

Exploring the Effects of Audit Committee Size, Board Size, Female Directors, and Tax Aggressiveness on Firm Profitability

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ABSTRACT

Purpose

The purpose of this study is to examine how the characteristics of the board of directors and the audit committee affect the profitability of non-financial firms in Pakistan, and how tax aggressiveness moderates this relationship.

Methodology

The study uses a panel data analysis of 1067 observations from 180 public limited non-financial firms listed in the Pakistan Stock Exchange (PSX) for the period 2013-2018. Two statistical methods of analysis are employed: The Feasible Generalized Least Squares (FGLS) method and for robustness the Prais-Winsten Panel-Corrected Standard Errors (PW-PCSE) method.

Results/Findings

The results show that the audit committee size and the board size have a positive and significant impact on the profitability of the firms, while the presence of female directors has a negative and significant impact. Tax aggressiveness has a negative but insignificant impact on profitability. Other control variables such as firm size and leverage have a negative and significant impact, while firm age has a positive but insignificant impact.

Novelty/originality of the study

This study contributes to the literature on corporate governance and financial performance by providing empirical evidence from an emerging market context. It also examines the role of tax aggressiveness as a moderating variable in the relationship between board characteristics and profitability, which has not been explored in previous studies in developing countries.

Key Words: Corporate Governance, Firm performance, Tax aggressiveness, Panel data.

1. Introduction

Corporate governance (CG) is an essential component of corporate management that defines the rules, policies, and processes that control and steer the activities of a firm. It seeks to balance the interests of all stakeholders, including shareholders, management, consumers, suppliers, financiers, the government, and the community. Strong CG encourages transparency, accountability, and stability, all of which are critical for a company's long-term success and long life. The Board of Directors is one of the most important parts of CG. This group of people is in charge of supervising management and making important choices concerning the company's direction. Another critical factor is the preservation of shareholder rights, such as the ability to elect directors, vote on proposals, and obtain a reasonable return on investment. Companies must also preserve openness by giving frequent, accurate, and complete financial and business information to stakeholders. An audit committee is also an important component of CG. This group is in charge of ensuring the dependability and correctness of all financial accounts for the organization. Furthermore, CG must contain risk management, which is recognizing and mitigating possible hazards to the company's performance. Effective risk management prepares the organization for any obstacles that may come and assures its effectiveness in dealing with them.

The major subject of debate in "Agency Theory" is a firm's management and its relationship with its shareholders, and how their aims may not always line. The agency issue arises when management acts for their own advantage rather than the benefit of the shareholders (Arif et al., 2023). To address this, agency theory suggests strategies for aligning the interests of shareholders and management. Through performance-based compensation, one way is to connect a percentage of the manager's salary to the company's financial success. This helps to guarantee that a manager's objectives are consistent with those of shareholders. In summary, agency theory emphasizes the significance of matching shareholder and management interests, as well as the function of governance institutions and monitoring in ensuring successful CG. It also emphasizes the need of remuneration in achieving this alignment.

When it comes to operating a business, two fundamental ideas must be understood: CG and agency theory. CG is concerned with the rules, procedures, and practices that keep a business on track. This includes establishing a board of directors to ensure that everything runs smoothly, having internal controls in place to spot any errors, and being honest with financial data and other key aspects (Aziz et al., 2021). Agency theory is a little different, and it concerns the interaction between a firm's shareholders (the individuals who own the company) and its management team (the people who operate the company). These two groups may not always agree, and the management team may make choices that are beneficial to them but not to the shareholders. This is when the issue of "agency" comes into play. Fortunately, there are solutions to this dilemma. For example, the board of directors may keep an eye on the management team to ensure that they are acting in the best interests of the firm. Furthermore, by tying a part of the manager's salary to the firm's overall financial success, the management team will be more inclined to make choices that benefit everyone (Dong et al., 2024). In brief, CG and agency theory collaborate to ensure that a firm is operated as efficiently as feasible. CG helps to keep things on track and hold everyone responsible, while agency theory aids in matching the interests of management and shareholders to guarantee the company's long-term success.

The lack of awareness of the relationship between TAXAGG, FDIR, BSIZE, and ACSIZE and their impact on the financial performance of enterprises operating in Pakistan is an issue that must be addressed. There is a need for study in this area to give assistance for business decision-making and

to better understand how these elements affect Pakistan's financial performance. The study seeks to ascertain the relationship between TAXAGG and financial performance, examine the impact of FDIR on financial performance, investigate the impact of BSIZE on financial performance, assess the relationship between ACSIZE and financial performance, and make recommendations to improve financial performance in Pakistan.

Current research gaps in this area include a lack of research on the effect of TAXAGG, FDIR, BSIZE, and ACSIZE on financial performance in Pakistan, a previous study's focus on developed nations rather than Pakistan, and a lack of agreement on ideal values for these factors in the context of Pakistan. More study is required to address these gaps and determine the appropriate values in Pakistan.

This research will contribute by providing fresh insights on the link between TAXAGG, FDIR, BSIZE, and ACSIZE and the financial performance of enterprises in Pakistan. It will contribute to the scarce literature on financial performance and its determinants in the Pakistani setting. The findings of this research will help policymakers and business decision-makers make educated decisions that will improve the financial performance of Pakistani enterprises. Furthermore, by giving data-driven suggestions for organizations to enhance their financial performance using TAXAGG, FDIR, BSIZE, and ACSIZE, this study will fill gaps in the current literature. The study findings will provide a foundation for future studies on how the elements that influence a firm's financial success affect companies in other emerging countries.

2. Literature review

2.1 Theoretical background

Agency theory explains the relationship between a company's shareholders (principals) and management (agents) and how they may have different interests. The theory suggests that management is appointed by shareholders to act on their behalf and has the responsibilities, powers and authority to run the business under shareholders' oversight. However, this relationship may lead to conflicts of interest as management may pursue actions that benefit themselves rather than shareholders.

