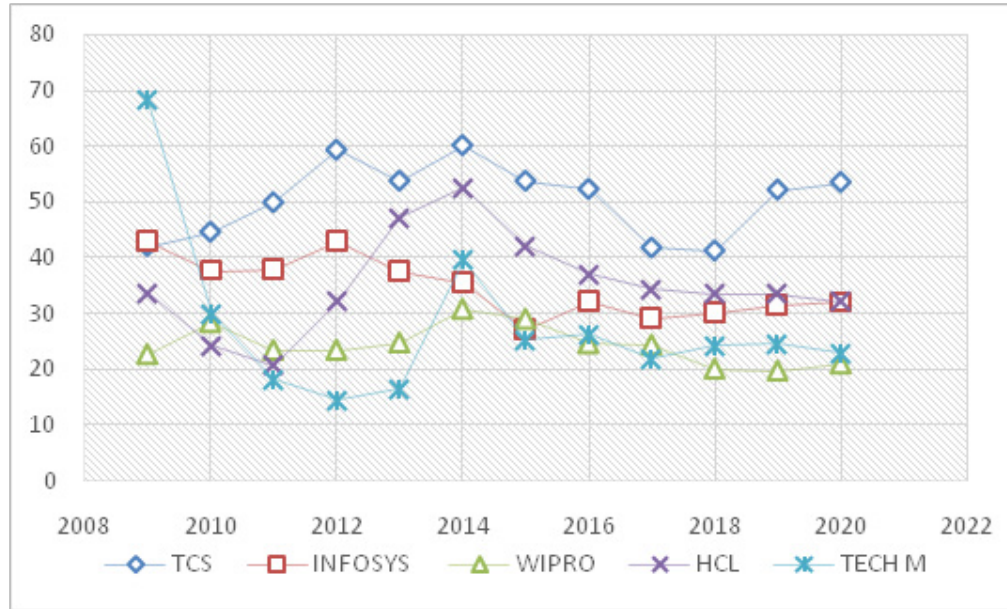
Figure 14.   ROCE trend for companies in the IT sector.

Source: Authors calculation based on the data retrieved from www.moneycontrol.com.

Table 3. Summary output of Multiple Linear Regression Analysis for the IT Sector

Company	Multiple-r (PE with ROCE and RONW as predictors)	Adjusted-r²	p-value from ANOVA	VIF	Simple r-ROCEand RONW	Simple r		Adjusted r²		p-value from ANOVA	
						PE and ROCE	PE and RONW	PE and ROCE	PE and RONW	PE and ROCE	PE and RONW
TCS	0.265	0.136	0.720	5.362	0.902**	0.264	0.229	0.023	0.042	0.407	0.475
Infosys	0.245	0.149	0.758	2.962	0.814**	0.072	0.078	0.094	0.093	0.825	0.811
Wipro	0.337	0.084	0.582	2.898	0.809**	0.272	0.337	0.018	0.025	0.392	0.284
HCL	0.600	0.360	0.134	11.43	0.955**	0.508	0.390	0.258	0.068	0.092	0.210
Tech Mahindra	0.644	0.285	0.089	31.90	0.986**	0.636	0.644	0.345	0.357	0.026*	0.024*

*Significance at 5%, **Significant Correlation p-values between ROCE and RONW

Source: Author calculation.

The Simple Linear Regression models based on the above analysis are as follows:

For Tech Mahindra, PE = 23.125-0.269*ROCE   (4a)

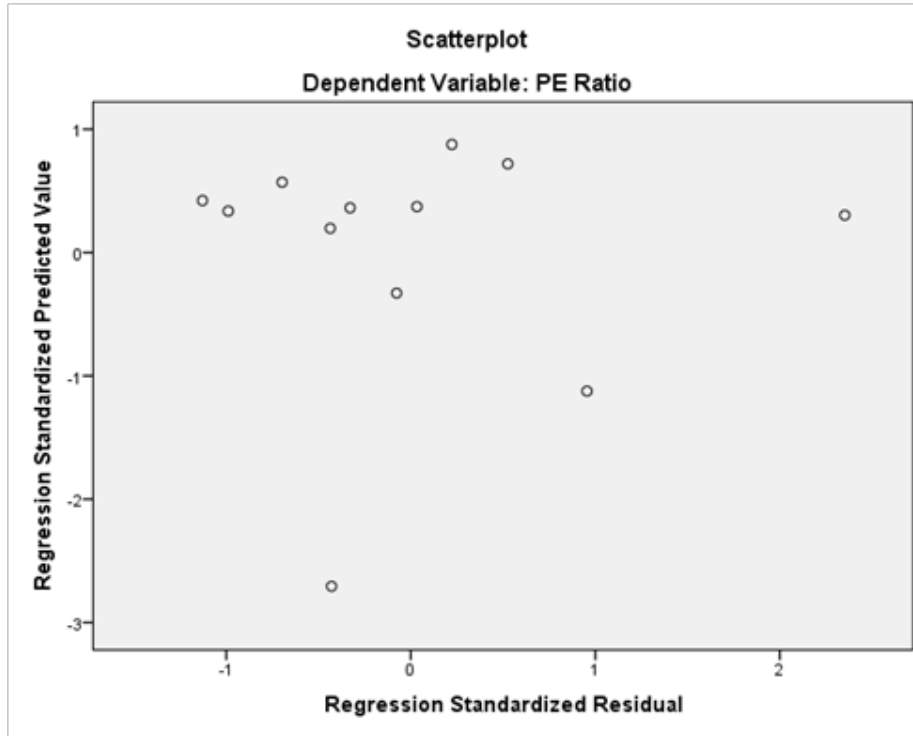PE = 23.366-0.288*RONW   (4b)

