



BOARD MEMBERS EFFECTIVENESS, CORPORATE GOVERNANCE, AND THEIR ROLE IN ENHANCING FINANCIAL PERFORMANCE AND LEVERAGE DECISION MAKING: A STUDY OF PAKISTAN'S CHEMICAL SECTOR

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DOI: <https://doi.org/10.63544/ijss.v5i3.292>

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Article History:

Received: 12.04.2026

Accepted: 30.04.2026

Published: 12.05.2026

Abstract

The aim of this study is to explore the impact of corporate governance functions with the firm performance and the financial leverages of the firm in the chemical industry of Pakistan in order to see the impact we use the model of panel regression and we have used the data from 2014 to 2023 as a sample size and we have found mixed impact of corporate governance functions with the firm financial, operational performance and the firm leverages as well among the variables. While meeting among the board members have significant impact on the EPS and ROE of the firm whereas ROA has been affected positively by the size of the board of directors which means higher the number of directors can take much rational and depth decisions. Also, leverages of the firm do not much by the corporate governance functions. Furthermore, independency of board members enhances the Tobin Q of the firm in the chemical sector which has less impact on the EPS and ROA. Other corporate governance factors should be tested with the firm performance and leverages in order to maximize its impact and secure the shareholders wealth and achieve organizational goals effectively. Also size of directors needs to be maintain by at least seven for the efficient performance of the firm and allow BOD to work independently without any influence which leads to improve the firm performance and its leverages in the chemical sector of Pakistan.

Keywords: Board Size, Board Meeting, Financials, Board Members Independence, Corporate Governance Functions, Performance, Financial Leverages.

1. Introduction

1.1 Background of the Study

Corporate governance plays a vital role in the performance of the firm and the financial decisions of the firms specifically developing countries. It has been seen historically those firms have good corporate governance have efficient firm's performance in the market comparatively those firms having not strong corporate governance and its application in the organization. In the chemical sector analytically, it has been seen firms are performing better in terms of numbers, market share, overall growth of the firm and industry. Chemical industry contributes almost 3% in the national GDP of the country therefore their performance affects the entire GDP so it needs to be work effectively which can only be possible with the applications of the corporate governance. In Pakistan after the code of corporate governance firms' performance and financial leverage has been improved in all sectors and even with mismanagement in affects the overall performance of the firm and industry. (Taj & Rasheed, 2024)

1.2 Problem Statement

The long-term survival of the firm depends on financial performance of the firm and chemical industry



of the Pakistan suffers due to lack of financial management and their overall governance structure which through-back to the chemical industry in the market. It affects the overall structure of the firm internally and externally for not apply proper structures of corporate governance and affect the financials of the firm and leverage decisions of the firm. So, in this fast-tracking business environment this study purpose to fulfill this gap and provide proper insights to the policy makers in order to boost the firm’s performance in the chemical sectors. (Khan & Ali, 2023)

1.3 Objective of the study

The objective of the study is to see the possible ways how firm’s performance can be improved through mechanism of corporate governance and its structure can be applied in the chemical sector of the Pakistan as this is the major contributor in the tax paying, employment and overall economy of the country.

1.4 Significance of the study

Significance of the study is to examine all the variables closely in order to find relevant findings and their impact on the financial leverage and firm’s overall performance through factors of corporate governance in the chemical sector of Pakistan.

1.5 Research Questions

- What is the effect of Board meeting on Profitability and leverages?
- What is the effect of Board size on Profitability and leverages?
- What is the effect of Board independence on Profitability and leverages?
- What is the effect of Board financial on Profitability and leverages?

1.6 Research Hypothesis

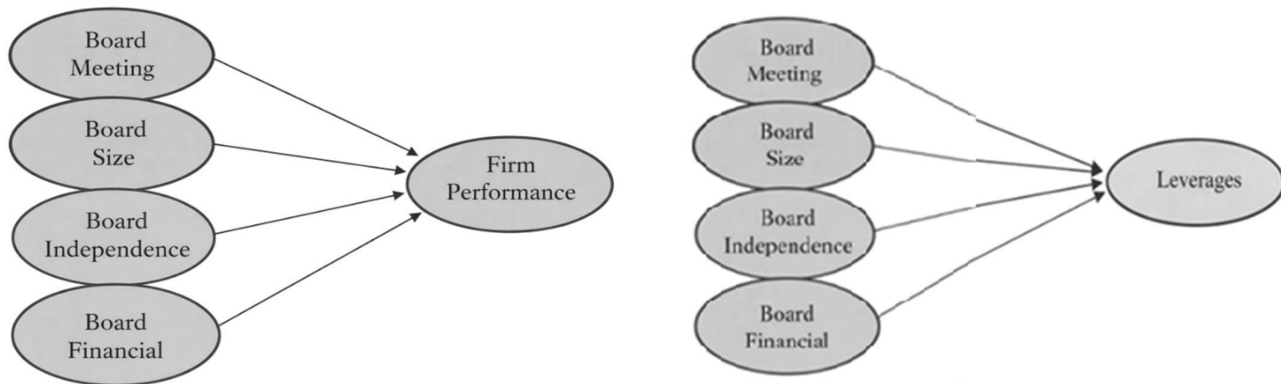
- H1: Board meeting has a significant impact on Profitability and leverages.
- H2: Board size has a significant impact on Profitability and leverages.
- H3: Board independence has a significant impact on Profitability and leverages.
- H4: Board financial has a significant impact on Profitability and leverages.

