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Corporate Governance and Firm Performance- A Study of CNX Nifty Companies

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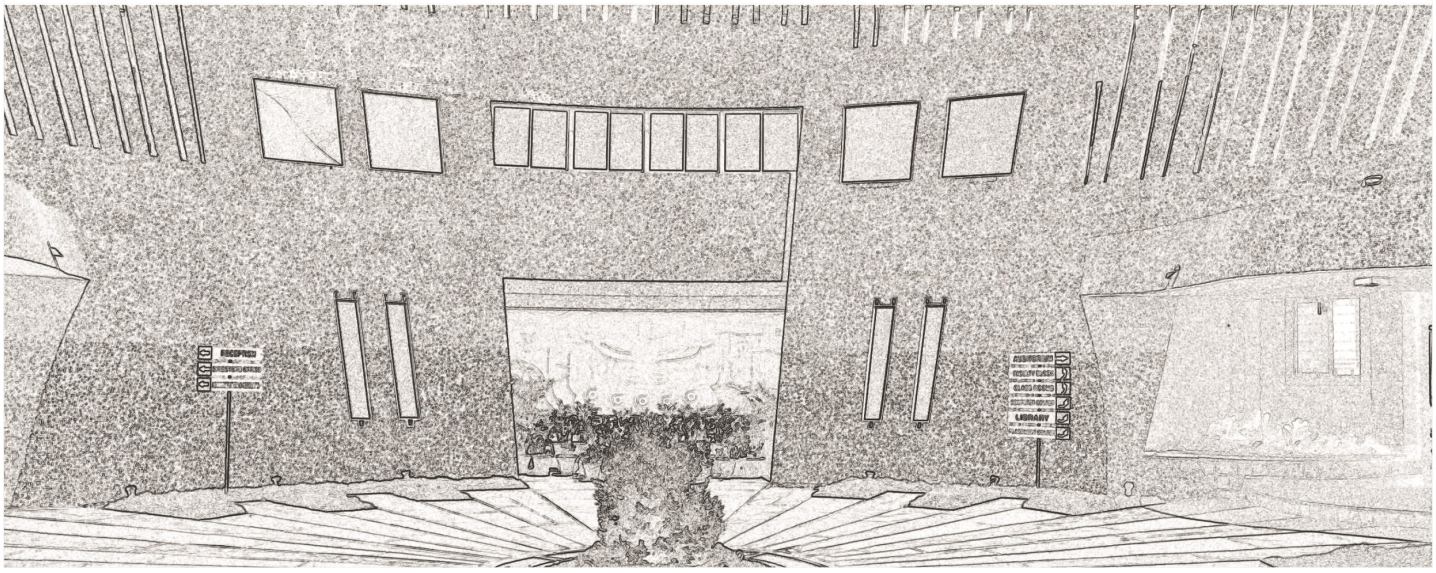

Corporate governance and firm performance - a study of BSE Sensex companies

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Note:

Preface

Research Center for Management Studies (RCMS), which was created five years ago at SDMIMD, has endeavoured to promote research in the field of management education in the Institute, in various ways. The Research Centre has encouraged faculty and students to actively take part in research activities jointly, collate and disseminate findings of the research activities through various types of projects to contribute to the body of knowledge to the academic fraternity in general, and management education in particular.

In this direction, keeping in line with the philosophy of promoting active research in the field of management to capture live situations and issues, the Research Center has taken a unique initiative to sponsor and encourage faculty members to carry out Applied Research Projects in various areas of management.

The duration of these projects is between four to eight months. At the end of the project, after peer review, a publication is taken out with an ISBN number by the institute. The projects help the faculty members, and the students, who work under the supervision of the faculty members for these projects, to identify issues of current importance in the field of management in various sectors. Data is collected mostly through primary research, through interviews and field study.

The institute takes into account the time and resources required by a faculty member to carry out such projects, and, fully sponsors them to cover the various costs of the project work (for data collection, travel, etc), thereby providing a unique opportunity to the two most important institutional stakeholders (faculty and students), to enrich their knowledge by extending their academic activities, outside the classroom learning situation, in the real world.

From the academic viewpoint, these projects provide a unique opportunity to the faculty and the engaging students to get a first-hand experience in knowing problems of targeted organizations or sectors on a face to face basis, thereby, helping in knowledge creation and its transfer, adding to the overall process of learning in a practical manner, with application of knowledge, as the focus of learning pedagogy, which is vital in management education.

Dr. Mousumi Sengupta

Chairperson, SDM RCMS

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M. Sriram

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Executive Summary

The aim of the study is to empirically examine the influence of corporate governance variables on firms' financial performance of NSE Nifty companies during the period 2004-2014. A total of 22 companies were selected for the present study which cuts across sectors such as Software services, Banking, Auto Industry, Pharmaceuticals et al. For measuring firms' performance, two variables, namely- Return on Assets (RoA) which is an accounting based measure and Tobin's Q which is a market based measure were considered as separate independent variables. Based on the review of earlier studies, four independent variables viz., Board Composition (BC), Board Ownership (BO), Board Size (BS) and CEO duality (CEOD) were selected for the study. Using the accounting based measure, the study finds that there is significant negative association between BS and BO with regard to the firms' performance. The other variables such as CEOD, BS did not have any influence on the financial performance. The study also finds no evidence of association between the independent variables and the market based measure, Tobin's Q. The study concludes that a small board size and a small ownership of executive and non-executive directors in the equity of firms will lead to improved financial performance.

Keywords- Return on Assets, Tobin's Q, Board Size, Board Composition, Board Ownership, CEO duality, corporate governance.

JEL Classification: G30, G34, K22.

1. Introduction

India has a large number of listed companies and it is estimated that close to 17000 companies are listed in the bourses. There is an issue of Principal-Agent relationship in companies' shareholders as owners of company are the principals and managers are the agents. The decision making authority is a company lives in the hands of managers and there is a possibility that decisions of managers may not align with shareholder is interested would like to pursue their own personal goals. Managers may avoid taking high investment and financing risks that may otherwise be needed to maximise shareholders wealth. Shareholders would like to see that their investments grow periodically and the performance of the company as a whole improves in the long run. There is a conflict between the interests of the shareholders and managers and is often referred to as agency problem. It is imperative that managers align their interests with that of the shareholders in the long run.

Corporate governance is a process or a set of systems and processes which ensures that a company is managed to suit the best interests of all those who are interested in the well-being of the company. The United Kingdom Cadbury Report (***Cadbury, 1992***) defines corporate governance as "the system by which companies are directed and controlled", including board practices and composition and their relationship to firm performance. Governance is an act of function or control and a system by which companies are directed and controlled. This concept has been attracting public attention for some time and is more of an interplay between companies and constituents. Good governance is a shared responsibility and an effort to promote increased transparency, integrity and rule of law. It helps to assure that companies not only use their capital efficiently but also ensures that the interests of the shareholders and society at large are protected. The initial research was focussed on whether the corporate governance norms would improve returns to shareholders in terms of dividend paid to them. **Todd Mitton (2004), Louis Correia de Silva et al., (2004)** found that strong corporate governance norms is associated with higher dividend pay out to shareholders. The term corporate governance as defined in Cadbury report comprises of all those activities which improves transparency in the business operations and protects the interest of stakeholders. This includes the board and its composition, formation of various committees for monitoring the activities of a company, disclosure practices etc. Researchers started using board and its constituents as proxy variable for corporate governance norms. Board and its constituents included the size of the board, proportion of independent directors, the equity holdings of executive and non-executive directors to the total shareholdings etc. Subsequently, more researchers started exploring whether the corporate governance variables influence performance and valuation of business firms. Some empirical investigations have found that good corporate governance has a positive effect on the firm's performance and market value (***Sami et al., 2008***). Board performance in terms of monitoring duties usually is influenced by the effectiveness of the board, which in turn is influenced by factors such as board composition and quality, size of boards, duality of CEO/Chairman positions, board diversity and ownership, information asymmetries and board culture (***Brennan, 2006***). The board composition refers to the ratio of non-executive directors and executive directors on the board as a means of monitoring the management including diversity of board members, and CEO duality (***Rashid, 2009***). The practices of corporate board structure vary from industry to industry within a country. The Enron debacle of 2001 involving the head-in-glove relationships between the auditor and the management, the erstwhile Satyam scam, the scam involving the fall of the Corporate giants in the U.S such as World.Com, Quest, Xerox, Transmile, Megan Media and Nasioncom in Malaysia and accounting scandal in Toshiba brought forth the importance of good corporate governance. The nexus between the management and auditors have destroyed the wealth of the shareholders and it is imperative that shareholders are provided complete transparency in terms of financial health of the companies. A considerable volume of research work on corporate governance and its impact on firm performance has been conducted in developed countries such as the United States, the United Kingdom, Australia, Germany and Japan. Very little studies have been conducted in emerging economies like India. This study will

therefore fill a gap in the literature by examining the nexus between performance and corporate governance practices of firms generally and specifically the corporate governance practices of firms in India. Furthermore, it will add to the general body of literature on the impact of corporate governance and performance of firms listed in Bombay Stock Exchange (CBSE) India.

