CORPORATE GOVERNANCE DISCLOSURE INDEX AND FIRM PERFORMANCE: EVIDENCE FROM NSE COMPANIES

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Abstract

The paper analyses the relationship between Corporate Governance Disclosure Index (CGDI) and Firm Performance of 38 non-financial NSE listed companies in India for a period of five years from 2008-2012. The objective of the paper is to examine the level of disclosure and the impact of such disclosure on the firm performance of NSE Nifty companies.The firm performance measures include Tobin's Q, Market to Book Value Ratio, Market Value Added, Return on Assets, Return on Capital Employed and Return on Equity. Econometric analysis is performed using Year-wise OLS Regression, Pooled OLS and Panel Data Models. The results of year-wise OLS regression analysis provided a strong evidence of strengthening of the relationship between CGDI and firm performance measures over the years. In brief, the research findings reveal that CGDI has a positive impact on firm performance based on market based measures as well as accounting based measures. The paper concludes firms that disclose more are likely to result in higher performance. The results also imply that firms are more willing to disclose more information leading to enhanced corporate governance mechanisms but there is still scope for the improvement.

Keywords: Corporate Governance Disclosure Index, Firm Performance, Tobin's Q, Fixed Effect Model, Random Effect Model, Feasible Generalized Least Square.

1. Introduction

"*Corporate Governance is about maintaining an appropriate balance of accountability among three key players; the corporation's owners, the directors whom the owners elect, and the managers whom the directors select. Accountability requires not only good transparency, but also an effective means to take action for poor performance or bad decisions.*" Corporate disclosure is a process through which firms communicate all

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relevant information pertaining to the functioning of the company to their shareholders. The major source of corporate disclosures is annual reports of the companies. A transparent, informative and strong system of corporate governance is of vital importance for firms to attract foreign funds.

Corporate governance disclosures practices adopted by a firm can influence the value of the firm. A number of studies were based on the fact that higher disclosures by the firm improve corporate performance. Disclosures play a significant role in ensuring integrity, transparency and accountability. Companies' annual report serves as the source of information leading to disclosures. From Agency perspective increased disclosure on corporate governance practices can enhance firm performance by aligning the interests between the owners and the mangers. Such disclosures help management in reducing managerial expropriation in the form of high perquisites and excessive remuneration and make them more accountable for their actions. Higher disclosures can also enhance firm performance by inducing investor's confidence resulting from information symmetry. On the other hand, greater disclosures by the firm can bring costs associated with greater public scrutiny. But these costs are overweighed by the benefits associated with the increased credibility among the investors.

The present paper aims at investigating the corporate governance disclosure practices followed by the companies in India based on the clause 49 of the Listing Agreement. The paper has two fold objectives. The primary objective is to assess the corporate governance disclosure practices followed by the NSE Nifty companies as per the clause 49 of the listing agreement with regard to Board of directors, board meeting, annual general meetings, board committees, mandatory and non-mandatory disclosures etc. The secondary objective is to analyze the impact of corporate governance disclosure index on firm's financial performance measured by accounting and market based measures. Keeping the objective in mind, a Corporate Governance Disclosure Index was constructed consisting of 52 mandatory and non-mandatory parameters based on the SEBI's Clause 49 of the listing Agreement in order to assess the level of disclosure of compliance of corporate governance practices by the Indian companies.

2. Review of Literature

Prior studies on corporate governance disclosure index found mixed results for the relationship between the CGDI and firm performance. Gompers, Ishii and Metrick (2001) constructed a Governance Index consisting of 24 distinct corporate governance provisions and found that corporate governance is significantly associated with stock returns and Tobin's Q for 1500 firms from 1990-1999. Following the research by Gompers et. al (2001), Bebchuk, Cohen and Ferrell (2004) investigated the relative

importance of the provisions included in the GIM governance index by further developing an Entrenchment index (E Index) based on six provisions. The results of OLS estimates showed a negative and significant relation between the entrenchment index and firm value (Tobin's Q) during the 1990-2003 periods for 8015 firm-year observations. In a similar study based on the Gompers et al. (2003) G-Index comprising of 24 provisions, Bhagat and Bolton (2008) created D-Index based on only four provisions of board members. The results of Two Stage Least Square (2SLS) found a negative relationship between D-Index and ROA for the pre-2002 time period, but a positive relationship in the post-2002 time period. Therefore they concluded that firms with stronger manager entrenchment actually perform better in 2003-2007 as the sign changes from negative to positive.

Klapper and Love (2004) developed Governance Index (GOV) based on 374 firms in 14 emerging countries and found that firms with better corporate governance have higher market valuation and operating performance as the relationship between firm performance and governance indicators is significant and positive. These findings were further supported by Durnev and Kim (2005) who analyzed firm-level governance data of 859 large firms from 27 countries. They also concluded that firm's choice of governance and disclosure practices is positively related to investment opportunities, external financing, and growth opportunities. For 515 Korean firms, Black, Jang and Kim (2006) constructed a corporate governance index (KCGI) consisting of 38 usable elements classified into four sub-indices: Shareholder Rights, Board Structure, Board Procedure and Disclosure. The result of OLS and Instrumental Variable for the year 2000 reported strong evidence that an overall corporate governance index is an important and likely casual factor affecting the market value irrespective of the choice of market variable used.

In Indian Context, Gupta, Nair and Gogula (2003) examined the corporate governance reporting practices of 30 BSE listed companies and found that the significant determinants of corporate governance disclosures in BSE listed companies are number of independent directors, size of the company and overseas listing status when analyzed using OLS regression. In a similar study,Sen (2011) examined the annual reports of 50 listed companies in order to determine the extent of corporate governance disclosure by developing an index consisting of 67 parameters in accordance with the clause 49 of listing agreement. The paper concluded that there is significant difference between the quantum and quality of corporate governance disclosures made by the listed companies. The size of the company is a significant determinant of disclosures. Larger companies showed better extent of disclosure compared to smaller ones. For BSE companies, Raithatha and Bapat (2012) found that financial parameters like Net Profit Margin,

Market Capitalization, FII Stake and Leverage Ratio resulted in co-efficient values which were found to be not significantly related to Corporate Governance score.

Sarkar, Sarkar and Sen (2012) constructed a Corporate Governance Index for 500 large listed firms for the period 2003 to 2008 and found evidence of strong relationship between Corporate Governance Index and market value of companies. Based on the internal control mechanisms,Varshney, Kaul and Vasal (2012) constructed a corporate governance index using a sample of 105 Indian firms for two years: 2002-03 and 2008-09. Using Economic Value added as a measure of firm performance, they found a positive association between corporate governance index and firm performance. However they could not find association of positive relationship with other firm performance measures used.Ben P. J. (2014) studied the impact of compliance with non-mandatory disclosures in corporate governance on the performance of Indian firms in the context of guidelines given by Securities and Exchange Board of India (SEBI) by constructing a self-index represented by DSCORE. Firm performance is measured using Price-to-book value and Return on Capital Employed (ROCE). The results of Ordinary Least Square for a sample of 100 BSE listed companies found evidence of a significant and weak relationship between the corporate governance index and firm performance, using market based measure. However the relationship was found insignificant in the case of ROCE.

Allegrini & Greco (2013) developed a Dscore containing 60 discretionary items based on the Financial information, Projected information, Capital market data, Strategic information, Risk information and Sustainability information of the companies. They regressed the voluntary disclosure index data of 177 listed non-financial companies of Italian Stock Exchange for the year 2007 on seven corporate governance variables viz. Board Size, CEO duality, Board Composition, Lead independent director, Board Committees, Board Meetings and Audit Committee Meetings. The results suggested that there exists a complementary relationship between governance and disclosures.

Javaid & Saboor (2015) developed a Corporate Governance Composite Index based on 21 proxies to analyse the impact of Corporate governance index on firm performance measured by ROA, ROE and Tobin's Q of 58 Pakistani listed manufacturing firms from year 2009-2013. The index was divided into three sub-indices namely Board Structure, Ownership Structure and Disclosures. The result found that corporate governance index (CGI) and firm performance has positive and significant association but the relationship for each specific index is dependent upon the measure of firm performance. The sub index 1 Board Structure is found to have positive and significant relationship with all three performance measures. The sub index 2 is found to have significant positive relationship with only accounting based measures of firm performance, on the other

hand, sub index 3 is only having significant relationship with ROA. The result also found that companies having strong corporate governance mechanism has greater chances to acquire external finance.

Cunha & Mendes (2017) analysed financial determinants of the level of corporate governance disclosure (CGD) across a large sample of Portuguese firms, listed in the Euronext Lisbon index, in the period between 2005 and 2011. They constructed an index, consisting of total of 82 corporate governance attributes grouped into six categories of information: management structure; specialized committees (remuneration and appointment); audit and risk management; ownership structure; compliance and corporate responsibility; and financial transparency. The results of the ordinal logistic model showed that firm size and growth opportunities as measured by Tobin's Q had a significant and positive influence on Corporate Governance Disclosures. However, the results of their study found that no relationship exists between Corporate Governance Disclosure and financial performance measured by ROE.

3. Objectives and Methodology

3.1 Objectives

The objectives of the present paper are:

1. To study the corporate governance disclosure practices followed by the NSE Nifty companies as per the clause 49 of the listing agreement.
2. To analyze the impact of corporate governance disclosure index on firm's financial performance by determining the corporate governance score of companies with respect to SEBI guidelines of Clause 49.

