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**The Impact of Corporate Governance Mechanism On Tax Planning: Empirical Study of Pakistan's Chemical and Pharmaceutical Sector**

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**ABSTRACT**

*This paper aims to investigate the impact of the corporate governance mechanism on corporate tax planning through the size of the board of directors, the dual identity of the CEO, and the institutional type of ownership system. The ETR (Effective Tax rate) of 29 non-financial firms of Pakistan's chemical & pharmaceutical sector from 2015 to 2019 is used as a proxy for measuring corporate tax planning (tax avoidance). The fixed effect regression model analysis results of 145 observations show that board size has an insignificant relationship with etr (tax avoidance), CEO duality has a negative significant relationship with etr (tax avoidance) and Institutional type of ownership and etr (tax avoidance) are significantly positively correlated with each other. In addition, the results show that the other corporate governance variable i.e. size of the company has a significant impact on etr (tax avoidance).*

**Keywords:** CG - Corporate Governance, CTA - Corporate Tax Avoidance, ETR, Board Size, CEO duality, Institutional Ownership, SE – Stock Exchange.

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## INTRODUCTION

A corporate Governance mechanism is a set of rules, procedures, and laws adopted to run, operate, and control the business. Corporate governance practices rapidly enhanced in recent years and heightened as one of the important issues worldwide for corporate control. Davies (2006) suggested that the executive board is responsible for implementing good corporate governance, which helps them get good corporate control. Many organizations have now adopted it in many countries to get good control and boost the investor's confidence. Grantham (2020) concludes that adopting and implementing the corporate governance practices within the organization helps the current and potential investors invest in the organization. Hebble and Ramaswamy (2005) argued that organizations could increase the public awareness between the investor and the stakeholders by implementing corporate governance practices. He further argued that by adopting good corporate governance, the organization might help to reduce financial distress.

Tax planning is defined as all actions taken by management to reduce the tax liabilities of a firm, and it includes both legal tax strategies i.e. Tax avoidance and illegal tax strategies i.e. Tax evasion. Tax avoidance means an activity that helps the organization reduce its tax liability legally. Lee et al., 2015, explained that the deliberate efforts of the organization to reduce its tax burden legally are called tax avoidance. Tax avoidance has now evolved as an important issue for shareholders and stakeholders. They are eager to know how much the organization paid the tax liability, how the organization avoided it, and whether it was avoided from legal or illegal means.

Although tax liability has always remained a major concern of corporate governance, firm management, and finance. Every organization focuses on managing its tax liability, but the way to manage the tax liability is always been one of the main issues of corporate governance. "Tax avoidance" refers to the practice of legally minimizing one's tax obligations (Fisher 2014). Avoiding taxes can help you achieve one of three aims. The first step is to pay less tax than the law requires. Second, paying taxes on income generated in a country other than the one where it was earned. The third purpose is to pay taxes on gains as they occur rather than when they are realized (Fisher 2014).

Corporate Governance and Corporate Tax Avoidance have a deep relationship discussed by many researchers. Fama and Jensen, 1983, explain that corporate governance helps the organization protect the shareholder's interest (maximizing the wealth) by reducing the tax liability from legal and legitimate methods. Improved corporate governance reduces the transfer of corporate profits for private benefit. Fewer transfers make profits that were previously exempt from corporate income tax taxable, thereby increasing the incentive for tax avoidance. However, Desai and Dharmapala (2009) believe that diversion supplements tax avoidance. Complementarity arises because, as Desai, Dyck, and Zingales (2007) concisely pointed out, "Most transactions designed to transfer company value to monitoring shareholders also decrease the company's tax burden. Likewise, many procedures designed to enforce the company's tax obligations make it more difficult for controlling shareholders to transfer company value to their interests."

This study revisits the topic to understand better how governance impacts tax avoidance. The discussion includes legal and illegal tax evasion, even though tax avoidance is commonly defined as behavior that uses legal techniques to decrease the tax burden. Desai et al. (2007) used a similar theoretical approach to ours: Each choice is made by a controlling shareholder, who weighs their interests against the costs

connected with each action before making a final decision. The reduction in transfers would have two opposing effects on tax avoidance, which is why strengthening governance is important. Reducing transfers will lead to greater earnings before corporate income tax because corporations don't tax transfers; thus, there is an increased motivation to decrease the tax burden as soon as the governing party is no longer present. She reaps more benefits from cash flow rights when there is less shareholder divergence. Based on these factors, predictions can be drawn by distinguishing between legal and illegal tax avoidance. Better governance will encourage the adoption of legal and low-risk tax avoidance.