The rest of the report is structured as follows: Section two presents literature inculcating the conceptual framework and empirical review on relationship between corporate governance and firm financial performance. Section three presents the methodology. Section four focuses on analysis and interpretation. Lastly, the study concludes and provides directions for future research.

2. Review of Literature

Board Composition and Firm Performance: Composition of board of directors as part of corporate governance measures and its linkage with a firm's performance has been the topic of research by academia and a number of other practitioners. Board composition refers to the proportion of independent and non-executive directors to the total board size of a firm. A positive relationship is expected between firm performance and the proportion of outside directors sitting on the board; unlike inside directors, outside directors are better able to challenge the CEO (Bhagat et al., 2001). Kumar et al., (2012), Latif et al.,(2013), Shobod Deba Nath et al., (2015), found no significant relationship between firm performance and board composition. Callen et al., (2003), Erhandt et al.,(2003), Sajid Hussain (2012), Simon Ayo Adenkule et al.,(2014), Hanni El-Chanani (2014) found positive correlation between board composition and firm performance. Berkman et al.,(2005), Rashid et al.,(2008), Moscer (2013), Hideaki Sakawa et al., (2009), Lal Chugh et al.,(2011) confirmed negative association between board composition and firm performance. Chatterjee (2011), Darmadi(2010) and Shakir (2008) found the association between board composition and firm performance to be inconclusive.

Board Size and Firm Performance : Board size refers to the number of directors on the board of various firms. Loderer et al.,(2002), Mak et al.,(2005), Hanifa et al.,(2006), Shobod Deba Nath et al.,(2015) have all found negative significant relationship between board size and firm performance. Adam et al.,(2005), Beiner et al.,(2006), Lal Chugh et al.,(2011) confirmed the positive effect of board size on firm performance. Connelly et al.,(2004) found no relationship between board size and firm performance.

Board Ownership and Firm Performance : Board ownership refers to the proportion of total equity owned by executive and non-executive directors in a firm thus indicating the level of ownership of the directors along with their monitoring power within organisation. Simon Ayo Adenkule et al., (2014), Shobo Deba Nath et al.,(2015) have found negative association between board ownership and firm's financial performance. Madan Mohan et al., (2015), Sekar Muni Amba (2013), Morck et al.,(1988) and McConnell et al.,(1990) found a significant positive association between board ownership and firm performance.

CEO Duality and Firm Performance : CEO duality refers to a situation in which the CEO of a firm plays the dual role of Chairman of the board and also of the Chief Executive Officer. There are two schools of thought as far as CEO duality is concerned. Based on the concept of 'Agency Theory', few academicians/ researchers support separation of the CEO-Chairman positions which in turn would maximise firm performances (Gillan et al., 2006). The board has a neutral authority to supervise the CEO's task. Another school of thought is that it ensures better monitoring and implementation of control throughout the firm, if the Chairman and CEO are the same (Adams et al., 2008). Hani El-Chanani (2014) found negative association between CEO duality and firms' performance. Lal Chugh et al.,(2011) found no relationship between CEO duality and firm performance. However, the study of Madan Mohan et al.,(2015) found significant positive association between CEO duality and firm performance.

Research Gap : From the review, it is quite evident that the earlier studies which were undertaken at different time periods and in different countries have yielded mixed results as far as the impact of corporate governance on firms' performance is concerned. Hence the present study aims to explore the impact of corporate governance norms on firm performance in with special reference to India.

3. Methodology-

3.1 Objectives

The following are the objectives of the study-

1. To examine the board structure of different companies selected for the study.
2. To analyse the impact of corporate governance variables on the firm performance (Using accounting based measure, Return on Assets).
3. To analyse the impact of corporate governance variables on the firm performance (Using market based measure, Tobin's Q).

3.2 Research Design

Descriptive research is used to used describe the characteristics of the relevant groups. This research design determines the degree of relationships between variables and also helps in making certain specific predictions. The present study is to analyse the impact of corporate governance norms on the performance of companies selected for the study. For the current study, variables such as board composition, board size, board ownership and CEO duality are considered as independent variables and Return on Assets is taken as a dependent variable. Similarly, another model is developed, wherein, the dependent variable is Tobin's Q and the independent variables are the same as mentioned above. The present research describes the relationship between the variables and its influence on the performance of companies selected for the study. Hence, descriptive design is considered most appropriate for the study.

3.3 Population and Sample

The population for the study is Sensex Companies. BSE Sensex is the leading index of Bombay Stock Exchange (BSE) and it is composed of 30 companies drawn from various sectors. Sample companies are those which have all the related information for the purpose of the study. To elaborate, the following criteria was followed to select a sample company for the analysis-

- The companies should have data for all the variables as well as for all the years selected for the study.
- The companies should have details regarding the equity holdings of executive and non-executive directors for the years selected for the study.

Hence, this is purposive sampling. Using purposive sampling, 22 companies were selected for the present study.

3.4 Period of study

The period of study is from 2004 to 2014. For each year and also for each company, data relating to variables such as Return on Assets (RoA), Tobin's Q, Board Composition (BC), Board Ownership (BO), Board Size (BS) and CEO duality (CEOD) are collected for the study. There are a total of 220 observations for the period of study selected.

3.5 Data Collection

Primary data was not collected for the study as it was not deemed necessary for the analysis. Secondary data was considered for the analysis. *Sajid Hussain (2012),Shobod Deba et al., Nath(2015)* have all used secondary data for conducting research in corporate governance and firm performance. Hence, the researcher has considered secondary data for the present study. The data for the study were collected from online database like Capital Market (Capital Line Corporate Data Base). Capital Market Publishers India Pvt Ltd, is a leading private sector research institution. They undertake research activities and build databases. One such database is Capital Line Corporate Data Base. It is a database of large and medium Indian firms. It contains detailed private information on all the companies traded on Indian stock exchanges.

3.6 Data Analysis

The data is analysed using SPSS software. For the purpose of the study, the variables have been classified into dependent and independent variables. Two regression models are developed for the analysis. One model is with an accounting based variable, which is Return on Assets. Return on Assets is taken as a dependent variable and regressed with the independent variables. Another model is with a market based variable, which is Tobin's Q *(Shobod Deba Nath et al., 2015)*. Tobin's Q is the dependent variable and it is regressed with the same set of independent variables. Return on Assets is collected

from the published annual reports, which shows a true and fair view of the performance of a Company (*Priyanka Aggarwal, 2013*).

Tobin's Q is defined as the ratio of market value of equity and market value of debt to the replacement cost of assets. But in Indian context calculation of Tobin's Q is difficult because corporate debts are not actively traded in the debt market. Again Indian companies report asset values at historical costs rather than at replacement costs (*Saravanan, 2009*). Hence, Tobin's Q is calculated in the following way- (market value of Equity + Book value of debt)/ Total Assets. Multicollinearity and autocorrelation tests have also been carried out for the study.

Dependent Variable : Return on Assets (RoA)- The annualised return on assets of each company for 10 years is considered as the dependent variable.

Tobin's Q- The Tobin's Q ratio of each company for 10 years is considered as the dependent variable.

Independent Variables- Board Composition (BC) - Board composition refers to the proportion of independent directors to total number of directors on the board.

Board Size (BS) - Board size refers to the total number of directors on the board.

Board Ownership (BO) - Board ownership refers to the proportion of total equity owned by executive and non-executive directors in a company.

