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"The Regression Analysis Of Stock Price Of Federal Bank"

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ABSTRACT:*The linear regression and correlation analysis of share price of private sector banks' stocks price in Bombay Stock Exchange (BSE) provide calculation of seasonal variance. The present study analysis is based on secondary data and the data collected for a period of 10 years from 2008 - 2017. The data are collected from BSE website. The researcher has selected Federal Bank on the basis of convenient sampling method. So the historical price of Federal bank's data was collected and analysed with help of SPSS and Microsoft excel. The descriptive statistics, annual compound growth and correlation matrix were applied for testing. On the basis of fitted trend, the growth was examined by the direction of causality between time and changing share prices. The findings indicate a strong relationship between the dependent and independent variables.*
KEYWORDS: *share price, descriptive statistics, annual compound growth and correlation matrix.*

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I. INTRODUCTION

Banking sector is the backbone of the financial system and it plays a significant role in economic development of a country. India has three type of banking system like public, private and foreign sector banks. This is surprising given the general conclusion regarding government ownership of banks. Private sector banks are those banks in which the equity is held by private shareholders, that is, there is no government shareholding. The banks, which came in operation after 1991, with the introduction of economic reforms and financial sector reforms are called "new private-sector banks". Banking regulation act was then amended in 1993, which permitted the entry of new private-sector banks in the Indian banking sector. However, there were certain criteria set for the establishment of the new private-sector banks, one of the criteria being: the bank should have a minimum net worth of Rs. 200 crores. The Federal Bank is a major Indian commercial bank headquartered in Aluva, Kochi, Kerala. As of 2017, the Bank has 1252 branches and 1687 ATMs across the country. Thus, the paper presents the investigation of regression analysis of Stock Prices of Federal Bank using descriptive statistics, annual compound growth and correlation matrix.

II. LITERATURE REVIEW

Ebru Yuksela and Ozlem Turker Bayrak (2012) furnished the relation between the cyclical behaviours of stock market indices of industry, service, finance and technology sectors at Istanbul Stock Exchange and gross domestic product of Turkey between 1998 January and 2011 September.

Zeeshan Arshad et al. (2015) identified the determinants of share prices for the listed commercial banks in Karachi stock exchange over the period 2007-2013. Mohammad Abdel Karim Almumani (2014), in his paper traced out the quantitative factors that influence share prices for the listed banks in Amman Stock Exchange over the period 2005-2011 using empirical analysis of a set of independent and dependant variables.

V. Richard Paul et al. (2017) in their article "Role of Construction Sector in Economic Growth in India" pointed out that on the basis of fitted trend, future value has been predicted. The economic growth was analysed the direction of causality between GDP and construction in public-private corporate and household sectors. Adeboye N. O. et al (2014) found the effect of Multi-collinearity on the standard error for regression coefficients when it is present in a Classical Linear Regression model (CLRM).

A classical linear regression model was fitted into the GDP of Nigeria, and the model was examined for the presence of Multi-collinearity using various techniques such as Farrar-Glauber test, Tolerance level, Variance inflation factor, Eigen values etc. and the result obtained shows that Multi-collinearity has contributed

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to the increase of the standard error for regression coefficients, thereby rendering the estimated parameters less efficient and less significant in the class of Ordinary Least Squares estimators. Thus, in this study, the ratio analysis, correlation and a linear multiple regression models have been used to measure the individual as well as combined effects of explanatory variables on the dependant variables.

III. RESEARCH METHODOLOGY

The secondary data regarding share price of private sector banks with special reference to Federal Bank are collected from BSE. The temporal analysis is based on 10 years of share prices starting from 2008 to 2017. The entire analysis was done by the use of SPSS. Statistical tools were used for identifying the stock price of Federal Bank.

The co-efficient of variation was estimated by using the following formula:

$$\text{Coefficient of variation} = \frac{\text{Standard Deviation}}{\text{Mean}} \times 100$$

To calculate compound annual growth rate, the researchers divide the value of quantity and value at the end of the period in question by its value at the beginning of that period, raise the result to the power of one divided by the period length, and subtract one from the subsequent result.