So, it is evident that corporate governance has an impact on firm affairs and CTA. The focus of this article is to investigate the relationship between CG and CTA through the size of the board of directors, the dual identity of the CEO, and the institutional type of ownership system. The current study has been divided into the following sections. After introducing section two based on the literature review, section three contains the theoretical framework, section four is the methodology section, data analysis and interpretation are given in section five, and section six is about concluding remarks.

### **Theoretical Discourse**

The overarching theory of research study is the Agency theory. The main goal of agency theory is to explain how principals (such as shareholders and government regulators) interact with agents (such as the management of a company). As a result, the agent is responsible for carrying out the principal's instructions under the so-called principal-agent model (De Andres et al., 2005). Management-ownership conflicts of interest arise when managers and owners have competing interests in the business (Bauer and Kourouxous, 2018).

According to Hanlon and Heitzman, both management and shareholders can influence a company's tax policy because of the separation of ownership and control (2010). Tax evasion relies on many interests to satisfy the worries of management and investors (Evana, 2019; Zemzem and Ftouhi, 2013). According to Evana, shareholders desire to reduce tax expenses by focusing on growing the value of their shares and paying accrued tax, while management accomplishes its objectives through increased earnings and improved performance (2019). Furthermore, methods of corporate tax evasion point to issues with corporate governance.

Because it boosts after-tax cash flow, tax avoidance is one of the riskier investment options open to management (Armstrong et al., 2015). Tax evasion can result in increased tax liabilities, penalties, and damage to a company's reputation if it is discovered (Hanlon & Slemrod, 2009). Due to agency conflicts, the agent may choose a different level of tax avoidance than the principals recommend. It's feasible that the founders might prefer a lower degree of tax avoidance in exchange for a lower level of business risk, or a larger level of tax avoidance.

### **Literature Review**

Kovermann, J., & Velte, P. (2019) studied the relationship between corporate governance and corporate tax avoidance. The study used corporate governance elements such as entitlement consistency among management and shareholders, ownership structure, board structure, law enforcement & government relations, and auditing and discussed their impact on corporate tax avoidance. The author observes that, in most cases, tax avoidance cannot be measured directly due to lack of tax information, so it measures by dummy variables i.e. *etr* and *book-tax gap*." With the

help of 79 different articles. The author concludes that effective corporate governance has a strong relationship with CTA.

Abdelfattah, T., & Aboud, A. (2020) discussed the relationship between tax avoidance, CG, and CSR. In his study, the author measured tax avoidance through ETR. With the help of Egyptian firm data for 2007–2016, the author concludes that a business or corporation with a more sophisticated board of directors provides more CSR disclosure and helps more for better tax management through tax avoidance.

In his article, Zeng T. (2019) discussed the effect of Country-level governance and accounting standards on tax avoidance. For this purpose, the researcher used the data of listed firms in 36 countries. The researcher used three different approaches to measure the tax avoidance, i.e., “long term etr,” “annual etr” and “book tax differences.” Results indicated that CTA is less for firms listed in a country with strong country level governance. On the other hand, for firms listed in a country where weak country level governance exists, the CTA is more.

Salhi, B et al. (2019) discussed the relationship of CG and CTA with the mediating role of CSR. To investigate the relationship, the researcher collects a sample of 200 French firms and 300 UK firms from 2005 to 2017. The researcher used a structural equation and system model to test the relationship. The researcher used ETR to measure CTA. Results indicate that CSR mediates the relationship of CG and CTA fully in the case of UK firms and partially in the case of French firms.

Kiesewetter, D., & Manthey, J. (2017) investigate how corporate governance and CSR impact the relationship between corporate value and CTA. To study the relationship, the researcher conducts empirical analysis by using the panel data of almost 7,924 observations related to European companies period of 2005 - 2014. The study results show that ETR and corporate value creation are positively related to one another.

Alkurdi, A., & Mardini, G. H. (2020) tested the impact of ownership structure and board composition on corporate tax avoidance. For this purpose, the researcher used the data of Jordanian firms listed during 2012 – 2017. The researcher used 348 observations for analysis purposes. Results indicate that the organization’s structure (managerial and institutional type of ownership) has negative relationship with CTA and the foreign ownership structure has a positive relationship with CTA.

Boussaidi, A., & Hamed-Sidhom, M. (2020) examine the relationship of board features, ownership structure, and tax aggressiveness. For this purpose, the researcher used unbalanced panel data of listed firms on the Tunisian stock exchange from 2011 to 2017. By applying the appropriate statistical technique, the researcher concludes that CEO duality, women's presence in the board of directors, and managerial and institutional ownership strongly relates to tax avoidance.