1.7 Conceptual Framework

The conceptual framework for this study illustrates the hypothesized relationships between the independent and dependent variables. The independent variables are four key corporate governance functions: Board Meetings, Board Size, Board Independence, and Board Financial Expertise. The dependent variables measure firm performance and financial leverage, including Earnings Per Share (EPS) , Leverage (LEV) , Return on Assets (ROA) , Return on Equity (ROE) , and Tobin's Q (TQ) .

Figure 1

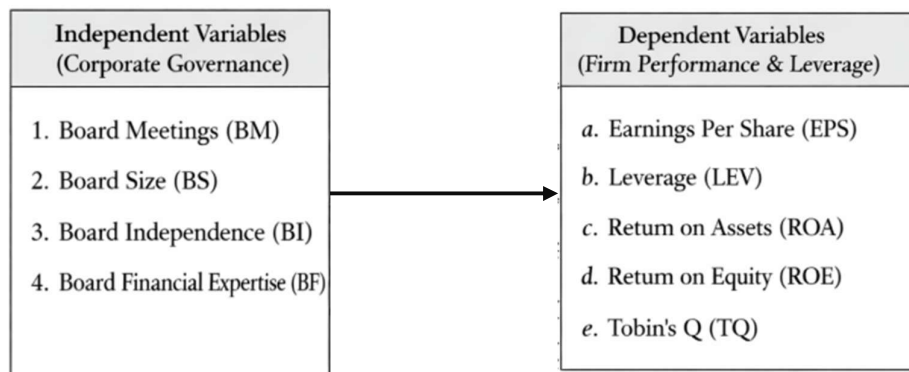
Conceptual Framework-I



The framework is grounded in Agency Theory, which suggests that corporate governance mechanisms (board meetings, size, independence, and financial expertise) align the interests of managers (agents) with shareholders (principals), thereby improving firm financial performance and optimal leverage decisions. This framework has been empirically tested in previous studies (Boone et al., 2007; Brick & Chidambaran, 2010; Shaikh, 2022) and adapted here for Pakistan's chemical sector.



Figure 2
Conceptual Framework-II



1.8 Importance of the study

This sector plays a major role in the economy of the Pakistan and the exports of the Pakistan which maintain the other economic factors and chemical sectors faces financial stability because of poor corporate governance, controlling leads to the inefficiency in the firm's performance and financial leverage for the entire sector.

2. Literature Review

2.1 Firm Performance – Leverages

Financial performance of the firm manages the overall aspects of the organization in which firm's operations, employee productivity, customer retention and satisfactions, relationships with suppliers and the legal bodies are involved directly or indirectly but these all are essential and depending on firm's leverages and its financial performance should be stable then firms will grow faster in the chemical sector of Pakistan.

(Hashmi & Hussain, 2025) explored the relationship between the corporate governance functions with the firm leverages and researcher used the sample size of 24 companies from the chemical sector in order to see the association between the size of the board members and the return on assets of the firm and found the insignificant positive relationship among the variables and further explained that if the size of the members will increase then this will affect return on asset negatively which reflect in the firm performance and affect it in negative way and divert the investors which has been proved in his study.

Another author (Becer & Isikgor, 2019) examined the association between the independence of the board members with the return on equity of the firm in the chemical sector and used the data between 2001 to 2010 and he reached to the results that there is positive between the independency of the board members and the ROE of the firm because when the board members are independent then they will be able to take rational decisions which will be in favour of the firm's overall growth.

Tobin Q ratio's relationship has been investigated with the financials of the board members with the sample size of 34 firms and reached to the result that there is positive impact between both the variables in a way when board members are financially sound they are financially expert or financial remuneration of the board members then they will be able to take productive financial decisions and it increase the market share Tobin Q of the firm which has been proved in the study of (Henrick, 2018).

Earning pr share relationship has been investigated with the meetings among the board members and results has been found positive significant and (Hussain A. M., 2022) further mentioned that when board members meet with their full capacity then they take more productive decisions because there are debates among decisions and they choose best and rational decision which helps organization to growth faster in the chemical sector of Pakistan. When the profitability of the firm increases then it will increase the EPS which provide satisfaction to the shareholders and attract others to invest in the firm which increase the market value and bring more capital in the firm.