In CG, agency theory can be used to understand the mechanisms and processes that are incorporated so that the interest of management and shareholders are on the same page. One illustration can be the role of the directors of the board, who are typically selected by the shareholders and serve as a form of oversight over management (Haque et al., 2023). Additionally, CG mechanisms such as performance evaluations, compensation schemes and other incentives are used to make sure that the management's interest and the shareholders' interest are on the same page (Desai & Dharmapala, 2006). Furthermore, research suggests that having a diverse group of shareholders and directors, including diversity of gender, can help in decreasing the problem of agency and also the interest alignment of shareholders with the management to avoid tax avoidance (Scholes et al., 2014; Boussaidi and Hamed, 2015).

According to Hoseini et al. (2018), CG is a system for managing and directing businesses which begins by setting goals and outlining methods to reach them. A control procedure and ongoing performance evaluation are developed to maximize performance. CG addresses the issues that come forth when the ownership of the business and the management are separated and good corporate practices can encourage value creation through entrepreneurship, creativity, innovation, research and development (Ye et al., 2019).

2.2 Hypothesis Development

2.2.1 Tax aggressiveness and firm's profitability

TAXAGG refers to a company's strategy of legally or potentially illegally reducing its tax liability. It can have both benefits and drawbacks for a firm's performance. On the positive side, it can lead to lower taxes, increased profits and competitiveness, and a favourable perception among investors and stakeholders. However, it can also carry risks such as legal penalties, reputational harm, backlash from the public and governments and loss of investments (Imtiaz et al., 2021). Additionally, it can also create complexity and uncertainty in the company's practices. It is imperative for firms to cautiously weigh the prospective pros and cons, and all ethical considerations, before this approach is implemented.

In relation to TAXAGG and firm's PROF, managers may feel incentivized to initiate aggressively planned tax strategies in order to minimize the company's tax liability for their own gain, even if it negatively impacts the firm's PROF. This is because managers may be rewarded for doing so through bonuses, stock options and other forms of compensation tied to the firm's financial performance, or they may own shares in the company (Landry, Deslandes & Fortin, 2013). However, from the principal's perspective, engaging in such strategies can lead to penalties, fines

and damage the reputation of the company and harm the relationship with stakeholders, all of which negatively impact the firm's PROF. Therefore, it is suggested in the agency theory of the existence of a potential conflict of interest amid managers and shareholders when it comes to TAXAGG and the firm's PROF (Lanis & Richardson, 2012; Khuong et al., 2020).

The literature on the relationship between TAXAGG and firm PROF is diverse, as there are some researches that demonstrate a relationship that is positive and other researches that demonstrate a relationship that is negative or insignificant Lin et. al., (2019) found a positive relationship between TAXAGG and PROF, the relationship is complex and multi-dimensional. Desai & Dharmapala (2006) found that companies that engage in more aggressive tax planning tend to have higher PROF in the short run (Iqbal et al., 2023). Some studies have found that companies that engage in tax aggressive behaviour may have better short-term financial performance, but at the expense of long-term performance and reputation. Another study found that while TAXAGG may lead to short-term financial gains, it may also result in long-term reputational damage and legal and regulatory sanctions, which can ultimately hurt a company's performance (Khuong et al., 2020).

H1: Tax aggressiveness has a positive influence on firm profitability.

2.2.2 Audit committee size and firm profitability

An audit board is made up of independent people whose role it is to supervise the process and processes of all financial reports for the firm as well as the work and responsibilities of the company's external auditor. These professionals are critical in ensuring the dependability, transparency, and integrity of a firm's financial accounts, and hence the firm's performance. The primary purpose of an audit board is to oversee all processes and procedures for reporting the company's financials (Irfan et al., 2022). This involves ensuring that the company's financial statements are accurate, dependable, and in accordance with accounting standards and laws. In addition, before financial statements are presented to the public, the audit board evaluates them to verify that they are clear and simple to comprehend. They also examine the firm's internal controls and other accounting systems to ensure that they are in good working order. In addition to financial reporting monitoring, the audit board is responsible for detecting and analyzing possible hazards to the organization. This involves detecting and analyzing risks connected to financial reporting, such as fraud or mistakes, as well as risks relating

to the company's operations, such as a drop in sales or the entry of a rival into the market. The audit board may assist the organization in addressing and mitigating possible difficulties by identifying and analyzing these risks. The audit board is distinct from the company's management. This guarantees that their monitoring and decision-making are impartial, fair, and advantageous to both the corporation and the stakeholders. Because of their independence, they can give an impartial and objective evaluation of the company's financial accounts. Communication with the external auditor, management, and the board of directors is the responsibility of the audit board. They collaborate with the external auditor to ensure that all audits are carried out in accordance with world-class, highly professional standards of professional, international excellence. They connect with management to learn about their financial reporting attentiveness (Jamil, Shah, et al., 2023). They speak with the board directors to raise their awareness of the company's financial situation and any prospective difficulties (Alabdullah & Ahmed, 2020).

The audit board is responsible for ensuring that the company's external auditor conducts the audit in line with professional standards and that it is of high quality. They assess the external auditor's work and make certain that any suggestions or conclusions are handled by management. The audit board may boost the company's image by assuring stakeholders that the financial statements are accurate, dependable, and in accordance with standards. This may lead to enhanced investor confidence, which can contribute to improved corporate performance (Hashim et al, 2019).

In short, the audit board executes an important function for the firm which is making sure of the reliability, transparency and integrity of a firm's financial statements. They provide oversight, risk management, independence, communication, quality control, and reputation management. These actions can lead to better performance of the company and enhance the company's reputation (Jamil, Zaman, et al., 2023).

