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Article

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ACCOUNTING, CORPORATE GOVERNANCE & BUSINESS ETHICS | RESEARCH ARTICLE

Corporate governance mechanisms and firm performance in Saudi Arabia before and during the COVID-19 outbreak

Helmi A. Boshnak¹, Mohammad Alsharif^{2*} and Majed Alharthi³

Abstract: This study examines the impact of corporate governance mechanisms on the performance of listed firms in Saudi Arabia before and during the coronavirus disease (COVID-19) pandemic. The study applied univariate, bivariate, and multivariate analyses to data collected from 258 annual reports from 2019 to 2020. The results show that during the COVID-19 pandemic, firm market performance (Tobin's Q ratio) has decreased with larger board size, more board meetings, while it has increased with board experience, board education, and board gender (number of women on the board). Moreover, during the COVID-19 pandemic, board gender was found to have a significant positive impact on the firm's operational performance (return on assets), implying that gender diversity on boards plays a crucial role in times of crisis. The findings have significant implications for Saudi Arabian firms, managers, investors, and policymakers. Furthermore, the latest corporate governance regulations in Saudi Arabia are almost certain to have a significant impact on firm performance, particularly during times of crisis. In addition, corporate governance regulations should consider the importance of small board size, lower board independence, board member experience and education, and board gender diversity to improve corporate performance, especially in times of crisis. Governments and regulators should collaborate to reduce the financial and economic impact of the COVID-19 pandemic. Comprehensive policies are needed to address the negative consequences of current and future crises.

Subjects: Accounting; Corporate Governance

Keywords: Saudi Arabia; corporate governance; COVID-19; firm performance; Tadawul

1. Introduction

Corporate governance is commonly defined as the process of directing, organising, and controlling a firm. Corporate governance is a system for professionally directing a firm based on good corporate governance principles. Transparency, accountability, responsibility, independence, and fairness are key principles of good corporate governance. Corporate governance is heavily influenced by the parties involved in a company's management system, such as shareholders, investors, creditors, employees, and the government. It is expected that good corporate governance will

improve firm performance. The primary goal of implementing good corporate governance is to maximise long-term value for shareholders and stakeholders (Naimah & Hamidah, 2017).

The coronavirus disease (COVID-19) pandemic has spread rapidly worldwide and the virus continues to mutate, posing a major threat to all economies, particularly the operations of listed corporations. Because of government measures, such as mobility restrictions, stay-at-home orders, social distance laws, and community lockdowns, this sickness is not simply a health concern; it also undermines global economies and businesses in a variety of ways. Evidence indicates that COVID-19 affects the financial performance of listed firms. For example, Hu and Zhang (2021) showed that a higher number of COVID-19 cases significantly decreased profitability in 107 countries. Moreover, Jin et al. (2021) confirmed that over the period of COVID-19 spread (2020), the profitability of Chinese-listed firms was significantly and inversely affected.

However, the main aim of corporate governance is to direct listed firms to apply the rules, regulations, and practices of the financial markets imposed by capital market authorities. Consequently, corporate governance increases the reliability and transparency of firms, which leads to a higher trust level for investors and stockholders. Robust evidence confirms that applying corporate governance efficiently leads to better financial performance (Ciftci et al., 2019; Koji et al., 2020; Waheed & Malik, 2019). It is important to look into the board characteristics and how these characteristics can affect the performance of the firm as the board of directors solved the the conflict of interests between managers and stockholders and secured the stockholders' rights within the corporation. The primary purpose of this study is to investigate the impact of corporate governance mechanisms on the performance of Saudi-listed firms during the COVID-19 pandemic.

In Saudi Arabia, oil exports have played a significant role in determining GDP; however, after the volatility and unstable prices of oil over the last decade, Crown Prince Mohammed bin Salman, representing the Saudi government, announced the Saudi Vision 2030 framework on 25 April 2016. Saudi Vision 2030 seeks to diversify the economy away from reliance on oil exports. One of the most important supports to Saudi Arabia's GDP is the Financial Sector Development Program, which has three objectives: 1) empowering financial institutions to enhance the growth of the private sector in Saudi Arabia; 2) supporting the construction of an advanced capital market; and 3) enabling and promoting financial plans (Financial Sector Development Program, 2016). According to Alsharif and McMillan (2021), the Saudi Stock Exchange (Tadawul) is rapidly becoming one of the world's largest financial markets in terms of market value.