Su, K et al. (2019) investigate the relationship between corporate dispersion (nature of ownership structure) and tax avoidance. The researcher used the panel data of Chinese firms listed from 2003 to 2015. Results of the study show that the geographically scattered type of ownership structure is negatively linked with corporate tax avoidance. Results also show that this negative association may change with the inclusion of women as directors in the board of directors’ composition.

Hamad S. et al. (2020) explore the moderating role of sustainability reporting of CG and the integrated reporting (IR) relationship. For this purpose, the researcher conducted a content type analysis based upon the annual financial reports of 100 Malaysian firms. The researcher used board size as an element of corporate governance.

Study results indicate that, with the help of better CG, the integrated reporting system of the firm can be better.

Chytis E. et al. (2020) studied the relationship between CG mechanisms and corporate tax planning. For this purpose, the researcher used the sample data of 55 nonfinancial firms listed at the Athens SE from 2011 to 2015. The researcher used board independence, firm size, the board size, audit firm size, ownership structure, CEO duality, liquidity, and leverage as corporate governance mechanisms and used ETR as a dummy variable to measure the tax planning/tax avoidance. Results indicate that board independence has a significant positive association with ETR. Firm size & CEO duality has significant negative relation with ETR and corporate governance elements, i.e., audit firm size, the board size, liquidity, ownership structure, and leverage has found no influence on ETR.

Young, A. (2017) examines the influence of corporate governance on CTA. For this purpose, the research evaluates the governance-related shareholder proposals and uses regression analysis to test the influence. Results indicate that improved CG increases CTA, while weak CG reduces CTA.

Armstrong, C. S et al. (2015) explore the relationship between corporate governance, management inducements, and CTA. Using the quantile regression analysis, the findings of the study reveal that board independence and financial sophistication have a positive relationship with CTA at a low level while having a negative relationship with CTA at a high level.

Jiang, Y et al. (2021) examines the association between institutional type of ownership and CTA strategies. The researcher used ETR and BTD as CTA measures. The researchers used data from 1108 Chinese listed firms from 2009 - 2017. By applying the quantile regression, the researcher concludes that organizational ownership is positively correlated with CTA.

Sari, G.M. (2014) posits that tax authorities must consider CTA as a legal activity and tax evasion as an illegal activity that may negatively affect the country and cause losses. This study investigates the relationship of corporate governance, firm size, institutional ownership, audit committee, board independence, and lost fiscal compensation with corporate tax avoidance. The researcher used cash ETR to measure CTA. To investigate the relationship, the researcher used the secondary data of listed manufacturing firms at Indonesian SE during the period 2008 to 2012. By applying the panel regression, the researcher concludes that, firm size has a significant positive impact on CTA, audit committee, institutional ownership structure, and lost fiscal compensation has no or less significant impact on CTA, and board independence has a significant negative impact on CTA.

Hamdan et al. (2019) investigate the association between firm performance and IT governance in emerging markets. For this purpose, the researcher used the data of 131 companies of 20 different sectors of the Saudi financial market during 2017. To measure IT governance, the researcher considers only those boards of directors with IT backgrounds. The researchers used the return on assets ratio and equity ratio as the organization's performance measures. The researcher used firm size, financial leverage, and firm age as control variables for the study. By applying the regression analysis, the researcher concludes that IT governance has positive influence only on operational performance levels.

Wu, M et al. (2020) studied the relationship of corporate governance mechanisms with earning management. For this purpose, the researchers investigate the long run effects of CG on earning management of Ghana's and Nigeria's listed companies. The research used the two different parameters, i.e., ACO and KNN, for testing the relationship. Under Ant Colony Optimization (ACO) approach, the researcher used four different dimensions of corporate governance, i.e., ownership structure index, right shareholder index, board disclosure index, and board procedure index. The researcher used firm size, growth, age, and financial leverage as control variables. The results of this study show that adopting the appropriate governance policies helps enhance the reduction in earning management.

Sari, E. P et al. (2021) examine the effect of company's age, leverage, company's sales growth, and company size on CTA. For this purpose, the researchers used the data of listed companies of Indonesia stock exchange related to the mining sector for 2016 to 2018. The researcher applied multiple regression analysis via SPSS. The researchers used ETR to measure the CTA. Results of the study indicate that company age, leverage, sales growth, and company size have simultaneous effects on ETR, which is corporate tax avoidance.