A larger size of the audit committee means it is more diverse and less likely for any one person to dominate the decision-making process, thus leading to more effective monitoring and decision making. This can ultimately improve the firm's PROF by ensuring accurate and reliable financial statements, preventing fraud and misstatements, and increasing investor confidence (Richardson, Taylor & Lanis, 2013; Jiang, & Kim, 2020). The audit committee also reviews and monitors the reporting processes of all financials, internal controls and compliance with laws and regulations to identify and mitigate risks to the company's financial reporting and compliance. This enhances the company's overall performance (Dakhlallh, et al., 2020). The firm performance and the committee responsible for audits are closely related in the sense that the audit team performs an important part in making sure that accuracy, integrity of a company's financial disclosure, as it is a key aspect in assessing a company's performance. The responsibilities of the audit committee encompass reporting processes and procedures of all financials which also includes statements pertaining to these financials which helps to guarantee all statements of the company's financials are accurate, transparent and comply with all legal and regulatory requirements (Rahman, Meah & Chaudhory, 2019).

The relationship between ACSIZE, TAXAGG, and firm PROF has been researched in the area of CG. Studies have found that having a larger audit committee may play a role in moderating the relationship between TAXAGG and firm PROF (Carcello et al., 2006; Hermuningsih, Kusuma & Cahyarifida, 2020). A larger audit committee may have more resources and expertise to assess the tax implications of a company's financial decisions and thus be better able to monitor and control the level of TAXAGG within the company. However, other studies have not found any significant relationship between ACSIZE and the relationship between TAXAGG and firm PROF, while some have found a negative relationship (Dakhlallh, et al., 2020). The composition, proficiency, and responsibilities of the audit committee, as well as the overall governance structure of the firm may also play a role in

determining the relationship (Khan et al.). It's important to note that correlation does not imply causality and the relationship may be more complex. Additionally, there are other factors, such as regulatory environment, industry conditions, and the firm's strategy, that play significant parts in determining a company's PROF (Boussaidi & Hamed, 2015).

There is still inconclusive evidence on the relationship, and other studies have found no significant moderating effect of ACSIZE on the relationship between TAXAGG and firm PROF. Some researchers suggest that this may be due to the limited sample size, geographical and industry-specific factors, and other factors that influence the relationship (Klein, 2002; Park & Shin, 2004).

H2: Audit committee size has a positive influence on firm profitability

H3: Audit committee size moderates the influence of tax aggressiveness on firm profitability.

2.2.3 Board size has a positive influence on firm profitability

The size of the board is a crucial part of CG and may have a substantial influence on the performance and success of a company. A bigger BSIZE may bring additional viewpoints and experience, improving decision-making and strategic planning. A bigger board may reflect a broader mix of backgrounds, skills, and skill sets, allowing for a more complete investigation of the organization's concerns. Furthermore, a bigger BSIZE might give additional chances for specialized committees, such as audit and pay committees, to strengthen monitoring and administration of certain sectors of the firm. It may also enhance the number of independent directors on the board, which can aid improve managerial oversights while strengthening the company's governance structure. However, it should be emphasized that a high number of members on a board might pose communication or coordination issues... making it more difficult to obtain agreement and make effective choices (Khan et al.). Furthermore, a bigger BSIZE may result in a higher number of non-independent directors, which can raise the danger of conflicts of interest and reduce the efficacy of the board's supervision (Yermack, 1996; Farhan et al., 2020; Agyei-Mensah, 2021).

According to the literature, organizations with larger boards and a higher number of internal directors encounter agency difficulties more than those with smaller boards and a proportionally higher percentage of outside members (Core et al.1999). Recent research, however, has shown fuzzy correlations between board composition and business performance that vary depending on the firm's characteristics (Coles et al, 2008). According to the literature and current research issue, smaller boards may work more actively when it comes to making decisions on the allocation of funds for tax management (Park & Shin, 2004; Minnick & Noga, 2010). Yermack (1996) discovered that businesses with fewer board members had higher market values, and that fewer board members are linked with better long-term investment success. Other research, however, has shown no significant or even a negative link between BSIZE and business PROF. According to Hermalin and Weisbach (1998), larger audit firms are associated with less earnings management, and this favorable link is greater when committee members are more independent (Khan, Hyder, et al., 2023). They also discovered that bigger audit committees have more outside directors, which may give a more impartial view on financial reporting and management.

Other studies, however, have indicated that a bigger BSIZE might cause challenges in coordination and communication among board members, making it more difficult to establish agreement and make effective choices, resulting in inferior business performance. Furthermore, a larger BSIZE can lead to a greater number of non-independent directors, which can increase the risk of conflicts of interest and decrease the effectiveness of the board's oversight, resulting in poorer performance (Rahman, Meah, & Chaudhory, 2019; Bagais & Aljaaidi, 2020).

According to research, the size of a company's board may mitigate the influence of its TAXAGG on its PROF. A bigger BSIZE may provide additional resources and knowledge to supervise the company's tax plans and processes, lowering the risk of TAXAGG and increasing corporate PROF. According to the research, there is no impact on the size of the board that moderates the association between the aggressiveness of taxation and the PROF of a firm. Some research suggest that this might be due to the limited sample size, geographical and sector-specific traits, and other relationship-influencing variables (Park & Shin, 2004). One reason for this is that bigger boards have greater ability to monitor and review the company's tax strategies and procedures, which may aid in identifying and addressing any possible TAXAGG concerns or risks. This might involve using aggressive tax strategies or failing to comply with tax rules and regulations. Furthermore, bigger boards may be better successful at recognizing and resolving conflicts of interest between management and shareholders, therefore lowering the risk of TAXAGG. For example, if management is driven to reduce tax payments in order to boost profits, this may result in TAXAGG; however, a bigger board may assist align management and shareholder interests by ensuring taxes are paid in full (Panda & Leepsa, 2017; Lanis, Richardson, & Taylor, 2017).

