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Relationship between stock price returns and select corporate fundamentals: A study

Dr. Siddhartha Sankar Saha[1], Tapas Kumar Tripathy[2*]
[1] Professor of Commerce, Former Head, Department of Commerce, Former Dean, Faculty Council for Post Graduate Studies in Commerce, Social Welfare and Business Management, Former Director, CUCSE-CEFM & Former Director, IQAC, University of Calcutta, Kolkata, West Bengal, India
[2] Research Scholar, Department of Commerce, University of Calcutta and Assistant Professor of Commerce, P. K. College, Contai, West Bengal, India

Abstract
The Indian stock market has witnessed a radical transformation and growth in recent times. Relationships between stock price returns with select corporate fundamentals variable are presented in this research paper. The panel data regression analysis reveals that the explanatory powers model has significant R square value in estimated regression model. The results clearly indicate that stock price return have been affected due to number of corporate fundamentals such as price earnings ratio, price to book value ratio and market capitalisation value. The relationship varies from one direction to others.

Keywords: Financial ratios, fixed effect regression model, hausman test

Introduction

The Background of the Study

Capital market mobilizes financial resources of retail investors, qualified institutional buyers including foreign institutional investors (FII), and other capital market intermediaries. Stock price return is a profit on an investment. It comprises any changes in value and interest or dividend or other such cash flows, which the investor receives from the investment. Return is the primary motivating force that drives investment. It represents the reward for undertaking investment. Measurement of realized return is necessary to assess how well the investment management has done. In addition to this, historical returns are often used as an important input in estimating future (prospective) returns. The impact of various corporate fundamental factors (like liquidity, profitability, efficiency of collection of debts, return from assets market-based ratios like price earnings ratio, etc.) on stock price returns in select NSE-listed companies is studied in this paper. This study explores the impact of select corporate fundamentals on stock returns of the select listed companies in National Stock Exchange (NSE) over the period of the study.

Past Studies and Research Gap

In order to address the theme of the study, a survey of literature concerning relationship between stock price returns and select corporate fundamentals of select NSE listed companies has been conducted here. Ozturk & Karabulut (2018) [24] explored the relationship between financial ratios and stock returns of technology related stocks of Istanbul Stock Exchange. Current ratio, earnings to price and net profit margin are chosen to analyze the relationship with stock returns. Their findings observed that Due to existence of heteroscedasticity, cross sectional dependence and autocorrelation in the sample data, robust estimators are used to estimate two-way fixed effects model. According to Park-Kmenta estimation model, it is observed that earnings to price and net profit margin are significant to explain the stock returns in Istanbul Stock Exchange where current ratio is found insignificant. As results, earnings to price and net profit margin are strong determinants of stock returns. Guloglu, Uyar & Uyar (2016) [13] investigated the effect of six financial ratio and one lag values on returns taking eighty-three manufacturing firms whose stock had been traded during 2000 to 2014. In this paper, researchers checked the existence of extreme values through descriptive statistics and kernel function and also used dynamic panel data regression with fixed effect. According to the results, stock returns react differently with the changes in the financial ratio of conditional distribution of returns. Sharif, Purohit & Pillai (2015) [29] explored the main determinants affecting share prices in Bahrain financial markets with eight firm specific variables using OLS and panel data regression method. The results indicate that the variables return on equity, book value per share, dividend per share, dividend yield, price earnings and firm size are significant determinants of share prices. High value of R square indicates that both fixed effect and random effect are significant. But Hausman test favoured the random effect estimation. Saeidi & Okhli (2012) [28, 30] considered the changes of assets return rate through stock price, company size, age of the company and beta during 2001 to 2010. In this paper, researchers investigated assets return ratio that can be used as an explanatory variable for describing stock price. Study also reveals that smaller company size is the more expensive its stock price. Zakaria, Muhammed & Zulkifli (2012) [34] investigated impact of dividend policy in share price volatility. This study uses dividend per share, dividend yield, growth size, leverage, earnings volatility as an explanatory variable. Empirical results of the study suggest that there is a significant positive relationship exists between dividend per share of a firm and share price volatility. On the other hand, dividend yield is negatively related with stock price changes and size, leverage. Study also showed the high correlation with the changes of the firm share with leverage.

There is a need for further study on relationship between stock price returns and select corporate fundamentals in

order to have better understanding on stock price returns and different corporate fundamentals. Main reasons behind in conducting this study are as follows:

1. Number of empirical researches in the field of relationship between stock price returns and different corporate fundamental is considerably less;
2. Empirical researches reviewed so far, analysed the impact of any one or a few of those corporate fundamentals determining the stock price returns;
3. Underlying different corporate fundamental factors have not been identified or less identified, so far, the impact of corporate fundamentals in stock price returns in NSE listed stocks;
4. No studies were undertaken so far, the impact of corporate fundamentals in stock price returns in NSE listed stocks in the context of global financial crisis.