Based on the extensive literature the null and alternate hypotheses are framed as follows:

Null Hypothesis: H_0: Corporate Governance Disclosure Index has no impact on Firm Performance.

Alternative Hypothesis: H_1: Corporate Governance Disclosure Index has a positive impact on Firm Performance.

3.2 Methodology

3.2.1 Sample and Data

The Sample corresponds to the 50 companies from the NSE CNX S & P Index. After the exclusion of banking and financial companies being governed by Banking Regulations Act, the number of companies reduced to 40. Due to non-availability of

data with respect to corporate governance reports of the companies or the financial data, 2 companies are further excluded from the sample. Thus, the final sample consists of 38 companies from different industries. The time period of the study covered five financial years i.e. 2007-08, 2008-09, 2009-10, 2010-11 and 2011-12.The year ending 31st March was considered for reporting the corporate governance practices. Table-1 shows the classification of sampled firms based on industry.

Table-1-Industry Classification of Sampled Companies

S No	Industry Group	Number of Companies	Percentage
1	AUTOMOBILE	5	13.16
2	CEMENT & CEMENT PRODUCTS	4	10.53
3	CONSTRUCTION	2	5.26
4	CONSUMER GOODS	3	7.89
5	ENERGY	7	18.42
6	INDUSTRIAL MANUFACTURING	1	2.63
7	IT	5	13.16
8	METALS	6	15.79
9	PHARMA	4	10.53
10	TELECOM	1	2.63
	TOTAL	38	

Source: Prowess Database

The data required to compute the corporate governance disclosure index has been extracted from the Corporate Governance reports included in the Annual Reports of the sampled NSE companies. The data with respect to the financial performance indicators was collected from the Prowess Database and also from the NSE website.

3.2.2 Variables

Independent Variable: Corporate Governance Disclosure Index is taken as the independent variable for the study. The Corporate Governance Disclosure Index (CGDI) has been developed based on the mandatory and non-mandatory parameters from SEBI's Clause 49 of the listing agreement. The CGDI consisted of 52 parameters categorised into eleven broad dimensions namely- Statement of Philosophy, Board of Directors, Board Meetings, Audit committee, Shareholder's/Investors Grievance Committee, Remuneration Committee, Nomination Committee, General Body Meetings, General Shareholder Information, Mandatory Disclosures and Non-mandatory Disclosures. These 52 parameters were drawn in a framework to calculate the corporate governance disclosure score and hence the Corporate Governance Disclosure Index.

Computation of Corporate Governance Disclosure Index (CGDI): A dichotomous procedure was followed in order to score each of the disclosed parameters. Disclosure of a particular item is given a score of 1 or 0 otherwise. All the parameters were given equal weight as they are considered equally important for the effective corporate governance. The Overall Corporate Governance Disclosure score of each company was calculated by summing up the individual scores of each dimension. This total indicates the extent of information disclosed in the annual report. 52 could be the maximum possible score that a company could score if all the items are disclosed. The Corporate Governance Disclosure Index was then calculated as

$$CGDI = \frac{Total\ Score\ of\ a\ Company}{Maximum\ Possible\ Score\ Obtainable\ By\ The\ Company\ (52)} X\ 100$$

The Value of CGDI ranged between 0 to 100 where 0 represents the worst disclosure and 100 represent the best disclosure by a particular company. The CGDI only indicates the presence of information in the annual or corporate governance report of a company but not the quality and extent of disclosure of a particular parameter. The content analysis of the annual reports of the company and the construction of the index inevitably involves the subjective judgment of the researchers.

The CGDI of the sampled companies for 5 years is presented in Table-2:

Table 2:Corporate Governance Disclosure Index of Sampled Companies

S. No.	Company Name	2007-08	2008-09	2009-10	2010-11	2011-12
1	A C C Ltd.	86.54	86.54	86.54	86.54	86.54
2	Ambuja Cements Ltd.	82.69	88.46	90.38	94.23	96.15
3	Asian Paints Ltd.	86.54	88.46	80.77	92.31	92.31
4	Bajaj Auto Ltd.	73.08	75.00	94.23	92.31	92.31
5	Bharat Heavy Electricals Ltd.	88.46	73.08	90.38	88.46	88.46
6	Bharat Petroleum Corpn. Ltd.	75.00	75.00	84.62	86.54	88.46
7	Bharti Airtel Ltd.	90.38	80.77	82.69	82.69	82.69
8	Cipla Ltd.	76.92	75.00	76.92	78.85	76.92
9	Coal India Ltd.	40.38	40.38	51.92	88.46	90.38
10	D L F Ltd.	88.46	90.38	90.38	90.38	90.38
11	Dr.Reddy'S Laboratories Ltd.	94.23	90.38	94.23	90.38	90.38
12	G A I L (India) Ltd.	80.77	84.62	84.62	80.77	84.62
13	Grasim Industries Ltd.	86.54	75.00	76.92	75.00	75.00
14	H C L Technologies Ltd.	86.54	98.08	98.08	98.08	98.08
15	Hero Motocorp Ltd.	82.69	86.54	86.54	84.62	84.62
16	Hindalco Industries Ltd.	61.54	78.85	78.85	82.69	82.69
17	I T C Ltd.	94.23	90.38	98.08	96.15	96.15
18	Infosys Ltd.	96.15	96.15	96.15	96.15	96.15
19	Jindal Steel & Power Ltd.	86.54	86.54	88.46	88.46	86.54

20	Larsen & Toubro Ltd.	84.62	88.46	78.85	92.31	88.46
21	Lupin Ltd.	80.77	84.62	82.69	86.54	82.69
22	Mahindra & Mahindra Ltd.	86.54	88.46	88.46	88.46	94.23
23	Maruti Suzuki India Ltd.	76.92	76.92	78.85	76.92	76.92
24	N M D C Ltd.	63.46	80.77	92.31	90.38	92.31
25	N T P C Ltd.	82.69	86.54	94.23	92.31	80.77
26	Oil & Natural Gas Corpn. Ltd.	82.69	88.46	88.46	92.31	92.31
27	Power Grid Corpn. Of India Ltd.	82.69	94.23	84.62	86.54	94.23
28	Reliance Industries Ltd.	92.31	88.46	92.31	94.23	96.15
29	Sesa Sterlite Ltd.	86.54	84.62	86.54	88.46	88.46
30	Sun Pharmaceutical Inds. Ltd.	86.54	86.54	86.54	86.54	80.77
31	Tata Consultancy Services Ltd.	90.38	90.38	88.46	88.46	86.54
32	Tata Motors Ltd.	96.15	94.23	94.23	94.23	90.38
33	Tata Power Co. Ltd.	90.38	90.38	86.54	94.23	96.15
34	Tata Steel Ltd.	90.38	88.46	88.46	88.46	86.54
35	Tech Mahindra Ltd.	84.62	86.54	90.38	88.46	88.46
36	Ultratech Cement Ltd.	61.54	69.23	78.85	76.92	80.77
37	United Spirits Ltd.	90.38	90.38	94.23	94.23	96.15
38	Wipro Ltd.	96.15	98.08	96.15	96.15	98.08

Source: Authors' compilation

Dependent Variables: The performance of the firm is considered as dependent variable. It is measured using the Market based performance measures-Tobin's Q, Market to book value ratio (MBVR) and Market Value Added (MVA) as well as the Accounting based measures-Return on Assets (ROA), Return on Capital Employed (ROCE) and Return on Equity (ROE). The formula used for Tobin's Q in the present study is a modified version of Tobin's Q. The modifications are incorporated to make it compatible with the manner of reporting in the Indian context. Accouting based measures are the indictor of the firm's profitability.

Control Variables: In order to analyze the relationship between CGDI and firm performance, the paper employed several other variables that may impact the relationship between CGDI and firm performance. The Control Variables include Risk, Firm Size, Firm Age, Firm Growth, Leverage, Advertising Intensity, Research Intensity, Industry Dummies and Year Dummies. Since the sample companies belong to 10 different industries, 9 Industry Dummies were used to avoid multicollinearity trap. Similarly, 4 year dummies were used for 5 years.

Table 3: Description of Variables

INDEPENDENT VARIABLE		
Corporate Governance Disclosure Index	CGDI	Percentage of Total score of a particular company to the maximum possible score attainable by the company (i.e. 52)
DEPENDENT VARIABLES		
Market Based Measures		
Tobin's Q	TQ	Market value of equity(Market Capitalization) + Book value of preference shares and borrowings divided by total assets
Market Value Added	MVA	Difference between Market Capitalization and Shareholder's equity (BV per share X Number of Shares Outstanding)
Market-to-Book Value Ratio	MBVR	Ratio of Market value of equity to Book value of equity
Accounting Based Measures		
Return on Assets	ROA	Ratio of profit before depreciation, interest, tax and amortization (PBDITA)to Total Assets
Return on Capital Employed	ROCE	Ratio of profit before depreciation, interest, tax and amortization (PBDITA) to Capital Employed
Return on Equity	ROE	Ratio of profit before depreciation, interest, tax and amortization (PBDITA) to Shareholders' Equity
CONTROL VARIABLES		
Firm Size	FS	Natural logarithm of total sales
Firm Age	FA	Natural Logarithm of difference between the financial year and the incorporation year
Leverage	Lev	Ratio of total debt to shareholders funds
Firm Growth	FG	Ratio of difference between current year sales and previous year sales to previous year sales
Research Intensity	RI	Ratio of Research and development expenditure to total sales
Advertising Intensity	AI	Ratio of Advertising expenditure to total sales
Risk	Risk	Value of Beta of the firm
Industry Dummies	Ind_dummies	Dummy variable carrying value 1 for a particular industry and 0 otherwise
Year Dummies	Year_dummies	Dummy variable carrying value 1 for the respective year and 0 otherwise

Source: Authors' compilation

3.2.3 Econometric Analysis

The relationship between corporate governance disclosure index and firm performance has been analyzed using various statistical and econometric tools. Descriptive statistics, Correlation Analysis and Regression Analysis of cross-sectional, pooled and panel data is performed. Multiple Regression Analysis using Ordinary Least Square method was performed on the cross-sectional data and pooled data.