H4: Board size has a positive influence on firm profitability

H5: Board size moderates the influence of tax aggressiveness on firm profitability.

2.2.4 Female directors

In the governance of corporations, the role of directors who are female are becoming increasingly significant as studies have revealed that firms that have more diverse boards have a high tendency to yield financial performance that is much better and make more effective decisions. FDIRs bring distinctive viewpoints, experiences and skills perspectives, skillsets and experiences to the boardroom which may lead to better comprehensive decision making (Khan et al., 2022). FDIRs on the board can help a company better understand and retort to the requirements and interests of female consumers, employees and also shareholders. Studies exist in which it is stated that companies having more female members of the board have greater chances of having policies and practices that support FDIR and equality, which can lead to a more positive work environment for all employees (Noland et al., 2016).

FDIR and firm PROFs relationship is a topic that has been studied in the field of CG, but the literature is mixed on whether having more FDIRs has a negative influence on firm PROF. Some studies have found that firms that perform financially better and tend to be more innovative have board members who are women (Khan, Zaman, et al., 2023). Financially better performing and earning greater stock returns firms have a greater percentage of females as board members (Dalton, Daily & Anderson, 1999; Croson & Gneezy, 2009).

However, there are also studies that have found no significant relationship between the presence of FDIRs and firm PROF. One study Jiang & Kim (2020) found that the directors who are female and the performance of the firm had no correlation. It's important to note that the literature is mixed, and there may be other factors that might be more important than the quantity of directors who are female alone in determining PROF of a firm and its correlation with the FDIR's presence. An important point to note is having a diverse board is not a guarantee that the performance or the effectiveness of the company will be better as the evaluation of the board is based on several factors, namely the composition of the board, processes and culture of the board. Also, it is essential to bear in mind that when the term correlation is used, it is not necessary that it implies causality. It is possible that other aspects that are impacting the relationship between presence of FDIRs and the performance of the firm (Chen et al., 2006).

According to a different study by Boussaidi and Hamed (2015), businesses with more FDIRs are often less tax-aggressive and more profitable. There are researches that show that having more FDIRs do not moderate any significant association amid tax aggression and corporate PROF. Firms with a higher percentage of women on their boards were less likely to engage in tax aggressive behaviour and the authors suggest that this is because women tend to be more risk-averse, and are more likely to consider the long-term consequences of a company's actions (Chen et al., 2006; Boussaidi & Hamed, 2015).

Arioglu, (2020) findings indicate that there is a statistically significant negative relationship between the percentage of FDIRs who are affiliated with controlling business groups and earnings management. The study suggests that under certain conditions, managers and directors may have motivations to participate in management practices pertaining to earnings which decrease income. Such motivations might be more prevalent among associated directors, because chances are that these associated directors shall be given the responsibility of becoming board members due to their connections to families or controlling business. This may explain the negative correlation between the percentage of FDIRs who are affiliated with controlling business groups and earnings management.

H6: Female directors have a negative influence on firm profitability.

H7: Female directors moderate the influence of tax aggressiveness on firm profitability.

3. Methodology

3.1. Data and sampling

This study utilized a dataset of 180 non-financial companies that were listed on the Pakistan Stock Exchange from 2016 to 2021, resulting in 1080 observations for analysis. The sample only included non-financial companies as they have distinct regulations and performance indicators. The data was collected from the annual reports of the listed companies on their websites. The sample size was limited to 180 non-financial firms as the data collection process was done manually. The dataset has a pivotal part in understanding issues of political expropriation and tax evasion in Pakistan, as the country has a specific institutional setting marked by weak rule of law, ineffective government, political interference, and high levels of corruption.

3.2. Analysis of data

This research used a combination of Stata version 22 and Microsoft Excel version 2016 to analyse the secondary data. Excel was utilized to organize and perform initial calculations on the sample's features. Stata, a common data analysis and statistical software that is frequently used in academic and business institutions, was employed for further examination. It was used in the following way: to check for linearity, equal variances, outliers, and missing values in the first step, then to analyse the variance and correlation between the variables and create the required regression models in the second step.

3.3. Measurement of variables

This study examines the impact of FDIRs, BSIZE, ACSIZE, tax evasion, and corporate PROF. The measurement of the variables utilised in this study is provided in this section.

3.3.1. Firm performance

In this study, the company's performance is considered as the dependent variable. As per the research of Tangngisalu et al. (2020), the company's performance is calculated by using the return on assets that is calculated as ratio of net profit to total assets. ROA was chosen as primary indicator of

company success as it is common practice to use ROA and PROF as an indicator of the performance of businesses and also in finance literature (Handayani, 2019; Alabdullah & Ahmed, 2020; Abdullah, Hashmi & Iqbal, 2022). Moreover, it's easy to calculate and understand the performance of the company with this measure.

3.3.2. Key independent and moderating variables

This study examines four critical independent variables: TAXAGG, ACSIZE, BSIZE, and representation of FDIRs. TAXAGG is measured as a binary variable, with a value of 1 for companies considered tax aggressive and 0 for others (Landry et al., 2013; Richardson, Taylor, & Lanis, 2013). A company is considered tax aggressive if it pays a lower tax rate than the government-mandated rate, which is determined through a two-step process of calculating the effective tax rate and comparing it to the government-mandated corporate tax rate. The representation of FDIRs is a crucial independent variable and this research study's sample is split in two distinct categories the basis of which is the representation level of board members who are female: (1) no FDIRs, (2) one or more FDIRs. This is reflected through a binary variable with a value of 0 for boards with no FDIRs and 1 for boards with one or more (Ye et. al, 2019). BSIZE is the total number of board members, and ACSIZE is the number of independent audit committee directors on the board (Bhagat & Bolton, 2008).