However, the existing research gap explored from the past studies encourages in examining the relationship between stock price returns with select corporate fundamentals in select NSE listed stocks.

Objectives of the Study

In this chapter, an earnest attempt has been made to know the impact of select corporate fundamentals on stock price returns of select NSE-listed companies. Sub-objectives are as follows:

1. To describe the characteristics of the data set during the study period *(Refer to 5.1);*
2. To analyse the impact of different corporate fundamentals on stock price returns in select NSE-listed companies during the study period *(Refer to 5.2).*

Data and Methodology

In order to fulfil the objectives of the study, an exploratory research design has been made. This study is based on secondary data, which have been collected from Capitaline corporate database and NSE official website. However, in this study, the judgement sampling method has been used to select top NSE listed 100 companies on the basis of market capitalization as done in the study for sample design. The research study has been made for 15 years from 2001-02 to 2015-16. It is significant to note that during the study period, the percentage of market capitalization of top 100 companies is 89.80% of total market capitalization of 302 companies. Moreover, these top 100 companies are categorized into different 13 sectors in considering the idea of Dalal Street Investment Journal (DSIJ) classification and NSE sector classification. Daily adjusted closing share price of select NSE-listed companies are considered here for calculation of daily stock price return series of each company.

Percentage of yearly stock price returns of top 100 NSE-listed companies are considered in the study as a dependent variable and different 13 independent variables [such as beta value of select companies and different 12 corporate fundamentals (like Debt Equity Ratio, Current Ratio, Total Assets Turnover, Price Earnings Ratio, Price to Book Value Ratio, Interest Coverage Ratio, Return on Capital Employed, Return on Net worth, Market Capitalisation, Return on Equity, Earnings Per Share, Rate of Dividend Per Share)] are considered here. In the study, different corporate fundamental variables have been transformed into log value. Reason behind the log transformation of any variable is that highly skewed distribution will be less skewed. Such transformation can reduce variability of data and make data confirm to normality (Feng, et. al., 2014) [11]. The methodology followed in this study is summarized below:

Exhibit- 1: Research Methodology

Type of Research	Empirical Research
Nature of Research Design	Exploratory Research Design
Data Set	Secondary data related to percentage of yearly stock price returns, stock returns volatility (beta value) and different corporate fundamentals of top hundred NSE-listed companies are considered.
Study Period	The period of study has been taken from 2001-02 to 2015-16. This period is chosen because different NSE-listed companies share prices have witnessed tremendous fluctuation during the same period.
Log transformation of select Independent Variables (IVs)	Different independent variables under this study are transformed into the logarithmic form. It is a data transformation method in which it replaces each variable (x) with a log(x) and most popular among the different types of transformations used to transform skewed data to approximately conform to normality.
Dependent Variable (DV)	Percentage of yearly stock price returns (SPR) (It is calculated using the formula $R_1 = [(P^t - P^{t-1}) \div P^{t-1}] \times 100$. (where r_t indicates yearly stock price return, P^t is the price of the security on year t and P^{t-1} is the price of the security on year $t-1$)
Independent Variables (IVs)	▪ Log of debt equity ratio (lnDER) ▪ Log of current ratio (lnCR) ▪ Log of total asset turnover ratio (lnTATR) ▪ Log of price earnings ratio (lnPER) ▪ Log of price to book value ratio (lnPBVR) ▪ Log of interest coverage ratio (lnICR) ▪ Log of return on capital employed (lnROCE) ▪ Log of return on net worth (lnRONW) ▪ Log of market capitalisation (lnMCAP) ▪ Log of return on equity (lnROE) ▪ Log of earnings per share (lnEPS) ▪ Log of percentage of dividend per share (lnDPS) ▪ Stock returns volatility represented by Beta Value The study explores the impact of select corporate fundamental factors on stock price returns. The study also enquires the relationship between stock price return and corporate fundamental factors along with stock returns volatility (beta value). The existing literature available strongly supports about the

	movement of stock price with factors of corporate fundamentals along with beta value.
Statistical Tools Used	Analysis to address stated objectives of the Study
Descriptive Statistics	To identify whether there is any difference in mean value, standard deviation, minimum and maximum value of stock returns volatility and select corporate fundamental.
Panel Data Regression	To assess the determinants of stock returns volatility, a panel data model has been used. The estimated model in a panel approach is as follows: $Y_{it} = \beta_0 + \beta_1 x_{1it} + ...U_{it}$ (*Where i stands for the i^{th} cross-sectional unit and t for the t^{th} time period).*
Hausman Specification Test	After running both the models, fixed effects model (FEM) and random effects model, Hausman test helps to determine the model, which is appropriate for the study. Hausman (1978) proposed a test based on the difference between the fixed effects and random effects estimates. Here, Null hypothesis is: random effects model is suitable and alternative hypothesis is: fixed effects model is suitable for the study. So, the hypothesis is as follows: ▪ H_0= Random Effects Model is appropriate; ▪ H_1= Fixed Effects Model is appropriate. If the test result shows that the p-value is statistically significant, fixed effects model is appropriate. Otherwise, random effects model is suitable for the study.
Poolability Test	Poolability test is compared with ordinary least squared (OLS) regression model and the new Least Square Dummy Variables fixed effects model has a higher R square value. If there is no significant cross sectional and temporal effect, OLS regression is appropriate. Otherwise, FEM is appropriate when an intercept and slope coefficients are constant across companies and time (Pillai Pillai, 2017).