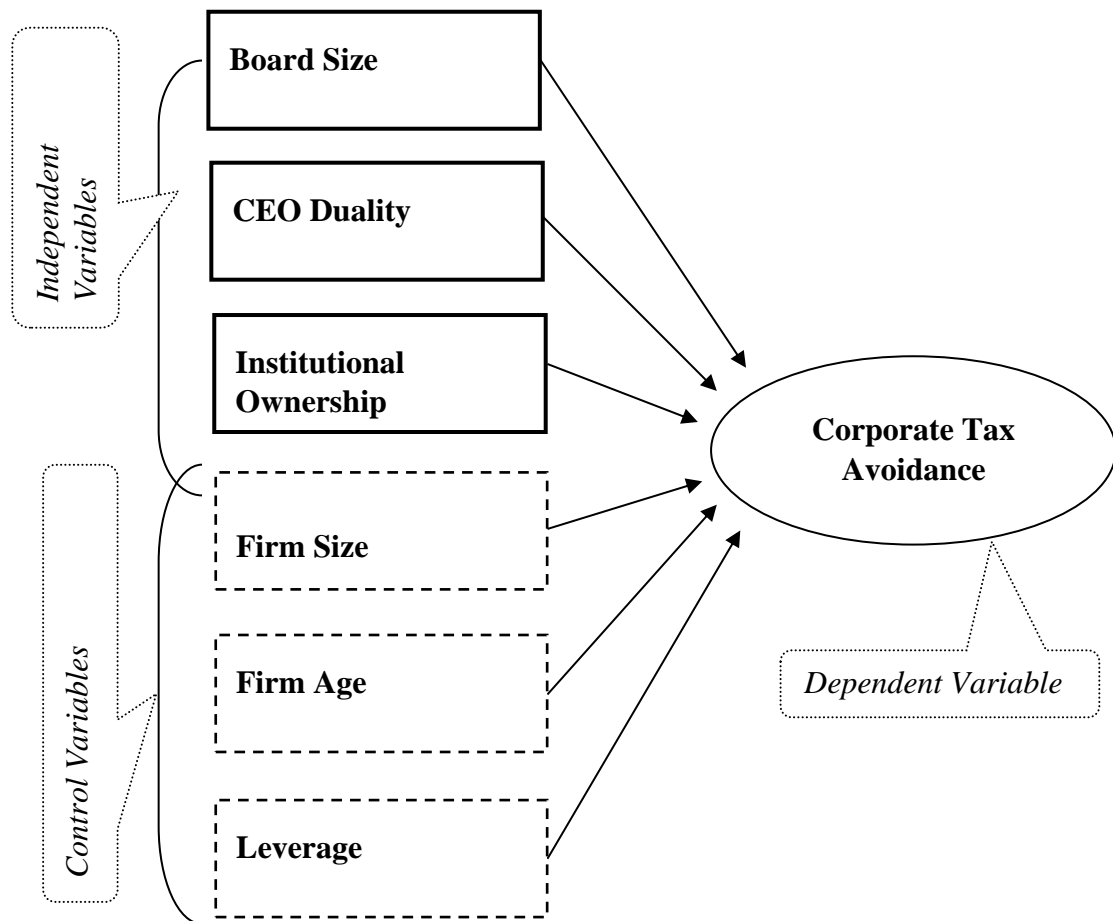
Egbunike, F. C et al. (2021) investigate the effects of corporate governance on corporate tax avoidance. To measure the CG mechanism, the researcher used audit committee diligence, board independence, CEO duality, board size, and board diligence as internal corporate governance elements. The researcher used ETR as a dummy variable to measure the CTA. The researcher used company size, ROA, quality of audit, financial leverage, and altman's Z score as control variables. To investigate the relationship, the researcher used the firms' data related to the consumer goods sector. After applying the Quantile regression approach, the researcher concludes that board independence, the board size, and board diligence significantly relate to tax avoidance. Results also showed that audit committee diligence and CEO duality have no significant relation with tax avoidance.

Waluyo, W. (2019) examines the association between CG and CTA. For the study, the researcher used audit committee, independence of the board, institutional type of ownership, and quality audit as corporate governance proxies. The researcher used ETR as a proxy for CTA. For analysis purposes, the researcher used 92 observations of different companies listed at the Indonesia stock exchange related to 2013 to 2016. The results of OLS regression model shows that, board independence and corporate performance negatively affect tax avoidance. Results also showed that the size of the company, audit quality and audit committee positively impact the CTA and institutional type of ownership has no significant impact on CTA.

Jamei, R. (2017) investigates the relationship between CG and CTA. The researcher measures CG through board members and ownership structure. To investigate the relationship, the researcher used the data of 104 listed companies at the Tehran SE from 2011 to 2015. The researcher used Eviews software and applied a multiple regression model to examine the relationship. Result denies any association between board members & ownership structure and CTA.

