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ANALYSIS ON RETURN, RISK AND VOLATILITY OF SECTORAL INDICES AGAINST BSE

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Abstract:

BSE has classified industrial grouping based on similar production processes, products or nature of business. Automobile, Banking, Energy, Fast moving Consumer Goods (FMCG), Healthcare, Industrials, IT, Oil & Gas, Power, Public Sector Undertakings (PSU) and Telecom are the classifications. This paper analyzes the return, risk and volatility of such sectoral indices against BSE for the period 2007:01 to 2016:12. The objectives of the study are " To classify sectors based on Return (High, Medium and Low)", "To classify sectors based on sensitivity (High, Medium and low), "To classify sectors based on risk (High, Medium and Low)", "To classify sectors based on volatility", "To find the sectors which moves with and against S&P BSE 500". The study reviewed various relevant literatures available and various research works of past and present. The study gathered monthly closing index of S&P BSE 500 and sector wise monthly closing index for the period 2007:01 to 2016:12. The study adapted tools like Pearson correlation, Standard deviation, Beta and Linear Regression to ensure the validity. The study would contribute to investment decisions by investors in selecting sectors based on risk, return, volatility and sensitivity of market.

Key Words: Sectoral Index, Sectoral Indices, Return, Risk, Volatility & BSE

Introduction about BSE:

BSE established in 1875 is Asia's first stock exchange. The BSE is the world's 11th largest stock exchange with an overall market capitalization of more than $ 2 Trillion. More than 5500 companies are publicly listed on the BSE. BSE sectoral index measures the overall performance of BSE listed companies sector wise. The sectors are classified as Consumer durables, Realty, Oil & Gas, Infrastructure, Capital goods, Health care, Automobile, Public Sector Undertakings (PSU), Power, Telecom, Information Technology, Metal and Fast Moving Consumer Goods (FMCG).

Security prices are influenced by number of factors some are company specific, sector specific while some belong to the environment in which the company is operating. Factors such as industry performance, industry returns, predicted growth of the industry and stability reflects the particular sectoral index.

Review of Literature:

G. William Shwert (1989) found aggregate leverage is significantly correlated with volatility, it explains a relatively small part of the movements in stock volatility. Kenneth R. French, G. William Schwert, Robert F. Stambaugh (1987) found evidence that the expected market risk premium (the expected return on a stock portfolio minus the Treasury bill yield) is positively related to the predictable volatility of stock returns. There is also evidence that unexpected stock market returns are negatively related to the unexpected change in the volatility of stock returns. This negative relation provides indirect evidence of a positive relation between expected risk premiums and volatility. James D. Hamilton and Gang Lin (1996) found that stock returns are well characterized by year-long episodes of high volatility, separated by longer quiet periods. Real output growth on the other hand, is subject to abrupt changes in the mean associated with economic recessions.

Research Problem:

An investor decision in buying and selling of stocks basically depends on three factors namely return, risk and volatility. This paper gives a comprehensive analysis which helps the investors to choose sectors for investment.

Objective of the Study:

- ✓ To classify sectors based on Return (High, Medium and Low) for the period 2007:01 to 2016:12
- ✓ To classify sectors based on Risk (High, Medium and Low) for the period 2007:01 to 2016:12
- ✓ To classify sectors based on Sensitivity (High, Medium and Low) for the period 2007:01 to 2016:12
- ✓ To classify sectors based on Volatility (High, Medium and Low) for the period 2007:01 to 2016:12
- ✓ To find the sectors which moves with and against BSE S&P 500 for the period 2007:01 to 2016:12

Methodology:

Research Design: The study follows descriptive research. Descriptive research is used to describe characteristics of a population or phenomenon being studied.

Data for Study: The study gathered monthly S&P BSE 500 closing index and monthly BSE sectoral closing index for the period 2007:01 (January 2007) to 2016:12 (December 2016).

Statistical Technique Used: On the basis of the objectives of the study and review of literature, the following tools applied for data analysis of the study:

- ✓ Pearson correlation
- ✓ Beta
- ✓ Average return
- ✓ Standard deviation
- ✓ Linear Regression

Limitations of the Study:

- ✓ The study is limited for the period 2007-2016.
- ✓ The study doesn't take into account of any macroeconomic factors like inflation, GDP, crude price dynamics and Exchange rate.
- ✓ S&P BSE Sectoral index represents companies based on higher market capitalization. It doesn't include all the firms in the particular industry.
- ✓ The study considered industry as a whole. The result may change company wise.