Results and Analysis

1. **Objective 1:** Describing the Characteristics of the Data Set during the study period

1.1 Descriptive Statistics

In the study, descriptive statistics are analyzed to understand the basic features of percentage change in select company's stock price return and select corporate fundamentals that reflect its performance in stock returns. Usually, the average values of return series and different corporate fundamentals are used to express the adequate characteristics of this data series.

1.2 Descriptive Statistics Results

Table 1 provides information regarding descriptive statistics results of stock price return and different corporate fundamentals, like log of debt equity ratio, log of current ratio, log of total asset turnover ratio, log of price earning (P/E) ratio, log of price to book value ratio, log of interest coverage ratio, log of return on net worth, log of market capitalization value, log of return on equity, earnings per share -Log value (EPS), log of percentage of dividend per share (DPS).

Table 1: Descriptive Statistics Results

Variables	Mean	Standard Deviation	Min	Max
Depended Variable: Percentage of Stock price return	42.84216	143.5898	-87.36423	4320.732
Independent Variables:				
Beta value with NIFTY	.875	.439	-.218	4.86
Log of debt equity ratio	-.3041966	.6065786	-2	1.834103
Log of current ratio	.092	.215	-.602	1.81
Log of total asset turnover ratio	.098	.418	-2	1.95
Log of price earning (P/E) ratio	1.21	.422	0	3.42
Log of price to book value ratio	.470	.43	-.82	2.12
Log of interest coverage ratio (Log value)	2.39	2.28	-10.72	11.40
Log of return on capital employed	-.575	.413	-2.88	.251
Log of return on net worth	-.691	.364	-2.82	.364
Log of market capitalisation	9.08	1.60	3.52	12.76
Log of return on equity	-.692	.350	-2	1.18
Earnings per share -Log value (EPS)	2.07	1.41	-3.21	6.15
Log of percentage of dividend per share (DPS)	.059	.468	-1.30	1.74

*(**Source:** Compilation of Capitaline Corporate Database- Data using STATA 13.0)*

Inferences

Mean value of stock return is an important indicator of our study and mean value is 42.824 with S.D. value 143.58 and this value varies between -87.36 and 4320.7. The next row discloses the mean, median and other descriptive statistics regarding log of debt equity ratio which indicates the relative proportion of shareholder's equity and debt used to finance a company's assets. Mean value of such ratios is -.3041 with SD .606 with minimum value -2 and maximum value 1.83.

2. **Objective- 2:** Analysing the impact of different corporate fundamentals on stock price returns in select NSE- listed companies during the study period

2.1 Different Assumptions Test before running Panel Data Regression Analysis

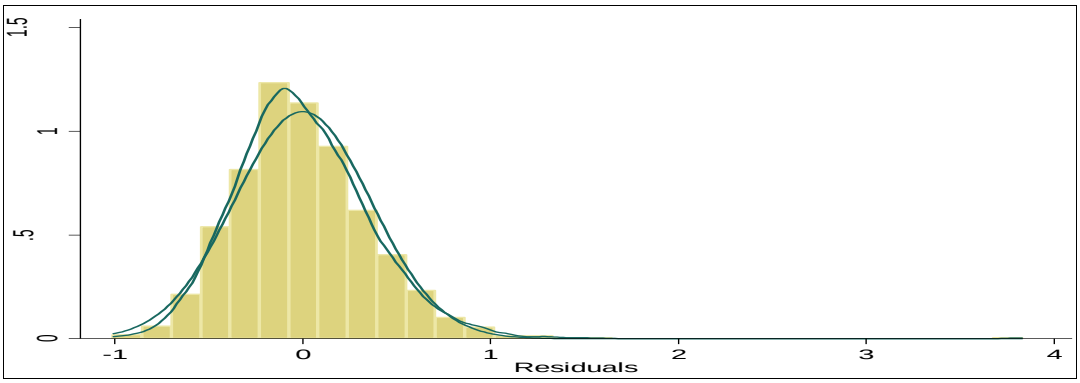
Table 2

Different Assumptions/ Regression Diagnostic	Statistical / Econometric Test	Remedial Measures
Linearity and Normality Test	Residual plot is used to test linearity and normality assumption. Test has been done by plotting dependent and independent variables	If linearity is not found, non-linear model is to be used like ARIMA model. The log