However, identifying the impact of corporate governance mechanisms such as board size (Ciftci et al., 2019; Koji et al., 2020), board meetings (Arora & Sharma, 2016; Puni & Anlesinya, 2020), board independence (Jesuka & Peixoto, 2021; Koji et al., 2020), board experience and education (Harjoto et al., 2019; Khanna et al., 2014; Yameen et al., 2019; Zayed, 2017), board gender (Asghar et al., 2020; Mertzanis et al., 2019), audit committee characteristics (Al-Matari et al., 2014; Alzeban, 2020; Jesuka & Peixoto, 2021; Salloum et al., 2014; Sharma et al., 2009), and firm characteristics such as firm size (Alodat et al., 2021; Zhou et al., 2018), leverage (Al-Gamrh et al., 2020b; Atayah et al., 2021), and liquidity (Jesuka & Peixoto, 2021; Mertzanis et al., 2019) on the performance of Saudi firms is also important to policymakers and investors. Thus, in this study, we also control and examine the association between corporate governance mechanisms, firm characteristics and performance ratios (return on assets [ROA], return on equity [ROE], and Tobin's Q [TQ]) in Saudi Arabia during the COVID-19 pandemic.

In the context of Saudi Arabia, little research investigates the relationship between corporate governance and firm performance during the COVID-19 pandemic. This study aims to address this gap in literature. The purpose of this study is to investigate the impact of corporate governance mechanisms on the performance of 129 publicly traded Saudi companies during the COVID-19 pandemic. This study contributes to the literature in several ways. First, this study provides valuable insights into the corporate governance mechanisms that drive firm performance,

particularly during the COVID-19 pandemic in an emerging market. It investigates the relationship between accounting- and market-based measures of corporate performance and corporate governance characteristics in the context of Saudi-listed firms. Second, empirical evidence on the relationship between corporate governance and performance in the Saudi context is quite limited (Boshnak, 2021; Buallay et al., 2017). Therefore, this study expands existing literature in several ways. First, it adds to the body of emerging market evidence on corporate governance and firm performance with new data spanning the period 2019–2020. Second, it explores the impact of a more comprehensive range of corporate governance mechanisms on firm operational (ROA), financial (ROE), and market (TQ) performance; these mechanisms include board characteristics (members' characteristics, size, meetings, independence, experience, education, and gender), and audit committee characteristics (size, meetings, independence, experience, and education). Further, it includes a range of potential firm-specific determinants, including firm size, leverage, and liquidity, to address the mixed results of previous research. Finally, it presents new evidence and analyses of the pivotal importance of corporate governance mechanisms in their impact on Saudi firm performance before and during the COVID-19 pandemic. This study aimed to answer the following questions:

- (1) Does the COVID-19 spread affect listed firms' performance in Saudi Arabia?
- (2) Does corporate governance affect listed firms' performance in Saudi Arabia through the COVID-19 pandemic period?
- (3) Do firm characteristics influence listed firms' performance in Saudi Arabia through the COVID-19 pandemic period?

The remainder of this paper is structured as follows: Section 3 explains the theoretical framework. Section 2 presents the literature review and the hypotheses formulation process. Section 5 describes the data and methods used. Section 6 presents the study findings and discusses them. Finally, Section 7 presents the conclusions, limitations, consequences, and directions for future study.

2. Theoretical framework

This study modifies the comprehensive theoretical context developed by Gaur et al. (2015). The theories employed therein vary in their explanations of the function of governance mechanisms at work. Specifically, these theories used different interpretations of the role of governance systems at work. Meanwhile, the sections below discuss the agency, stewardship, and resource dependence theories and summarize the seminal theories employed in this study.