Cross-sectional (Year- wise) Data Analysis

In cross-sectional, data is a type data collected by observing one or more variable at the same point of time, or without regard to differences in time.

The typical OLS multiple regression equation is as follows for cross-sectional data:

$$y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \cdots \ldots \ldots \ldots \ldots + \beta_k x_k + \mu \qquad (1)$$

Where y is the dependent variable

$x_1, x_2 \ldots \ldots \ldots \quad x_k$ are the independent and control variables.

β_0 is the constant term (intercept parameter of the regression)

$\beta_1 \beta_2 \ldots \ldots \ldots \ldots \ldots \ldots .. \beta_k$ are the slope parameters

μ represents the unobserved factors that change over time and affect y.

Pooled Regression Analysis

In pooled data, the data has elements of both the cross-section and time-series,

The typical OLS multiple regression equation is as follows for pooled data:

$$y_{it} = \beta_0 + \beta_1 x_{it1} + \beta_2 x_{it2} + \cdots \ldots \ldots \ldots \ldots + \beta_k x_{itk} + \mu_{it} \qquad (2)$$

Where i denote the number of firms and t denotes the time period

Panel Data Regression

The Panel data analysis uses two techniques: Fixed effect model and Random effect model.Fixed effect model is estimated using least square dummy variable (LSDV) regression (Ordinary least square with a set of dummies) and fixed effect within estimates. On the other hand,Random effects assume that the entity's error term is not correlated with the predictors which allows for time-invariant variables to play a role as explanatory variables. In random effects one can include time invariant variables (i.e. gender etc.). This is the advantage of random effect over fixed effect as in the fixed effects model these variables are absorbed by the intercept.

Feasible Generalized Least Square (FGLS)

The present paper has also employed FGLS regression to analyze the impact of board size on the performance variables. Feasible GLS is applied when there is a certain degree of correlation between the observations and when the variances of the observations are unequal (heteroskedasticity). FGLS allows estimations in the presence of heteroskedasticity across panels and first order autocorrelation within panels.

STATA Version 12 has been used for the analysis of the data

4. Results and Analysis

4.1 Descriptive Statistics

The descriptive statistics of the corporate governance disclosure index is presented in Table-4. Year-wise descriptive statistics of the sample companies for 5 years from 2007-08 to 2011-12 along with the descriptive statistics for 190 firm year observations is shown. In the year 2007-08, the minimum value for CGDI is 40.38 and the maximum value is 96.15 with the mean value of 83.24 indicating that companies in the year 2007-2008 varied in their disclosures to a great extent. In the year 2008-09, minimum value was same as that in the year 2007-08 but maximum value rose to a level of 98.07 which remained the same for all subsequent years. The minimum level raised in the year 2009-10 to a value of 51.92 and 75 in the years 2011 and 2012 respectively. The mean value of CGDI varied from 83.24 to 88.66 in the five years period. Variation in CGDI is highest in the year 2007-08, the variation decreased in subsequent years except for the year 2011-12 in which the variation increased from the previous year.

The overall CGDI for 190 firm year observations for 38 sampled firms for a period of 5 years depicted a minimum value of 40.38 and a maximum value of 98.07 with the mean value of 86.41. The standard deviation and median CGDI for all sampled firms for 5 years is 8.79 and 88.46 respectively.

Table 4: Descriptive Statistics

Variable	Obs	Mean	Median	Std. Dev.	Min	Max
CGDI 2007-08	38	83.24899	86.53846	11.22146	40.38462	96.15385
CGDI 2008-09	38	84.61538	86.53846	10.16614	40.38462	98.07692
CGDI 2009-10	38	86.89271	88.46154	8.350903	51.92308	98.07692
CGDI 2010-11	38	88.66397	88.46154	5.739519	75	98.07692
CGDI 2011-12	38	88.66397	88.46154	6.256126	75	98.07692
CGDI Total (5 years)	190	86.417	88.46154	8.797359	40.38462	98.07692

Source: Authors' compilation

4.2 Correlation Analysis

The pair-wise correlation between the CGDI and firm performance measures is presented in Table-5. For all the years CGDI was found to be positively correlated with the market based performance measures (Tobin's Q, MBVR and MVA). However, the relationship between accounting measures ROA is negative with CGDI in the year 2007-08 and for accounting measure ROE, the relationship is negative in the year 2007-08 and 2008-09. In the year 2009-10, the relationship between CGDI and market based measures (Tobin's Q, MBVR and MVA) is statistically significant at 5% level of significance. CGDI is in positive and significant relationship with MVA for the year 2010-11. CGDI for 190 firm year observation for the total sample of 38 companies for a period of 5 years is found to be positively and significantly correlated with the market based measures at 5% level of significance but only positively correlated with the accounting based measures (ROA, ROCE and ROE).When it comes to market based measures the relation with CGDI is positive and significant because for listed companies the market based measures are important since it gives the level of transparency by the company, internal functioning of the companies and compilation of various regulations and provisions of both SEBI guidelines and companies act. Table-5 presents the correlation between CGDI and firm performance.

Table 5: Correlation Matrix

	Tobin's Q	MVA	MBVR	ROCE	ROA	ROE
CGDI 2007-08	0.1045	0.2239	0.2011	0.0433	-0.01	-0.0116
CGDI 2008-09	0.2569	0.1344	0.1417	0.0075	0.062	-0.0292
CGDI 2009-10	0.3308*	0.3449*	0.2779*	0.0164	0.0048	0.0766
CGDI 2010-11	0.2111	0.3275*	0.2181	0.162	0.1836	0.1312
CGDI 2011-12	0.0601	0.2137	0.1034	0.1909	0.1739	0.2058
CGDI Total (5 years)	0.1709*	0.2574*	0.1806*	0.0326	0.0262	0.0077

Source: Authors' compilation

4.3 Cross Sectional (Year Wise) OLS Regression

In order to analyze the relationship between the CGDI and firm performance, the cross sectional OLS regression is performed with different accounting and market based performance measures as dependent variables and CGDI as independent variable along with the control variables such as Risk, Firm Size, Firm Age, Firm Growth, Leverage, Advertising Intensity, Research Intensity, and Industry Dummies. The Regression Equation for year-wise OLS Regression is as follows:

$$FirmPerformance = \beta_0 + \beta_1 CGDI + \beta_2 FA + \beta_3 FG + \beta_4 FS + \beta_5 Lev + \beta_6 Risk + \beta_7 Ai + \beta_8 RI + \beta_9 (Ind\_dummies) + \mu_{it} \qquad (3)$$

Here, Firm Performance denotes Tobin's Q, MBVR, MVA, ROA, ROCE and ROE in different models respectively.

The maximum value of VIF for all the five years is 1.80, 1.88, 1.66, 1.59 and 1.39 respectively. Thus the data is free from multicollinearity. To control for heteroskedasticity robust standard errors are used.

The results of the year-wise OLS regression for the year 2007-08 are depicted in Table-6. CGDI is found to be positively associated with the firm performance measures except for MBVR. However the relationship is not statistically significant at 10 % level of significance. The R-squared values ranged 0.449 to 0.683 for the models with different performance measures.

Table 6: Regression Results- CGDI and Firm performance -2007-08

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Tobin's Q	MBVR	MVA	ROA	ROCE	ROE
CGDI	0.0134	-0.0173	15,237	0.00247	0.00256	0.00246
	(0.0500)	(0.0711)	(10,315)	(0.00177)	(0.00312)	(0.00344)
Risk	-0.820	0.210	-458,062	-0.0500	-0.0501	0.0201
	(1.645)	(2.342)	(339,694)	(0.0582)	(0.103)	(0.113)
FG	-1.701**	-2.304**	123,332	-0.0415	-0.0762	-0.0555
	(0.774)	(1.102)	(159,810)	(0.0274)	(0.0483)	(0.0533)
FA	0.630	1.366	-199,396	-0.0963**	-0.135*	-0.234**
	(1.229)	(1.750)	(253,807)	(0.0435)	(0.0766)	(0.0846)
FS	-0.166	-1.255	773,202***	0.0115	-0.0211	-0.0116
	(1.170)	(1.666)	(241,547)	(0.0414)	(0.0729)	(0.0806)
Lev	-1.795*	-1.695	-484,729**	-0.141***	-0.248***	-0.0409
	(1.008)	(1.435)	(208,097)	(0.0357)	(0.0628)	(0.0694)
AI	52.42	56.01	7.806e+06	-1.099	-4.624	-6.077
	(68.61)	(97.69)	(1.417e+07)	(2.429)	(4.278)	(4.724)
RI	-24.74	-79.97*	-7.091e+06	-0.850	-2.045	-2.604
	(29.14)	(41.49)	(6.017e+06)	(1.032)	(1.817)	(2.006)
Industry Dummies	YES	YES	YES	YES	YES	YES