	residuals data points on graph. A normal probability plot of residuals is a scatter plot which shows the percentiles of the normal distribution. When the graphical plot is approximately linear, the error terms or residuals are likely normally distributed.	transformation is used to make data conform to normality or reduce the variability of data series.
Collinearity	Correlation matrix	Excluded the specific variable.
Heteroscedasticity	Modified Wald test	Avoiding outlier data point or square transformation
Stationary	Panel Unit Root Test using: ▪ Levin, Lin & Chu Test ▪ Im, Pesaran Test ▪ ADF - Fisher Chi-square ▪ PP - Fisher Chi-square	First different transformation

2.2 Normality Test

Normality test is used to check whether the sample company's different corporate fundamental variable, return and stock returns volatility represented by beta value are distributed normally or not. More precisely, the tests are a form of model selection and can be interpreted in several ways depending on one's interpretations of probability. Plotting of residual value of different variables in this study gives a clear picture whether the data have the Skewness or Kurtosis matching a normal distribution as under:



(**Source:** Compilation of Capitaline Corporate Database- Data using STATA 13.0)

Chart 1: Plotting of Residual value for Different Variables

Inferences

Plotting residual value plot of corporate fundamentals variable states that the sample companies' different variables are normally distributed which is represented in above graph.

2.3 Correlation of Different Corporate Fundamentals

The correlation coefficient among different variable of corporate fundamentals, percentage change in stock price return and Beta are shown here:

Table 3: Correlation Table of Different Corporate Fundamentals with Beta

	% of Return	LDE	LCR	LTAT	LPE	LPBVR	LIC	LROCE	LRONW	LMCAP	LROE	LEPS	LDPS	Beta
% of Return	1.00													
LDE	.054	1.00												
LCR	-.005	.053	1.00											
LTAT	.022	-.306	-.201	1.00										
LPE	.05	-.211	.016	.146	1.00									
LPBVR	.116	-.322	.057	.375	.566	1.00								
LIC	-.018	-.461	.195	.324	.247	.465	1.00							
LROCE	.035	-.114	-.077	.317	-.153	.237	.128	1.00						
LRONW	.11	-.161	.031	.338	-.187	.508	.306	.486	1.00					
LMCAP	-.061	-.205	-.024	.014	.319	.334	.260	.101	.052	1.00				
LROE	.108	-.144	.053	.35	-.171	.526	.273	.453	.843	.016	1.00			
LEPS	-.049	-.056	.009	.042	.022	.103	.296	.135	.083	.408	.042	1.00		
LDPS	-.044	-.280	-.014	.219	.23	.476	.451	.132	.307	.454	.305	.374	1.00	
Beta	.003	.195	-.12	-.304	-.203	-.386	-.373	-.091	-.224	.096	-.231	-.103	-.251	1.00

*(**Source:** Compilation of Capitaline Corporate Database- Data using STATA 13.0)*

Inferences

Correlation matrix shows (Table – 3) the correlation coefficient among different variable of corporate fundamentals, percentage change in stock price return and Beta. We find the association among percentage change in stock price return and other explanatory variables, the percentage change in stock price return and debt equity ratio are associated with .054 or 5.4%. Similarly, other explanatory ratios, like total assets turnover, price earnings ratio, return on capital employed with percentage change in stock price are corelated with .022 or 2.2%, .05 or 5%, .035 or 3.5%. Negative correlation found between current ratio

and percentage of stock price return is -.005 or -.05% and market capitalization and percentage of stock price return is -.061 and dividend per share with percentage change in stock price return is -.044. Lower degree of negative correlation with percentage change of stock price return and market capitalization. Moderate degree of association exists between beta and debt equity ratio is 19.5%. moderate and low degree of negative relation is found between beta with current ratio, total assets turnover, price earnings ratio, price to book value ratio, interest coverage ratio, return on capital employed, return on net worth, return on equity, earnings per share and dividend per share.

2.4 Heteroskedasticity Test

Heteroskedasticity is treated as a serious problem in regression results. Modified Wald test is used to detect group wise heteroskedasticity. This test has been performed to find out the effect of heteroskedasticity in the select fixed effect panel data regression model. If alternative hypothesis is selected, there is a problem of heteroskedasticity (Greene, 2003) [12]. In that case, the selected model should be modified by making it robust.

Modified Wald test for Group wise Heteroskedasticity

Hypothesis	▪ **H_0:** Homoskedasticity exists in error term; ▪ **H_1:** Homoskedasticity does not exist in error term (i.e.; Heteroskedasticity).
Test Statistics	Modified Wald Test with Probability Value
Underlying Distribution	χ^2 Test
Level of Significance	5% or 0.05
Decision Rule	If p- value >0.05 (statistically significant), H_0 is accepted and vice versa.