2.1. Agency theory

According to the agency theory (agent and principal), ultimate owners and management can be separated. Agents strive to operate in the best interests of the ultimate principal. According to this argument, the two conflicts of interest are normal (Fama & Jensen, 1983). Issues emerge when managers behave in their own self-interest, increasing shareholder spending (Fama & Jensen, 1983). While monitoring agents ensure that they act in the best interests of the principals, the cost to the company (agency charges) will rise, affecting shareholder interests. Managers are more likely to deviate from defending shareholders' interests in an environment that is devoid of regulating instruments and efficient market laws. Corporate governance systems are required to alleviate these agency concerns. The agency theory establishes a framework for successful company governance by utilizing both internal and external channels (Roberts et al., 2005). According to Rasmussen and Schmidt (2012), corporate governance tools can be achieved by increasing board size and independence and reducing CEO dual responsibilities, and audit-related factors should reduce agency issues inside organizations.

2.2. Stewardship theory

According to the stewardship philosophy, managers are motivated by the aims of the principal rather than their own (Davis et al., 1997). This implies that a firm's executives are trustworthy (Siebels & Zu Knyphausen-Aufseß, 2012). Several assumptions are made in this theory. First, managers and owners have similar interests (Davis et al., 1997). Second, as long as managers are dependable, CEO duality may be the best style of governance (Siebels & Zu Knyphausen-Aufseß, 2012). Agents can utilize firm knowledge to their advantage, allowing them to work for the firm's benefit (Nicholson & Kiel, 2007). Finally, company managers strive to make the best use of the business's resources to increase firm value (Davis et al., 1997). According to Donaldson (1990) increasing CEO duality and the number of board executives should both enhance the board and contribute to a better grasp of the business process. Thus, the stewardship theory instills trust and autonomy in managers, lowers monitoring costs, boosts shareholder ROE (Daily et al., 2003), and improves overall company financial performance.

2.3. Resource dependence theories

According to the notion of resource dependency, directors serve as a key link between a company and valuable external resources necessary for the firm's growth (Pearce & Zahra, 1992). According to this notion, the board of directors plays a controlling function while also providing necessary resources, such as business connections and contracts, talents, experience, and knowledge (Chen, 2011). The latter improves business performance while increasing stockholder value (Pearce & Zahra, 1992). In principle, a diversified corporate board with broad linkages to external sources should increase both value and business performance.

3. Literature review and hypotheses formulation

While several studies have examined the determinants of listed firm performance (Al-Ahdal et al., 2021; Al-Bassam et al., 2018; Alodat et al., 2021; Jesuka & Peixoto, 2021), few studies have tested the impact of COVID-19 (Atayah et al., 2021; Hu & Zhang, 2021; Jin et al., 2021).

3.1. COVID-19 and firm performance

COVID-19 is one of the most pressing issues of the twenty-first century. Its impact on the environment, business, and economy is severe because of the uncertainty caused by the disease and how this affects government activities. The economic impact of the pandemic is now being examined; evidently, it is more than simply a health issue. Countries have been severely affected, and the highly contagious nature of COVID-19 has caused authorities to enforce quarantine measures. These rules have a considerable detrimental influence on enterprises' market requirements. Policy restrictions related to transportation, social distancing, stay-at-home regulations, and the elimination of unnecessary enterprises have all had a substantial influence on firms' overall performance.

Atayah et al. (2021) have examined the factors that impact financial performance (ROA, ROE, and TQ) for G-20 countries over the period 2010–2020. The findings of this study reveal that, over the COVID-19 period, the performance of listed firms in 16 countries performed very well, as the governments of G-20 have supported their economies to increase the stability of financial markets. In contrast, six countries (Germany, Korea, Russia, Mexico, Saudi Arabia, and the UK) have been negatively affected during the pandemic. Moreover, larger firms are more profitable than smaller firms. In addition, firms audited through the Big 4 achieved more profits than those audited by other companies. The correlation between leverage and ROA is significant and negative, meaning that higher debt leads to lower profitability. The study also shows that higher economic growth leads to a lower probability in the G-20 countries.