Constant	6.594	15.04	-3.547e+06**	0.204	0.585	0.698
	(6.741)	(9.598)	(1.392e+06)	(0.239)	(0.420)	(0.464)
Observations	38	38	38	38	38	38
R-squared	0.449	0.573	0.642	0.683	0.655	0.569
Robust Standard Errors in parentheses						
*** p<0.01, ** p<0.05, * p<0.1						

Source: Authors' Analysis

In the OLS regression for the year 2008-09, CGDI is statistically positively significant with the firm performance measures- Tobin's Q and MBVR at 5 % and 10% level of significance. With all other performance variables the relationship is positive but not significant. The R-squared valued ranged between 0.405 to 0.682 as shown in Table-7

Table 7: Regression Results- CGDI and Firm performance -2008-09

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Tobin's Q	MBVR	MVA	ROA	ROCE	ROE
CGDI	0.0494**	0.0621*	5,937	0.00246	0.00228	0.000313
	(0.0199)	(0.0329)	(5,908)	(0.00191)	(0.00343)	(0.00388)
Risk	-1.860***	-2.880***	-375,683**	-0.0709	-0.0807	-0.0855
	(0.591)	(0.976)	(175,444)	(0.0567)	(0.102)	(0.115)
FG	1.127	2.555	236,534	0.0579	0.114	0.239
	(1.134)	(1.872)	(336,538)	(0.109)	(0.195)	(0.221)
FA	0.160	0.0957	-66,729	-0.0622	-0.0883	-0.159
	(0.498)	(0.823)	(147,870)	(0.0478)	(0.0859)	(0.0972)
FS	0.489	0.347	351,372**	0.00235	-0.0210	-0.00979
	(0.459)	(0.759)	(136,362)	(0.0441)	(0.0792)	(0.0896)
Lev	-0.939***	-1.178**	-282,920***	-0.111***	-0.193***	-0.0229
	(0.329)	(0.543)	(97,568)	(0.0315)	(0.0567)	(0.0641)
AI	22.14	20.64	576,328	-1.389	-5.038	-5.597
	(32.11)	(53.03)	(9.532e+06)	(3.082)	(5.536)	(6.263)
RI	6.199	7.409	-1.444e+06	-0.836	-1.654	-2.092
	(11.19)	(18.48)	(3.322e+06)	(1.074)	(1.930)	(2.183)
Industry Dummies	YES	YES	YES	YES	YES	YES
Constant	-3.180	-1.270	-1.533e+06*	0.179	0.501	0.768

	(2.797)	(4.619)	(830,254)	(0.268)	(0.482)	(0.546)
Observations	38	38	38	38	38	38
R-squared	0.575	0.631	0.682	0.630	0.581	0.405
Robust Standard Errors in parentheses						
*** p<0.01, ** p<0.05, * p<0.1						

Source: Authors' Analysis

The results of the OLS regression for the year 2009-10 as presented in Table-8 revealed that CGDI is positively and significantly related with Tobin's Q and MBVR at 5% level of significance. The relationship is positive with all other performance measures. The results are similar to the year 2008-09. The R-squared value is highest for the model with dependent variable ROA i.e. 0.69 and lowest for the model with dependent variable MBVR i.e. 0.47

Table 8: Regression Results- CGDI and Firm performance -2009-10

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Tobin's Q	MBVR	MVA	ROA	ROCE	ROE
CGDI	0.110**	0.198**	14,023	0.00195	0.00429	0.00542
	(0.0435)	(0.0938)	(13,298)	(0.00186)	(0.00461)	(0.00491)
Risk	-1.409	-3.018	-78,803	-0.0966**	-0.206*	-0.242**
	(1.006)	(2.169)	(307,613)	(0.0429)	(0.107)	(0.114)
FG	0.600	3.347	485,294	0.0650	0.219	0.235
	(1.574)	(3.394)	(481,310)	(0.0671)	(0.167)	(0.178)
FA	0.333	0.533	-222,534	0.0168	0.0588	0.0224
	(0.926)	(1.997)	(283,223)	(0.0395)	(0.0983)	(0.105)
FS	-0.357	-0.943	471,010**	0.00867	-0.000425	0.0121
	(0.672)	(1.449)	(205,540)	(0.0287)	(0.0713)	(0.0759)
Lev	-0.826	-1.065	-437,866**	-0.0706***	-0.166**	-0.0124
	(0.574)	(1.238)	(175,575)	(0.0245)	(0.0609)	(0.0648)
AI	42.01	78.95	-7.589e+06	0.910	2.553	1.696
	(47.81)	(103.1)	(1.462e+07)	(2.040)	(5.074)	(5.398)
RI	-4.788	-31.69	-6.581e+06	-0.636	-2.055	-2.467
	(18.14)	(39.12)	(5.548e+06)	(0.774)	(1.925)	(2.048)
Industry Dummies	YES	YES	YES	YES	YES	YES

Constant	-3.036	-3.806	-2.299e+06*	0.0400	0.0340	0.00322
	(4.167)	(8.987)	(1.274e+06)	(0.178)	(0.442)	(0.470)
Observations	38	38	38	38	38	38
R-squared	0.567	0.470	0.632	0.697	0.631	0.556
Robust Standard Errors in parentheses						
*** p<0.01, ** p<0.05, * p<0.1						

Source: Authors' Analysis

For the year 2010-11, the results of the OLS regression are shown in Table-9. The relationship between market based performance measures (Tobin's Q, MBVR and MVA) is positive and significant. Also CGDI is positively and significantly related with the accounting based measure ROCE at 10% level of significance. With ROA and ROE, the relationship is found positive. The R-squared value reached to a level of 0.74 for the model with Tobin's Q as dependent variable.

Table 9: Regression Results- CGDI and Firm performance -2010-11

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Tobin's Q	MBVR	MVA	ROA	ROCE	ROE
CGDI	0.0810*	0.167*	42,810**	0.00403	0.00921*	0.00954
	(0.0518)	(0.0915)	(19,176)	(0.00238)	(0.00515)	(0.00626)
Risk	-0.480	0.382	-319,638	-0.0840***	-0.150**	0.0235
	(0.625)	(1.104)	(231,351)	(0.0288)	(0.0622)	(0.0756)
FG	-0.772	-1.055	475,669*	-0.0288	-0.0398	-0.0168
	(0.634)	(1.120)	(234,647)	(0.0292)	(0.0631)	(0.0766)
FA	-0.232	-0.307	482,278	-0.0102	0.0178	0.00628
	(1.186)	(2.095)	(439,064)	(0.0546)	(0.118)	(0.143)
FS	-4.255***	-7.154***	-886,474**	-0.136**	-0.237**	-0.294**
	(1.089)	(1.925)	(403,291)	(0.0501)	(0.108)	(0.132)
Lev	-1.079	-1.452	-133,069	-0.144***	-0.218**	-0.226**
	(0.850)	(1.502)	(314,789)	(0.0391)	(0.0846)	(0.103)
AI	-50.10	-76.02	6.093e+06	-6.021***	-10.03**	-9.837**
	(36.36)	(64.26)	(1.347e+07)	(1.674)	(3.620)	(4.398)
RI	-24.40	-50.79*	-8.921e+06	-1.845**	-3.530**	-3.917*
	(16.15)	(28.54)	(5.981e+06)	(0.743)	(1.608)	(1.953)

Industry Dummies	YES	YES	YES	YES	YES	YES
Constant	6.389	6.015	-4.348e+06**	0.403	0.367	0.314
	(5.485)	(9.693)	(2.031e+06)	(0.252)	(0.546)	(0.663)
Observations	38	38	38	38	38	38
R-squared	0.740	0.669	0.593	0.730	0.663	0.532
Robust Standard Errors in parentheses						
*** p<0.01, ** p<0.05, * p<0.1						

Source: Authors' Analysis

Finally for the year 2011-2012, the results of the OLS, showed that CGDI is positively and significantly associated with only two performance measures i.e. MVA and ROCE at 10% level of significance as shown in Table-10. For rest of the performance measures, the relationship is positive but not significant. The R-squared value for the models ranged between a maximum value of 0.786 to a minimum value of 0.490.