Figure 15. Residual vs. fitted plot.

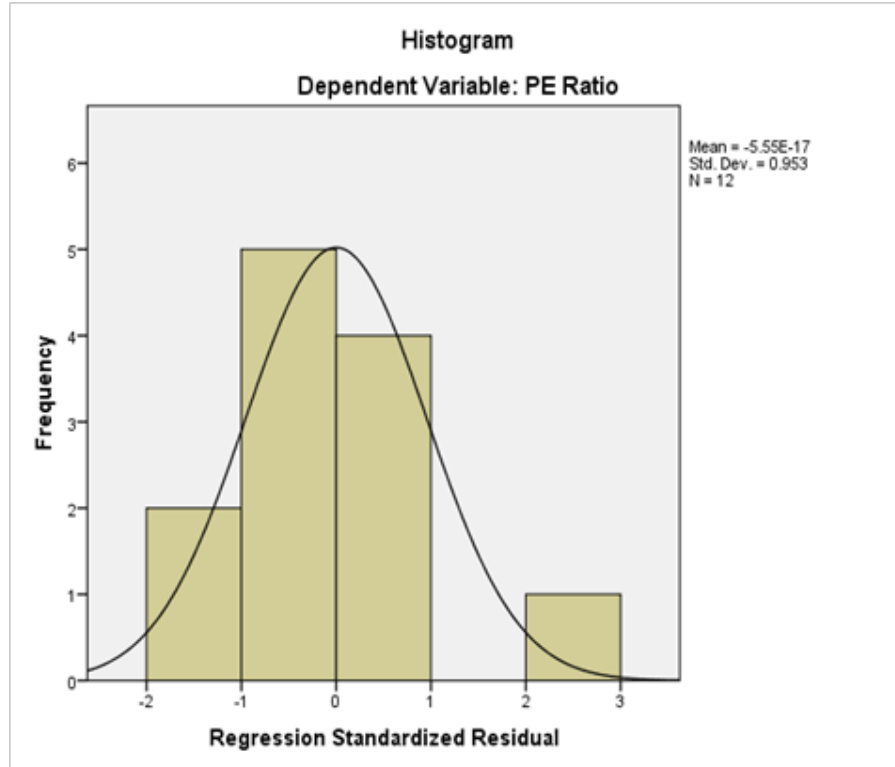Source: Author calculation.

Figure 16 Histogram of residuals.

Source: Author calculation.

6. Results and Discussions

For the FMCG sector, the P/E ratio reflects the sentiment of the investors. HUL shows a positive trend in terms of PE ratio followed by P and G, Dabur, Godrej and Marico for the period 2010-2020. HUL, Dabur and P and G show high P/E ratio than Godrej and Marico. It can be observed that the P/E Ratio and RONW are moving in the opposite direction but not true in all the cases and the same goes for P/E Ratio and ROCE too. Among the companies in the FMCG sector studied, for Godrej and Dabur, the multiple linear regression model establishing the relationship between P/E ratio as a linear function of ROCE and RONW as predictors, is significant. However, a higher Variance Inflation Factor (VIF) indicates the existence of multi collinearity between ROCE and RONW. A very strong and significant correlation can be seen between ROCE and RONW. Further, simple linear regression analysis between PE and ROCE, PE and RONW demonstrate a significant relationship. While ROCE and RONW have a strong correlation, they influence the P/E ratio. For HUL, MARICO and P and G, there is a moderate relationship between the three metrics and the ROCE and RONW together do not significantly impact the P/E ratio.