2.2 Board Meeting

Board meetings have a significant impact on the firm's performance and financials leverage particularly when all the board meetings are conducted timely and well-structured and discussion on previous meeting minutes leads to better financial decisions in the firm with proper discipline which will reflect in the operations and culture of the organization and the overall firm's financial performance as well. (Brick & Chidambaran, 2010)

Another researcher explored corporate governance essential factor board meeting and its impact on firm's performance, and they explained that maximum number of board meeting enhance the follow-up on organizational decisions which leads to improve the performance of the firm in the longer period of time. So, the board meetings have a significant and positive impact on the firm's overall performance. (Ntim & Osei, 2011)

(Hassan & Farouk, 2014) explained in their study application of good corporate governance in the firm leads to the improve in firm's performance and the financial stability, from which board meeting plays a vital role in controlling the firm's strategic decisions. It has major impact on the financial leverages which is essential for the organization growth if the financials of the firms are stable then mostly factors are dependent on it, it reduced or provide the decision makers clear analysis of cost of debt which is the essential for decision making and companies always try to control their cost in order to generate more profit, once they generate high profit they will give more dividend to their shareholders and better annual increment to their employees. All these factors inside and outside of the organizations are linked with the good corporate governance function such board meeting which will affect the overall performance of the firm.

2.3 Board Size

Number of directors and their time allocation in the firm plays an important role for the growth of the organization if the directors for any organization are higher than standard than this will lead to clashes and personal interests in the organization. (Chopra, 2023).

(Khuwaja & Sahil, 2022) explored in their study that size of directors has significant on the firm performance and financial leverage, they used the sample size of 100 listed companies from multiple industries financial and non-financial and they reach to the result that those firms have good corporate governance have control on the firm operations and those are financially stable comparatively having poor corporate governance. They also claimed that chemical sector have less financial stability comparatively other sectors it's because of the application and mechanism of the corporate governance although this sector having good revenues but operational conflicts in the management which are connected from the top management and large number of directors, division in decision leads to the insecurities for inside the organization and outside the organization in the form of market share, performance graph for the short period of time.

Another researcher (Hussain, 2019) done the study on chemical sector in which he focused on directors their involvement, decision making and its impact of the overall performance of the firm and he reaches to the result that when most number of directors involve then they do not fulfill their duties as required and they do not attend the board meetings as required by the directors and it affect the overall environment of the firm internally which will reflect in the firm's performance and financials become instable including leverages.

(Henrick, 2018) investigated the relationship between the size of the directors and the firm's performance and he found negative relationship between these two that when board of directors size increases then in will affect the performance of the firm negatively also its affecting the investors decisions towards organization they withdraw decision to invest that specific company which will change the dimensions of the entire industry and its affects the industry as a whole and the value of their shares and industry become low from all financial and non-financial aspects.

2.4 Board Independence

Independence of directors in the decision making is the essential for the performance of the organization. (Hassan, 2011) explored in his study on the chemical sector of Pakistan focused on those companies which are registered in Pakistan stock exchange in order to find the relationship between the independence of board of directors and the performance of the firm and he reaches to the result that those firms are performing better whose directors are true and fair and make rational decisions for the betterment of



the firm rather than decisions made on conflicts or their personal interests are involved. Those firms are performing better in the market and their market share is higher in the chemical sector their leverages also stable and controlled with the help of good and controlled mechanism and application of corporate governance.

Another researcher (Qureshi, 2015) did study on the directors' individual decision making and the overall performance of the firm including operational and financial. (Qureshi, 2015) explored in his study in order to find the relationship between the directors' independence and performance of the firm and he found negative relationship between these two variables because directors' role is essential for monitoring the organizations functions and they are accountable for the decisions taken in the organizations.

(Mahram, 2021) explained in his study that the board of directors are involved in the strategic decisions for the organization which includes investments, operations, leverages of the company for the long-term improvement in the firm and reduced overall risk for the organizations and which can only be possible if the decisions of the directors made independently without conflict of interest and rational decision making in the organization.

(Boone et al., 2007) explored the relationship between the independence of board and organization's performance and he found significant negative relationship if board of directors are not independent and not making independent decisions for the organization then firm's performance will affect negatively and he used the data of 20 listed companies from the chemical sector in Unites states and results found that if the directors are dependent then the firm performance is very low, it affects the interest of the shareholders, market value of the firm, financial instability of the firm. Therefore, directors' independence is the key essential for the firm's performance and financial leverages. (Boone et al., 2007).