## Conceptual Framework of the study

Figure



### Mathematical Modeling

$$(CTA_{it}) = a + b_1 (bs_{it}) + b_2 (cd_{it}) + b_3 (io_{it}) + b_4 (fs_{it}) + b_5 (lfa_{it}) + b_6 (levrg_{it}) + \epsilon_{it}$$

In the above mathematical model, CTA is Corporate Tax Avoidance, cd is ceo duality, bs is board size, io is institutional ownership, fs is firm size, lfa is log of firm age and levrg is leverage. The above figure is designed with the help of a literature review. The author found the above corporate governance variables which may affect corporate tax avoidance. So, based on the literature review we define our dependent and independent variables for the current study as:

#### Dependent variable

Corporate Tax Avoidance

#### Independent variables

Board size, CEO duality and Institutional ownership

#### Control variables

Firm size, firm age and leverage

**Problem statement:**

Corporate Governance mechanisms and tax avoidance have a deep relationship. Many researchers examined the relationship in both positive and negative directions (Fama and Jensen, 1983), (Kovermann, J., & Velte, P. 2019), (Chytis E. et al. 2020). But unfortunately, very limited research has been conducted on the relationship between the Corporate Governance mechanism and tax avoidance in the context of the Pakistan market. Therefore, the current study is opt to determine whether there is an association between the Corporate Governance mechanism and tax avoidance or not with reference to Pakistan.

**Research Hypothesis:**

To investigate the relationship between the dependent variable and the independent variable, the researcher developed the following hypothesis:

**H1:** Board size has some impact on corporate tax avoidance

**H2:** CEO Duality has some impact on corporate tax avoidance

**H3:** Institutional Ownership has some impact on corporate tax avoidance

**Data Sources and Methodology**

Panel data is collected from a secondary source of information i.e. published annual reports and the stock exchange data of Chemicals & Pharmaceuticals – a non-financial sector of Pakistan. The population for the study is Chemicals & Pharmaceutical sector listed on Pakistan Stock Exchange. From the population, 145 observations related to 29 different firms from 2015 to 2019 are collected as the sample for the analysis purpose. Firms are selected based on their listing on the stock exchange during the studied period and based on consistent positive after-tax earnings over the time. For testing the relationship between corporate governance (independent variable) and corporate tax avoidance (dependent variable) the author used Stata software.

**Table 01**

**Measurement of variables fact sheet**

Variables		Proxy	Reference
<b>Dependent Variables:</b>	Corporate Tax Avoidance	Measured by Proxy i.e. ETR - Effective Tax Rate  = Tax expense/Profit before tax	Kovermann, J., & Velte, P. (2019) Salhi, B et al. (2019) Alkurdi, A., & Mardini, G. H. (2020) Abdelfattah, T., & Aboud, A. (2020) Dyreng et al., 2010 Armstrong et al. (2015) Lanis and Richardson (2011)



<b>Independent Variables:</b>	Corporate Governance	Board size (Measured by counting the number of directors in board)	Hamad, S et al. (2020) Abdelfattah, T., & Aboud, A. (2020) Alkurdi, A., & Mardini, G. H. (2020)
		CEO Duality (coded as 1 for CEO dual role and 0 for independent role)	Abdelfattah, T., & Aboud, A. (2020) Chytis, E et al. (2020)
		Institutional Ownership (calculated by: number of institutions owned shares/total share outstanding * 100%)	Alkurdi, A., & Mardini, G. H. (2020) Richardson et al. (2014) Boussaidi, A., & Hamed-Sidhom, M. (2020) Jiang, Y et al. (2021)
<b>Control Variables:</b>	Firm Size	Measure by taking log of company's total assets	Hamad, S et al. (2020) Young, A. (2017) Chytis, E et al. (2020) Hamdan, A et al. (2019)
	Firm Age	Firm Age in years (Log of years)	Hamdan, A et al. (2019) Wu, M et al. (2020)
	Leverage	Total liabilities(TL) / Total assets (TA)	Hamdan, A et al. (2019) Abdelfattah, T., & Aboud, A. (2020) Wu, M et al. (2020)

For measuring corporate governance, we used three different proxies i.e. Board size, CEO duality and Institutional ownership. Board size is measured by counting the number of directors in the board as measured by Hamad, S et al. (2020), Abdelfattah, T., & Aboud, A. (2020) and Alkurdi, A et al. (2020) previously. CEO duality is measured by observing whether the CEO has a dual role on board or not, 1 is used for the dual role of CEO and 0 is used for the separate role of CEO and chairman as measured by Abdelfattah, T., & Aboud, A. (2020) and Chytis, E et al. (2020) previously. Institutional ownership is calculated by the number of shares owned by institutions/total share outstanding \* 100%) as measured by Alkurdi, A., & Mardini, G. H. (2020), Richardson et al. (2014), Boussaidi, A., & Hamed-Sidhom, M. (2020) and Jiang, Y et al. (2021) previously.