Another study explored the effects of COVID-19 on financial performance (Hu and Zhang (2021) on 107 cross-countries for the period 2020Q1–2020Q3. The results indicate that COVID-19 influenced the financial performance of firms, but countries with better healthcare systems have been impacted less than those with weak healthcare systems. Furthermore, the leverage ratios indicate

that firms have benefited from debt positively. The correlation between ROA and firm size is found to be significant and negative.

Another recent study also focused on the effects of COVID-19 on firm performance is conducted by Aqabna et al. (2023) on MENA region during the period 2007–2021. This study used GMM regressions to find the results. The results of GMM suggest that over the period of COVID-19 pandemic (2020–2021), the ROA decreased significantly. In addition, there is an insignificant correlation between the COVID-19 outbreak, and Tobin's Q and ROE. Alharthi (2022) examined the factors of financial performance (ROA and ROE) of 11 Kuwaiti listed banks for the period 2013–2020. This study employed GMM regression. He found that COVID-19 affected the ROE of Kuwaiti listed banks significantly and negatively. The COVID-19 has insignificant impact on ROA of Kuwaiti listed banks.

Jin et al. (2021) tested the impact of the COVID-19 outbreak on listed corporations in the tourism industry in China over the period 2019–2020. This study concludes that COVID-19 has impacted the financial performance of listed corporations in China's tourism industry. This result occurred because of international airport closures and flight cancellations. Moreover, the lockdown has forced hotels to close temporarily, which has inversely influenced the profitability of the tourism sector in China. Larger listed firms are more profitable than smaller firms. This study also reports that working capital supported the financial performance of listed banks in the tourism sector, but the leverage ratio influenced financial performance significantly and negatively. In the context of Saudi Arabia, Boshnak et al. (2021) investigate how firm characteristics affect the performance of Saudi listed firms during the COVID-19 epidemic between Q3 2019 and Q3 2020. The results show that the onset of the COVID-19 pandemic had a significant impact on firms' operational, financial, and market performance measures. The study also reports that larger firms performed better both before and during the pandemic, while leverage is a clearly negative factor affecting firm performance on all three measures both before and during the pandemic. Furthermore, certain industries, such as materials (petrochemicals), consumer services, real estate, and consumer durables and apparel, appear to be the most affected by the pandemic. Therefore, we formulated the following hypothesis:

H1: The COVID-19 pandemic impacts listed firms' performance in Saudi significantly

3.2. Corporate governance and firm performance

Many studies have investigated the influence of corporate governance on the financial performance of firms (Al-Ahdal et al., 2020; Al-Bassam et al., 2018; Alodat et al., 2021; Ciftci et al., 2019; Mardnly et al., 2018; Mishra et al., 2021; Puni & Anlesinya, 2020; Saidat et al., 2019). However, relatively few studies have investigated the influence of corporate governance on profitability during the COVID-19 pandemic (Atayah et al., 2021; Hu & Zhang, 2021; Jin et al., 2021). According to agency theory, the practises used by the board of directors force managers to satisfy stockholder needs (Jensen & Meckling, 1976). Furthermore, the board provides expertise and supervision to management and expects responsibility in return (Al-Najjar, 2013). According to resource dependency theory, the role of the board of directors is to connect the company to its external environment in order to increase revenue, manage risk, and obtain essential services such as finance and information (Calabrò et al., 2013; Ntim et al., 2012). Most studies suggest that a larger board size supports financial performance (Ciftci et al., 2019; Koji et al., 2020) but some argue that a fewer number of boards can attain more returns to firms (Saidat et al., 2019). Studies show that larger boards are ineffective and more vulnerable to CEO manipulation, which complicates decision-making and raises coordination costs and processing problems (Anderson & Reeb, 2003a, 2003b; Coles et al., 2008). Furthermore, smaller boards should reduce free-riding and improving firm performance (Eisenberg et al., 1998; Yermack, 1996). Regarding the number of