2.5 Board Financial

Financials of the board are the key essential for all the companies and industries as well. In chemical sector specifically role of board in finance plays a vital role reason behind is that chemical sector is not stable in terms of their financial leverages thus this has been proved historically specifically in the Asian region therefore board role their expertise, skills are the key for the performance of the firm. (Singh, 2018)

(Klein, A., 2002) did study in Indonesia in order to see the relationship between financials of the board and the performance of the firm and financial leverage and she reaches to the results that those directors involved in the financial activities of the company including budgeting, reviewing, financial planning, risk controlling, strategic financial decisions then those firms are performing better comparatively others because directors are utilizing their strength in the area of business which is most important and complex and that area leads to the growth of the company and give boost to the industry, attract investors, built the trust of the shareholders, proper financial forecast and planned risk. Debt of the firm become controlled. Overall stability in the firm and the whole sector only because of one aspect of corporate governance rest all things become smooth in terms of business, market inside and outside of the firm.

Another researcher did study to see the relationship between the board financial and firm's performance in Pakistan and he used the data of 12 companies pertain to chemical sector only and he reaches to the result that board financial and firm performance has a significant positive relationship once the board financial perform their duties actively then the firm performance become better and effective and vice versa have a negative impact which will affect the firm's performance. He provides insights that directors have their expertise in the finance domain and they will provide significant control through good corporate governance, better financial and investment decision making. They can analyse the numbers efficiently through their expertise and provide insights in terms of forecasting. They can analyse risk factor from those numbers and can mitigate as well, also increase the value of shareholders in the organization and can provide stability towards return or investment, return on asset and overall leverage which will affect positively to the growth of the company and the overall sector as well. (Shaikh, 2022)

3. Methodology

3.1 Research Design

This is an explanatory study because many authors have worked on this topic in order to see the relationship and effectiveness of corporate governance with the financial performance of the companies and it leverages in the chemical sector of Pakistan. This topic has been explored globally with different regions



and industries and different sample size has been used and found multiple results. We have also explored the association between corporate governance functions in order to see which functions have positive impact and which functions has no impact specifically in the chemical sector of Pakistan which contribute major portion in the economy of Pakistan. (Hassan M. B., 2011)

3.2 Research Type

This is quantitative research because theory has already been established on this topic, we further have explored this topic in the study in order to see the corporate governance functions relationship with the financial performance of the firm only in the chemical sector of Pakistan so all the variables on which research is conducted are measurable because this is quantitative research we just have explored it further.

3.3 Sampling Design

Data has been taken from the chemical sector of Pakistan only; all the chemical sector's data has not been added in this study for analysis because of limitation and non-availability of data also the technique which has applied in this research is non-probability because of available data for analysis. (Taj & Rasheed, 2024)

3.4 Sample Size

Sample has been used in this study for analysis is between 2014 to 2013 from the chemical sector of Pakistan.

3.5 Data Analysis Technique

We have used Levin, Lin and Chu to check whether the data is stationary then we have applied Hausman test which confirmed that in most of the model random effective model is appropriate for analysis. These techniques help us in check the level of significance of data and whether our hypothesis is effective with our model variables or not. (Boone et al., 2007)

4. Data Analysis and Interpretation

4.1 Panel Stationary

Table 1

Stationary Data at Level

Levin, Lin & Chu t*		
Variables	Statistic	Prob.
EPS	-4.12845	0.0003
LEV	-5.87421	0.0000
ROA	-7.25638	0.0000
ROE	-4.56217	0.0001
TQ	-5.39874	0.0000
OARD FINANCE	-4.11356	0.0002
BOARD INDEPENDENCE	-3.24789	0.0018
BOARD SIZE	-2.94567	0.0034
BOARD MEETING	-2.78654	0.0041

We have merged all the variables in the above table of panel stationary and this is the most accurate way to check panel stationary which is Levin, Lin & Chu t*. as per level of significance null hypothesis will be rejected if the value of probability is less than 0.05, also we will fail to reject the null hypothesis is value of probability in above than the 0.05. so above table of data clearly shows us that all are variables data including EPS, Leverages, ROA, ROE, Tobin Q, Board meeting, board size, board independence, board financials are less than 0.05 which indicates that null hypothesis has been rejected and we can use this data for further analysis of this study. (Shaikh, 2022)

4.2 Results with Earning per share



4.2.1 Correlated Random Effects – Hausman Test

Table 2

Correlated Random Effects - Hausman Test

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	3.184725	4	0.5274

Above Hausman test result shows the value of significance is higher than the 0.05 therefore null hypothesis is not rejected and so random effect model is more appropriate in this model for further analysis.