Residual analysis is presented in Figures 4 and 5 which shows the residuals to be randomly spread out with a mean close to zero and a symmetric histogram respectively, indicating normality of the residuals. ROCE and RONW show operational efficacy and future growth of all five FMCG companies. These two ratios are often used together to know the complete valuation of companies' financial performance which influences the P/E value of the company. The Godrej and Dabur companies' profitability trends are showing upward and downward from 2010 to 2020. It is observed that net profit and market price influence the P/E ratio for HUL, Godrej, P and G and Dabur, giving signaling of overvalued stock, which is above the industry average of 39.86. The HUL, P and G and Marico are high-growth companies with high P/E ratios. The FMCG sector shows an upward trend for RONW and ROCE, which increases the P/E value. RONW and ROCE for all companies have moved from an increasing trend to downwards in 2020 due to the pandemic effect which has impacted the P/E ratio also.

When making an investment decision for an investor P/E ratio alone cannot just decide the value of the stock. FMCG sector, which is not a cyclical business normally, sustains a high P/E ratio because the market expects the sector to be uninterrupted by external factors like a pandemic, inflation, GDP, natural calamities, interest rates, etc. In the banking sector, the majority of the company's P/E Ratio and RONW and ROCE are moving in opposite directions and hence they are negatively correlated. P/E ratio in 2018 is zero for all banks, which means each share of all five banks, is losing money or losing equity, (RONW and ROCE is negative in 2018). It observed that from 2016 onwards, the majority of the bank's P/E ratio is zero, which shows there are negative earnings and hence negative ROCE and RONW. Among the companies in the Banking Sector, it can be seen that there is a very strong correlation between ROCE and RONW. For SBI and BOI, ROCE and RONW exert an impact on the P/E ratio. The companies in the Banking sector reflect a moderate relationship between the three metrics. Residual analysis is presented in Figures 10 and 11 which show the residuals to be randomly spread out with a mean close to zero and a symmetric histogram respectively, indicating normality of the residuals. The SBI and BOB earnings for shareholders are reporting more which will increase the P/E ratio as compared to other banks in the industry. The increase in the P/E ratio means investors are willing to pay more for banks with higher growth or earnings (ROCE) or higher return to shareholders (RONW). The banking industry's average P/E ratio is 35.11, which measures the highly valued stock and low valued stock compared with individual banks' P/E ratio.

The SBI P/E ratio is above the industry average, which is overvalued stock. The entire banking industry is in a cyclical downward. The reasons may be pandemic in 2020, increase in NPAs, banks growth is linked to the economy, interest rate fluctuations many more.

In the IT sector, it can be observed that P/E Ratio and RONW and ROCE are moving in opposite directions

but not true for all ten years. There are upward and downward trends in earnings for TCS followed by Infosys, HCL, Wipro and Tech Mahindra. The IT industry five years P/E ratio average is 19.75. TCS's P/E average is quite above the industry average and is thus overvalued stock. Infosys, HCL and Wipro and Tech Mahindra, have been showing a downwards trend in valuation and its average is below the industry average and is a hence undervalued stock. Among the companies in the IT Sector, for Tech Mahindra, ROCE significantly impacts the P/E ratio and so does the RONW. It is seen that ROCE and RONW are strongly correlated. The companies in the IT sector reflect a moderate relationship between the three metrics. Residual analysis is presented in Figures 15 and 16 which show the residuals to be randomly spread out with a mean close to zero and a symmetric histogram respectively, indicating normality of the residuals. It is evident from the analysis that the P/E ratio is helpful to gauge the performance of the companies in the industry and to knowing the forward P/E ratio of the company. The relationship between the P/E ratio and returns ratio shows investors are ready to pay more for the company with higher growth or earnings (ROCE) or higher return to shareholders (RONW). However, if return ratios are falling then as result the market punishes the company with a low P/E ratio like Tech Mahindra.

Equations 1 to 4 represent the model built showing the simple linear regression fit between the P/E ratio and RONW and ROCE respectively for the companies in the sectors where the relationship is significant. Multiple linear regression is not fit here due to the high correlation between ROCE and RONW. Hence a simple linear regression model is used to demonstrate the relationship between the P/E ratio and ROCE, P/E ratio and RONW.

7. Conclusions

There are not many discussions made based on P/E Ratio. The P/E ratio is a very important and most widely used ratio for valuing the stock of the company although each industry has a typical P/E ratio which might be high or low. However, comparing each company's P/E ratio with that of the industry gives a clear picture of undervalued and overvalued stock and at the same time associates it with the returns. The analysis proves that there is a positive relationship between the P/E Ratio and RONW and ROCE for most of the companies in all three sectors. The analysis also highlights a strong correlation between RONW and ROCE among the companies in all three sectors. Hence, these ratios are often used together to know the comprehensive valuation of companies' financial performance which influences the P/E value of the company. However, looking at just these three ratios would not give a true idea of the profitability of the stocks. There are other factors, which influence the investment decision such as past and future growth of the business, sales projections, cash flows, returns, debt component, management team, parent company and ability to withstand macro-economic factors. Thus, for picking up a lucrative stock an investor should consider the P/E value, Return ratios, and other fundamentals of a company and thorough technical analysis for long-term and short-term investments.

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