For measuring corporate tax avoidance, we used ETR (the simplest measure for measuring corporate tax avoidance) as a proxy. ETR is measured by dividing the tax expenses by profit before tax ( $ETR = \text{tax expense} / \text{EAT}$ ) as measured by Kovermann, J., & Velte, P. (2019), Salhi, B et al. (2019), Alkurdi, A., & Mardini, G. H. (2020), Abdelfattah, T., & Aboud, A. (2020), Dyreng et al., 2010, Armstrong et al. (2015) and Lanis and Richardson

(2011) previously. ETR refers to a percentage of gross income, the tax burden. As a result, a low ETR is interpreted as signaling that the numerator has decreased due to tax avoidance. A lower ETR can also be caused by a higher denominator, where "low" denotes less than the statutory tax rate (Bradley et al., 2012). ETR has been utilized in various studies since it is so simple to calculate from financial information.

For minimizing the effects of other variables and for obtaining the correct results, we used some control variables i.e. firm age, firm size, and leverage. Firm size is calculated by taking the log of the company's total assets of the concerned firm as measured by Hamad, S et al. (2020), Young, A. (2017), Chytis, E et al. (2020), and Hamdan, A et al. (2019) previously. Firm age is measured by counting the years since incorporation and by taking the log of years in numbers as measured by Hamdan, A. et al. (2019) and Wu, M et al. (2020) previously. Leverage is measured by dividing the total liabilities by the total assets of each firm as measured by Hamdan, A et al. (2019), Abdelfattah, T., & Aboud, A. (2020), and Wu, M et al (2020) previously. For testing the relationship between corporate governance (independent variable) and corporate tax avoidance (dependent variable) we used Stata software.

### Data Analysis and Interpretations

For investigating the relationship between CG and CTA, we used the Fixed Effect model as used previously by (Boussaidi, A, & Hamed-Sidhom, M. 2020), (Chytis, E et al. 2020), (Jiang, Y et al. 2021), and (Innocent, O. C., & Gloria, O. T. 2018)

First, we estimate the Descriptive Statistics, results are given as:

**Table 2:**

#### Descriptive Statistics

Var	Obsr	Mean	Std Dev.	Min	Max
etr	145	.328	.503	-.743	4.805
bs	145	8.083	1.566	5	13
cd	145	.041	.2	0	1
io	145	.135	.416	0	4.964
fs	145	6.82	.766	5.073	8.268
lfa	145	1.481	.279	.602	1.924
levrg	145	.451	.179	.129	.925

Source: Authors' estimations

Above table shows the descriptive analysis regarding the dependent variable i.e. corporate tax avoidance (measured by etr), independent variables i.e. board size, ceo duality, and institutional ownership and control variables i.e. firm size, firm age and leverage. Table shows that, there are 145 observations used to investigate the relationship. The above table shows, that the mean value of etr, bs, cs, io, fs, lfa and levrg are 0.328, 8.08, 0.041, 0.135, 6.82, 1.481 and 0.451 respectively. It is clear from the above table that, fs (firm size) has the highest maximum value i.e. 8.268 while cd

and io has lowest values i.e. 0 respectively. The standard deviation values of etr, bs, cs, io, fs, lfa and levrg are 0.503, 1.566, 0.2, 0.416, 0.766, 0.279 and 0.179 respectively which shows the deviation of the values from the sample mean which shows that the variables are variable over the time hence, it allows us to study the relationship of CG and CTA.

**Table 03**

**Pairwise correlation**

Var	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1) etr	1.000						
(2) bs	-0.081	1.000					
(3) cd	-0.005	-0.144	1.000				
(4) io	-0.060	0.101	-0.031	1.000			
(5) fs	-0.227*	0.278*	-0.374*	0.094	1.000		
(6) lfa	0.122	0.062	-0.025	0.091	0.134	1.000	
(7) levrg	-0.028	0.351*	-0.255*	-0.058	0.346*	-0.157	1.000

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

Source: Authors' estimations

The above correlation, tables shows that, bs (board size), cd (ceo duality) and io (institutional ownership) has a negative correlation with etr. Same in the case with fs (firm size) and levrg (leverage), they also have a negative correlation with etr, lfa (Log of firm age) on the other hand, has a positive correlation with etr. Despite the correlation or association of variables either positive or negative, none of the coefficients correlation i.e. -0.081, -0.005, -0.060, -0.227, 0.122, and -0.028 exceeds 0.8 which means there is no multicollinearity among the variables.