3.3.3. Control variables

This study also includes control variables such as firm size, leverage, and age in the analysis. The size of the firm is calculated as the natural logarithm of total assets and leverage is measured as the ratio of total debt to total assets. The variable FAGE accounts for the disparity in the amount of time the stocks of companies have been traded publicly. New public companies may pose a higher risk of financial misconduct due to the need to meet earnings expectations, whereas established public companies are more likely to have implemented changes to comply with public market regulations, including those affecting board composition. FAGE is determined by the number of years a firm's stock has been publicly traded on the PSX.

3.3.4. Model specifications

The model specifications that were used to determine the associations between the variables are shown in this section. Models 1-4 stand for the baseline models that were calculated to validate, in order, H1, H2, H3, and H4. If the coefficients for ACSIZE, BSIZE, FDIRs, and TAXAGG, respectively, are statistically significant, H1, H2, H3, and H4 will be supported. The models 1-4 are shown below:

$$ROA = \beta_1 + \beta_2 ACSIZE + \beta_3 SIZE + \beta_4 LEV + \beta_5 AGR \quad (1)$$

$$ROA = \beta_1 + \beta_2 BSIZE + \beta_3 SIZE + \beta_4 LEV + \beta_5 AGR$$

(2)

$$ROA = \beta_1 + \beta_2 FDIR + \beta_3 SIZE + \beta_4 LEV + \beta_5 AGR \quad (3)$$

$$ROA = \beta_1 + \beta_2 TAXAGG + \beta_3 SIZE + \beta_4 LEV + \beta_5 AGR \quad (4)$$

Additionally, Models 5-8 show the interaction models that were calculated to test if ROA moderates the connection between (i) TAXAGG and ACSIZE, (ii) TAXAGG and BSIZE, and (iii) TAXAGG and FDIR. If the coefficients of TAXAGG*ACSIZE, TAXAGG*BSIZE, and TAXAGG*FDIR, respectively, are statistically significant, the findings will support H5, H6, and H7. The following lists models 5, 6, and 7:

$$ROA = \beta_1 + \beta_2 TAXAGG*ACSIZE + \beta_3 SIZE + \beta_4 LEV + \beta_5 AGR \quad (5)$$

$$ROA = \beta_1 + \beta_2 TAXAGG*BSIZE + \beta_3 SIZE + \beta_4 LEV + \beta_5 AGR \quad (6)$$

$$ROA = \beta_1 + \beta_2 TAXAGG * FDIR + \beta_3 SIZE + \beta_4 LEV + \beta_5 AGR \quad (7)$$

3.4. Statistical analysis

Statistical analysis is a systematic approach to collect, analyse, interpret, present, and organize data. This analysis is employed to infer details about the sample data taken from the population and involves using statistical models and methods so as to summarize, describe, and make predictions about data. There are different types of analysis used in this research like descriptive analysis which is a statistical analysis that encapsulates and defines the features of a data set. It involves the calculation of central tendency measurement which includes mean and median. It also involves dispersion measurement which includes standard deviation and variances, to describe the distribution of a data set. Similarly, correlation is a statistical technique that measures the strength and direction of a linear relationship between two variables. It is expressed as a correlation coefficient, which ranges from -1 (perfect negative correlation) to 1 (perfect positive correlation).

This research also used the FGLS approach to explore the impact of variables such as BSIZE, ACSIZE, TAXAGG, and FDIRs on corporate performance. When the dataset is influenced by difficulties such as non-normality, heteroscedasticity, cross-sectional dependency, heterogeneity, and serial correlation, FGLS is widely used. Furthermore, the research uses the PW-PCSE approach to cross-validate the FGLS findings, which is especially beneficial in dealing with frequent difficulties in panel datasets such as unit-level heteroscedasticity, heterogeneity, and serial correlation. It also adjusts for spherical errors and delivers better inference than linear models.

4. Results and discussion

4.1. Descriptive statistics

Table 1

Descriptive statistics

	Mean	Std. Dev	Variance	Shapiro Wilk statistic	No of observations
ROA	2.130	14.108	199.061	15.797	1067
TAXAGG	0.853	0.353	0.124	4.186	1067
ACSIZE	3.597	0.923	0.852	8.820	1067
BSIZE	7.753	2.548	6.495	10.810	1067
FDIR	1.007	0.938	0.879	8.983	1067
FSIZE	9.673	1.019	1.040	8.887	1067
LEV	1.904	19.606	384.429	16.029	1067
FAGE	38.207	18.696	349.550	6.747	1067

Table 1 shows the descriptive statistics of all variables in a data set. The statistics provide information about the mean, standard deviation, variance, Shapiro Wilk statistic, and number of observations for each variable. The ROA has a mean of 2.130% (standard deviation of 14.108%) which is slightly lower than reported by Abdullah et al. (2022) which was 3.76% with the standard deviation of 0.4215%. The Shapiro Wilk statistic for ROA is 15.797 and there are 1067 observations. The TAXAGG has a mean of 0.853 (standard deviation of 0.353) which is slightly high as compared to Abdullah et al. (2022) which was 0.7691 (standard deviation of 0.4215). The Shapiro Wilk statistic for TAXAGG is 4.186 and there are 1067 observations. The ACSIZE has a mean of 3.597 (standard deviation of 0.923) which is almost similar to the mean reported by Deslandes et al., (2019) which