CEO Duality (CEOD)-CEO duality refers to the leadership nature of board structure in which the CEO plays the dual role of Chairman of the board also. It is binary in nature, wherein, this variable takes the value to be one, if CEO and the Chairman are the same individual, otherwise zero, if the CEO and Chairman are two different individuals.

In order to examine the relationship between corporate governance and firm performance, the following multiple regression model is developed,

$$Y_{I,t} = \alpha + \beta_1 * BC_{i,t} + \beta_2 * BS_{i,t} + \beta_3 * BO_{i,t} + \beta_4 * CEOD_{i,t} + \epsilon$$

$Y_{I,t}$ = Return on Assets for the i^{th} firm at time t

$Y_{1,I,t}$ = Tobin's Q for the i^{th} firm at time t

$BC_{i,t}$ = Board Composition for the i^{th} firm at time t

$BS_{i,t}$ = Board Size for the i^{th} firm at time t

$BO_{i,t}$ = Board Ownership for the i^{th} firm at time t

$CEOD_{i,t}$ = CEO duality for the i^{th} firm at time t

α is the intercept, β is the regression coefficient and ϵ is the error term.

3.7 Hypotheses

The following are the hypotheses developed for the study-

H_1= There is significant association between board composition and firm performance

H_2= There is significant association between board size and firm performance

H_3= There is significant association between board ownership and firm performance

H_4= There is significant association between CEO duality and firm performance.

4. Analysis and Interpretation

Table I

Industry wise classification of Companies

Industry	No. of Companies	% of Companies
Software Services	4	17
Banking	5	22
FMCG	1	5
Telecommunication	1	5
Pharmaceutical	3	14
Textiles	1	5
Auto Industry	4	17
Heavy Engineering	1	5
Paint	1	5
Steel	1	5
Total	22	100

(Source- Author's Classification)

Table I shows the classification of firms according to the Industry. It can be seen from the table that a majority of the firms in the sample belong to software services, banking, pharmaceutical and auto industry.

Table 2
Descriptive Statistics

Particulars	RoA	BC	BO	BS	CEOD	Tobin's Q
Mean	0.163645	0.467386	0.030302	13.19091	0.886364	2.018606
Median	0.130000	0.468627	0.000591	13.00000	1.000000	1.394291
Maximum	1.260000	0.750000	0.510700	21.00000	1.000000	14.11724
Minimum	-0.420000	0.000000	0.000000	3.000000	0.000000	0.008555
Std.Dev	0.194843	0.138420	0.091570	3.120108	0.318093	2.419096
Skewness	2.034222	-0.736923	3.842912	0.168366	-2.434791	2.437962
Kurtosis	10.60245	4.338954	17.31833	3.165057	6.928205	10.29135
Observations	220	220	220	220	220	220

Table II shows the descriptive statistics of all the variables considered for the study. The average RoA is 16.36 % and the RoA ranges between (42%) to 126% during the period of study. Skewness is positive for RoA indicating a relatively long right tail when compared to the left one. The average BC is 46.73% which indicates that around 47% of the board comprises of independent/outside directors. The BC ranges between 0% and 75% respectively during the period of study. Skewness is negative for BC indicating a relatively long left tail in the distribution when compared to the right one. The average BO is 3.03% during the period of study. This shows that both the executive and non-executive directors hold an average of 3% in the equity of the firms selected for the study. Their minimum and maximum holdings are 0% and 51% respectively. Skewness is positive for BO indicating a relatively long right tail in the distribution when compared to the left one. The average BS is 13.19 which shows that on an average there are 13 director on the board of various firms. The minimum board size is 3 and the maximum board size is 21. Skewness is positive for BS and it indicates a long right tail in the distribution. The average CEOD is 88.63%. The categorisation of sample reveals that 88.63% of firms have CEO duality, i.e, the same person holding the position of Chairman and Chief Executive. Only 12% of the firms had separate persons for the post of Chairman and Chief Executive. Skewness is negative for CEOD indicating a long left tail in the distribution. The average Tobin's Q is 2.01. The minimum and maximum value of Tobin's Q is 1.39 and 14.11.

Table 3
Multicollinearity among Independent Variables

Variables	BC	BO	BS	CEOD
BC	1.000000			
BO	-0.069730	1.000000		
BS	-0.077748	-0.163566*	1.000000	
CEOD	0.087711	-0.049009	0.104773	1.000000

*Significant @ 5%

Table III shows the multicollinearity between the independent variables considered for the study. For developing a regression model, it is vital and essential that there is no high correlation (positive/negative). Two variables are highly correlated if the value of 'r' is close to 0.80(Simon Ayo Adenkule et al., 2014) and (Shenoy et al., 1995). From the table, it can be inferred that there is negative correlation between BS and BO and is statistically significant @ 5%. The correlation between other variables in terms of 'r' values are either positive or negative and are also statistically insignificant. Since the 'r' value is well below the cut-off value of 0.80, all the variables are considered for the study.

Table 4
Multiple Regression Results
Dependent Variable: ROA
Sample:1 220

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.360708	0.078249	4.609773	0.0000*
BC	-0.003080	0.091908	-0.033507	0.9733
BO	-0.463940	0.139817	-3.318194	0.0011*
BS	-0.016801	0.004128	-4.069793	0.0001*
CEOD	0.045187	0.039974	1.130411	0.2596

R-squared	0.103410	Mean dependent var	0.163645
Adjusted R-squared	0.086729	S.D. dependent var	0.194843
S.E. of regression	0.186202	Akaike info criterion	-0.501502
Sum squared resid	7.454320	Schwarz criterion	-0.424374
Log likelihood	60.16525	Hannan-Quinn criter.	-0.470356
F-statistic	6.199377	Durbin-Watson stat	2.107794
Prob(F-statistic)	0.00097		

*Significant @1%

Table IV shows the regression results of the study. When the independent variables: Board Composition(BC), Board Ownership(BO), Board Size (BS), CEO duality(CEOD) were regressed on Return on Assets(RoA), an R-squared value of 10.34% was generated. R-squared measures the degree of relationship between dependent and independent variables. It shows that a 10.34% variation in the dependent variable is jointly explained by all the independent variables. The results also reveal that only two variables, Board Ownership (BO) and Board Size (BS) are significant and negatively influencing RoA. The coefficient value of BO is (0.463) and is statistically significant @1%.Similarly, the coefficient value of BS is (0.0168) and is statistically significant @1% ($p<0.01$). The results also show that a small board size and a smaller holding in the equity capital of firms by executive/non-executive directors will lead to improved performance of firms in terms of Return on Assets (RoA). The other variables such as CEOD and BC do not significantly influence Return on Assets. The Analysis of Variance (ANOVA) generates a significant p-value ($p<0.01$), indicating that the model is significant at a level of 0.01. Thus H_2 and H_3 are accepted. H_1 and H_4 are rejected. Since the Durbin Watson value is more than 2 in the model, it might suffer from autocorrelation. To check the presence of autocorrelation, Breush-Godfrey Serial Correlation LM test using E-Views was carried out. The following table (Table V) shows the results. Since the F-statistics ($p>0.05$) is statistically insignificant, it is inferred that there is no serial correlation in the series.

Table 5

Breusch Godfrey Serial Correlation LM Test

F-statistic	0.421267	Prob. F(2,213)	0.6568
Obs*R-squared	0.866794	Prob. Chi-Square(2)	0.6483

Table 6

Multiple Regression Results-I

Dependent Variable: TOBIN_Q

Sample: 1 220

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.172147	1.016350	0.169377	0.8657
BC	0.540220	1.193766	0.452534	0.6513
BO	0.945601	1.816044	0.520693	0.6031
BS	0.097692	0.053620	1.821951	0.0699
CEOD	0.312136	0.519210	0.601175	0.5484

R-squared	0.018725	Mean dependent var	2.018606
Adjusted R-squared	0.000468	S.D. dependent var	2.419096
S.E. of regression	2.418529	Akaike info criterion	4.626661
Sum squared resid	1257.596	Schwarz criterion	4.703789
Log likelihood	-503.9328	Hannan-Quinn criter.	4.657808
F-statistic	1.025652	Durbin-Watson stat	1.855355
Prob(F-statistic)	0.394918		

Table VI shows the results of the multiple regression model using market based measure, Tobin's Q as the dependent variable. R-squared measures the degree of relationship between dependent and independent variables. It shows that a 1.87% variation in the dependent variable is jointly explained by all the independent variables. The coefficient values of all the independent variables though positive are not statistically significant ($p>0.05$). Also, the F-Statistic which is used to measure the strength of the regression model is insignificant ($p>0.05$). Hence, it can be found that there is no evidence of significant association between corporate governance variables and Tobin's Q, a proxy to measure firms' performance.