board meetings throughout the financial year, frequent board meetings allow for faster resolution of critical issues, improved management oversight, greater coordination, and a greater focus on stockholder interests (Lipton & Lorsch, 1992). It is argued that board meeting time is a critical resource for improving board efficiency and decision-making (Conger et al., 1998). Conger et al. (1998) declares that when boards meet on a regular basis, directors have more opportunities to improve firm performance and follow the interests of shareholders. Puni and Anlesinya (2020) and Arora and Sharma (2016) suggest that greater board meetings allow firms to be more profitable. In contrast, Asghar et al. (2020) prove that a lower number of board meetings increases earnings significantly and positively. Focusing on independents on the board, institutional argument argues that the appointment of independent directors is mainly intended to alleviate institutional pressure, and their presence does not ensure superior performance. According to Gaur et al. (2015), having more independent directors leads to more conflict and inefficient decision-making. However, some argue that hiring qualified and experienced non-executive (independent) directors is an effective way of mitigating potential conflict between shareholders and management (John & Senbet, 1998), and that should enhance firm performance. Jesuka and Peixoto (2021) and Koji et al. (2020) pointed out that the relationship between the number of independents on the board and firm performance is significant and positive. Regarding gender diversity, resource dependence theory suggests that having a diverse board of directors enhances relationships with customers and competitors, increases access to capital, and expands the company's networks and linkages (Liu et al., 2014; Reguera-Alvarado et al., 2017). For example, some corporations appoint female directors to their boards in order to maintain good relationships with their female clients or customers (Liu et al., 2014). As a result, the connections that female directors have to external resources have the potential to increase critical resourcing and thus improve firm performance (Reguera-Alvarado et al., 2017). Asghar et al. (2020) and Mertzanis et al. (2019) argue that the number of female board members significantly supports firm performance. Focusing on the audit committee characteristics, Al-Matari et al. (2014) concluded that the structure of audit committees has a significant positive impact on firm performance. As a result, the inclusion of non-executive directors on the audit committee is viewed as a mechanism for increasing accountability and maximizing the firm's wealth. Meeting frequency has been shown to improve audit committee effectiveness, which has a significant impact on firm performance (Salloum et al., 2014; Sharma et al., 2009). The audit committee's independence and expertise have been shown to have a positive impact on the firm performance of Saudi and UAE-listed firms (Alzeban, 2020). Jesuka and Peixoto (2021) point out that the greater the number of audit committees, independents in the audit committee, and the number of years of experience for audit members, the more significant the increases in the returns of firms. Based on the discussion above, we propose the following hypothesis:

H2: Corporate governance impacts listed firms' performance in Saudi significantly.

3.3. Firm characteristics and firm performance

Firm characteristics are integral to firm performance, and previous studies have shown that good management of firm characteristics leads to higher profitability. The most important factors that affect firm performance are firm size, leverage, and liquidity.

3.3.1. Firm size

An extensive number of past studies show that larger firms are more profitable than medium- and small-sized firms (Al-Gamrh et al., 2020b; Koji et al., 2020; Rababah et al., 2020), but few studies confirm a significant and negative correlation between firm size and financial performance (Asghar et al., 2020; Hu & Zhang, 2021). The total assets are an indicator of firm growth. Therefore, our study tests the impact of total assets on financial performance, and it is expected that a higher intensity of total assets supports financial performance in Saudi Arabia. However, during the

COVID-19 pandemic, the cost of operations could increase significantly, which would affect profitability significantly and negatively.

3.3.2. Leverage

The majority of studies in the literature review indicate that higher liabilities affect profitability significantly and adversely (Alodat et al., 2021; Chauhan et al., 2016; Waheed & Malik, 2019). In contrast, a limited number of studies confirm that higher debt allows more profits to be achieved (Hu & Zhang, 2021). In this study, we analyze the effects of the leverage ratio on firm performance in Saudi Arabia. It is anticipated that liabilities can significantly decrease returns.