Table 10: Regression Results- CGDI and Firm performance -2011-12

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Tobin's Q	MBVR	MVA	ROA	ROCE	ROE
CGDI	0.0505	0.0977	25,462*	0.00393	0.00802*	0.00779
	(0.0396)	(0.0705)	(14,052)	(0.00252)	(0.00452)	(0.00537)
Risk	-3.823***	-6.237***	-1.179e+06***	-0.146***	-0.221**	-0.270**
	(0.753)	(1.339)	(266,983)	(0.0479)	(0.0860)	(0.102)
FG	0.444	3.244	342,159	0.123	0.417	0.474
	(2.703)	(4.804)	(958,154)	(0.172)	(0.308)	(0.366)
FA	-0.728	-0.804	-258,741	-0.0927*	-0.147	-0.131
	(0.766)	(1.362)	(271,526)	(0.0487)	(0.0874)	(0.104)
FS	-0.594	-0.510	245,080	0.0213	0.0544	0.0911
	(0.589)	(1.048)	(208,906)	(0.0374)	(0.0673)	(0.0798)
Lev	-0.269	-0.114	-110,602	-0.0764**	-0.159**	-0.0132
	(0.525)	(0.933)	(186,101)	(0.0334)	(0.0599)	(0.0711)
AI	-80.05	-95.43	-3.260e+07	-3.450	-6.064	-3.343
	(53.80)	(95.64)	(1.907e+07)	(3.419)	(6.141)	(7.284)
RI	-21.94	-43.60	-1.473e+07**	-1.759*	-3.588**	-3.673*
	(14.69)	(26.11)	(5.206e+06)	(0.933)	(1.676)	(1.988)

Industry Dummies	YES	YES	YES	YES	YES	YES
Constant	7.138	6.588	-1.008e+06	0.0715	-0.176	-0.323
	(4.655)	(8.276)	(1.650e+06)	(0.296)	(0.531)	(0.630)
Observations	38	38	38	38	38	38
R-squared	0.786	0.735	0.627	0.656	0.644	0.490
Robust Standard Errors in parentheses						
*** p<0.01, ** p<0.05, * p<0.1						

Source: Authors' Analysis

Thus, the results of the year-wise OLS regression analyzing the relationship between CGDI and firm performance indicates that corporate governance disclosure index positively impacts the performance of the firm when measured using various performance measures. However, the relationship is not statistically significant for all the years and for different performance measures used.

4.4 Pooled OLS Regression

To further analyse the relationship between CGDI and firm performance measures, Pooled OLS regression technique was employed. The data for the five years is pooled and regressed with firm performance measures as dependent variables and CGDI as explanatory variable along with the control variables. In addition to the Industry dummies, 4 year dummies were also added in the regression equation representing four years from 2009 to 2012.

Regression Equation for Pooled Data is as follows:

$$(FirmPerformance)_{it} = \beta_0 + \beta_1 CGDI_{it} + \beta_2 FA_{it} + \beta_3 FG_{it} + \beta_4 FS_{it} + \beta_5 Lev_{it} + \beta_6 Risk_{it} + \beta_7 AI_{it} + \beta_8 RI_{it} + \beta_9 (Ind\_dummies)_{it} + \beta_{10}(Year\_dummies)_{it} + \mu_{it}$$

(4)

Here, Firm Performance denotes Tobin's Q, MBVR, MVA, ROA, ROCE and ROE in different models respectively.

The maximum VIF is 1.33 implying that the data is free from the problem of multicollinearity. For heteroskedasticity, robust standard errors are used. The Durbin Watson value revolved around 2 which mean that there is no first order autocorrelation in the data.

The results of the Pooled OLS regression are depicted in Table-11. The coefficients of the CGDI are found to be significantly and positively associated with all the performance measures used. However, the level of significance varied. CGDI is significantly associated at 1% level of significance with market based performance measures (Tobin's Q, MBVR and MVA), at 5% level of significance with ROA and ROCE and with 10% level of significance with ROE. The R-squared value for the Pooled OLS regression dropped as compared to the year-wise OLS regression

Table 11: Pooled OLS Regression estimates: CGDI and Firm Performances-2008-12

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Tobin's Q	MBVR	MVA	ROA	ROCE	ROE
CGDI	0.0464***	0.0850***	16,379***	0.00185**	0.00291**	0.00289*
	(0.0156)	(0.0267)	(4,310)	(0.000749)	(0.00140)	(0.00158)
Risk	-1.493***	-2.421***	-445,877***	-0.0457***	-0.0689**	-0.0938**
	(0.366)	(0.625)	(100,863)	(0.0175)	(0.0329)	(0.0370)
FG	-0.0400	0.101	-103,727	-0.0768***	-0.111***	-0.154***
	(0.371)	(0.634)	(102,294)	(0.0178)	(0.0333)	(0.0375)
FA	-0.418	-0.576	156,590*	-0.0132	-0.0135	-0.0137
	(0.343)	(0.586)	(94,628)	(0.0164)	(0.0308)	(0.0347)
FS	-0.111	-0.336	439,221***	0.00508	-0.00213	0.0263
	(0.300)	(0.512)	(82,677)	(0.0144)	(0.0269)	(0.0303)
Lev	-0.893***	-0.875**	-340,783***	-0.0949***	-0.181***	-0.0137
	(0.259)	(0.443)	(71,463)	(0.0124)	(0.0233)	(0.0262)
AI	22.55	38.51	5.873e+06	-1.826**	-3.726**	-3.334*
	(18.22)	(31.13)	(5.026e+06)	(0.873)	(1.638)	(1.845)
RI	0.347	-12.46	-5.228e+06**	-0.714**	-1.593**	-1.692**
	(7.385)	(12.62)	(2.037e+06)	(0.354)	(0.664)	(0.748)
Industry Dummies	YES	YES	YES	YES	YES	YES
Year Dummies	YES	YES	YES	YES	YES	YES

Constant	1.672	2.903	-2.368e+06***	0.237***	0.406**	0.400**
	(1.858)	(3.174)	(512,388)	(0.0890)	(0.167)	(0.188)
Observations	190	190	190	190	190	190
R-squared	0.437	0.413	0.476	0.513	0.493	0.351
Durbin Watson Stats	2.06	2.16	1.92	1.81	1.75	1.86
Robust Standard Errors in parentheses						
*** p<0.01, ** p<0.05, * p<0.1						

Source: Authors' Analysis

4.5 Panel Data Regression

4.5.1 Specification Tests

4.5.1.1 Hausman Test

In order to choose between the Fixed Effect and Random Effect Model, the study employed Hausman Test. Hausman Test rejects the null hypothesis for models with performance variables Tobin's Q, MBVR, MVA and ROA, implying that Fixed Effect Model is favoured over Random Effect Model. However, for ROCE and ROE, Random Effect Model is favoured as Hausman Test accepts the null hypothesis. Thus, the study used Fixed Effect Model for Dependent Variables-Tobin's Q, MBVR, MVA and ROA and Random Effect Model for ROCE and ROE. Table- 12 shows the results pertaining to Hausman Test.

Table 12: Hausman Test

Specification Tests	Hausman Test	
VARIABLES	Chi square	p-value
Tobin's Q	31.7	0.0015***
MBVR	55.05	0.0000***
MVA	21.7	0.041***
ROA	20.88	0.0347***
ROCE	16.58	0.1211
ROE	7.95	0.7179

Source: Authors' Analysis

Note: *** Statistically Significant at 1% Level

4.5.1.2 Multicollinearity Test

The correlation value less than 0.8 signifies that there is no multicollinearity among the variables. The results of Correlation Analysis as shown in Table-13 confirm that there is no issue of multicollinearity in the data.

Table 13: Pairwise Correlation between CGDI and Control Variables

	CGDI	Risk	FG	FS	Lev	FA	AI	RI
CGDI	1							
Risk	0.1833*	1						
FG	-0.2317*	-0.0883	1					
FS	0.2764*	0.2879*	-0.1289	1				
Lev	0.0442	0.1749*	0.0039	0.1376	1			
FA	0.0865	0.3266*	-0.0437	0.1058	-0.0085	1		
AI	0.0721	-0.1819*	-0.007	-0.1638*	-0.0694	-0.1552*	1	
RI	0.014	-0.2597*	0.0169	-0.2990*	-0.1767*	-0.0852	-0.1833*	1

Table-14 presented the VIF statistics as a check for multicollinearity. VIF values are found very less with the mean VIF of 1.21 for all CGDI (independent variable) and control variable. This also signifies that there is no multicollinearity among the variables.

Table 14: Collinearity Statistics

Variable	CGDI	Risk	FA	FG	FS	Lev	AI	RI	Mean VIF
VIF	1.2	1.33	1.14	1.06	1.32	1.07	1.2	1.3	1.21

Source: Authors' Analysis

4.5.1.3 Heteroskedasticity Tests

The results of Likelihood ratio test for testing the panel level heteroskedasticity are depicted in Table-15. Test results showed that there is heteroskedasticity in the case of all dependent variables.

Table 15: Heteroskedasticity Tests

Specification Tests	Likelihood Ratio (LR) Test for Panel Level Heteroskedasticity	
VARIABLES	Chi square	p-value
Tobin's Q	250.55	0.0000***

MBVR	238.51	0.0000***
MVA	316.28	0.0000***
ROA	139.65	0.0000***
ROCE	172.88	0.0000***
ROE	166.76	0.0000***

Source: Authors' Analysis

Note: *** Statistically Significant at 1% Level

4.5.1.4 Autocorrelation Test

The results of Wooldridge test for serial correlation as show in Table-16 concluded the presence of first order autocorrelation in all the panel models with different dependent variables.

Table16: Autocorrelation Test

Specification Tests	Wooldridge Test for Autocorrelation in Panel Data	
VARIABLES	F Stats	p-value
Tobin's Q	38.183	0.0000***
MBVR	32.071	0.0000***
MVA	17.391	0.0002***
ROA	12.546	0.0011***
ROCE	11.203	0.0019***
ROE	12.418	0.0012***

Source: Authors' Analysis

Note: *** Statistically Significant at 1% Level

Following the results of the heteroskedasticity and autocorrelation, the panel data regression models use cluster robust Standard Errors to control for heteroskedasticity and autocorrelation Table-17 below shows the summary of the regression used in the study.