5. Findings and Discussion

The study finds that there is a negative and significant relationship between Board Size and Firm performance (using RoA as the dependent variable).

The implication of the study is that as firms maintain a smaller board size, the financial performance is expected to improve. A number of similar studies in Nigeria, Bangladesh and Baharin yielded contradicting results (Simon Ayo Adenkule et al., 2014), (Sekar Muni Amba, 2013), Sajid Hussain(2012). The studies showed that there is a positive and significant relationship between board size and firm performance. The findings of the present study corroborate the result of Yermack (1996) who examined the relationship between board size and firm performance and concluded that the smaller the board size, better is the performance of firms. Secondly, the study finds that there is a negative and significant relationship between board ownership and firm performance. The findings imply that lower the equity ownership of executive and non-executive directors in the total equity of firms, better is the financial performance of firms. The findings of the present study contradict the findings of similar studies done earlier (Shobod Deba Nath et al., 2015), (Pinteries, 2002). It is also found that there is positive but insignificant association between CEO duality and firms' performance. The findings are similar to the earlier studies (Shobod Deba Nath et al., 2015), (Simon Ayo Adenkule et al., 2014). Finally, there is no significant relationship between board composition and firm performance. Therefore, there is no evidence that the presence of more independent/non-executive directors will improve firms' performance.

The study also used market based measure, Tobin's Q as a dependent variable to check whether corporate governance variables influence Tobin's Q ratio, a proxy to measure financial performance of firms. The results indicate a positive but insignificant association between the dependent variable and the independent variables leading to the conclusion that corporate governance factors do not have any significant association with Tobin's Q. The findings contradict the findings of Shobod Deba Nath et al., (2015), where in board size had a significant negative association with Tobin's Q ratio.

6. Conclusion and Directions for Future Research

The present study has examined the relationship between corporate governance and firm performance of listed companies in BSE (Bombay Stock Exchange). Two independent variables, Board Size and Board Ownership had a significant negative association with Return on Assets. It was also found that none of the independent variables had significant association with market based measure, Tobin's Q. The study concludes that a small board size and a lower equity holding of executive/non-executive directors in the firms will improve the financial performance in the long run. The presence of independent directors in the board and individual holding dual positions of CEO and Chairman do not have any significant impact on the firm performance. The study finds no evidence of significant association between corporate governance variables and Tobin's Q ratio.

The following are the directions for future research-

a. Variables such as Sales, Leverage and Age of the firm were not considered for the study. Future studies can use these variables as control variables and study the impact of firms' performance along with corporate governance variables.

b. Future studies can focus on the impact on corporate governance norms on the performance of firms according to Industry/Sector wise. The results may vary.

c. Future studies can also construct a Corporate Governance Index which takes into account all the factors relating to corporate governance disclosures. This index could be compared with firms' performance.

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Appendix

List of Companies Selected for Study

TCS
HDFC BANK
INFOSYS
HUL
ICICI
BHARTI AIRTEL
DR. REDDY
GRASIM
HERO MOTOR CORP
WIPRO LTD
MARUTI SUZUKHI LTD
AXIS BANK
HCL TECHNOLOGIES
KOTAK MAHINDRA BANK
TATA MOTORS LTD
NTPC LTD.
ASIAN PAINTS LTD.
MAHINDRA & MAHINDRA LTD.
LUPIN LTD.
HINDALCO INDUSTRIES LTD.
SUN PHARMACEUTICAL LTD.
YES BANK

Annexure-

Data for Analysis and Interpretation

Company	Year	% of independent Board Members	Board Size	Board Composition		Board Ownership		CEO	ROA
				Individual Board members	Independent Board members	% of equity-Executive Member	% of equity-non – executive member		
2004									
	TCS	0.33	3	2	1		0.00003	1	0.53
	HDFC BANK	0.64	11	4	7	0.206%	0.00354	1	0.01
	INFOSYS	0.53	15	7	8	0.000%	0	1	0.36
	HUL	0.42	12	7	5	0.450%	0.0045	1	0.34
	ICICI	0.62	21	8	13	0.000%	0	1	0.01
	BHARTI AIRTEL	0.53	15	7	8	0.000%	0	1	0.13
	DR. REDDY	0.64	11	4	7	0.442%	0.00442	1	0.03
	GRASIM	0.50	12	6	6	0.000%	0	0	0.14
	HERO MOTOR CORP	0.29	17	12	5	0.000%	0	1	-0.42
	WIPRO LTD	0.75	8	2	6	0.00%	2.13638E-06	1	0.3
	MARUTI SUZUKHI LTD.	0.31	13	9	4	0	0	1	0.18
	AXIS BANK	0.31	13	9	4	0	0	1	0.01
	HCL TECHNOLOGIES	0.67	9	3	6	0	0	0	0.14
	KOTAK MAHINDRA BANK	0.40	10	6	4	0.5107	0.5107	1	0.01
	TATA MOTORS LTD	0.43	14	8	6	0.0004	0.0004	0	0.19
	NTPC LTD.	0.00	9	9	0	0.00%	0.00000004	0	0.1
	ASIAN PAINTS LTD.	0.46	13	7	6	0.02%	0.000138	1	0.26
	MAHINDRA & MAHINDRA LTD.	0.62	13	5	8	0.00%	0.000007	1	0.17
	LUPIN LTD.	0.64	11	4	7	0%	0	1	0.09
	HINDALCO INDUSTRIES LTD.	0.30	10	7	3	0.00%	0	1	0.12
	SUN PHARMACEUTICAL LTD.	0.00	8	8	0	0.00%	0	1	0.1
	YES BANK	0.27	15	11	4	0.00%	0	1	0

Company	Year	% of independent Board Members	Board Size	Board Composition		Board Ownership		CEO	ROA
				Individual Board members	Independent Board members	% of equity-Executive Member	% of equity-non – executive member		
2005									
	TCS	0.50	4	2	2	0.010%	0.00088	1	0.48
	HDFC BANK	0.58	12	5	7	0.254%	0.00386	1	0.01
	INFOSYS	0.53	15	7	8	0.000%	0.00012808	1	0.35
	HUL	0.45	11	6	5	0.000%	0	1	0.6
	ICICI	0.61	18	7	11	0.000%	0	1	0.01
	BHARTI AIRTEL	0.47	15	8	7	0.000%	0	1	0.17
	DR. REDDY	0.60	10	4	6	2.202%	0.02202	1	0.07
	GRASIM	0.58	12	5	7	0.000%	0	0	0.12
	HERO MOTOR CORP	0.41	17	10	7	0.000%	0	1	-0.21
	WIPRO LTD	0.56	9	4	5	0%	1.61888E-05	1	0.31
	MARUTI SUZUKHI LTD.	0.31	13	9	4	0	0	1	0.22
	AXIS BANK	0.38	13	8	5	0	0	0	0.01
	HCL TECHNOLOGIES	0.50	8	4	4	0	0	1	0.11
	KOTAK MAHINDRA BANK	0.50	10	5	5	0.4954	0	0	0.01
	TATA MOTORS LTD	0.47	15	8	7	0.0004	0	0	0.18
	NTPC LTD.	0.08	13	12	1	0.000005	0.000009	0	0.09
	ASIAN PAINTS LTD.	0.46	13	7	6	0.018	0.038	0	0.26
	MAHINDRA & MAHINDRA LTD.	0.67	12	4	8	0	0	0	0.23
	LUPIN LTD.	0.50	12	6	6	0	0	0	0.12
	HINDALCO INDUSTRIES LTD.	0.27	15	11	4	0.00%	0	0	0.11
	SUN PHARMACEUTICAL LTD.	0.40	10	6	4	12.62%	0.1262	0	0.14
	YES BANK	0.33	12	8	4	0.00%	0.1301	1	0.01
2006									
	TCS	0.67	6	2	4	0.010%	0.00088	1	0.46
	HDFC BANK	0.27	11	8	3	0.060%	0.00102	1	0.01
	INFOSYS	0.56	16	7	9	NA	0.00015132	1	0.34
	HUL	0.50	12	6	6	NA	0	1	0.66
	ICICI	0.60	20	8	12	NA	0.003679836	1	0.01
	BHARTI AIRTEL	0.48	21	11	10	NA	0	1	0.24
	DR. REDDY	0.45	11	6	5	2.730%	0.0273	1	0.25
	GRASIM	0.55	11	5	6	NA	0.001061003	1	0.17
	HERO MOTOR CORP	0.47	17	9	8	NA	0.000125196	1	0
	WIPRO LTD	0.63	8	3	5	0%	1.59744E-05	1	0.3
	MARUTI SUZUKHI LTD.	0.31	13	9	4	0	0	1	0.21