This can be written as follows:

$$\text{CAGR} = \left(\frac{\text{Ending Value}}{\text{Beginning Value}}\right)^{\left(\frac{1}{\#\text{ of years}}\right)} - 1$$

The study analyses the forecasted trend in Federal Bank in India, with the company's share prices growth by polynomial trend equation to study the forecasted trend pattern. The cubic trend equation of the form is:

$Y = b_o + b^1 t + b^2 t2 + b^3 t3$,

Where,

bi's (i = 1, 2 & 3)

are trend coefficients and

b_o = constant,

is fitted,

ti = i^{th} year (i = 1, 2 , ……., 10) and the results are presented below.

The F-values indicate the overall significance of the trend equation fitted. The coefficients of determination or R2 are points out a measure to an extent that the trend coefficients are able to explain the variations of the dependent variables under study.

The general form of equation of multiple linear regression is:

$Y_i = \beta_o + \beta_1 . X_i + \beta_i \times + \beta_2 .X_{i,2} + \ldots + \beta_k . X_{i,k} + \varepsilon$ and

i = 1, 2,…..,n are the observations from the sample;

Y_i = observation i of the dependent variable;

$X_1, X_2, \ldots, X_k$ = independent variables;

B_0 = constant (free term of equation);

$B_1, , \ldots \beta_k$ = coefficients of independent variables;

ε = error term of equation

Tolerance Level

In multiple regressions, tolerance is used as an indicator of multi-collinearity. Tolerance is estimated by $1-R^2$, where R^2 is calculated by regressing the independent variable of interest unto the remaining independent variables included in the multiple regression analysis. Researchers desire higher levels of tolerance, as low levels are known to affect adversely the result associated with a multiple regression analysis. The tolerance level is the 1-R2 value when each of the independent variables is regressed on the other independent variables. Low tolerance levels indicate high levels of multi-collinearity. When a tolerance levels get somewhere below 0.40, then multi-collinearity exist.

Variance Inflation Factor (VIF)

In multiple regressions, the VIF is used as an indicator of multi-collinearity. Computationally, it is defined as the reciprocal of tolerance: $1\backslash 1-R^2$. Researchers desire lower levels of VIF, as higher levels of VIF are

known to affect adversely the result associated with a multiple regression analyses. In fact, the utility of VIF, as distinct from tolerance, is that VIF specifically indicates the magnitude of the inflation in the standard errors associated with a particular beta weight that is due to multi-collinearity. VIF of over 2.50 starts to indicate relatively high levels of multi-collinearity.

The research method applied here is the enter method of linear regression into SPSS. The variables are select industries and time variables. The analysis is classified under nine included variables and four excluded variables based on the correlation and regression models.

IV. TREND ANALYSIS OF SEASONAL SHARE PRICE OF FEDERAL BANK

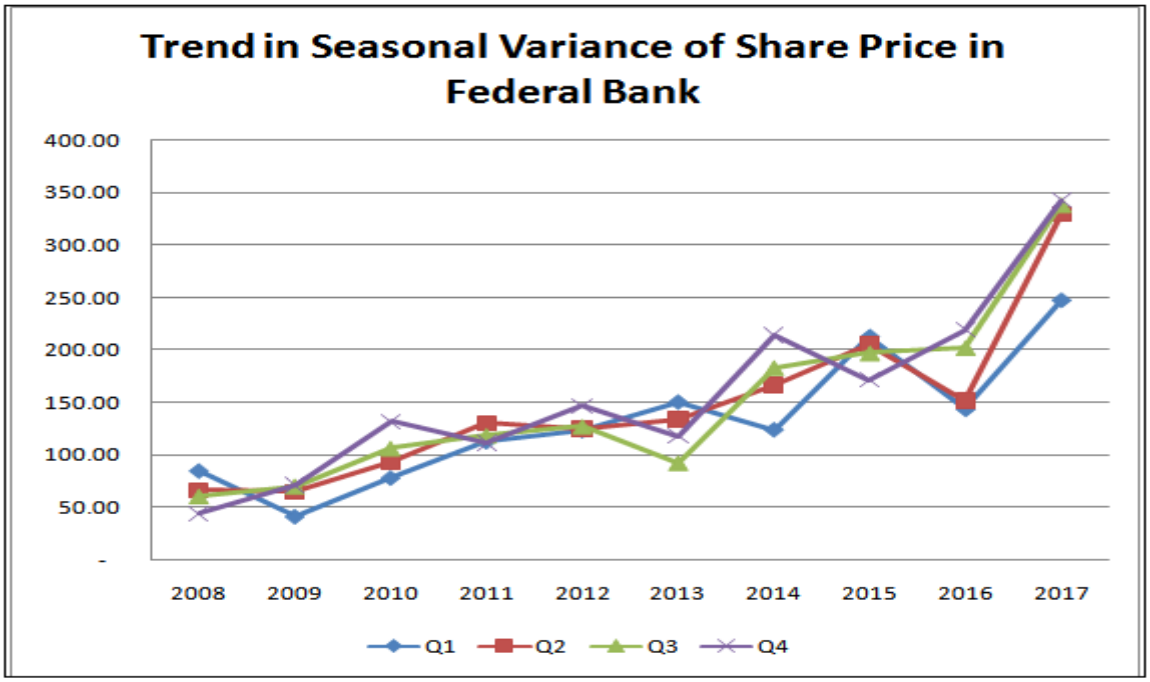
The following table presents the seasonal trend analysis of share price of Federal Bank in India. The annual share price can be classified into four quarters. The result and discussion is based on the analysis of best quarter of the annual share price.