Table17: Regression Summary

REGRESSION SUMMARY	
Tobin's Q, MBVR, MVA and ROA	Fixed effect Model (With-in) adjusted for "cluster robust" standard error.
	LSDV adjusted for "cluster robust" standard error.
	FGLS model adjusted for heteroskedasticity and first order autocorrelation.
ROCE and ROE	Random effect Model adjusted for "cluster robust" standard error.
	FGLS model adjusted for heteroskedasticity and first order autocorrelation.

Source: Authors' Compilation

4.5.2 Regression with Tobin's Q as a measure of firm performance

In order to analyze the relationship between CGDI and firm performance, CGDI is regressed with Tobin's Q as dependent variable based on the regression summary as described in Table-17. Below are the regression equations. In Model 1, only CGDI (independent variable) is regressed as explanatory variables with Tobin's Q as dependent variable. On the other hand in Model 2 regression of CGDI along with the various control variables is performed using Tobin's Q as firm performance measure.

FIXED EFFECT WITH-IN ESTIMATES EQUATION

MODEL 1:

$$(Tobin'sQ)_{it} = \beta_0 + \beta_1 CGDI_{it} + \mu_{it} \tag{5}$$

MODEL 2:

$$(Tobin'sQ)_{it} = \beta_0 + \beta_1 CGDI_{it} + \beta_2 FA_{it} + \beta_3 FG_{it} + \beta_4 FS_{it} + \beta_5 Lev_{it} + \beta_6 Risk_{it} + \beta_7 AI_{it} + \beta_8 RI_{it} + \beta_9 (Ind\_dummies)_{it} + \beta_{10}(Year\_dummies)_{it} + \mu_{it} \tag{6}$$

LEAST SQUARE DUMMY VARIABLE (LSDV) EQUATION

MODEL 1:

$$(Tobin'sQ)_{it} = \beta_0 + \beta_1 CGDI_{it} + \alpha_1 + \alpha_2 C_{2i} + \alpha_3 C_{3i} + \ldots\ldots\ldots + \alpha_n C_{ni} + \mu_{it} \tag{7}$$

MODEL 2:

$$(Tobin'sQ)_{it} = \beta_0 + \beta_1 CGDI_{it} + \beta_2 FA_{it} + \beta_3 FG_{it} + \beta_4 FS_{it} + \beta_5 Lev_{it} + \beta_6 Risk_{it} + \beta_7 AI_{it} + \beta_8 RI_{it} + \beta_9 (Ind\_dummies)_{it} + \beta_{10}(Year\_dummies)_{it} + \alpha_1 + \alpha_2 C_{2i} + \alpha_3 C_{3i} + \ldots\ldots\ldots + \alpha_n C_{ni} + \mu_{it} \tag{8}$$

The results of the regression analysis (Table-18) showed that CGDI has a positive impact on Tobin's Q irrespective of the regression technique employed. In both the models (without and with control variables) CGDI showed a positive relationship with Tobin's Q. However, the impact of CGDI is found significant only in the case of FGLS at 1% level of significance. Risk is found to be negatively and significantly associated with Tobin's Q. On the other hand, Ai and RI are positively and significantly associated with Tobin's Q. The relationship of Tobin's Q with other control variables is found insignificant.

Table 18: Regression Results Using Tobin's Q as firm performance measure

VARIABLES	(1) Fixed Effect with Cluster Robust Standard errors	(2)	(1) LSDV with Cluster Robust Standard Errors	(2)	(1) FGLS with Panels Heteroskedastic and First order Auto-Correlation	(2)
CGDI	0.0493	0.00846	0.0493	0.00846	0.0165***	0.0234***
	(0.0625)	(0.0597)	(0.0697)	(0.0671)	(0.00503)	(0.00873)
Risk		-1.423***		-1.423***		-0.802***
		(0.430)		(0.483)		(0.255)
FG		-0.400*		-0.400		-0.239
		(0.213)		(0.239)		(0.202)
FA		9.154**		9.154**		-0.0530
		(3.403)		(3.827)		(0.334)
FS		-2.052		-2.052		-0.256
		(1.538)		(1.729)		(0.221)
Lev		-0.574		-0.574		-0.571***
		(0.391)		(0.440)		(0.173)
AI		108.7**		108.7**		53.24***
		(40.98)		(46.08)		(14.00)
RI		34.53***		34.53***		8.874*
		(9.039)		(10.16)		(4.793)
Industry Dummies		NO		YES		YES
Year Dummies		YES		YES		YES
Constant	-1.747	-0.869	-1.747	-0.869	1.002**	2.986**
	(5.397)	(6.987)	(6.022)	(7.856)	(0.441)	(1.449)
Observations	190	190	190	190	190	190
R-squared	0.055	0.408	0.596	0.747		
Number of Firms	38	38	38	38	38	38
Robust Standard Errors in parentheses						
*** p<0.01, ** p<0.05, * p<0.1						

Source: Authors' Analysis

4.5.3 Regression with MBVR as a measure of firm performance

Regression equations are as follows:

FIXED EFFECT WITH-IN ESTIMATES EQUATION

MODEL 1:

$$(MBVR)_{it} = \beta_0 + \beta_1 CGDI_{it} + \mu_{it} \qquad (9)$$

MODEL 2:

$$(MBVR)_{it} = \beta_0 + \beta_1 CGDI_{it} + \beta_2 FA_{it} + \beta_3 FG_{it} + \beta_4 FS_{it} + \beta_5 Lev_{it} + \beta_6 Risk_{it} + \beta_7 AI_{it} + \beta_8 RI_{it} + \beta_9(Ind\_dummies)_{it} + \beta_{10}(Year\_dummies)_{it} + \mu_{it} \qquad (10)$$

LEAST SQUARE DUMMY VARIABLE (LSDV) EQUATION

MODEL 1:

$$(MBVR)_{it} = \beta_0 + \beta_1 CGDI_{it} + \alpha_1 + \alpha_2 C_{2i} + \alpha_3 C_{3i} + \ldots\ldots\ldots + \alpha_n C_{ni} + \mu_{it} \qquad (11)$$

MODEL 2:

$$(MBVR)_{it} = \beta_0 + \beta_1 CGDI_{it} + \beta_2 FA_{it} + \beta_3 FG_{it} + \beta_4 FS_{it} + \beta_5 Lev_{it} + \beta_6 Risk_{it} + \beta_7 AI_{it} + \beta_8 RI_{it} + \beta_9(Ind\_dummies)_{it} + \beta_{10}(Year\_dummies)_{it} + \alpha_1 + \alpha_2 C_{2i} + \alpha_3 C_{3i} + \ldots\ldots\ldots + \alpha_n C_{ni} + \mu_{it} \qquad (12)$$

As shown in Table-19 CGDI is significantly positively associated with MBVR for FGLS methodology at 1 % level of significance. With Fixed effect and LSDV regression the relationship between CGDI and MBVR is positive but not significant.Like Tobin's Q Risk is negatively and significantly associated with MBVR. Except FG other control variables also depicted the same relationship with MBVR as with Tobin's Q

Table 19: Regression Results MBVR as firm performance measure

VARIABLES	(1)	(2)	(1)	(2)	(1)	(2)
	Fixed Effect with Cluster Robust Standard errors		LSDV with Cluster Robust Standard Errors		FGLS with Panels Heteroskedastic and First order Auto-Correlation	
CGDI	0.0894	0.0327	0.0894	0.0327	0.0382***	0.0420***
	(0.0898)	(0.0803)	(0.100)	(0.0903)	(0.00796)	(0.0154)
Risk		-2.877***		-2.877***		-1.547***
		(0.656)		(0.738)		(0.366)

FG		-0.615*		-0.615*		-0.262
		(0.321)		(0.361)		(0.341)
FA		19.40***		19.40***		0.0294
		(5.053)		(5.682)		(0.506)
FS		-3.282		-3.282		-0.162
		(2.697)		(3.032)		(0.282)
Lev		0.657		0.657		-0.430**
		(1.045)		(1.175)		(0.188)
AI		168.9***		168.9**		82.36***
		(55.63)		(62.56)		(26.62)
RI		54.04**		54.04*		3.860
		(24.73)		(27.81)		(7.899)
Industry Dummies		NO		YES		YES
Year Dummies		YES		YES		YES
Constant	-3.391	-9.699	-3.391	-9.699	0.924	4.438**
	(7.756)	(12.98)	(8.655)	(14.59)	(0.701)	(2.072)
Observations	190	190	190	190	190	190
R-squared	0.065	0.458	0.600	0.768		
Number of Firms	38	38	38	38	38	38
Robust Standard Errors in parentheses						
*** p<0.01, ** p<0.05, * p<0.1						

Source: Authors' Analysis

4.5.4 Results with MVA as a measure of firm performance

Like Tobin's Q and MBVR, Regression is performed using FE, LSDV and FGLS models adjusted for heteroskedasticity and autocorrelation. The Regression equations are as follows:

FIXED EFFECT WITH-IN ESTIMATES EQUATION

MODEL 1:

$$(MVA)_{it} = \beta_0 + \beta_1 CGDI_{it} + \mu_{it} \tag{13}$$

MODEL 2:

$$(MVA)_{it} = \beta_0 + \beta_1 CGDI_{it} + \beta_2 FA_{it} + \beta_3 FG_{it} + \beta_4 FS_{it} + \beta_5 Lev_{it} + \beta_6 Risk_{it} + \beta_7 AI_{it} + \beta_8 RI_{it} + \beta_9 (Ind\_dummies)_{it} + \beta_{10}(Year\_dummies)_{it} + \mu_{it} \qquad (14)$$