2.5 Heteroskedasticity Test Results

Heteroskedasticity test is made for fixed effects model in Panel data regression. Results of Modified Wald test for heteroskedasticity in group wise fixed effect regression model is summarized here:

Table 4: Result of Modified Wald Test

Sl. No.	**Model**	**Modified Wald Test**		**Decision Rule**	**Decision on H_0**
1	Fixed Effects Regression Model- 1 (DV: Stock price return; IVs: 12 Corporate Fundamentals and Stock Returns Volatility)	χ^2 value	66629.43	P–Value>0.05	Accepted
		P- value	0.0631		

*(***Source:** *Compilation of Capitaline Corporate Database- Data using STATA 13.0)*

Inferences

It has been observed that the value of probability is 0.0631, which is greater than 0.05. Null Hypothesis (H_0) is accepted and alternative hypothesis is rejected in fixed effects panel regression model. It indicates that the problem of heteroskedasticity does not exist in this study and variances of residuals are homogeneous.

2.6 Stationary Test

First of all, there is a need for testing whether the different companies' stock price return, stock return volatility (Beta Value) and different corporate fundamentals data series are stationary or non-stationary. Panel unit root test (at level – individual intercept) using Augmented Dickey-Fuller (ADF) Test (Dickey and Fuller 1979) has been conducted here.

Panel Unit root Test

Hypothesis	▪ **H_0:** Panel data series has unit root; ▪ **H_1:** Panel data series has not unit root.
Test statistics	Augmented Dickey – Fuller Test (At Level – Individual intercept)
Underlying Distribution	▪ Levin, Lin &Chu test ▪ Im, Pesaran and Shin W-stat ▪ ADF - Fisher Chi-square ▪ PP - Fisher Chi-square
Decision Rule	If p- value <0.05, H_0 is rejected and vice versa.

2.7 Stationary Test Results

The Augmented Dickey Fuller Test at level for all the variables are given below:

Table 5: Panel Unit Root Test Results (At Level – Individual intercept)

Particulars	**Different Unit Root Test**	**Statistics & Corresponding 'P' value**		**Decision Rule**	**Decision on H_0**	**Data series stationarity**
		Test Statistics	**P- Value**			
Percentage of Stock price return	Levin, Lin &Chu t	-26.68	0.000	P–Value<0.05	Rejected	Stationary series
	Im, Pesaran and Shin W-stat	-23.68	0.000			
	ADF - Fisher Chi-square	872.32	0.000			
	PP - Fisher Chi-square	1075.20	0.000			
Log of debt equity ratio	Levin, Lin &Chu t	-16.78	0.000	P–Value<0.05	Rejected	Stationary series
	Im, Pesaran and Shin W-stat	-7.13	0.000			
	ADF - Fisher Chi-square	300.81	0.000			
	PP - Fisher Chi-square	229.01	0.000			
Log of current ratio	Levin, Lin &Chu t	-12.00	0.000	P–Value<0.05 (Except PP	Rejected	Stationary