Table 1 Trend analysis of seasonal share price of federal bank

Year	Q1	Trend Value	Q2	Trend Value	Q3	Trend Value	Q4	Trend Value
2008	84.48	52.17	65.99	47.04	60.91	39.72	44.36	42.80
2009	41.10	69.78	65.08	69.13	70.48	64.18	71.70	68.22
2010	77.87	87.39	93.24	91.23	106.52	88.64	131.92	93.64
2011	112.32	105.00	130.36	113.33	118.58	113.09	111.62	119.06
2012	122.87	122.62	124.76	135.43	127.13	137.55	146.73	144.48
2013	149.99	140.23	133.60	157.53	92.70	162.01	117.95	169.90
2014	123.68	157.84	166.41	179.62	183.32	186.46	214.18	195.31
2015	212.15	175.45	204.85	201.72	197.21	210.92	171.43	220.73
2016	143.18	193.07	151.83	223.82	202.35	235.38	219.45	246.15
2017	246.58	210.68	328.63	245.92	338.58	259.83	342.52	271.57
CGR	**0.13**		**0.20**		**0.21**		**0.25**	

Source: Calculated Value.

It is inferred from Table 1 that shows that the seasonal share price of Federal Bank's trend value had registered a sustainable trend during the period of study. It reveals that the trend value from 52.17 (2008) to 210.68 (2017), 47.04 (2008) to 245.92 (2017), 39.72 (2008) to 259.83 (2017) and 42.80 (2008) to 271.57 (2017). During the four seasons, Q4 is the first position following Q3,Q2, and Q1 resulted that the least trend values.



Fiq.1Descriptive Statistics in Seasonal Variation of Share Price Analysis of Federal Bank

In order to find out the seasonal variation of Q1, Q2, Q3 and Q4 of Federal Bank, the table classifies the whole year into four quarters. The descriptive statistics exhibits the statistical classification of the four periods:

Table 2 Descriptive Statistics in Seasonal Variance of Share Price of Federal Bank

	Q 1	**Q 2**	**Q 3**	**Q 4**
Mean	299.34	338.64	354.13	378.10
Std. Error of Mean	47.62	57.450	60.18	58.60
Std. Deviation	150.61	181.67	190.32	185.33
Variance	22684.47	33005.71	36223.63	34347.66
Skewness	.50	1.46	1.42	1.37
Std. Error of Skewness	.68	.68	.68	.68
Kurtosis	-.20	2.95	2.25	2.14
Std. Error of Kurtosis	1.33	1.33	1.33	1.33
Range	473.43	625.00	627.56	632.35
Minimum	96.49	139.87	163.99	167.70
Maximum	569.92	764.87	791.55	800.05
Sum	2993.40	3386.48	3541.35	3781.07

Source: Computed value

It is obvious from the descriptive statistics results of Table 2 that stocks at Federal Bank have high volatility, positive skewness, and high kurtosis values (one has negative kurtosis). The result shows that trend time and price change of Federal Bank in India. It is observed from the table 2 that all the period, the growth is positive value. If the quantity increases spontaneously, value is increased significantly. The second quarter is better than first quarter; the third quarter is better than second quarter; the last quarter is better than all others. It dogged to one quarter to another quarter as it represented the sustainable growth of share price in the market.