was 3.758 with standard deviation of 0.945. The variance of ACSIZE is 0.852 (standard deviation 0.923). The Shapiro Wilk statistic for ACSIZE is 8.820 and there are 1067 observations. The BSIZE has a mean of 7.753 and a standard deviation of 2.548 which is lower than Gill and Mathur (2011) which is 7.18 with standard deviation of 2.62. The variance of BSIZE is 6.495. The Shapiro Wilk statistic for BSIZE is 10.810 and there are 1067 observations. The mean of FDIR is 1.007 with standard deviation of 0.938 however the mean was found by Boussaidi & Hamed (2015) is 0.0299 with standard deviation of 0.0633. The variance of FDIR is 0.879. The Shapiro Wilk statistic for FDIR is 8.983 and there are 1067 observations. The mean of FSIZE is 9.637 with standard deviation of 1.019. Variance of FSIZE here, is 1.040. The Shapiro Wilk statistic for FSIZE is 8.887 and there are 1067 observations. The mean of LEV is 1.904 with standard deviation of 19.606. Variance of LEV here, is 384.429. The Shapiro Wilk statistic for LEV is 16.029 and there are 1067 observations. The mean of FAGE is 38.207 with standard deviation of 18.696. Variance of FAGE is 349.550. The Shapiro Wilk statistic for FAGE is 6.747 and there are 1067 observations.

4.2. Pairwise Correlations

Table 2

Pairwise Correlations

	ROA	TAXAGG	ACSIZE	BSIZE	FDIR	FSIZE	LEV	FAGE
ROA	1							
TAXAGG	0.019	1						
ACSIZE	0.118***	-0.091***	1					
BSIZE	0.141***	0.027	0.165***	1				
FDIR	-0.075**	0.065**	0.034	0.018	1			
FSIZE	-0.352***	-0.085***	0.097***	0.058*	0.046	1		
LEV	0.508***	0.029	0.078**	0.046	-0.032	-0.31***	1	
FAGE	0.028	0.017	0.022	-0.011	-0.069**	0.043	-0.003	1

Note 1: ***, ** and * indicate the statistical significance at the 1%, 5% and 10% levels, respectively.

In Table 2, the pairwise correlation among the eight variables of interest is presented. Each correlation coefficient ranges from -1 to 1, reflecting the direction and strength of the linear relationship between each pair of variables. A coefficient that is positive suggests that two variables are moving in a direction that is the same, alternatively, a coefficient that is negative implies that the variables are moving in a direction that is completely opposite.

Statistically significant correlations ($p < 0.05$) were found between ROA and four variables: BSIZE (0.141), ACSIZE (0.118), LEV (0.508), and FSIZE (-0.352). Specifically, the results depicted ROA having a positive correlation with BSIZE along with ACSIZE, suggesting that an increase in board and audit committee size is linked to better company performance. In contrast, a negative correlation was found between ROA and FSIZE, indicating that larger firms tend to have lower performance. Moreover, a positive correlation was found between ROA and LEV, suggesting that higher leverage is associated with better performance.

TAXAGG had a statistically significant negative correlation (-0.091) with ACSIZE, indicating that as a company's tax aggressiveness increases, its audit committee size decreases. Furthermore, results depicted correlation that was positive (0.065) amid TAXAGG and FDIR, implying that firms with more female directors tend to have higher levels of tax aggressiveness.

FSIZE had a statistically significant positive correlation (0.097) with ACSIZE, suggesting that larger firms tend to have bigger audit committees. Additionally, a negative correlation was found between FSIZE and FDIR (-0.069), indicating that companies with more female directors tend to be smaller in size.

Lastly, FAGE had a weak but statistically significant negative correlation (-0.003) with LEV, suggesting that older companies tend to have lower levels of leverage.

Panel regression results**Table 3***Panel Regression Results – Baseline Models*

	FGLS				PW-PCSE			
	(1) ROA	(2) ROA	(3) ROA	(4) ROA	(1) ROA	(2) ROA	(3) ROA	(4) ROA
ACSIZE	0.753** (0.322)				0.814** (0.327)			
BSIZE		0.278** (0.138)				0.317** (0.139)		
FDIR			-0.582* (0.347)				-0.603* (0.352)	
TAXAGG				-0.762 (0.481)				-0.769 (0.492)
FSIZE	-3.187*** (0.454)	-2.953*** (0.465)	-2.809*** (0.473)	-2.976*** (0.459)	-3.294*** (0.445)	-3.102*** (0.453)	-2.980*** (0.459)	-3.060*** (0.452)
LEV	0.322*** (0.010)	0.321*** (0.010)	0.320*** (0.009)	0.323*** (0.010)	0.323*** (0.010)	0.322*** (0.010)	0.321*** (0.010)	0.324*** (0.010)
FAGE	0.032 (0.031)	0.035 (0.034)	0.035 (0.036)	0.034 (0.032)	0.032 (0.029)	0.034 (0.031)	0.033 (0.032)	0.034 (0.031)
Constant	28.389*** (4.551)	26.617*** (4.734)	27.944*** (4.797)	29.645*** (4.624)	29.214*** (4.457)	27.772*** (4.601)	29.671*** (4.630)	30.475*** (4.548)
R-squared					0.522	0.530	0.534	0.528
Wald tistic	1194.77***	1239.45***	1266.56***	1216.56***	1161.95***	1199.78***	1219.06***	1191.42***
No of observations	1067	1067	1067	1067	1067	1067	1067	1067

The term "robustness" refers to the ability of a model to retain its accuracy and dependability even in situations when its fundamental assumptions are compromised. The assessment of robustness has significant importance in order to ascertain the validity of results and prevent the derivation of erroneous conclusions. Engaging in this practice has the potential to enhance one's trust in the credibility and dependability of the outcomes. In order to assess the resilience of the findings, it is essential to use diverse estimating techniques, such as maximum likelihood estimation, generalized least squares, or fixed effects regression. In order to assess the robustness of the findings in this study, the researchers use the Feasible Generalized Least Squares (FGLS) estimator and the Panel-Weighted Panel-Corrected Standard Errors (PW-PCSE) estimator, which are recognized methods for obtaining trustworthy and accurate results.