Future Scope:

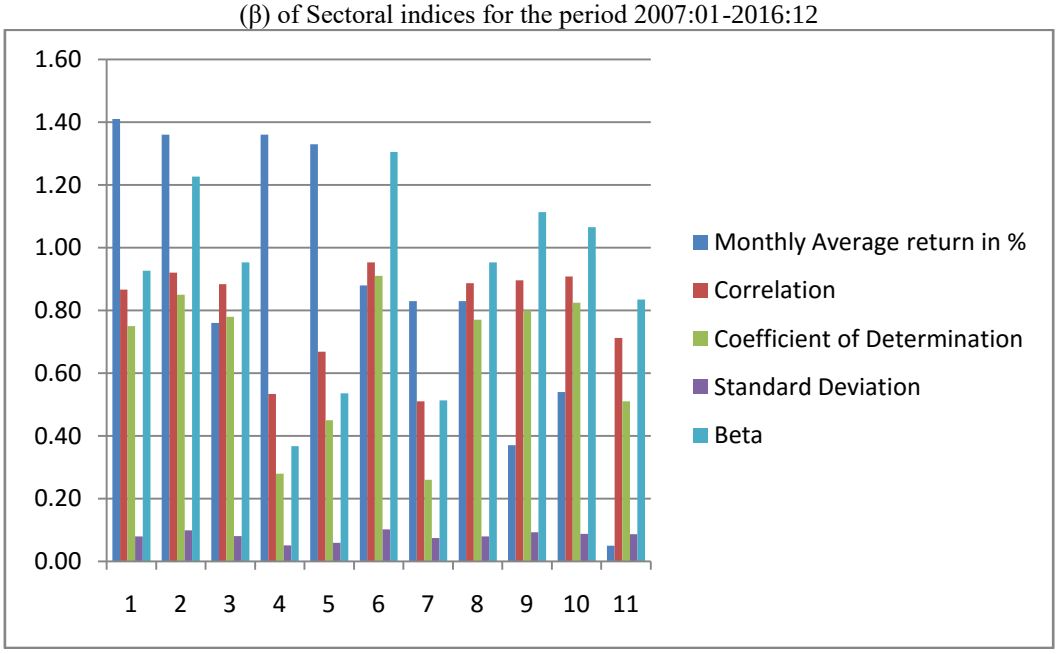
- ✓ The study used tools like Pearson correlation, standard deviation and Linear Regression. Risk adjusted return tools like Sharpe index, Treynor index and Jensen index shall be used to compare risk and return of sectoral indices.
- ✓ Projection tools shall be used to predict the future return of sectoral indices.

Data Analysis and Interpretation:

Table 1: Monthly average return, Correlation, Coefficient of Determination (R^2), Standard Deviation and Beta (β) of Sectoral indices for the period 2007:01-2016:12

Sectoral Index	Monthly Average Return	Correlation	Standard Deviation	Beta
S&P BSE Auto	1.41%	0.87	0.08	0.93
S&P BSE Banking	1.36%	0.92	0.10	1.23
S&P BSE Energy	0.78%	0.88	0.08	0.95
S&P BSE FMCG	1.36%	0.53	0.05	0.37
S&P BSE Health	1.33%	0.67	0.06	0.54
S&P BSE Industrials	0.88%	0.95	0.10	1.30
S&P BSE IT	0.83%	0.51	0.07	0.51
S&P BSE Oil&Gas	0.83%	0.89	0.08	0.95
S&P BSE Power	0.37%	0.90	0.09	1.11
S&P BSE PSU	0.54%	0.91	0.09	1.07
S&P BSE Telecom	0.05%	0.71	0.09	0.83

Chart 1: Monthly average return, Correlation, Coefficient of Determination (R^2), Standard Deviation and Beta (β) of Sectoral indices for the period 2007:01-2016:12



Inference:

- ✓ The monthly average return of Automobile, Banking, FMCG and Health care sectors were high
- ✓ The monthly average return of Energy, Industrials, IT, Oil & Gas sectors were medium
- ✓ The monthly average return of Power and PSU sector were low
- ✓ The monthly average return of Telecom was very low
- ✓ The Correlation between S&P BSE 500 and sectoral index of Industrials, Banking, PSU and Power were very high
- ✓ The Correlation between S&P BSE 500 and sectoral Index of Energy, Oil & gas and Automobile were high
- ✓ The Correlation between S&P BSE 500 and sectoral Index of Telecom and Healthcare were medium
- ✓ The Correlation between S&P BSE 500 and sectoral Index of FMCG and IT was low
- ✓ The standard deviation of Banking and Industrials were very high
- ✓ The standard deviation of Power, PSU and Telecom were high
- ✓ The standard deviation of Automobile, Energy, IT and Oil & gas were medium
- ✓ The standard deviation of Health and FMCG were low
- ✓ The Beta value of Industrials, Banking, Power and PSU were high
- ✓ The Beta value of Auto, Energy, Oil & gas and Telecom were medium
- ✓ The Beta value of FMCG, Health and IT were low