3.3.3. Liquidity

The liquidity ratio can be measured as current assets divided by current liabilities. Most previous studies have found that the relationship between liquidity and financial performance is significant and positive (Jesuka & Peixoto, 2021; Mertzanis et al., 2019; Zhou et al., 2018). Thus, we expect to find a positive correlation between the liquidity ratio and firm performance in Saudi Arabia. Based on the above discussion, the following hypothesis is formulated:

H3: Firm characteristics impact listed firms' performance in Saudi significantly.

4. Methodology and sample

Following Boshnak (2021), among other research, this study explores the impact of corporate governance on three different firm performance types: (i) "operational" using ROA; (ii) "financial" using ROE; and (iii) "market" using TQ. The independent variables in the study models are as follows: (i) corporate governance factors: board size (BSIZE), board meetings (BMEET), board independence (BINDEP), board experience (BEXP), board education (BEDUC), board gender (BGENDER), audit committee size (ASIZE), audit committee meetings (AMEET), audit committee independence (AINDEP), audit committee experience (AEXP), and audit committee education (AEDUC); (ii) control variables: firm size (SIZE), leverage (LEV), and liquidity (LEQ). Table 1 outlines the descriptions of the variables.

In this study, two stages of analysis were followed. In the first stage, bivariate analysis was performed to identify the changes in variables between the pre and post COVID-19 periods. The year 2019 represents the period before COVID-19 and the year 2020 represents the period after COVID-19, as the COVID-19 precautionary and preventive measures in Saudi Arabia started on 27 February 2020 and the first case of infection with COVID-19 was recorded on 2 March 2020. The paired sample test (i.e., before-and-after test) was applied using a mix of parametric and non-parametric methods to ensure the robustness of the results. However, in the second stage, multiple regression analysis was applied to control for other variables and analyze the net effect of corporate governance mechanisms on firm performance. In the second stage, multiple regression analysis, the random effect model (EFM) was applied for four reasons: (1) the panel regression is more appropriate because the study sample is a panel dataset; (2) the Breusch-Pagan Lagrange multiplier (LM) test is significant, indicating the random effect exists, while the Hausman test is not conclusive because the data fail to meet the asymptotic assumptions of the test; (3) because of the large number of firms, the use of a fixed effect model will result in an unmeaningful statistical analysis due to the lack of sufficient observations (Gujarati & Porter, 2009); and (4) the sector dummy variables will be used to further control the heterogeneity in the sample, and the robust standard errors will be estimated to obtain unbiased standard errors. Therefore, the estimated regression models are as follows:

$$\begin{aligned} FP_{it} = & \alpha_1 + \beta_1 BSIZE_{it} + \beta_2 BMEET_{it} + \beta_3 BINDEP_{it} + \beta_4 BEXP_{it} + \beta_5 BEDUC_{it} + \beta_6 BGENDER_{it} \\ & + \beta_7 ASIZE_{it} + \beta_8 AMEET_{it} + \beta_9 AINDEP_{it} + \beta_{10} AEXP_{it} + \beta_{11} AEDUC_{it} + \beta_{12} Size_{it} \\ & + \beta_{13} Leverage_{it} + \beta_{14} Liquidity_{it} + \beta_{15} D2020_t + \beta_{16} Sector_i + \varepsilon_{it} \end{aligned} \quad (1)$$

Table 1. Variables description

Variable	Symbol	Description
<i>Operational performance</i>		
Return on assets	ROA	The ratio of net income to total assets.
<i>Financial performance</i>		
Return on equity	ROE	The ratio of net income to total equity.
<i>Market Performance</i>		
Tobin's Q	TQ	The ratio of (equity + current liabilities) to total assets.
<i>Corporate governance</i>		
Board size	BSIZE	Number of members on the board.
Board meetings	BMEET	Number of meetings held during the financial year.
Board independence	BINDEP	Number of independents on the board.
Board experience	BEXP	Number of members with experience in other firm boards.
Board education	BEDUC	Number of members with a business education degree.
Board gender	BGENDER	Number of females on the board.
Audit committee size	ASIZE	Number of members on the audit committee.
Audit committee meetings	AMEET	Number of meetings held during the financial year.
Audit committee independent	AINDEP	Number of independents on the audit committee.
Audit committee experience	AEXP	Number of members with experience in auditing.
Audit committee education	AEDUC	Number of members with an accounting or finance education degree.
<i>Firm characteristics</i>		
Size	Size	The natural logarithm of total assets.
Leverage	Leverage	The ratio of total liabilities to total assets.
Liquidity	Liquidity	The ratio of current assets to total current liabilities.