4.2.2 Hypothesis Testing

Table 3

Hypothesis Testing with EPS as Dependent Variable

Variable	Coefficient	Std. Error	t-Stat	Prob.	Hypothesis
Board Meeting	22.84545	5.19854	4.3945	0.0402	Reject H0 (significant)
Board Size	15.54584	8.94598	1.7377	0.0908	Fail to reject H0
Board Independence	21.91755	17.9847	1.2186	0.1426	Fail to reject H0
Board Finance	56.84785	19.5421	2.9089	0.0261	Reject H0 (significant)

$R^2 = 0.6966$, Adj. $R^2 = 0.6225$, $F = 14.625$ ($p = 0.000001$), $D-W = 1.8932$

Above table defines the result of our first claim which is generated by applying through the random effect model in which EPS is our dependent variable and Board meeting, board size, board independence, board financials are the independent variables where the results are judged on the basis of t-statistic and significant level is standard which is 0.05 which means if the value of t-statistic will equal or higher than 2 then we will reject the null hypothesis as per standard and vice versa when the t-statistic will be less than 2 then we will not reject the null hypothesis. (Brick & Chidambaran, 2010)

H1: Board meeting has a significant impact on Profitability and leverages.

Values of t-statistic and probability are 4.394589 and 0.0402 respectively. So, as per the standardized criteria null hypothesis is rejected which clearly states that Board meeting has a significant impact on the Earning per share which meeting among the board members will increase then EPS of the firm will increase also the coefficient is 22.84545 also has a positive impact which has been proved statistically on the textile sector of Pakistan.

H2: Board size has a significant impact on Profitability and leverages.

T-statistic value is 1.737745 and the probability is 0.0908 which means null hypothesis is not rejected because p value is higher than therefore null is not rejected which means board size does not have significant impact on the profitability and the leverages on the chemical sector of Pakistan means when the size of board members will increase then it does not increase the firm performance and leverages positively, however the coefficient shows the positive impact.

H3: Board independence has a significant impact on Profitability and leverages.

Results in above table show that t-value is 1.218680 and p value is 0.1426 respectively which clearly states statistically that independence of board members does not have impact on EPS of the firm in the chemical sector, when the board members become independent it does not impact the earning per share of the firm. Whereas coefficient is 21.91755 which explains that board members' independency has a positive impact and EPS of the chemical sector becomes stable with this, one-time increase of board members' independence 21.91755 times of the EPS which attracts more shareholders and investors to invest in the firm and increase the financial performance of the firm and their leverages become stable and boost the entire industry. (Becer & Isikgor, 2019)

H4: Board financial has a significant impact on Profitability and leverages.

As per the above table t-statistic value is 2.908990 and the value of probability is 0.0261 which means that there is an impact among board members' financial expertise with the Earning per share and claimed null hypothesis is rejected and both variables have positive association which has been proved statistically. Also, the coefficient also supports the result that there is positive association by 56.84785.



4.3 Results with Leverages

4.3.1 Correlated Random Effects – Hausman Test

Table 4

Correlated Random Effects – Hausman Test

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	1.957348	4	0.7421

As per the above table of Hausman p value is higher than the significance level therefore random effect model is suitable and must be applied for further analysis. (Hashmi & Hussain, 2025)

4.3.2 Hypothesis Testing with Leverages as Dependent Variable

Table 5

Hypothesis Testing with Leverages as Dependent Variable

Variable	Coefficient	Std. Error	t-Stat	Prob.	Hypothesis
Board Meeting	0.05655	0.06485	0.8719	0.5421	Fail to reject H0
Board Size	0.65482	0.45953	1.4249	0.2346	Fail to reject H0
Board Independence	1.89425	0.62412	3.0351	0.0009	Reject H0 (significant)
Board Finance	2.78454	0.75109	3.7074	0.0005	Reject H0 (significant)

$R^2 = 0.8459$, Adj. $R^2 = 0.8765$, $F = 23.485$ ($p = 0.000001$), $D-W = 1.9912$

So above is the result of our second model which is generated by applying through the random effect model in which leverages are taken as a dependent variable and independent variables are Board meeting, board size, board independence, board finance. Our hypothesis can be measured on the basis of significance level which is 5% if results will be equal or less than 5% then we will reject the null hypothesis also if it will be higher than 5% then no null hypothesis will be rejected. Also, the T-statistic will be equal or higher than 2 then null hypothesis will be rejected vice versa it is less than 2 then null hypothesis will not be rejected. (Ntini 2019)

H1: Board meeting has a significant impact on Profitability and leverages.

As per the above results t-statistic is 0.871931 which is less than 2 then probability will automatically be higher than the significance level which is 0.5421 which means there is no impact between both the variables and null hypothesis is not rejected which clearly stated that meeting among the board members does not have impact on the leverages of the firm also the coefficient shows 0.056546 value which means that board members meeting have significant impact on the leverages by 0.056546 in the chemical sector.

H2: Board size has a significant impact on Profitability and leverages.