Table 3 The Correlation Co-Efficient and the Significance for the Dependent and Independent Variables

	Q 1	Q 2	Q 3	Q 4
Q 1	1.000			
Q 2	.935	1.000		
Q 3	.857	.958	1.000	
Q 4	.795	.917	.977	1.000

Table 3 provides correlations among stocks price of each quarters. We can see a higher positive correlation among stocks prices. The difference of correlation among stocks price of quarter period compared with only mutual stocks correlation coefficients. This finding will be tested with regression analysis.

The Linear Regression: A Relationship between the Time and Price Change of Federal Bank in India with Time Series Data

The linear regression is based on the calculation of the correlation coefficient for the all the variable groups. The correlation between a dependent variable and the other independent variables are being analysed. If the correlation coefficient has a value approaching 1, this means that the correlation is strong. The aim of using the linear regression is to determine what impact on the economic growth has the independent variables such as time and price changes of Federal Bank. The optimal method used for the linear regression model is the backward method, which is based on the elimination, at every step of iteration, of the independent variable which has the weakest influence on the dependent variable. None of the independent variables were removed, as it is shown in Table 4. From the Table 5, there can be observed that among the variables, it is a good correlation, but not very strong, because the correlation coefficient is 0.904. In addition to this value, none of the independent variables have been removed, so all these variables have a significant relationship on time series.

The significance is below 0.05, which means that there are small errors determined by chance. As a remark, the total credit influence on the time series is very good and strong (sig =0.000), and the tolerance is 1.00, greater than 1-Adjusted R square (1–0.795=0.250), which eliminates the uncollinearity risk. VIF (Variance Inflation Factor = 1/Tolerance) also helps for the collinearity analysis, being able to warn about an uncollinearity situation if its value has a greater value than 2.

Table 4.1Variables Entered/Removed [a]

Model	**Variables Entered**	**Variables Removed**	**Method**
1	VAR00001	.	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).

a. Dependent Variable: VAR00005

Table 4.2 The Correlation Coefficient Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.904[a]	.817	.795	1.37246	.817	35.798	1	8	.000	2.753

a. Predictors: (Constant), Time
b. Dependent Variable: Quarters

Using regression analysis, the researchers have determined a strong positive correlation between stocks prices at MSE (most of the values oscillate around 0.904), as shown in Table 5.

Table – 5 The Correlation Coefficient Model Summary [b]

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	.060	1.008		0.05	.954		
Q 1	.018	.003	0.705	5.98	.000	1.000	1.000
Q 2	.184[b]	0.00	0.802	0.40	.696	.125	7.996
Q 3	.373[b]	0.00	0.904	1.33	.225	.266	3.757
Q 4	.384[b]	0.00	1.22	1.72	.129	.368	2.721

In our case, VIF is 2.721, which also eliminates the uncollinearity risk. Thus, using the coefficients calculated (column B – Table 5), the linear regression equation obtained is: public - 6.273 x 10-5, Q1 period 0.18, Q2 period 0.184 Q3 period 0.373 and Q4 period 0.384. The interpretation of coefficients from regression equation points out that, considering data for the period 2008 to 2017, the impact of the share price analysis resulted that the following correlations: if price will increase one period, then subsequent period growth rate increases with 0.18 percent; if price will increase one period, then subsequent period growth rate increases with 0.373 percent; if price will increase one period, then subsequent period growth rate increases with 0.384 percent.

V. CONCLUSION:

The present study derives that the cubic trend found among the four quarters has positive growth and significant for F value at 5% level. The multi-collinearity has been analysed based on dependent and independent Pearson correlation analysis and it is tested at the level of significant. In this paper, the effects of collinearity on omitted variables, bias and parameter variance, estimates were examined. It is found that, consistent with prior results, negative and positive correlations could yield less precise estimates, and can induce parameters to switch signs. The trend and regression analysis resulted from the study that the Federal Bank's share prices have a long lasting reciprocation of the financial investment foreseen.

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