$$\begin{aligned}
 FP_{it} = & \alpha_1 + \beta_1 BSIZE_{it} + \beta_2 BMEET_{it} + \beta_3 BINDEP_{it} + \beta_4 BEXP_{it} + \beta_5 BEDUC_{it} + \beta_6 \beta_6 BGENDER_{it} \\
 & + \beta_7 ASIZE_{it} + \beta_8 AMEET_{it} + \beta_9 AINDEP_{it} + \beta_{10} AEXP_{it} + \beta_{11} AEDUC_{it} + \beta_{12} Size_{it} \\
 & + \beta_{13} Leverage_{it} + \beta_{14} Liquidity_{it} + \beta_{15} D2020_t \times Sector_i + \varepsilon_{it}
 \end{aligned} \tag{2}$$

where i and t denote cross-sectional and time dimensions, respectively.

FP_{it} is firm performance, measured by several indicators such as the ROA ratio, ROE ratio, and TQ ratio. $\beta_1 BSIZE_{it}$, $\beta_2 BMEET_{it}$, $\beta_3 BINDEP_{it}$, $\beta_4 BEXP_{it}$, $\beta_5 BEDUC_{it}$, $\beta_6 BGENDER_{it}$, $\beta_7 ASIZE_{it}$, $\beta_8 AMEET_{it}$, $\beta_9 AINDEP_{it}$, $\beta_{10} AEXP_{it}$, and $\beta_{11} AEDUC_{it}$ are firm characteristics. $\beta_{15} D2020_t$ is a dummy variable for 2020. $\beta_{16} Sector_i$ is a vector of the sector dummy variables. $\beta_{15} D2020_t \times Sector_i$ is a vector of interaction terms between the dummy variable for 2020 and the sector dummy variables.

Table 2. Sample distribution

No.	Sectors	Number of Firms	Percent
1	Capital Goods	12	9%
2	Commercial & Professional Svc	3	2%
3	Consumer Durables & Apparel	6	5%
4	Consumer Services	8	6%
5	Diversified Financials	4	3%
6	Energy	5	4%
7	Food & Beverages	11	9%
8	Food & Staples Retailing	4	3%
9	Health Care Equipment & Svc	7	5%
10	Materials	40	31%
11	Media and Entertainment	1	1%
12	Pharma, Biotech & Life Science	1	1%
13	Real Estate Mgmt & Dev't	9	7%
14	Retailing	6	5%
15	Software & Services	2	2%
16	Telecommunication Services	3	2%
17	Transportation	5	4%
18	Utilities	2	2%
	Total	129	100%

Notes: The sample is the actual population of listed Saudi firms from 18 sectors

4.1. Study sample

The study sample consists of 129 listed Saudi firms representing 18 sectors out of the total 21 sectors (i.e. 85.71%) of the Saudi Stock Exchange (Tadawul) from 2019 to 2020 (see Table 2). Following Boshnak (2021), among other studies, firms from the Bank, Insurance, and Real Estate Investment Traded Funds (REITs) sectors were excluded because they have different regulations and characteristics. Data were collected manually from the annual reports of 129 listed Saudi firms.