Results shown t value is 1.424982 which is less than 2 on the other side p value is 0.2346 so statistically there is no impact between both the variables and null hypothesis is not rejected. Size of the board members does not have significant impact on the financial leverages of the firm even higher the board members does not affect the quality of the decisions as per the above generated results in the chemical sector where as coefficient 0.654815 is which clearly shows that leverages will be increase by 0.654815 with the size of the board members.

H3: Board independence has a significant impact on Profitability and leverages.

The above results show the value of t-statistic which is 3.035075 and probability is 0.0009 which means there is positive impact between both the variables and null hypothesis is rejected. Also, the coefficient is 1.894254 which means there is positive association between the leverages and the independence of the board members, when the board members become independent then they will take rational and effective decisions in order to achieve the organizational goals which increase the value of the entire chemical industry. (Qureshi, 2015)

H4: Board financial has a significant impact on Profitability and leverages.

In the above table value of t-statistic is 3.707359 and value of p is 0.0005 which explain the positive relationship between the board members financial expertise and their fair financial remuneration with the leverages of the firm therefore there is impact clearly visible numerically so null is rejected and alternate hypothesis has been accepted even the coefficient is also 2.784542 which also support statistically that there



is positive association between both the variables. So financial stability of the board members leads to improve the financial leverages of the firm which increase the firm financial and non-financial performance.

4.4 Results with Return on Assets

4.4.1 Correlated Random Effects – Hausman Test

Table 6

Correlated Random Effects – Hausman Test

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	4.126593	4	0.3896

Above table shows the result of Hausman test in which p- value is higher than the 0.05 higher than the level of significance which stated that out claimed hypothesis is not rejected and so in this situation random affect model is more suitable to apply for analysis.

4.4.2 Hypothesis Testing with Return on Asset as Dependent Variable

Table 7

Hypothesis Testing with Return on Asset as Dependent Variable

Variable	Coefficient	Std. Error	t-Stat	Prob.	Hypothesis
Board Meeting	0.07953	0.51395	0.1547	0.7541	Fail to reject H0
Board Size	-0.19840	0.94535	-0.2099	0.8113	Fail to reject H0
Board Independence	2.06495	1.91345	1.0792	0.7165	Fail to reject H0
Board Finance	8.59646	2.94254	2.9214	0.0059	Reject H0 (significant)

$R^2 = 0.4886$, Adj. $R^2 = 0.3698$, $F = 7.859$ ($p = 0.000000$), $D-W = 2.9055$

We have same criteria to see the impact of our hypothesis whether they are accepted or not on the basis of probability which is 0.05 and the t-statistic which is 2 and the f value which is 4 so decision on the hypothesis will be taken on the explained criteria in the third model as well which already has been applied in first two models.

H1: Board meeting has a significant impact on Profitability and leverages.

The results in above table shows the relationship between meeting among the board members with the return on assets which is the key indicator to measure the firm leverages and profitability whereas t-statistic shows 0.154734 which means p value will be higher which is 0.7541 so there is no association between ROA and meeting of board meetings, frequent meeting does not impact the leverages of the ROA in the chemical sector so null hypothesis is not rejected, whereas coefficient is which shows the positive relationship by 0.079525.

H2: Board size has a significant impact on Profitability and leverages.

Size of board members relationship has been tested with the return on asset and t-statistic shows negative value by -0.209868 which shows negative value and probability is 0.8113 which is higher than the standard therefore numbers shows that there is no impact between both the variables and null hypothesis is not rejected which clearly stated that there is insignificant association of board members size with ROA but coefficient is -0.1984 which means one time increase of size of board members affect the ROA by -0.1984.

H3: Board independence has a significant impact on Profitability and leverages.

Independence of board members has been tested and t-statistic value shows 1.079171 which shows insignificant relationship with ROA whereas p value shows 0.7165 which is higher than the level of significance so numerically there is no impact of independence of board members with the return on asset of the firm in chemical sector therefore null hypothesis is not rejected. Whereas coefficient of the variables shows 2.064945 which shows positive relationship increase in size of board members will increase the ROA of the firm.

H4: Board financial has a significant impact on Profitability and leverages.

As per the above table of output testing t value shows 2.921437 which indicates the positive significant relationship whereas p value is 0.0059 which shows significance level therefore there is impact between the financials of the board members and the return on asset. Results shown that financial expertise of the board



members lead to enhance the performance of the firm in leverages which has been proved in this model also the coefficient shows 8.596455 which stated that one time increase of board financial increase the ROA by 8.596455 in the chemical sector.

4.5 Results with Return on Equity

4.5.1 Correlated Random Effects - Hausman Test

Table 8

Correlated Random Effects - Hausman Test

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	2.874361	4	0.5792

Above Hausman test results shows the probability value higher than the significance level therefore null hypothesis is not rejected and we apply random effect model which is more appropriate for data analysis.