	Im, Pesaran and Shin W-stat	-5.59	0.000	- Fisher Chi-square)		series
	ADF - Fisher Chi-square	304.20	0.000			
	PP - Fisher Chi-square	150.49	0.880			
Log of total asset turnover ratio	Levin, Lin &Chu t	-5.40	0.000	P–Value<0.05 (Except Im, Pesaran and Shin W-stat)	Rejected	Stationary series
	Im, Pesaran and Shin W-stat	-1.48	0.068			
	ADF - Fisher Chi-square	220.40	0.004			
	PP - Fisher Chi-square	203.41	0.032			
Log of price earning (P/E) ratio	Levin, Lin &Chu t	-12.34	0.000	P–Value<0.05	Rejected	Stationary series
	Im, Pesaran and Shin W-stat	-11.39	0.000			
	ADF - Fisher Chi-square	513.5	0.000			
	PP - Fisher Chi-square	589.4	0.000			
Log of price to book value ratio	Levin, Lin &Chu t	-11.18	0.000	P–Value<0.05	Rejected	Stationary series
	Im, Pesaran and Shin W-stat	-10.11	0.000			
	ADF - Fisher Chi-square	453.19	0.000			
	PP - Fisher Chi-square	582.42	0.000			
Log of interest coverage ratio	Levin, Lin &Chu t	-6.23	0.000	P–Value<0.05	Rejected	Stationary series
	Im, Pesaran and Shin W-stat	-4.10	0.000			
	ADF - Fisher Chi-square	277.55	0.000			
	PP - Fisher Chi-square	233.68	0.000			
Log of return on capital employed	Levin, Lin &Chu t	-5.41	0.000	P–Value<0.05	Rejected	Stationary series
	Im, Pesaran and Shin W-stat	-2.94	0.001			
	ADF - Fisher Chi-square	251.8	0.000			
	PP - Fisher Chi-square	233.2	0.001			
Log of return on net worth	Levin, Lin &Chu t	-3.62	0.000	P–Value<0.05	Rejected	Stationary series
	Im, Pesaran and Shin W-stat	-3.11	0.000			
	ADF - Fisher Chi-square	298.6	0.000			
	PP - Fisher Chi-square	324.4	0.000			
Log of market capitalisation	Levin, Lin &Chu t	-14.44	0.000	P–Value<0.05	Rejected	Stationary series
	Im, Pesaran and Shin W-stat	-7.53	0.000			
	ADF - Fisher Chi-square	409.4	0.000			
	PP - Fisher Chi-square	562.5	0.000			
Log of return on equity	Levin, Lin &Chu t	-5.03	0.000	P–Value<0.05	Rejected	Stationary series
	Im, Pesaran and Shin W-stat	-4.47	0.000			
	ADF - Fisher Chi-square	340.8	0.000			
	PP - Fisher Chi-square	364.1	0.000			
Log of Earnings per share	Levin, Lin &Chu t	-6.04	0.000	P–Value<0.05 (Except Im, Pesaran and Shin W-stat & ADF - Fisher Chi-square)	Rejected	Stationary series
	Im, Pesaran and Shin W-stat	-0.28	0.388			
	ADF - Fisher Chi-square	203.13	0.425			
	PP - Fisher Chi-square	321.05	0.000			
Beta Value	Levin, Lin &Chu t	-6.23	0.000	P–Value<0.05	Rejected	Stationary series
	Im, Pesaran and Shin W-stat	-5.61	0.000			
	ADF - Fisher Chi-square	322.05	0.000			
	PP - Fisher Chi-square	565.09	0.000			

*(***Source:** *Compilation of Capitaline Corporate Database- Data using EVIEWS 10.0)*

Inferences

The study result test statistics shows that the p-value is statistically significant in most of the cases in respective of Levin, Lin &Chu test; Im, Pesaran and Shin W-stat; ADF - Fisher Chi-square and PP - Fisher Chi-square (P- Value = 0.000 which is < 0.05). It shows that H_0 is rejected and H_1 is accepted. It implies that panel data series do not any unit root. The result indicates that the variables used in the regression model are stationary (Brooks, 2014) [6].

2.8 Analysing the impact of different Corporate Fundamentals on Stock Price Returns in select NSE Listed Companies

2.8.1 Panel Data Regression

Comparing the fixed effects model (FEM) with random effects model (REM) in panel data regression, fixed effects model is ultimately selected through Hausman Test. Such fixed effects panel regression model is compared with pooled regression model using poolability test. Final model selection, which has been made on the basis of restricted F test results in Poolability Test, is fixed effect model. The effects of different corporate fundamentals on stock price returns in select NSE-listed companies are explained through fixed effects panel regression model.

2.8.2 Selection between Fixed Effects Model and Random Effects Model: The Hausman Test

After running both the model in panel data regression (i.e. Fixed Effects Model and Random Effects Model), Hausman test helps to determine the appropriate model for the study.

Hausman Test

Hypothesis	▪ **H_0:** Random effects model is appropriate; ▪ **H_1:** Fixed effects model is appropriate (i.e.; Fixed effects model is inappropriate).
Test Statistics	χ^2 (chi - square)- test with probability value
Underlying Distribution	χ^2 test
Level of Significance	5% or 0.05
Decision Rule	If p- value <0.05 (statistically significant), H_0 is rejected and vice versa.

2.8.3 Hausman Test Results

Results of Hausman test is presented here:

Table 5.6: Result of Hausman Test

Hausman test results		Decision Rule	Decision on H_0
χ^2 value (b-B)'[(V_b-V_B) ^ (-1)] (b-B)	153.84	P–Value<0.05	Rejected
P- value	0.0000		

*(**Source:** Compilation of Capitaline Corporate Database- Data using STATA 13.0)*

Inferences

Test result of chi square (χ^2) test shows that the p-value is statistically significant (prob >chi2 = 0.000 which is less than 0.05). It shows that H_0 is rejected and H_1 is accepted from the test results. It implies that fixed effects model is appropriate instead of random effects model for the study.