Company	Year	% of independent Board Members	Board Size	Board Composition		Board Ownership		CEO	ROA
				Individual Board members	Independent Board members	% of equity-Executive Member	% of equity-non – executive member		
2006									
	AXIS BANK	0.58	12	5	7	0	0.0016	1	0.01
	HCL TECHNOLOGIES	0.63	8	3	5	0	0.0016	1	0.25
	KOTAK MAHINDRA BANK	0.50	10	5	5	0.4698	0.4717	1	0.01
	TATA MOTORS LTD	0.33	12	8	4	0.0003	0.0003	1	0.18
	NTPC LTD.	0.08	13	12	1	0.000005	0.000009	1	0.09
	ASIAN PAINTS LTD.	0.46	13	7	6	0.0249	0.0487	1	0.31
	MAHINDRA & MAHINDRA LTD.	0.54	13	6	7	0	0.0008	1	0.21
	LUPIN LTD.	0.50	14	7	7	0.000149	0.0002	1	0.17
	HINDALCO INDUSTRIES LTD.	0.40	15	9	6	0.00%	0.0006	1	0.13
	SUN PHARMACEUTICAL LTD.	0.40	10	6	4	13.12%	0.1312	1	0.18
	YES BANK	0.58	12	5	7	0.00%	0.1254	1	0.01
2007									
	TCS	0.75	8	2	6	0.010%	0.00088	1	0.41
	HDFC BANK	0.50	12	6	6	0.106%	0.224	1	0.01
	INFOSYS	0.50	16	8	8	0.000%	0.000313163	1	0.33
	HUL	0.45	11	6	5	0.003%	0.00006	1	1.26
	ICICI	0.67	18	6	12	0.000%	0.003641196	1	0.01
	BHARTI AIRTEL	0.47	19	10	9	0.000%	0	1	0.23
	DR. REDDY	0.60	10	4	6	2.408%	0.02416	1	0.09
	GRASIM	0.50	10	5	5	0.000%	0.001060521	0	0.2
	HERO MOTOR CORP	0.41	17	10	7	0.000%	0	1	0
	WIPRO LTD	0.55	11	5	6	0%	0.000157477	1	0.2
	MARUTI SUZUKHI LTD.	0.31	13	9	4	0.00%	0	1	0.19
	AXIS BANK	0.55	11	5	6	0.00%	0.0016	1	0.01
	HCL TECHNOLOGIES	0.67	9	3	6	0.00%	0.0016	1	0.32
	KOTAK MAHINDRA BANK	0.45	11	6	5	44.49%	0.4467	0	0.01
	TATA MOTORS LTD	0.36	11	7	4	0.03%	0.0003	0	0.14
	NTPC LTD.	0.29	14	10	4	0.00%	0.000004	0	0.09
	ASIAN PAINTS LTD.	0.46	13	7	6	0.59%	0.0297	0	0.37
	MAHINDRA & MAHINDRA LTD.	0.62	13	5	8	0.00%	0.0008	1	0.16
	LUPIN LTD.	0.36	11	7	4	1.32%	0.0132	1	0.19
	HINDALCO INDUSTRIES LTD.	0.47	15	8	7	0.00%	0.0007	1	0.11

Company	Year	% of independent Board Members	Board Size	Board Composition		Board Ownership		CEO	ROA
				Individual Board members	Independent Board members	% of equity-Executive Member	% of equity-non – executive member		
2007									
	SUN PHARMACEUTICAL LTD.	0.42	12	7	5	12.31%	0.1231	1	0.24
	YES BANK	0.54	13	6	7	6.79%	0.1865	1	0.01
2008									
	TCS	0.50	12	6	6	0.013%	0.00106	1	0.35
	HDFC BANK	0.42	12	7	5	0.159%	0.00266	1	0.01
	INFOSYS	0.53	15	7	8	0.688%	0.00715	1	0.33
	HUL	0.33	12	8	4	0.000%	0	1	1.01
	ICICI	0.65	20	7	13	0.000%	0.000342734	1	0.01
	BHARTI AIRTEL	0.53	19	9	10	0.000%	0.000001	1	0.22
	DR. REDDY	0.40	10	6	4	2.402%	0.02412	1	0.1
	GRASIM	0.45	11	6	5	0.000%	0.001059425	1	0.13
	HERO MOTOR CORP	0.38	16	10	6	0.000%	0	1	-0.03
	WIPRO LTD	0.55	11	5	6	0.00%	0.000148435	1	0.17
	MARUTI SUZUKHI LTD.	0.33	12	8	4	0.00%	0	1	0.12
	AXIS BANK	0.60	10	4	6	0.00%	0.0016	1	0.01
	HCL TECHNOLOGIES	0.67	9	3	6	0.00%	0.0031	1	0.24
	KOTAK MAHINDRA BANK	0.45	11	6	5	44.33%	0.4451	1	0.01
	TATA MOTORS LTD	0.46	13	7	6	0.05%	0.0005	1	0.04
	NTPC LTD.	0.21	19	15	4	0.00%	0.000004	1	0.09
	ASIAN PAINTS LTD.	0.35	17	11	6	0.00%	0.0276	1	0.31
	MAHINDRA & MAHINDRA LTD.	0.44	18	10	8	0.00%	0.0007	1	0.09
	LUPIN LTD.	0.20	15	12	3	1.41%	0.0142	1	0.18
	HINDALCO INDUSTRIES LTD.	0.41	17	10	7	0.00%	0.0009	1	0.07
	SUN PHARMACEUTICAL LTD.	0.31	16	11	5	12.04%	0.1204	1	0.24
	YES BANK	0.50	12	6	6	6.73%	0.0673	1	0.01
2009									
	TCS	0.60	10	4	6	0.013%	0.00106	1	0.37
	HDFC BANK	0.58	12	5	7	0.134%	0.00162	1	0.01
	INFOSYS	0.53	15	7	8	0.688%	0.00071	1	0.26
	HUL	0.40	10	6	4	0.003%	0.00006	1	0.85
	ICICI	0.67	18	6	12	0.000%	0.002838405	1	0.01
	BHARTI AIRTEL	0.53	19	9	10	0.000%	0.000581	1	0.23
	DR. REDDY	0.55	11	5	6	2.376%	0.000253	1	0.13