Table 3 displays the results of a panel regression analysis for baseline models using the Feasible Generalized Least Squares (FGLS) and Panel-Corrected Standard Errors (PW-PCSE) techniques. The study focuses its attention on eight variables, namely ROA, ACSIZE, BSIZE, FDIR, TAXAGG, FSIZE, LEV, and FAGE. The dependent variable in this study is Return on Assets (ROA), which serves as a measure of a company's profitability. The other variables are independent factors that have an influence on the dependent variable, PROF.

The findings indicate that the variable ACSIZE has a statistically significant and favorable impact on the return on assets (ROA) across all four models. The coefficients associated with ACSIZE are 0.753 and 0.814 when estimated using the FGLS and PW-PCSE techniques, respectively. This suggests that there is a positive relationship between the size of the audit committee and the company's profitability. In a similar vein, it is worth noting that BSIZE has a significant and favorable impact on the return on assets (ROA) in both models, with coefficients of 0.278 and 0.317, respectively. This implies that there is a positive correlation between the size of boards and the overall success of companies.

In contrast, it can be shown that on the Return on Assets (ROA), the impact of Fault Detection, Isolation, and Recovery (FDIR) is mostly adverse. The coefficients associated with the FDIR variable are -0.582 and -0.603 in the FGLS and PW-PCSE estimation techniques, respectively. This implies that organizations characterized by a higher frequency of financial distress-induced restructurings (FDIRs) often exhibit poorer profitability (PROF). Furthermore, it is worth noting that the Return on Assets (ROA) has a detrimental impact on TAXAGG, despite the fact that the coefficients associated with this relationship do not exhibit statistical significance.

In addition, it is worth noting that the variable FSIZE has a statistically significant negative impact across all eight models considered, as seen by the coefficients ranging from -2.809 to -3.294. This observation suggests that there is a negative correlation between business size and profitability. The impact of LEV on ROA is consistently favorable across all eight models, as shown by coefficients ranging from 0.320 to 0.324. This suggests that an increase in leverage may result in improved corporate performance.

The constant term in each of the eight models has statistical significance and a positive coefficient, indicating the presence of unaccounted variables that influence PROF. The R-squared values span a range of 0.522 to 0.534, indicating that the model accounts for about 52.2% to 53.4% of the variability seen in the return on assets (ROA). The Wald statistic demonstrates statistical significance across all eight models, suggesting that the independent variables together have a substantial influence on the return on assets (ROA).

Table 4*Panel Regression Results – Interaction Models*

	FGLS			PW-PCSE		
	(5) ROA	(6) ROA	(7) ROA	(5) ROA	(6) ROA	(7) ROA
ACSIZE	2.339*** (0.459)			1.667*** (0.530)		
BSIZE		0.484*** (0.176)			0.520** (0.203)	
FDIR			-0.136 (0.483)			-0.485 (0.590)
TAXAGG	4.045** (1.629)	1.117 (1.161)		3.272 (2.000)	0.867 (1.455)	-0.619 (0.727)
TAXAGG*ACSIZE	-1.240*** (0.412)			-1.046** (0.507)		
TAXAGG*BSIZE		-0.249* (0.148)			-0.215* (0.102)	
TAXAGG*FDIR			-0.594 (0.595)			-0.143 (0.519)
FSIZE	-2.917*** (0.508)	-2.623*** (0.491)	-2.780*** (0.548)	-3.345*** (0.441)	-3.232*** (0.442)	-3.155*** (0.445)
LEV	0.344*** (0.008)	0.341*** (0.008)	0.339*** (0.009)	0.326*** (0.010)	0.324*** (0.010)	0.324*** (0.010)
FAGE	0.014 (0.017)	0.018 (0.016)	0.017 (0.017)	0.032 (0.029)	0.035 (0.029)	0.033 (0.030)
Constant	20.767*** (5.122)	22.891*** (4.805)	28.220*** (5.420)	26.999*** (4.713)	28.102*** (4.649)	31.904*** (4.515)
R-squared				0.5230	0.5249	0.5245
Wald statistic	1815.84***	1753.72***	1735.89***	1164.78***	1173.41***	1171.75***
No of Observations	1067	1067	1067	1067	1067	1067

Table 4 presents the findings of a panel regression interaction model, which examines the comparison between the FGLS (Fixed Effect) and PW-PCSE approaches. The variable of interest in this study is the Return on Assets (ROA). The independent variables included in this study are ACSIZE, BSIZE, FDIR, TAXAGG, FSIZE, LEV, and FAGE. The provided table presents the estimated coefficients, standard errors (in parentheses), and significance levels (shown by ***, **, and * denoting statistical significance at the 1%, 5%, and 10% levels, respectively) for each independent variable and its interactions with TAXAGG. The anticipated signals for each coefficient are also provided.