For studying the relationship of dependent and independent variables, and for better results, we supposed there is no multicollinearity and heteroscedasticity problem exists in our data. For this purpose, in pre estimates part, we used multicollinearity, heteroscedasticity, and autocorrelation tests.

**Multicollinearity test**

Generally, if the variance inflation factors (VIFs) values exceed 10, it means there is a multicollinearity problem exists in the data. This means the independent variables have some linear relationship among them which is not good.

**Table 4 :Variance inflation factor**

	VIF	1/VIF
Fs	1.348	.742
levrg	1.347	.743
Bs	1.202	.832
Cd	1.187	.842

<b>lfa</b>	1.081	.925
<b>Io</b>	1.034	.967
<b>Mean VIF</b>	1.2	.

Source: Authors' estimations

In the above table, it is clearly shown that VIF values of all the variables i.e. 1.348, 1.347, 1.202, 1.187, 1.081, and 1.034 are less than 10 which means there is no multicollinearity problem exists in the data. Mean VIF is 1.2 which is less than 5 and also shows no multicollinearity.

### Autocorrelation

Autocorrelation refers to the degree of similarities between the panel data, for estimating the auto correlation between the data, we conducted the Wooldridge test

**Table 5:**

<b>Wooldridge test</b>	
H <sub>0</sub> : no first-order autocorrelation	
F( 1, 28) =	34.498
Prob > F =	0.0000

(H<sub>0</sub>: no serial correlation) Source: Authors' estimations

Above results shows that data contains the first-order autocorrelation. So, the null hypothesis (H<sub>0</sub>) is rejected.

### Heteroskedasticity

For estimating the heteroskedasticity in data through a fixed effect regression model, we used modified Wald's test

**Table 6:**

**Table Wald Test for Group-wise Heteroskedasticity**

<b>Wald Test</b>	
(H <sub>0</sub> : $\sigma(i)^2 = \sigma^2$ for all i)	
chi2(29) =	4.3e+06
Prob > chi2 =	0.0000

Source: Authors' estimations

Results of the test in above table shows that, the null hypothesis is rejected.

### Model specification

For model specification, Hausman test is used to detect the violation of the model; this model assumes that the explanatory variables are orthogonal to the unit effects. On the basis of this test, fixed or random model will be selected.

**Table 7: Table Findings of Model Selection Tests**

Models	Tests	Results	
Fixed vs. Random	Hausman Test	chi2(6) = 31.93	Prob>chi2 = 0.0000

Source: Authors' estimations

From the above Hausman test table, p-value of 0.0000 can be inferred that the differences among estimators is systematic at the 5% significance level. Therefore, FE (fixed effect) is more efficient instead of RE (random effects).

### Main model results

We estimate the OLS model. Results of the regressions performed plus a refinement of the fixed effect model i.e. Driscoll-Kraay fixed effect model are summarized in following table.

**Table 8:**

etr	Drisc/Kraay					
	Coef.	Std Err	t	P>t	[95%Conf	Interval]
bs	-0.014	0.016	-0.860	0.397	-0.047	0.019
cd	-0.313	0.111	-2.830	0.009	-0.540	-0.086
io	0.027	0.009	3.140	0.004	0.009	0.045
fs	-0.612	0.201	-3.040	0.005	-1.025	-0.200
lfa	0.597	0.578	1.030	0.310	-0.587	1.780
levrg	-0.091	0.245	-0.370	0.713	-0.593	0.411
_cons	3.782	0.527	7.170	0.000	2.702	4.862

Number of obs = 145

Prob > F 0.0000

within R-squared 0.0219

Source: Authors' estimations

From above table 8 after applying the Driscoll-Kraay fixed-effect model, F value shows that, a model used for current study is significant i.e. (Prob > F = 0.0000). In regression model, variable coefficients result shows that, bs (board size), cd (ceo duality), fs (firm size), and levrg (leverage) hurt etr (corporate tax avoidance) and on the other hand, io (institutional ownership), and lfa (firm age) had a positive impact on etr (corporate tax avoidance). Furthermore, from the above table, P-value of bs i.e. 0.397 more than 0.05 indicates an insignificant relationship with etr, P values of cd and io i.e. 0.009 and 0.004 respectively less than 0.05 indicates a significant relationship with etr. In the case of control variables, the p-value of fs i.e. 0.005 which is less than 0.05 indicates the

significant impact on CTA and the P values of lfa and leverage i.e. 0.310 and 0.713 respectively are more than 0.05 shows an insignificant relationship with tax avoidance.