Company	Year	% of independent Board Members	Board Size	Board Composition		Board Ownership		CEO	ROA
				Individual Board members	Independent Board members	% of equity-Executive Member	% of equity-non – executive member		
2009									
	GRASIM	0.46	13	7	6	0.000%	0.00053294	1	0.26
	HERO MOTOR CORP	0.44	18	10	8	0.000%	0.00028795	1	-0.01
	WIPRO LTD	0.50	12	6	6	0.00%	0	1	0.21
	MARUTI SUZUKHI LTD.	0.33	12	8	4	0.00%	0	1	0.2
	AXIS BANK	0.50	12	6	6	0.00%	0.0016	1	0.01
	HCL TECHNOLOGIES	0.67	9	3	6	0.00%	0	1	0.25
	KOTAK MAHINDRA BANK	0.40	10	6	4	44.04%	0.4404	1	0.02
	TATA MOTORS LTD	0.50	14	7	7	0.05%	0.0005	1	0.07
	NTPC LTD.	0.00	17	17	0	0.00%	0.000004	1	0.09
	ASIAN PAINTS LTD.	0.40	15	9	6	0.00%	0.0276	1	0.48
	MAHINDRA & MAHINDRA LTD.	0.57	14	6	8	0.00%	0.0007	1	0.19
	LUPIN LTD.	0.23	13	10	3	1.04%	0.0105	0	0.19
	HINDALCO INDUSTRIES LTD.	0.47	15	8	7	0.00%	0.0008	0	0.06
	SUN PHARMACEUTICAL LTD.	0.33	15	10	5	12.78%	0.1278	1	0.16
	YES BANK	0.60	10	4	6	9.99%	0.0999	1	0.012
2010									
	TCS	0.50	14	7	7	0.013%	0.00106	1	0.38
	HDFC BANK	0.45	11	6	5	0.180%	0.00221	1	0.02
	INFOSYS	0.56	16	7	9	0.686%	0.00703	1	0.26
	HUL	0.44	9	5	4	0.003%	0.00007	1	0.65
	ICICI	0.67	21	7	14	0.000%	0.02873369	1	0.01
	BHARTI AIRTEL	0.44	18	10	8	0.069%	0.00007	1	0.13
	DR. REDDY	0.64	11	4	7	2.268%	0.02305	1	0.12
	GRASIM	0.38	13	8	5	0.001%	0.00109	1	0.13
	HERO MOTOR CORP	0.54	13	6	7	0.000%	0.00028795	1	0.01
	WIPRO LTD	0.58	12	5	7	0.00%	0	1	0.18
	MARUTI SUZUKHI LTD.	0.36	14	9	5	0.00%	0	1	0.16
	AXIS BANK	0.53	15	7	8	0.00%	0	1	0.01
	HCL TECHNOLOGIES	0.33	9	6	3	0.00%	0	1	0.17
	KOTAK MAHINDRA BANK	0.27	11	8	3	41.59%	0.4159	1	0.02
	TATA MOTORS LTD	0.54	13	6	7	0.04%	0.0004	1	0.05
	NTPC LTD.	0.29	14	10	4	0.00%	0.000004	1	0.08
	ASIAN PAINTS LTD.	0.47	15	8	7	0.00%	0.0387	1	0.37

Company	Year	% of independent Board Members	Board Size	Board Composition		Board Ownership		CEO	ROA
				Individual Board members	Independent Board members	% of equity-Executive Member	% of equity-non – executive member		
2010									
	MAHINDRA & MAHINDRA LTD.	0.58	12	5	7	0.00%	0.0007	1	0.2
	LUPIN LTD.	0.00	12	12	0	1.13%	0.0114	1	0.19
	HINDALCO INDUSTRIES LTD.	0.50	16	8	8	0.00%	0.0008	1	0.05
	SUN PHARMACEUTICAL LTD.	0.38	16	10	6	11.43%	0.1143	1	0.21
	YES BANK	0.67	9	3	6	0.00%	0	1	0.01
2011									
	TCS	0.50	12	6	6	0.013%	0.00105	1	0.43
	HDFC BANK	0.43	14	8	6	0.037%	0.00041	1	0.02
	INFOSYS	0.63	16	6	10	0.510%	0.00524	1	0.28
	HUL	0.50	10	5	5	0.003%	0.00006	1	0.6
	ICICI	0.63	19	7	12	0.000%	0.000430207	1	0.01
	BHARTI AIRTEL	0.50	18	9	9	0.074%	0.00075	1	0.09
	DR. REDDY	0.58	12	5	7	1.874%	0.01916	1	0.11
	GRASIM	0.38	13	8	5	0.001%	0.00109	1	0.12
	HERO MOTOR CORP	0.54	13	6	7	0.000%	0.000807512	1	0.02
	WIPRO LTD	0.62	13	5	8	0.00%	1.62718E-05	0	0.16
	MARUTI SUZUKHI LTD.	0.29	14	10	4	0.00%	0	1	0.1
	AXIS BANK	0.43	14	8	6	0.00%	0	1	0.02
	HCL TECHNOLOGIES	0.40	10	6	4	0.00%	0	1	0.17
	KOTAK MAHINDRA BANK	0.60	10	4	6	41.41%	0.4141	1	0.02
	TATA MOTORS LTD	0.54	13	6	7	0.04%	0.0004	1	0.03
	NTPC LTD.	0.16	19	16	3	0.00%	0.000004	1	0.07
	ASIAN PAINTS LTD.	0.39	18	11	7	0.00%	0.0401	1	0.35
	MAHINDRA & MAHINDRA LTD.	0.41	17	10	7	0.11%	0.0018	1	0.18
	LUPIN LTD.	0.36	14	9	5	1.22%	0.0122	1	0.16
	HINDALCO INDUSTRIES LTD.	0.47	17	9	8	0.00%	0.0008	1	0.05
	SUN PHARMACEUTICAL LTD.	0.38	16	10	6	12.67%	0.1267	1	0.21
	YES BANK	0.44	9	5	4	0.00%	0	1	0.01

Company	Year	% of independent Board Members	Board Size	Board Composition		Board Ownership		CEO	ROA
				Individual Board members	Independent Board members	% of equity-Executive Member	% of equity-non – executive member		
2012									
	TCS	0.50	12	6	6	0.013%	0.00105	1	0.38
	HDFC BANK	0.45	11	6	5	0.221%	0.00257	1	0.02
	INFOSYS	0.53	19	9	10	0.503%	0.00517	1	0.25
	HUL	0.50	10	5	5	0.000%	0	1	0.98
	ICICI	0.71	14	4	10	0.000%	0.000429856	1	0.02
	BHARTI AIRTEL	0.50	16	8	8	0.073%	0.00074	1	0.07
	DR. REDDY	0.64	11	4	7	1.517%	0.01564	1	0.13
	GRASIM	0.38	13	8	5	0.001%	0.00109	1	0.11
	HERO MOTOR CORP	0.50	12	6	6	0.000%	0.000522817	1	0.01
	WIPRO LTD	0.67	12	4	8	0.01%	0.0001	1	0.18
	MARUTI SUZUKHI LTD.	0.38	13	8	5	0.00%	0	1	0.12
	AXIS BANK	0.50	14	7	7	0.00%	0	1	0.02
	HCL TECHNOLOGIES	0.58	12	5	7	0.00%	0	1	0.24
	KOTAK MAHINDRA BANK	0.40	10	6	4	41.15%	0.4115	0	0.02
	TATA MOTORS LTD	0.43	14	8	6	0.00%	0	1	0.01
	NTPC LTD.	0.39	18	11	7	0.00%	0.000004	1	0.09
	ASIAN PAINTS LTD.	0.35	17	11	6	0.00%	0.0465	1	0.33
	MAHINDRA & MAHINDRA LTD.	0.44	16	9	7	0.11%	0.0019	1	0.18
	LUPIN LTD.	0.31	13	9	4	1.04%	0.0105	1	0.23
	HINDALCO INDUSTRIES LTD.	0.47	15	8	7	0.00%	0.0008	0	0.03
	SUN PHARMACEUTICAL LTD.	0.35	17	11	6	11.76%	0.1176	1	0.06
	YES BANK	0.33	9	6	3	0.00%	0.00%	1	0.01
2013									
	TCS	0.50	14	7	7	0.005%	0.00232	1	0.41
	HDFC BANK	0.46	13	7	6	0.208%	0.00247	1	0.02
	INFOSYS	0.60	15	6	9	0.000%	0.00012729	1	0.24
	HUL	0.50	10	5	5	0.015%	0.00016	1	0.86
	ICICI	0.67	12	4	8	0.000%	0.000431834	1	0.02
	BHARTI AIRTEL	0.74	19	5	14	0.007%	0.00008	1	0.08
	DR. REDDY	0.73	11	3	8	1.514%	0.0157	1	0.16
	GRASIM	0.46	13	7	6	0.000%	0.00107911	1	0.07
	HERO MOTOR CORP	0.50	12	6	6	0.000%	0.000522817	1	-0.1
	WIPRO LTD	0.69	13	4	9	0.31%	0.004	0	0.22