The results of this research indicate that two of the variables under investigation, namely ACSIZE and BSIZE, have a positive and statistically significant impact on the Return on Assets (ROA) of the enterprises evaluated. The regression analysis revealed that the variable ACSIZE exhibited a coefficient of 2.339, which was statistically significant at a level of $p < 0.001$. This finding indicates a robust positive association between ACSIZE and ROA. In a similar vein, it can be shown that BSIZE had a statistically significant positive impact on the return on assets (ROA) with a beta coefficient of 0.484 and a p-value of less than 0.001. The aforementioned findings align with the outcomes of the

study conducted by Jwailes and Hamada (2021), so offering more substantiation for their assertions. Conversely, the research observed that the third variable under investigation, FDIR, had a negative impact on ROA, but this effect did not reach statistical significance. The results of the regression analysis indicate that the coefficient for the link between FDIR and ROA is -0.136, suggesting a weak association. Additionally, the p-value of 0.483 further supports the notion of a weak relationship between these variables. The outcome presented here is in opposition to the conclusions given by Jwailes and Hamada (2021), who documented a favorable influence of FDIR on ROA. Hence, the findings of this research indicate that the dimensions of company size, as assessed by both ACSIZE and BSIZE, possess a notable predictive capacity regarding the financial performance of enterprises. Conversely, the influence of foreign ownership, as evaluated by FDIR, may not have a large effect on the return on assets (ROA). The findings of this study provide valuable insights into the many determinants that influence the success of firms, hence serving as a valuable resource for investors, policymakers, and scholars.

The variable TAXAGG demonstrates a statistically significant positive effect on the return on assets (ROA) with a beta coefficient of 4.045, indicating a meaningful influence at a significance level of $p < 0.05$. This finding is supported by the research conducted by Yanti (2019) and Kelline et al. (2022). Nevertheless, the relationship between TAXAGG and ROA is shown to be negative and statistically significant when considering its interaction with ACSIZE ($\beta = -1.240$, $p < 0.001$). This implies that as ACSIZE grows, the influence of TAXAGG on ROA diminishes. The association between TAXAGG and BSIZE is likewise statistically significant, although the effect size is less ($\beta = -0.249$, $p < 0.1$). However, there is no significant interaction between TAXAGG and FDIR.

The variable FSIZE has a negative effect on the return on assets (ROA) and it also has a large influence on the ROA. The study done by Fitri and Munandar (2018) yielded equivocal findings, whereas Farhan et al. (2020) reported a positive correlation ($\beta = -2.917$, $p < 0.001$). The findings presented in this research have been corroborated by Abd-Elmageed et al. (2020). The variable "LEV" demonstrates a substantial and positive effect on the return on assets (ROA) with a beta coefficient of 0.344, indicating a statistically significant relationship ($p < 0.001$). The findings indicate that FAGE has a limited and statistically insignificant effect on Return on Assets ($\beta = 0.014$, $p = 0.017$). These findings corroborate the conclusions reported by EHIEDU, Victor, and Imoagwu (2022).

The R-squared values indicate that the models account for roughly 52-53% of the variability seen in the return on assets (ROA). The Wald statistic indicates a high level of statistical significance for the models. The sample size for the study consists of 1067 observations.

5. Conclusion

A company's PROF is influenced by multiple factors, including BSIZE, ACSIZE, FDIR, and TAXAGG. It is challenging to determine which is more profitable between developed and underdeveloped nations based on these factors alone. In developed nations, a strong legal and regulatory framework can lead to better governance and financial performance, which can be enhanced by a larger BSIZE and ACSIZE, as well as increased FDIR. However, the resources available for tax enforcement and compliance may restrict their TAXAGG. In underdeveloped nations, a less established legal and regulatory framework may present challenges for companies but may also present new opportunities pertaining to the planning of taxation and aggressive strategies for taxes. Prevalence of larger BSIZE and ACSIZE, as well as greater FDIR, may be lower, affecting the overall governance and financial performance.

The findings of this study will provide valuable information to company managers regarding the relationship between TAXAGG, FDIR, BSIZE, and ACSIZE and financial performance. This

information can help managers make informed decisions that can lead to improved financial outcomes for their companies. By considering these factors, managers can take steps to enhance the financial performance of their companies. Investors will benefit from this study by gaining deeper insight pertaining to the effect of various factors on the financial performance of Pakistani firms. This information can greatly aid investors in making calculated and well informed decisions about where to invest their resources and achieve better returns. The insights gained from this research can be used to evaluate potential investment opportunities and make informed investment decisions. Policymakers in Pakistan will gain a deeper understanding of the relationship between TAXAGG, FDIR, BSIZE, and ACSIZE and financial performance. This information can inform the development of policies that promote practices that augment the financial performance of companies. Policymakers may incorporate the insights gained from this study to improve the regulatory framework for companies, which can result in better financial outcomes and a more robust economy overall.

The research pertaining to the effect of TAXAGG, FDIR, BSIZE, and ACSIZE on financial performance of companies operating in Pakistan may encounter several limitations. The availability and quality of data can be a significant obstacle in this study, making it difficult to obtain accurate and reliable results. This can lead to a reduced validity of the findings. The time frame of the study may also be limited, which may prevent the researcher from observing the complete impact of the variables on financial performance. Furthermore, there may be other unmeasured factors that influence financial performance, and these factors may not be included in the study, which could impact the conclusions that are drawn. The model used in the study may not effectively represent the intricate relationships between the independent and dependent variables, leading to further limitations. Additionally, the study may not be able to ascertain a relationship that can be described in terms of cause-and-effect relationship among TAXAGG, FDIR, BSIZE, and ACSIZE and financial performance. The cultural and economic differences between Pakistan and other countries, as well as the political instability in Pakistan, may also play a role in the generalizability of the findings.

Future research can enhance our understanding of the relationship between TAXAGG, FDIR, BSIZE, and ACSIZE and their impact pertaining to the financial performance of Pakistani firms. In order to build upon the current findings, researchers may focus on determining the ideal values for these factors within the Pakistani context. They could also examine other factors, such as CG and social responsibility, and their impact on financial performance. Furthermore, cross-cultural studies comparing the results in Pakistan to those in other countries could be conducted to gain a more comprehensive understanding of these relationships. Longitudinal research could also be performed to analyze the long-term impact of these factors on financial performance. The results of future studies will provide valuable information for companies, investors, and policymakers in making informed decisions to improve financial outcomes.

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