Table 2: Comparative analysis of Average monthly market return and standard deviation of S&P BSE 500 and S&P BSE Sectotal index for the period 2007:01-2016:12

S&P BSE 500 Monthly average return: 0.87%
S&P BSE 500 standard deviation: 0.07

Sectoral Index	Monthly Average return of S&P BSE Sectoral Index	Standard deviation of S&P BSE Sectoral index
S&P BSE Auto	1.41%	0.08
S&P BSE Banking	1.36%	0.10
S&P BSE Energy	0.78%	0.08
S&P BSE FMCG	1.36%	0.05
S&P BSE Health	1.33%	0.06
S&P BSE Industrials	0.88%	0.10
S&P BSE IT	0.83%	0.07
S&P BSE Oil&Gas	0.83%	0.08
S&P BSE Power	0.37%	0.09
S&P BSE PSU	0.54%	0.09
S&P BSE Telecom	0.05%	0.09

Chart 2: Comparative analysis of Average monthly market return of S&P BSE 500 and S&P BSE Sectotal index for the period 2007:01-2016:12

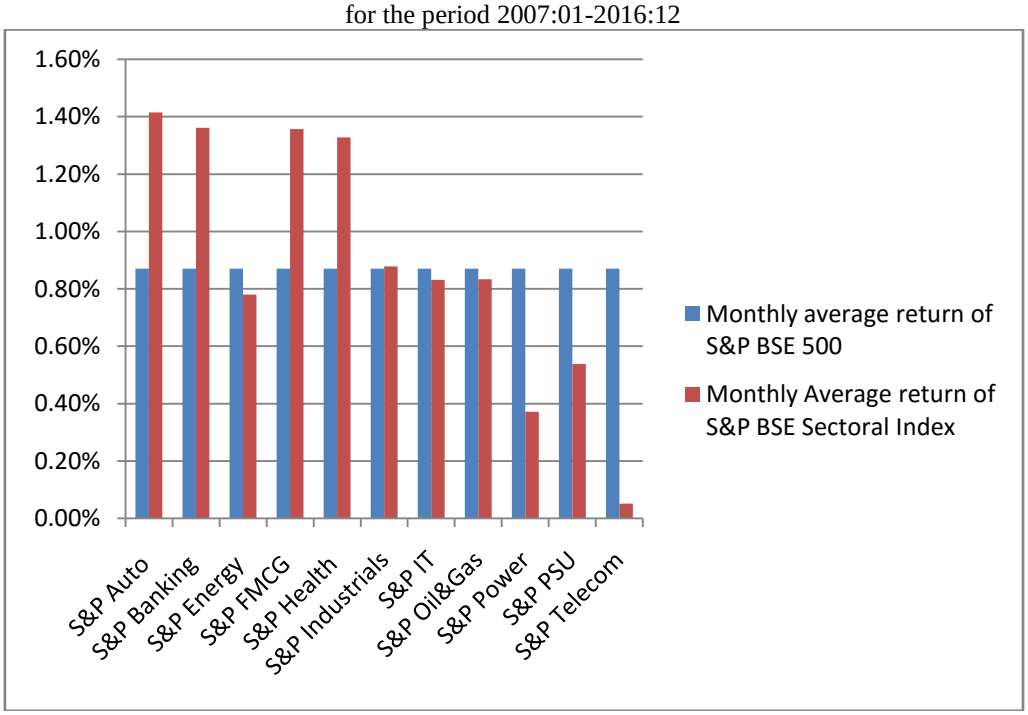
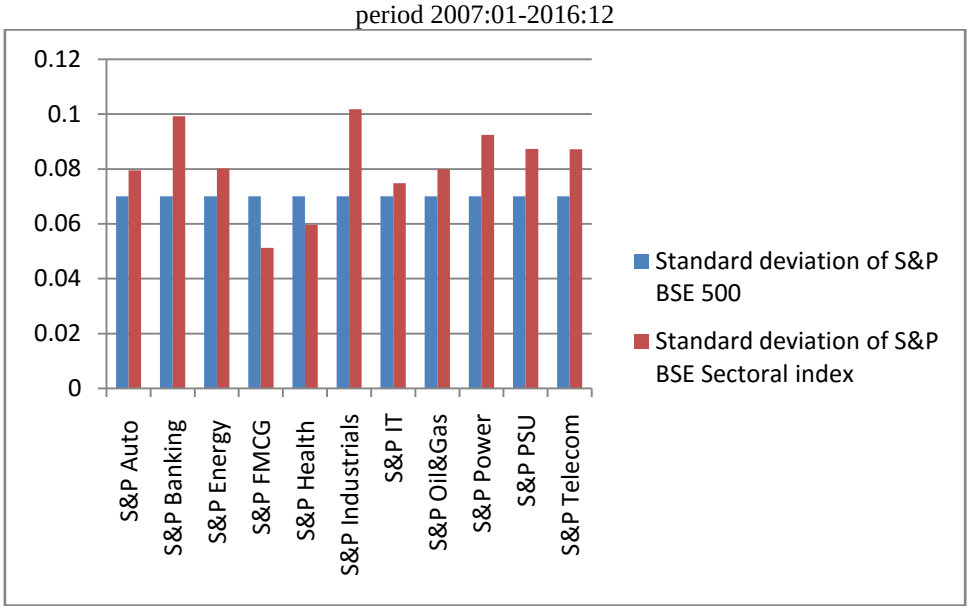