2.8.4 Poolability Test

Poolability test is used to compare the Pooled Ordinary Least Squared (OLS) Regression Model with the Fixed Effects Model considering R square value. If we assume that there is neither significant cross sectional nor significant temporal effect, and in that case, pool the data set and OLS regression is appropriate. Otherwise, model with an intercept α and slope coefficients β constant across companies and time is considered. This is known as poolability test in panel regression (Pillai, 2017). When we compared with the fixed effect (FE) model, the first one (pooled regression) is a restricted model; it imposes a common intercept on all companies - $\mu_2 = \mu_3 = \mu_4 = \mu$. Details of restricted F test are discussed here:

Poolability Test

Hypothesis	▪ **H_0:** Common intercept for all companies; ▪ **H_1:** Intercept varies for companies.
Test Statistics	F test with corresponding p value
Underlying Distribution	Restricted F test (F)= $\frac{(R^2_{UR} - R^2_R)/J}{(1-R^2_{UR})/(n-k)}$ Where, ▪ R^2_{UR}= R square of the unrestricted regression (second model i.e., Fixed effect model); ▪ R^2_R = R square of the restricted regression (first model i.e., OLS model). (J = number of linear restrictions on the first model; k = number of parameters in the unrestricted regression; and n = NT = number of observations.)
DF	Total number of variables = 13
Level of Significance	5% or 0.05
Decision Rule	If p- value <0.05, H_1 is accepted and H_0 is rejected.

Poolability Test Results

Restricted F test is conducted between OLS regression and the Least Square Dummy Variable Fixed Effects model. This test is useful for the presence of individual effects. Results of poolability test is summarized here:

Table 7: Poolability test result

Model	F test value	P- Value	Decision Rule	Decision on H_0
Restricted F Test	3.67	0.000	P - Value < 0.05	Rejected

*(**Source:** Compilation of Capitaline Corporate Database- Data using STATA 13.0)*

Inferences

Here, F= 3.67, with a p-value equal to zero. It shows that H_0 is rejected and H_1 is accepted for the test result. The difference in the explanatory powers of the model is highly significant and concludes that pooled OLS regression is not acceptable and Fixed Effects model is appropriate. It is also stated that with this greater p-value, we strongly reject the null hypothesis of zero company effect.

2.8.5 Development and Interpretation of Panel Data Regression Model (Fixed Effects Model)

In the panel data regression – Fixed Effect Model, 13 independent variables are selected. Variables are transformed into log value for the purpose of smooth calculation process. In this study, our dependent variable is stock price return and select corporate fundamentals are used as independent variables. The following panel data regression model is considered to estimate the relationship between dependent variable and independent variables. The format of the equation is as follows:

- $SPR_{it} = \alpha + \beta_1 lnDER + \beta_2 lnCR - \beta_3 lnTATR + \beta_4 lnPER + \beta_5 lnPBVR - \beta_6 lnICR + \beta_7 lnROCE + \beta_8 lnRONW - \beta_9 lnMCAP + \beta_{10} lnROE + \beta_{11} lnEPS - \beta_{12} lnDPS + \beta_{13} BETA + \varepsilon_{it}$
- $\beta_{1\ to}\ \beta_{13}$ Regression coefficient;
- lnDER, lnCR, lnTATR, lnPER, etc. indicates different corporate fundamentals used as Independent variables at the log value;
- α = Intercept

Here, 'i' is the i^{th} company (100 companies in this study) and 't' is the time period (from the year 2001-02 to 2015- 16 i.e.; 15 years) for the determents and 'ln' stands for log value.

Table 8: Parameter Estimates for Panel Data Regression – Fixed Effects

Intercept (α)		**248.69**
Estimate (β)	β_1	5.812
	β_2	12.821
	β_3	-4.836
	β_4	28.816
	β_5	175.73
	β_6	-0.379
	β_7	6.308
	β_8	21.919
	β_9	-30.464
	β_{10}	24.184
	β_{11}	1.246
	B_{11}	-7.768
	β_{13}	-12.308

*(**Source:** Compilation of Capitaline Corporate Database- Data using STATA 13.0)*

The Fixed Effects Panel regression equation results are shown here:

Table 9.

Model No.	**Equation**
1.	$SPR = 248.696 + 5.812 \ln DER + 12.821 \ln CR - 4.836 \ln TATR + 28.816 \ln PER + 175.734 \ln PBVR - 0.379 \ln ICR + 6.308 \ln ROCE + 21.914 \ln RONW - 30.464 \ln MCAP + 24.184 \ln ROE + 1.246 \ln EPS - 7.768 \ln DPS - 12.308 BETA$

Inferences

From the estimated values of panel data regression (Fixed Effects), it is observed that out of thirteen independent variables, eight independent variables such as debt equity ratio, current ratio, price earnings ratio, price to book value ratio, return on capital employed, return on net worth, return on equity and earnings per share positively influence stock price return. As per the study, other five independent variables (Total asset turnover ratio, Interest coverage ratio, Market capitalisation, Percentage change in dividend per share, Beta value) negatively influence the stated theme.