LEAST SQUARE DUMMY VARIABLE (LSDV) EQUATION

MODEL 1:

$$(MVA)_{it} = \beta_0 + \beta_1 CGDI_{it} + \alpha_1 + \alpha_2 C_{2i} + \alpha_3 C_{3i} + \ldots\ldots\ldots + \alpha_n C_{ni} + \mu_{it} \qquad (15)$$

MODEL 2:

$$(MVA)_{it} = \beta_0 + \beta_1 CGDI_{it} + \beta_2 FA_{it} + \beta_3 FG_{it} + \beta_4 FS_{it} + \beta_5 Lev_{it} + \beta_6 Risk_{it} + \beta_7 AI_{it} + \beta_8 RI_{it} + \beta_9 (Ind\_dummies)_{it} + \beta_{10}(Year\_dummies)_{it} + \alpha_1 + \alpha_2 C_{2i} + \alpha_3 C_{3i} + \ldots\ldots\ldots + \alpha_n C_{ni} + \mu_{it} \qquad (16)$$

Table-20 reveals the impact of CGDI on MVA as firm performance measure. CGDI is found to be significantly positively associated with MVA under different estimation models. But the level of significance varied. With Fixed effect and LSDV model the level of significance is 10% whereas with FGLS the level of significance is 1%. Risk is found to be negatively significantly associated with MVA. FG, FS and Leverage are negatively associated on the other hand; AI and RI are positively associated with MVA. FA depicted a positive relationship under Fixed Effect and LSDV model and negative relationship under FGLS model.

Table 20: Regression Results Using MVA as firm performance measure

	(1)	(2)	(1)	(2)	(1)	(2)
VARIABLES	Fixed Effect with Cluster Robust Standard errors		LSDV with Cluster Robust Standard Errors		FGLS with Panels Heteroskedastic and First order Auto-Correlation	
CGDI	19,097*	10,478*	19,097*	10,478*	9,522***	6,303***
	(11,079)	(10,633)	(12,362)	(11,956)	(2,107)	(1,856)
Risk		-225,192**		-225,192**		-94,106*
		(83,292)		(93,654)		(59,729)
FG		-40,605		-40,605		-72,282
		(53,550)		(60,212)		(48,060)

FA		770,078		770,078		-99,718
		(533,852)		(600,266)		(63,478)
FS		-55,522		-55,522		-452,455***
		(340,693)		(383,077)		(68,991)
Lev		-22,742		-22,742		-184,840***
		(80,393)		(90,395)		(47,364)
AI		1.951e+07***		1.951e+07***		8.105e+06**
		(5.974e+06)		(6.717e+06)		(3.424e+06)
RI		4.328e+06		4.328e+06		1.780e+06
		(4.487e+06)		(5.045e+06)		(1.131e+06)
Industry Dummies		NO		YES		YES
Year Dummies		YES		YES		YES
Constant	-1.212e+06	-1.301e+06	-1.212e+06	-1.301e+06	-464,838***	-2.041e+06***
	(957,430)	(1.561e+06)	(1.068e+06)	(1.755e+06)	(178,558)	(375,881)
Observations	190	190	190	190	190	190
R-squared	0.148	0.348	0.751	0.809		
Number of Firms	38	38	38	38	38	38
Robust Standard Errors in parentheses						
*** p<0.01, ** p<0.05, * p<0.1						

Source: Authors' Analysis

4.5.5 Regression with ROA as a measure of firm performance

Regression equations for the two models (without and with control variables) with ROA as dependent variable are as follows:

FIXED EFFECT WITH-IN ESTIMATES EQUATION

MODEL 1:

$$(ROA)_{it} = \beta_0 + \beta_1 CGDI_{it} + \mu_{it} \tag{17}$$

MODEL 2:

$$(ROA)_{it} = \beta_0 + \beta_1 CGDI_{it} + \beta_2 FA_{it} + \beta_3 FG_{it} + \beta_4 FS_{it} + \beta_5 Lev_{it} + \beta_6 Risk_{it} + \beta_7 AI_{it} + \beta_8 RI_{it} + \beta_9 (Ind\_dummies)_{it} + \beta_{10}(Year\_dummies)_{it} + \mu_{it} \qquad (18)$$

LEAST SQUARE DUMMY VARIABLE (LSDV) EQUATION

MODEL 1:

$$(ROA)_{it} = \beta_0 + \beta_1 CGDI_{it} + \alpha_1 + \alpha_2 C_{2i} + \alpha_3 C_{3i} + \ldots\ldots\ldots + \alpha_n C_{ni} + \mu_{it} \qquad (19)$$

MODEL 2:

$$(ROA)_{it} = \beta_0 + \beta_1 CGDI_{it} + \beta_2 FA_{it} + \beta_3 FG_{it} + \beta_4 FS_{it} + \beta_5 Lev_{it} + \beta_6 Risk_{it} + \beta_7 AI_{it} + \beta_8 RI_{it} + \beta_9 (Ind\_dummies)_{it} + \beta_{10}(Year\_dummies)_{it} + \alpha_1 + \alpha_2 C_{2i} + \alpha_3 C_{3i} + \ldots\ldots\ldots + \alpha_n C_{ni} + \mu_{it} \qquad (20)$$

CGDI has positive but insignificant impact on firm performance measure ROA under various regression techniques used as presented in the Table-21. The relationship between control variables and ROA is different as against market based performance measures (Tobin's Q, MBVR and MVA). Risk demonstrated a positive relationship with ROA under Fixed effect and LSDV model and negative under FGLS techniques. FS is found to be significantly positively associated with ROA. FG is negatively associated with ROA whereas AI and RI are negatively associated with ROA. As far as leverage is concerned, it is negatively and significantly associated with ROA.

Table 21: Regression Results Using ROA as firm performance measure

VARIABLES	(1)	(2)	(1)	(2)	(1)	(2)
	Fixed Effect with Cluster Robust Standard errors		LSDV with Cluster Robust Standard Errors		FGLS with Panels Heteroskedastic and First order Auto-Correlation	
CGDI	0.000200	6.54e-05	0.000200	6.54e-05	6.79e-05	0.000217
	(0.00123)	(0.00139)	(0.00137)	(0.00156)	(0.000214)	(0.000451)
Risk		0.0226		0.0226		-0.00744
		(0.0165)		(0.0186)		(0.00928)
FG		-0.0131*		-0.0131		-0.00848
		(0.00773)		(0.00869)		(0.00737)
FA		0.0882		0.0882		-0.0994***

		(0.0933)		(0.105)		(0.0165)
FS		0.115**		0.115*		0.0249*
		(0.0532)		(0.0598)		(0.0144)
Lev		-0.109***		-0.109**		-0.123***
		(0.0388)		(0.0437)		(0.0130)
AI		-0.0268		-0.0268		-0.708
		(0.847)		(0.953)		(0.479)
RI		-0.630		-0.630		-0.104
		(0.615)		(0.692)		(0.348)
Industry Dummies		NO		YES		YES
Year Dummies		YES		YES		YES
Constant	0.224**	-0.447	0.224*	-0.447	0.199***	0.264***
	(0.106)	(0.284)	(0.119)	(0.319)	(0.0191)	(0.0862)
Observations	190	190	190	190	190	190
R-squared	0.001	0.263	0.747	0.813		
Number of Firms	38	38	38	38	38	38
Robust Standard Errors in parentheses						
*** p<0.01, ** p<0.05, * p<0.1						

Source: Authors' Analysis

4.5.6 Results with ROCE as a measure of firm performance

As Hausman test accepted the null hypothesis for ROCE of significant Random effects, Regression is performed using Random Effect Model. Also FGLS model adjusted for heteroskedasticity and autocorrelation is used.

RANDOM EFFECT EQUATION

MODEL 1:

$$ROCE_{it} = \beta_0 + \beta_1 CGDI_{it} + w_{it} \tag{21}$$

MODEL 2:

$$ROCE_{it} = \beta_0 + \beta_1 CGDI_{it} + \beta_2 FA_{it} + \beta_3 FG_{it} + \beta_4 FS_{it} + \beta_5 Lev_{it} + \beta_6 Risk_{it} + \beta_7 AI_{it} + \beta_8 RI_{it} + \beta_9 (Ind\_dummies)_{it} + \beta_{10} (Year\_dummies)_{it} + w_{it} \qquad (22)$$

Like ROA, CGDI is positively associated with ROCE across all models as shown in Table-22. Control variable Leverage, AI and RI are negatively and significantly impacting firm performance measure ROCE. FG also showed a negative but insignificant relationship with ROCE. FS has a positive and insignificant impact on ROCE. Risk showed a negative relationship with ROCE under Random effect regression and positive relationship under FGLS estimation.