Chart 3: Comparative analysis of standard deviation of S&P BSE 500 and S&P BSE Sectotal index for the period 2007:01-2016:12



Inference:

- ✓ The monthly average return of Automobile, Banking, FMCG, Health and Industrials sectors were more than the monthly average return of S&P BSE 500
- ✓ The monthly average return of Energy, IT, Oil & Gas, Power, PSU, Telecom sectors were less than the monthly average return of S&P BSE 500
- ✓ The standard deviation of Automobile, Banking, Energy, Industrials, Oil & Gas, Power, PSU and Telecom sectors were higher than the standard deviation of S&P BSE 500
- ✓ The standard deviation of IT sector was similar to the standard deviation of S&P BSE 500
- ✓ The standard deviation of FMCG and Health sectors were lower than the standard deviation of S&P BSE 500

Table 3: Calculation of sectoral index movement based on Linear Regression equation (Assuming S&P BSE 500 x = -2, x= -1, x=0, x= 1 and x= 2)

Sectoral Index	**x= -2**	**x= -1**	**x= 0**	**x= 1**	**x= 2**
S&P BSE Auto	1.87	0.94	0.01	-0.93	-1.86
S&P BSE Banking	2.32	1.16	0.01	-1.15	-2.30
S&P BSE Energy	1.92	0.96	0.00	-0.96	-1.92
S&P BSE FMCG	0.70	0.36	0.01	-0.33	-0.68
S&P BSE Health	1.16	0.62	0.08	-0.46	-1.00
S&P BSE Industrials	2.63	1.31	0.00	-1.32	-2.63
S&P BSE IT	1.04	0.52	0.00	-0.51	-1.03
S&P BSE Oil&Gas	1.92	0.96	0.00	-0.96	-1.92
S&P BSE Power	2.24	1.12	-0.01	-1.13	-2.25
S&P BSE PSU	2.14	1.07	0.00	-1.08	-2.15
S&P BSE Telecom	1.62	0.81	-0.01	-0.82	-1.63

Suggestions:

The monthly average return from Automobile, Banking, FMCG and Healthcare sectors were high and also these sectors outperformed S&P BSE 500 for the period 2007-2016. The other sectors were comparatively yielded low return with respect to S&P BSE 500 for the same period. The telecom sector yielded very low return during this period. Sectors like Industrials, Banking, PSU and Power moves with the S&P BSE 500 and have high sensitivity towards it, whereas sectors like Energy, Oil & gas, Automobile, Telecom, Healthcare, FMCG and IT were relatively low. The volatility of Banking, Industrials, Power, PSU and Telecom were high. Sectors like Automobile, Energy, IT, Oil & Gas, Health and FMCG were less prone to volatility. The risk factor was higher in sector like Banking, power and PSU; whereas it is relatively lower in sectors like Auto, Energy, Oil & Gas and Telecom. FMCG, Health and IT sectors registered low risk factor in this period. Comparing return, risk and volatility Automobile sector performed exceeding well during this period. Even though volatility is high sectors like FMCG, Banking, Healthcare and Industrials also performed well in terms of return. Other sectors like Energy, PSU, and Oil & Gas performed moderately. The lowest return and relatively higher risk was registered by Telecom industry.

Conclusion:

Even though technology plays a vital role in our day today life, Technology related industry won't guarantee a good investment return which is proved by the low return from Telecom industry. Public sector Undertaking (PSU) also had an underwhelming performance during this period. Power industry also yielded low return during the ten year period. Manufacturing oriented industry like industrials, Oil & Gas and Energy yielded moderate return. Consumer driven sectors like fast moving consumer goods (FMCG), Health care and Banking yielded high return. Banking sector proves to be the market driver as it has a good return and moves with the trend of BSE. Automobile sector done exceedingly well during this period with high return and also relatively lower volatility.

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