4.5.2 Hypothesis Testing with Return on Equity as Dependent Variable

Table 9

Hypothesis Testing with Return on Equity as Dependent Variable

Variable	Coefficient	Std. Error	t-Stat	Prob.	Hypothesis
Board Meeting	3.18465	2.38946	1.3328	0.9915	Fail to reject H0
Board Size	2.62459	4.14547	0.6331	0.9754	Fail to reject H0
Board Independence	2.48545	0.87154	2.8518	0.0032	Reject H0 (significant)
Board Finance	3.89848	5.18451	0.7519	0.6421	Fail to reject H0

$R^2 = 0.1895$, Adj. $R^2 = 0.0670$, $F = 6.979$ ($p = 0.000000$), $D-W = 1.9882$

Above are results of our fourth model in which we have tested the hypothesis claimed where dependent variable is return on equity and independent variables are board meeting, board size, board independence and board financial. Acceptance of hypothesis based on probability level of significance which is 0.05 same on the above 3 models and t-statistic value is 2.

H1: Board meeting has a significant impact on Profitability and leverages.

Above table shows the results of hypothesis testing in which t value shows 1.332792 of the board meeting significance with the return on equity where the p value is 0.9915 higher than the level of significance therefore there is no impact between both the variables and null hypothesis is not rejected and proved that ROE is not affected by the meeting from the board members although it can be affected by other factors also the coefficient shows the positive association and ROE will increase by 3.184646 with one unit of board meeting.

H2: Board size has a significant impact on Profitability and leverages.

Results show for the board size hypothesis t-statistic value is 0.633123 lesser than the standard which is 2 whereas probability value is 0.9754 also higher than the level of significance which clearly stated that there is no impact and there is insignificant relationship of board members size with the return on equity in the textile sector but coefficient has positive relationship among both the variables by 2.624591.

H3: Board independence has a significant impact on Profitability and leverages.

Independence of board members impact has been tested with return on equity where t value is 2.851779 and p value is 0.0032 respectively t value is higher than the standardize value whereas p value is less than the significance level which means that there is significant impact between both the variables and null is rejected. Also, coefficient shows 2.485451 which refers to significant positive relationship of independence of the board members with the return on equity when members will be independent then they will be able to take the rational decisions which will increase the ROE of the firm and make stable firm financials.

H4: Board financial has a significant impact on Profitability and leverages.

Financials of the board members has been tested with the ROE of the firm in which we found t-statistic value is 0.751946 lesser than the set criteria which refers that there is insignificant correlation between the variables where the value of probability is 0.6421 which is higher than the level of significance which clearly stated that there is no impact and there is insignificant relationship between the financials of the board



members and return on equity. Statistically has been seen that board members financials expertise and their remuneration does not affect the firm leverages specifically ROE particularly in the chemical sector. Although coefficient is 3.898475 shows significant and positive correlation between both the variables.

4.6 Results with Tobin Q

4.6.1 Correlated Random Effects - Hausman Test

Table 10

Correlated Random Effects - Hausman Test

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	4.013657	4	0.4049

Hausman test has been applied in order to see the appropriate model for data analysis and statistics shows that null hypothesis is not rejected because p- value is higher than the significance level therefore random affect model is more appropriate.

4.6.2 Hypothesis Testing with Tobin Q as Dependent Variable

Table 11

Hypothesis Testing with Tobin Q as Dependent Variable

Variable	Coefficient	Std. Error	t-Stat	Prob.	Hypothesis
Board Meeting	2.56611	0.67545	3.7991	0.0062	Reject H0 (significant)
Board Size	0.06942	0.49452	0.1404	0.3485	Fail to reject H0
Board Independence	1.26945	0.39258	3.2336	0.0071	Reject H0 (significant)
Board Finance	0.87946	0.78946	1.1140	0.0964	Fail to reject H0

$R^2 = 0.8482$, Adj. $R^2 = 0.8645$, $F = 23.458$ ($p = 0.000000$), $D-W = 2.9874$

Above results shows the result of our last model in order to see the relationship of our independent variables with the dependent variables where independent variables are board meeting, board size, board independence and board financials while dependent variable is Tobin Q which is the financial ratio helps in to measure the firm market value. In this model criteria are set t-statistic par value is 2 lesser than 2 means show insignificant relationship where probability criteria are 5% higher than this will be insignificance and vice versa will be impactful in the acceptance or not acceptance of hypothesis. (Shaikh, 2022)

H1: Board meeting has a significant impact on Profitability and leverages.

In the above outcomes relationship between the board members meeting and Tobin Q has been tested in which t value shows the positive balance which is 3.799109 higher than the standard but which clearly indicates that there is positive significant correlation between the variables on the other side p value shows 0.0062 less than the level of significance which means there is impact between the meetings among the board members and the Tobin Q when the meetings among the committee members will increase then this will increase the Tobin Q which definitely improve the other leverages. while the coefficient is 2.566112 which means that significant and positive relationship of Tobin Q with the corporate governance function meeting of board members enhance in firm leverages in the chemical sector.