Table 22: Regression Results Using ROCE as firm performance measure

VARIABLES	(1)	(2)	(1)	(2)
	Random Effect with Cluster Robust Standard errors		FGLS with Panels Heteroskedastic and First order Auto-Correlation	
CGDI	0.000365	0.00134	0.000531	0.000789
	(0.00169)	(0.00173)	(0.000372)	(0.000740)
Risk		0.0163		-0.00837
		(0.0319)		(0.0180)
FG		-0.0101		-0.00376
		(0.0139)		(0.0117)
FA		-0.0529		-0.165***
		(0.0557)		(0.0298)
FS		0.0301		0.0646**
		(0.0431)		(0.0256)
Lev		-0.206***		-0.193***
		(0.0606)		(0.0274)
AI		-0.0783*		-1.554*
		(1.470)		(0.906)
RI		-1.041**		-1.157**
		(0.521)		(0.468)

Industry Dummies		YES		YES
Year Dummies		YES		YES
Constant	0.285*	0.214	0.270***	0.295**
	(0.146)	(0.205)	(0.0319)	(0.134)
Observations	190	190	190	190
Number of Firms	38	38	38	38
Robust Standard Errors in parentheses				
*** p<0.01, ** p<0.05, * p<0.1				

Source: Authors' Analysis

4.5.7 Regression with ROE as a measure of firm performance

For ROE also Hausman Test accepted the null hypothesis, thus the regression is performed using Random effect along with FGLS.

RANDOM EFFECT EQUATION

MODEL 1:

$$ROE_{it} = \beta_0 + \beta_1 CGDI_{it} + w_{it} \tag{23}$$

MODEL 2:

$$ROE_{it} = \beta_0 + \beta_1 CGDI_{it} + \beta_2 FA_{it} + \beta_3 FG_{it} + \beta_4 FS_{it} + \beta_5 Lev_{it} + \beta_6 Risk_{it} + \beta_7 AI_{it} + \beta_8 RI_{it} + \beta_9 (Ind\_dummies)_{it} + \beta_{10}(Year\_dummies)_{it} + w_{it} \tag{24}$$

The regression estimates are shown in Table-23. Like accounting measures ROA and ROCE, The relationship between CGDI and ROE is found to be positive irrespective of the regression technique employed. Control variable Risk, FA and RI are negatively significantly associated with ROE, but the relationship with FG and AI is only negative. FS has a positive and significant impact on ROE. Leverage also has a positive impact on ROE; however the impact is found significant only under FGLS estimation.FA is negatively and significantly associated with ROE because of company and products life cycle growth stage, as it calculated taken into account the date of incorporation. RI research is negative and significantly associated with ROE as the firms and product becomes older there is a need to spend lot on R&D expenditure which is adversely impacting the ROE. Firm growth isnegatively associated with ROE, as this measure is calculated with the help of sales

numbers, when sales dip ROE will falls, but this fall is not statistically significant as it is clear from the model (name the model), AI isnegatively associated with ROE, spending on advertising to a large extent is a controllable cost and its impact is not significant on the ROE. FS is positive and significantly associated with ROE, large and big firms because of their conglomerate/ diversified character, huge asset base in their balance sheet has a significant impact on ROE

Table 23: Regression Results Using ROE as firm performance measure

VARIABLES	(1)	(2)	(1)	(2)
	Random Effect with Cluster Robust Standard errors		FGLS with Panels Heteroskedastic and First order Auto-Correlation	
CGDI	0.000803	0.00127	0.000575	0.000627
	(0.00195)	(0.00185)	(0.000635)	(0.000774)
Risk		-0.0259*		-0.0305*
		(0.0343)		(0.0184)
FG		-0.00992		-0.00366
		(0.0170)		(0.0127)
FA		-0.120*		-0.177***
		(0.0699)		(0.0255)
FS		0.0624*		0.0793***
		(0.0444)		(0.0240)
Lev		0.0212		0.0329*
		(0.0637)		(0.0188)
AI		-0.0612		-1.143
		(1.389)		(1.001)
RI		-1.218*		-1.050**
		(0.651)		(0.512)
Industry Dummies		YES		YES
Year Dummies		YES		YES

Constant	0.466***	0.231	0.451***	0.286**
	(0.173)	(0.243)	(0.0571)	(0.137)
Observations	190	190	190	190
Number of Firms	38	38	38	38
Robust Standard Errors in parentheses				
*** p<0.01, ** p<0.05, * p<0.1				

Source: Authors' Analysis

5. Conclusion

In the present paper we have outlined the construction of corporate governance disclosure Index for NSE listed firms in India. The index is based on eleven broad dimensions namely- Statement of Philosophy, Board of directors, Board meetings, Audit committee, Shareholder's/Investors Grievance Committee, Remuneration Committee, Nomination Committee, General Body Meetings, General Shareholder Information, Mandatory Disclosures and Non-mandatory Disclosures. 52 parameters form these eleven dimensions were used to develop the overall CGDI. The CGDI for the 5 years form 2008-12 for 38 non-financial NSE nifty 50 companies showed an upward trend in the governance practices. Companies are moving close to each other in terms of their CGDI. However, the results revealed that there is significant scope for improvement in the corporate governance disclosure practices followed by the companies as not even a single company in the period of 5 years attained a maximum value of CGDI i.e. 100.

The results of Cross Sectional OLS regression, Pooled OLS regression and Panel Data regression concluded that CGDI has a positive impact on firm performance measured either with market based measures or accounting based measures. The Cross-Sectional OLS regression analysis results provided a sound proof of strengthening of the relationship between CGDI and firm performance measures over the years. This strengthening of relationship is attributable to the growing corporate governance reforms as enacted in Indian corporate sector over these years. The results of pooled OLS regression found a positive and significant relationship between the CGDI and Firm performance measures. Panel Data regression results reported a significant and positive relationship between CGDI and market based performance measures but only positive relationship with accouting measures. The results are consistent with agency theory of Corporate Governance which focuses on monitoring the performance managers so that they align their interests with the interests of the shareholders of the company. The findings are in line with the previous studies in both developed and developing market (Klapper and Love, 2004; Durnev and Kim, 2005; Sarkar et. al,

2012; Black et. al, 2006; Varshney et. al, 2012). The study implies that firms that disclose more are likely to result in higher performance.

The research paper is subject to certain limitations. The study is restricted to a limited number of companies for a period of 5 years. The findings may be different if a larger sample was included for a longer time period. Also the parameters included in the study were recorded based on the information disclosed in the annual reports and it is thus assumed that the information is fair and accurate. A worthwhile avenue for future research could be to use same hypothesis to analyse the corporate governance disclosure practices followed by other developing countries and more developed countries for a large number of companies and in light of other control variables.

Despite the limitations, the results provided strong evidence in favour of the theoretical arguments that corporate disclosures reduces agency costs arising due to separation of ownership and control and information asymmetry.

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Annexure

Corporate Governance Disclosure Index

S.NO	MAIN DIMENSION	SUB DIMENSION	Points Assigned	Score
1	**Statement of Philosophy**	Statement of Company's Philosophy on Code of governance	1	1
2	**Board of Directors**	Details of Board of Directors	1	6
3		Percentage of non-executive directors as stipulated	1	
4		Percentage of Independent directors as stipulated	1	
5		Details of membership in other companies	1	

6		Details of membership/Chairmanship in other committees	1	
7		Disclosure of tenure & age limit of directors	1	
8	**Board Meetings**	Number of board meetings in a year	1	4
9		Dates of Board meetings	1	
10		Attendance of each director at the Board Meeting	1	
11		Attendance of each director at the last AGM	1	
15	**Audit Committee**	Description of Audit Committee terms of Reference	1	7
16		Members of Audit Committee	1	
17		Audit Committee chaired by Independent Director	1	
18		Presence of member with expertise in accountancy	1	
19		Number of audit committee meetings	1	
20		Dates of audit committee meetings	1	
21		Attendance of each director in the committee meeting	1	
22	**Shareholders' / Investors Grievance Committee**	Members of Shareholders' / Investors Grievance Committee	1	6
23		Independence of Shareholders' / Investors Grievance Committee	1	
24		Number of Shareholders' / Investors Grievance committee meetings	1	
25		Dates of Shareholders' / Investors Grievance committee meetings	1	
26		Attendance of each director in the committee meeting	1	
27		Information on the number of Grievance received and addressed	1	
28	**Remuneration Committee**	Brief description of terms of reference	1	5
29		Composition, name of members and Chairperson of Remuneration Committee	1	
30		Dates of Remuneration Committee Meetings	1	
31		Attendance of each director in the committee meeting	1	
32		Details of remuneration to all the directors, as per format in main report.	1	
33	**Nomination Committee**	Presence of Nomination Committee	1	1
12	**General Body Meetings**	Dates, Time and Location of last three AGMs	1	3
13		Details of Special Resolution passed in the last three AGMs	1	
14		Details of Resolution passed through postal ballot in the last financial year	1	
34	**General Shareholder Information**	Listing on Stock Exchange	1	7
35		Stock Code	1	
36		Registrar and Transfer Agents	1	
37		Share transfer System	1	

38		Distribution of Shareholding	1	
39		Plant Locations	1	
40		Address for Correspondence	1	
41	**Mandatory Disclosures**	Information and Compliance of Code of Conduct	1	8
42		Significant Related Party transactions	1	
43		Non-compliance by the company, penalties & strictures imposed	1	
44		Management Discussion & Analysis Report	1	
45		Remuneration to Directors	1	
46		Means of Communication Information	1	
47		CEO/CFO Certification	1	
48		Compliance Report on Corporate Governance	1	
49	**Non Mandatory Disclosures**	Whistle Blower Policy	1	4
50		Training of the Board Members	1	
51		Audit Qualification	1	
52		Shareholder Rights	1	
		Total	52	52