Company	Year	% of independent Board Members	Board Size	Board Composition		Board Ownership		CEO	ROA
				Individual Board members	Independent Board members	% of equity-Executive Member	% of equity-non – executive member		
2013									
	MARUTI SUZUKHI LTD.	0.27	15	11	4	0.00%	0	1	0.12
	AXIS BANK	0.47	15	8	7	0.00%	0	1	0.02
	HCL TECHNOLOGIES	0.69	13	4	9	0.00%	0	1	0.32
	KOTAK MAHINDRA BANK	0.45	11	6	5	39.82%	0.3982	1	0.02
	TATA MOTORS LTD	0.50	12	6	6	0.00%	0	1	0.01
	NTPC LTD.	0.44	18	10	8	0.00%	0.000004	1	0.07
	ASIAN PAINTS LTD.	0.39	18	11	7	0.00%	0.0585	1	0.31
	MAHINDRA & MAHINDRA LTD.	0.50	18	9	9	0.12%	0.002	1	0.17
	LUPIN LTD.	0.33	15	10	5	1.05%	0.0106	1	0.32
	HINDALCO INDUSTRIES LTD.	0.33	15	10	5	0.00%	0.0007	1	0.02
	SUN PHARMACEUTICAL LTD.	0.40	15	9	6	12.65%	0.1265	1	-0.23
	YES BANK	0.46	13	7	6	0.00%	0	1	0.02

Final Data Set for Analysing and Development of Model

ROA	BC	BS	BO	CEOD	Tobin Q
0.53	0.33	3	0.00003	1	0.658332
0.01	0.64	11	0.00354	1	0.039369
0.36	0.53	15	0	1	2.014487
0.34	0.42	12	0.0045	1	1.320147
0.01	0.62	21	0	1	1.830131
0.13	0.53	15	0	1	0.077059
0.03	0.64	11	0.00442	1	0.16146
0.14	0.50	12	0	0	0.040755
-0.42	0.29	17	0	1	1.490386
0.3	0.75	8	0.00021	1	0.080778
0.18	0.31	13	0	1	0.368394
0.01	0.31	13	0	1	0.532491
0.14	0.67	9	0	0	2.626505
0.01	0.40	10	0.5107	1	1.194475
0.19	0.43	14	0.0004	0	0.319856
0.1	0.00	9	0.00004	0	0.451567
0.26	0.46	13	0.000138	1	5.016693
0.17	0.62	13	0.000007	1	2.873032
0.09	0.64	11	0	1	0.008555
0.12	0.30	10	0	1	1.026729
ROA	BC	BS	BO	CEOD	Tobin Q
0.1	0.00	8	0	1	0.957005
0	0.27	15	0	1	0.045751
0.48	0.50	4	0.00088	1	3.226295
0.01	0.58	12	0.00386	1	1.802064
0.35	0.53	15	0.000128	1	2.787947
0.6	0.45	11	0	1	0.078392
0.01	0.61	18	0	1	1.329915
0.17	0.47	15	0	1	0.047471

0.07	0.60	10	0.02202	1	1.524916
0.12	0.58	12	0	0	0.24116
-0.21	0.41	17	0	1	0.36575
0.31	0.56	9	0.000016	1	2.024511
0.22	0.31	13	0	1	4.606832
0.01	0.38	13	0	0	1.696601
0.11	0.50	8	0	1	0.525699
0.01	0.50	10	0	0	0.824406
0.18	0.47	15	0	0	4.16839
0.09	0.08	13	0.000009	0	7.391318
0.26	0.46	13	0.038	0	0.692028
0.23	0.67	12	0	0	1.598846
0.12	0.50	12	0	0	0.932641
0.11	0.27	15	0	0	0.042766
0.14	0.40	10	0.1262	0	4.32963
0.01	0.33	12	0.1301	1	2.652639
0.46	0.67	6	0.00088	1	2.161985
0.01	0.27	11	0.00102	1	0.080803
0.34	0.56	16	0.000151	1	0.699434
0.66	0.50	12	0	1	0.050953
0.01	0.60	20	0.00368	1	2.592328
0.24	0.48	21	0	1	0.223365
0.25	0.45	11	0.0273	1	0.618265
0.17	0.55	11	0.001061	1	1.873232
0	0.47	17	0.000125	1	3.195735
0.3	0.63	8	0.00015	1	1.690377
0.21	0.31	13	0	1	0.61548
0.01	0.58	12	0.0016	1	0.510346
0.25	0.63	8	0.0016	1	7.438671
0.01	0.50	10	0.4717	1	5.120293
0.18	0.33	12	0.0003	1	0.401803
0.09	0.08	13	0.000009	1	3.308496
0.31	0.46	13	0.0487	1	1.219544
0.21	0.54	13	0.0008	1	0.057182
0.17	0.50	14	0.0002	1	2.927801
0.13	0.40	15	0.0006	1	1.938577
ROA	BC	BS	BO	CEOD	Tobin Q
0.18	0.40	10	0.1312	1	2.15921
0.01	0.58	12	0.1254	1	0.082843
0.41	0.75	8	0.00088	1	0.717955
0.01	0.50	12	0.224	1	0.049188
0.33	0.50	16	0.000313	1	1.533505
1.26	0.45	11	0.00006	1	0.219618
0.01	0.67	18	0.003641	1	0.425504
0.23	0.47	19	0	1	1.258288
0.09	0.60	10	0.02416	1	2.603989
0.2	0.50	10	0.001061	0	2.03559
0	0.41	17	0	1	0.638861
0.2	0.55	11	0.000157	1	0.34053
0.19	0.31	13	0	1	3.609616
0.01	0.55	11	0.0016	1	2.421575
0.32	0.67	9	0.0016	1	0.323273
0.01	0.45	11	0.4467	0	2.59271
0.14	0.36	11	0.0003	0	0.74254
0.09	0.29	14	0.000004	0	0.022785
0.37	0.46	13	0.0297	0	1.683981
0.16	0.62	13	0.0008	1	1.448372
0.19	0.36	11	0.0132	1	1.203152
0.11	0.47	15	0.0007	1	0.051359
0.24	0.42	12	0.1231	1	0.279403
0.01	0.54	13	0.1865	1	0.021744
0.35	0.50	12	0.00106	1	1.082247
0.01	0.42	12	0.00266	1	0.097232
0.33	0.53	15	0.00715	1	0.563589

1.01	0.33	12	0	1	0.594165
0.01	0.65	20	0.000343	1	2.26177
0.22	0.53	19	0.000001	1	1.616883
0.1	0.40	10	0.02412	1	0.49327
0.13	0.45	11	0.001059	1	0.072549
-0.03	0.38	16	0	1	1.96917
0.17	0.55	11	0.000148	1	1.235441
0.12	0.33	12	0	1	0.071486
0.01	0.60	10	0.0016	1	1.568071
0.24	0.67	9	0.0031	1	1.304954
0.01	0.45	11	0.4451	1	0.056556
0.04	0.46	13	0.0005	1	2.837536
0.09	0.21	19	0.000004	1	3.3821
0.31	0.35	17	0.0276	1	3.247689
0.09	0.44	18	0.0007	1	0.089981
0.18	0.20	15	0.0142	1	1.018826
0.07	0.41	17	0.0009	1	0.06239
0.24	0.31	16	0.1204	1	1.719888
ROA	BC	BS	BO	CEOD	Tobin Q
0.01	0.50	12	0.0673	1	0.192326
0.37	0.60	10	0.00106	1	0.923498
0.01	0.58	12	0.00162	1	2.958293
0.26	0.53	15	0.00071	1	3.265004
0.85	0.40	10	0.00006	1	1.675625
0.01	0.67	18	0.002838	1	0.692935
0.23	0.53	19	0.000581	1	0.248234
0.13	0.55	11	0.000253	1	10.09059
0.26	0.46	13	0.000533	1	2.686389
-0.01	0.44	18	0.000288	1	0.252543
0.21	0.50	12	0	1	1.966935
0.2	0.33	12	0	1	1.240289
0.01	0.50	12	0.0016	1	0.051121
0.25	0.67	9	0	1	2.317845
0.02	0.40	10	0.4404	1	3.704754
0.07	0.50	14	0.0005	1	2.607852
0.09	0.00	17	0.000004	1	0.089972
0.48	0.40	15	0.0276	1	1.020369
0.19	0.57	14	0.0007	1	0.066909
0.19	0.23	13	0.0105	0	1.911711
0.06	0.47	15	0.0008	0	0.353935
0.16	0.33	15	0.1278	1	4.429783
0.012	0.60	10	0.0999	1	3.231555
0.38	0.50	14	0.00106	1	2.566234
0.02	0.45	11	0.00221	1	1.389997
0.26	0.56	16	0.00703	1	3.402663
0.65	0.44	9	0.00007	1	0.344561
0.01	0.67	21	0.028734	1	11.67823
0.13	0.44	18	0.00007	1	4.415942
0.12	0.64	11	0.02305	1	0.192602
0.13	0.38	13	0.00109	1	2.411307
0.01	0.54	13	0.000288	1	1.234981
0.18	0.58	12	0	1	0.036182
0.16	0.36	14	0	1	1.899572
0.01	0.53	15	0	1	3.648946
0.17	0.33	9	0	1	2.543587
0.02	0.27	11	0.4159	1	0.406576
0.05	0.54	13	0.0004	1	0.521424
0.08	0.29	14	0.000004	1	0.045999
0.37	0.47	15	0.0387	1	1.398585
0.2	0.58	12	0.0007	1	0.320014
0.19	0.00	12	0.0114	1	4.839315
0.05	0.50	16	0.0008	1	2.63379
0.21	0.38	16	0.1143	1	2.366801
ROA	BC	BS	BO	CEOD	Tobin Q