H2: Board size has a significant impact on Profitability and leverages.

Tobin Q ratio has been tested with the size of the board members where the t value shows 0.1403754 less than 2 therefore it is statistically proved there is insignificant relationship of Tobin Q with the size of the board members. Even though probability is 0.3485 higher than the significance level 5% therefore there is no impact among the variables therefore null is not rejected. While the coefficient are 0.069418 indicates the positive correlation of size of the board members with the Tobin Q when board members size will increase then they will be able to take efficient strategic financial decisions which leads to increase the firm leverages which has been proved in this model.

H3: Board independence has a significant impact on Profitability and leverages.

T-statistic and probability values are 3.233603 and 0.0071. so as per the standard criteria on which decision is based pertain to hypothesis that t value is higher than the critic value which is statistically significant whereas significance is also less than 5% which refers that there is impact between the



independence of the board members and the Tobin Q and null is rejected proved numerically. also, coefficient value is 1.269451 which also indicate positive relation between both the variables independence board members enhance the Tobin Q of the firm in the chemical sector by 1.269451.

H4: Board financial has a significant impact on Profitability and leverages.

Relationship of board members financial with the Tobin Q ratio has been established in the above analysis which clearly stated that t value is 1.1139985 which is less than the critical value which refers that there is insignificant association between the financial expertise of the board members with the Tobin Q. also p value is 0.0964 higher than the significance level which means insignificant relation proved statistically and null is not reject. While the coefficient 0.879455 which indicated that financial expertise and fair remuneration of the board members lead to increase the Tobin of the firm in the chemical sector of Pakistan.

5. Conclusion

We have analysed the results of corporate governance functions with firm performance and the leverages. in this study we used data for analysis is stationary and Hausman test applied on all the dependent variable which found mixed impact with the independent variables corporate governance function in the chemical sector of Pakistan. Furthermore, it has identifies that EPS of the firm is affected by meeting among the board of directors and financial expertise of the board members because when directors meet frequently then will able to resolve the team queries and provide departmental directions to the team in order to achieve the organizational goal for which directors need to be financially sound and firm should pay them market competitive salary then they will able to work freely and sensibly. On the other side leverages of the firm does not affect by corporate governance main function which is size of the board members which clearly stated that size in the board meetings does not have any significant impact, but the quality of their decisions affects the firm in the chemical sector particularly. (Hashmi & Hussain, 2025) While return on assets is only affected by the financials of the board members which indicates that BOD must be diversified from all type of backgrounds which helps in the decision making process and work better for the firm performance in the chemical sector and their remuneration should be set as per their expertise not less than market value at all which will allow directors to work independently and sensibly. Additionally return on equity does not affect by the meeting from board of directors, size of the board members and financials of the board members only independency of the members has significant impact on the ROE of the firm which increase the capital and allow firm to explore the investment opportunity which provide stability to the firm financials in the chemical sector which has proved statistically. Tobin Q measure the firm market performance which increase the firm market value which attract investors so it affects by the meeting among the board members and independency of the board members leads to improve Tobin Q which will increase the trust of the investors.

6. Recommendations

As per the above analysis below are the recommendations to increase the effect of the corporate governance functions in the chemical sector in order to achieve maximum output to achieve the organizational goals:

- Quality among the board members meetings needs to be improved and attendance of BOD should be increased in order to take timely and collective decisions for the firm.
- Independency of board of directors should be improved for the rational decisions although some independent committees need to be made to monitor the performance of the directors but in the Board meeting their decisions should not be influence based it affect the firm and entire chemical industry.
- Size of the board of directors should not be less than seven because shareholders wealth protection and achievement of organizational goals is the primary goal of corporate governance so maintain size of board members and diversification in the team allow BOD to run the organization in a better way.
- Financial remuneration of board of directors needs to be improved to allow directors work sensibly in the chemical sector of Pakistan.

7. Future Directions

We have tested the impact of corporate governance in the chemical sector only, furthermore it can be extended on the other industries in order to maximize the impact of corporate governance and protect the public wealth and attract investors which will generate more funds for all industries and improve the overall



economy of the country. We just test few variables of corporate governance other variables need to be tested and proper monitoring of those variables can be conducive for the firms and provide stability to the firm and their financial, operational and compliance performance.

Contribution of Authors

All the authors participated in the ideation, development, and final approval of the manuscript, making significant contributions to the work reported.

Conflict of Interest Statement

The authors declare no conflicts of interest.

Funding Statement

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Informed Consent

Informed consent was obtained from all individual participants included in the study.

Ethical Approval

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Data Availability

The datasets generated during and analysed during the current study are available from the corresponding author on reasonable request.

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