After applying the fixed effect regression model to the data, the coefficient results can be written in equation form as:

$$(CTA_{it}) = 3.782 - 0.014 (bs) - 0.313 (cd) + 0.027 (io) - 0.612 (fs) + 0.597 (lfa) - 0.091 (levrg) + \varepsilon$$

This shows that, by increasing one unit change in board size, ceo duality, firm size, and leverage the tax avoidance will decrease by 0.014, 0.313, 0.612 and 0.091 times respectively. On the other hand, by increasing one unit change in institutional ownership, and firm age the tax avoidance will increase by 0.02, and 0.597 times respectively.

### **Results & Discussions:**

This paper investigates the impact of corporate governance on corporate CTA using a sample of 145 observations of the Pakistan Chemicals & Pharmaceutical sector over the period 2015-2019. By using appropriate estimation methods, the F value of analysis i.e. (Prob > F = 0.0000) indicates that the model used for the current study is significant. The correlation table shows that bs (board size), cd (ceo duality), and io (institutional ownership) have a negative correlation with etr. Furthermore, from the correlation table, it is evident that the association of variables is either positive or negative, none of the coefficients correlation i.e. -0.081, -0.005, and -0.060 exceeds 0.8 which means there is no multicollinearity among the variables. VIF values of all the variables i.e. 1.348, 1.347, 1.202, 1.187, 1.081, and 1.034 are less than 10 which also shows there is no multicollinearity. The Wooldridge test shows that data contains the first-order autocorrelation and the Wald test results show that there is no Heteroskedasticity issue in the data.

According to the analysis results in table 8, the coefficient value of bs i.e. -0.014 shows a negative association with etr (dependent variable), and p-value i.e. 0.397 which is more than 0.05 shows that the association is insignificant which means the board size has no or less impact on CTA, so the researchers' hypothesis "Board size has some impact on corporate tax avoidance" is rejected. The same has been observed by (Chytis, E et al. 2020), and (Innocent, O. C., & Gloria, O. T. 2018).

According to the analysis results in table 8, the coefficient value of cd i.e. -0.313 shows a negative association with etr (dependent variable), and the p-value i.e. 0.009 which is less than 0.05 shows that the association is significant which means the CEO duality has an impact on CTA, so the researchers' hypothesis "CEO Duality have some impact on corporate tax avoidance" is accepted. The results are consistent with the results of (Chytis, E et al. 2020).

According to the analysis results in table 8, the coefficient value of io i.e. 0.027 shows a positive association with etr (dependent variable), and the p-value i.e. 0.004 which is less than 0.05 shows that the association is significant which means the institutional ownership has an impact on CTA, so the researchers' hypothesis "Institutional Ownership has some impact on corporate tax avoidance" is accepted which is consistent with (Jiang, Y et al. 2021)

### **CONCLUSION:**

This study is conducted to examine the relationship between corporate governance mechanisms and corporate tax planning. A sample of 29 non-financial firms listed on the Pakistan stock exchange from 2015 to 2019 was collected and regressed the

corporate governance mechanism variables i.e. board size, CEO duality, and institutional ownership with corporate tax planning variable i.e. corporate tax avoidance which is measured by proxy ETR. By applying the Drisc/Kraay fixed effect regression model, the results in table 08 show that board size has an insignificant relationship with etr (tax avoidance) which means with the increase or decrease in board size, the corporate tax planning has not been affected. CEO duality has a significant relationship with etr (tax avoidance) which shows the companies where the CEO has performed the dual roles have high ETR's which means such organizations are less involved in tax planning. On the other hand, organizations, where CEO has not performed dual roles, have resulted in high etr values which force the organization to involve in tax planning. So, CEO duality and etr are associated with each other for engaging in tax planning. Furthermore, study results also show that Institutional ownership has a significant relationship with etr (tax avoidance) which means an increase in institutional ownership leads to more tax avoidance and a family-based organization where institutional ownership is minimal has less tax avoidance.

For future research other factors of corporate governance, such as successful audit committees, management equity incentives, and board members' general corporation tax understanding can be used for exploring the relationship with tax avoidance. Furthermore, some other proxies of corporate tax avoidance, such as BTD, cash ETR, and GAAP ETR can be used.

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