Test of Significance

Significance of the parameter estimates are analysed with the help of t- test based on the following considerations:

Hypothesis-1	▪ **H_0:** There is no significant relationship between dependent variable and independent variables ▪ **H_1:** There is a significant relationship between dependent variable and independent variables
Hypothesis-2	▪ H_0: Each coefficient of the indirect variables is equal to 0 ▪ H_1: Each coefficient of the indirect variables is different from 0
Hypothesis-3	▪ H_0: Each parameter estimate is equal to 0 ▪ H_1: Each parameter estimate is different from 0
Test Statistics	t- test value of each independent variable of the model
Underlying Distribution	t- test
DF	K-1, where K = Number of variables 13
Level of Significance	5% or 0.05
Decision Rule	t-value has to be higher than 1.96 (for a 95% confidence) or If p- value <0.05, H_0 is not accepted and vice versa

Table 10: Results of t – test

Independent Variables	**Estimate**	**Std. Error**	**t – test value**	**P value**	**Decision Rule**	**Decision on H_0**
Log of debt equity ratio	5.812	9.658	0.60	0.54	P–Value>0.05	Accepted
Log of current ratio	12.821	30.205	0.42	0.67	P–Value>0.05	Accepted
Log of total asset turnover ratio	-4.836	31.466	-0.15	0.87	P–Value>0.05	Accepted
Log of price earnings ratio	28.816	17.59	1.64	0.10	P–Value>0.05	Accepted
Log of price to book value ratio	175.73	25.72	6.83	0.00	P–Value<0.05	Rejected
Log of interest coverage ratio	-0.379	3.794	-0.10	0.92	P–Value>0.05	Accepted
Log of return on capital employed	6.308	21.22	0.30	0.76	P–Value>0.05	Accepted
Log of return on net worth	21.919	22.29	0.98	0.32	P–Value>0.05	Accepted
Log of market capitalisation	-30.464	7.523	-4.05	0.00	P–Value<0.05	Rejected
Log of return on equity	24.184	24.620	0.98	0.32	P–Value>0.05	Accepted
Log of Earnings per share	1.246	7.464	0.17	0.86	P–Value>0.05	Accepted
Log of percentage of dividend per	-7.768	16.801	-0.46	0.64	P–Value>0.05	Accepted

share						
Beta value with NIFTY	-12.308	12.967	-0.95	0.34	P–Value>0.05	Accepted

(**Source:** *Compilation of Capitaline Corporate Database- Data using STATA 13.0)*

Inferences

All Null hypotheses (H_0) are accepted for all the independent variables except price to book value ratio and market capitalisation. It suggests that only those corporate fundamentals *(Price to book value ratio influences positively and market capitalization influences negatively)* significantly influence the percentage change in stock price returns of select NSE-listed companies.

Measuring Strength of Association

Table 11: Panel Regression (Fixed Effects) Results

R square (R^2) Value	**Within**	**10.79%**
	Between	0.01%
	Overall	2.63%

With a view to measuring the strength of association between outcome variable and different predictor variables, R^2 is used. Overall R^2 Value is 2.63% or 0.0263. Moreover, within the sample companies, R square value is 10.79% and corresponding between companies R square value comparatively is lower (i.e., 0.0001 or 0.01% only). Hence, the model explains only 2.63% variability of the dependent variable (DV) indicating not so strong association. P ('rho') value (explains intra-class correlation) indicates that 28.25% of the variance is due to differences across panel.

Determination of Model Fitness

Fitness of the panel data regression model -- fixed effects is analysed with the help F test (ANOVA) as follows:

Hypothesis	▪ **H_0**: All the regression coefficients in the model are equal to 0 ▪ **H_1**: All the regression coefficients in the model are different than 0
Test Statistics	F test value with corresponding p value
Underlying Distribution	F test
DF	Total number of predictor variables = 13
Level of Significance	5% or 0.05
Decision Rule	If Prob >F value is < 0.05 than we accept H_0 and reject H_1

Table 12: F test (ANOVA) Results

Model	**F test value**	**P- Value**	**Decision Rule**	**Decision on H_0**
F Test	11.74	0.000	P - Value < 0.05	Rejected

Inferences

F test value is 11.74 and corresponding p value of F-test also shows significant at 1% level and this leads to the rejection of null hypothesis. It shows that H_0 is rejected and H_1 is accepted form the test result. It implies that fixed effects panel regression coefficients in the model are different than zero. Hence, the model is statistically significant and fit to explain the dependent variable.

Conclusion

Relationships between stock price returns with select corporate fundamentals variable and Beta Value are presented in this paper using Panel Data Regression. The above analysis reveals that the explanatory powers model has significant R square value in estimated regression model. The results clearly indicate that stock price return have been affected due to price earnings ratio, price to book value ratio and market capitalisation value. Being panel data, it is found three R^2 results, where within results showed 10.79% and between results showed 0.01%, whereas the overall R^2 depicted 2.63%. Although it shows that price earnings ratio and price to book value ratio are having linear and positive relationship with stock price return and market capitalisation is having inverse relationship with stock price return. The relationship varies from one direction to others.

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