0.01	0.67	9	0	1	1.054265
0.43	0.50	12	0.00105	1	3.686745
0.02	0.43	14	0.00041	1	1.939196
0.28	0.63	16	0.00524	1	9.034833
0.6	0.50	10	0.00006	1	3.609198
0.01	0.63	19	0.00043	1	0.192656
0.09	0.50	18	0.00075	1	2.034796
0.11	0.58	12	0.01916	1	1.594754
0.12	0.38	13	0.00109	1	0.039087
0.02	0.54	13	0.000808	1	1.547813
0.16	0.62	13	0.00016	0	3.071461
0.1	0.29	14	0	1	2.347586
0.02	0.43	14	0	1	0.406744
0.17	0.40	10	0	1	0.296092
0.02	0.60	10	0.4141	1	0.048936
0.03	0.54	13	0.0004	1	1.16409
0.07	0.16	19	0.000004	1	0.302131
0.35	0.39	18	0.0401	1	5.050836
0.18	0.41	17	0.0018	1	2.795185
0.16	0.36	14	0.0122	1	1.920945
0.05	0.47	17	0.0008	1	0.822409
0.21	0.38	16	0.1267	1	5.329788
0.01	0.44	9	0	1	1.907348
0.38	0.50	12	0.00105	1	9.255646
0.02	0.45	11	0.00257	1	3.52576
0.25	0.53	19	0.00517	1	0.165775
0.98	0.50	10	0	1	2.371008
0.02	0.71	14	0.00043	1	14.11724
0.07	0.50	16	0.00074	1	0.037586
0.13	0.64	11	0.01564	1	1.571152
0.11	0.38	13	0.00109	1	3.665597
0.01	0.50	12	0.000523	1	2.271785
0.18	0.67	12	0.0001	1	0.399405
0.12	0.38	13	0	1	0.453341
0.02	0.50	14	0	1	0.05251
0.24	0.58	12	0	1	1.126027
0.02	0.40	10	0.4115	0	0.357554
0.01	0.43	14	0	1	5.841815
0.09	0.39	18	0.000004	1	2.766672
0.33	0.35	17	0.0465	1	2.592538
0.18	0.44	16	0.0019	1	0.626686
0.23	0.31	13	0.0105	1	9.624171
0.03	0.47	15	0.0008	0	2.981248
0.06	0.35	17	0.1176	1	9.240477
0.01	0.33	9	0	1	3.906056
ROA	BC	BS	BO	CEOD	Tobin Q
0.41	0.50	14	0.00232	1	0.147228
0.02	0.46	13	0.00247	1	3.091996
0.24	0.60	15	0.000127	1	14.11724
0.86	0.50	10	0.00016	1	0.037586
0.02	0.67	12	0.000432	1	1.571152
0.08	0.74	19	0.00008	1	3.665597
0.16	0.73	11	0.0157	1	2.271785
0.07	0.46	13	0.001079	1	0.399405
-0.1	0.50	12	0.000523	1	0.453341
0.22	0.69	13	0.004	0	0.05251
0.12	0.27	15	0	1	1.126027
0.02	0.47	15	0	1	0.357554
0.32	0.69	13	0	1	5.841815
0.02	0.45	11	0.3982	1	2.766672
0.01	0.50	12	0	1	2.592538
0.07	0.44	18	0.000004	1	0.626686
0.31	0.39	18	0.0585	1	9.624171
0.17	0.50	18	0.002	1	2.981248

0.32	0.33	15	0.0106	1	9.240477
0.02	0.33	15	0.0007	1	3.906056
-0.23	0.40	15	0.1265	1	0.147228
0.02	0.46	13	0	1	3.091996

Calculation of Tobin's Q Ratio

Tobin Q 2005	Tobin Q 2006	Tobin Q 2007	Tobin Q 2008	Tobin Q 2009	Tobin Q 2010	Tobin Q 2011	Tobin Q 2012	Tobin Q 2013	Tobin Q 2014
0.658332468	0.957005343	0.932640991	1.219543929	0.742540161	1.304954056	1.240289382	1.234980656	1.594754187	14.11724317
0.039368679	0.045750875	0.042765728	0.057181914	0.022784643	0.056555635	0.051120654	0.036181835	0.039087316	0.037586018
2.014487208	3.226295338	4.329630203	2.927800704	1.683980961	2.837536328	2.3178447	1.899572131	1.547812763	1.571152058
1.32014709	1.802064361	2.652639041	1.938576938	1.448372154	3.38210034	3.704754442	3.648946425	3.071461013	3.6655974
1.83013142	2.787946878	2.161984898	2.159210077	1.203152059	3.247688778	2.607852094	2.543587147	2.347585592	2.271785125
0.077059482	0.078392093	0.080803023	0.082842736	0.051359488	0.089980538	0.089972192	0.406576159	0.406743807	0.399404951
0.161459538	1.329914985	0.699434394	0.717955458	0.279402767	1.018825906	1.020368973	0.521423683	0.296091806	0.453341131
0.040754798	0.047471143	0.050953445	0.0491882	0.021743694	0.062389603	0.066908812	0.045999282	0.048936037	0.052509844
1.490386331	1.524915718	2.592327885	1.533504583	1.082247338	1.719887688	1.911710843	1.398584829	1.164090312	1.126026569
0.080777678	0.241160187	0.223365323	0.219617968	0.09723163	0.192326446	0.353935244	0.320014361	0.302131207	0.357553805
0.368394307	0.365749634	0.618264924	0.425503842	0.563588919	0.923497716	4.429782973	4.839315427	5.050835584	5.841814577
0.532491285	2.024510936	1.873231946	1.258287959	0.594165397	2.958293183	3.231554934	2.633789624	2.795185051	2.766671962
2.626505414	4.606831706	3.195735029	2.603989402	2.261770251	3.265003662	2.566233611	2.366800607	1.920945388	2.592538407
1.194474758	1.696601279	1.69037686	2.035589592	1.6168832	1.675625381	1.389996733	1.054264543	0.822408884	0.626686199
0.319855663	0.525699454	0.615480372	0.638861203	0.493270111	0.692935339	3.402662851	3.686744993	5.329788233	9.624171172
0.451566899	0.824405928	0.510345675	0.340530381	0.072548983	0.248233878	0.344561172	1.939196343	1.907348146	2.981248289
5.016692611	4.168390156	7.438670568	3.609615965	1.969169862	10.09058921	11.67822579	9.03483318	9.25564569	9.240476627
2.873032447	7.39131758	5.120293009	2.421575364	1.235440949	2.686389354	4.415941513	3.609197787	3.525760022	3.90605643
0.008555309	0.692028289	0.401802768	0.323273096	0.071486021	0.25254302	0.192602342	0.192656474	0.165774988	0.147227604
1.026729454	1.598845913	3.308496065	2.592709992	1.568070832	1.966934898	2.411307364	2.034796259	2.371008313	3.091996424