5. Results and discussion

5.1. Descriptive statistics

Table 3 presents the descriptive statistics of the study variables. The mean operational performance (ROA) is approximately 1.2% and ranges from -65% to 25%, the mean financial performance (ROE) is approximately -3.3% and ranges from -619% to 91%, and the mean market performance (TQ) is approximately 80% and ranges from 9.7% to 100%. The mean board size (BSIZE) is approximately eight directors and ranges from four to 11 directors. Firms conduct an average of five board meetings (BMEET) per year; however, this varies greatly, from one to 15 meetings. The mean board independence (BINDEP) is approximately four members and ranges from zero to eight members. The mean board experience (BEXP) is seven members and ranges from one to 11 members. The mean board education (BEDUC) comprises six members, ranging from one to 11 members. The mean board gender (number of women on the board) was 10.5% and ranged from zero to two members. The average audit committee size (ASIZE) consists of four members, with a range of three to seven, and these committees hold six meetings (AMEET)

Table 3. Descriptive statistics

Variable	Obs. No	Minimum	Maximum	Mean	Std. Deviation
<i>Firm performance</i>					
Return on Assets	258	-0.647	0.251	0.012	0.103
Return on equity	258	-6.191	0.911	-0.033	0.520
Tobin's Q	258	0.097	1.000	0.800	0.169
<i>Corporate governance</i>					
Board size	258	4	11	8.267	1.521
Board meetings	258	1	15	5.186	1.899
Board independence	258	0	8	3.891	1.301
Board experience	258	1	11	6.791	2.110
Board education	258	1	11	6.105	2.289
Board gender	258	0	2	0.105	0.354
Audit committee size	258	3	7	3.601	0.789
Audit committee meetings	258	2	22	5.725	2.329
Audit committee independent	258	0	4	1.640	0.941
Audit committee experience	258	0	7	2.810	1.122
Audit committee education	258	0	5	1.833	1.196
<i>Firm characteristics</i>					
Size	258	41.16	1,914,261	26,595.98	158,392.60
Leverage	258	0.008	0.960	0.449	0.239
Liquidity	258	0.001	13.470	2.085	2.022

Notes: The assets size (in SAR million).

per year, ranging from two to 22 meetings. The mean audit committee independence (AINDEP) is approximately two members and ranges from zero to four members. The mean audit committee experience (AEXP) is approximately three members and ranges from zero to seven. The mean audit committee education (AEDUC) is approximately two members and ranges from zero to five members. The mean firm size is 26,595 million, ranging from 41 million to 1,914,261 million. The mean firm leverage is approximately 45%, ranging from 8% to 96%. The mean firm liquidity is approximately 209% and ranges from 1% to 1,347%.

Table 4 shows the correlation matrix of the study variables, which indicates the absence of a serious multicollinearity problem because no correlation coefficient exceeds the 0.8 level (Gujarati & Porter, 2009). The only strong dependent variables correlation is between the operational performance (ROA) and financial performance (ROE) (0.71), as might be expected, which are included in different models in any case. As regards to independent variables, the table shows that

Table 4. The correlation matrix

	ROA	ROE	TQ	BSIZE	BMEET	BINDEP	BEXP	BEDUC	BGENDER	ASIZE	AMEET	AINDEP	AEXP	AEDUC	Size	Leverage	Liquidity
ROA	1																
ROE	0.71*	1															
TQ	0.01	-0.04	1														
BSIZE	0.20*	0.20*	-0.21*	1													
BMEET	-0.09	-0.07	-0.27*	0.20*	1												
BINDEP	0.02	0.05	-0.03	0.40*	0.09	1											
BEXP	0.12	0.13*	-0.15*	0.68*	0.17*	0.24*	1										
BEDUC	0.08	0.11	-0.06	0.61*	0.21*	0.18*	0.63*	1									
BGENDER	0.16*	0.06	0.09	0.10	-0.07	0.07	-0.09	-0.03	1								
ASIZE	0.15*	0.12*	-0.05	0.31*	0.15*	0.09	0.27*	0.24*	-0.06	1							
AMEET	0.05	0.09	-0.02	0.23*	0.35*	0.05	0.19*	0.26*	-0.08	0.14*	1						
AINDEP	0.12	0.08	-0.07	0.09	-0.11	0.31*	0.02	-0.02	-0.07	0.09	-0.10	1					
AEXP	0.16*	0.12	-0.05	0.24*	0.10	-0.05	0.45*	0.47*	-0.12	0.55*	0.15*	0.08	1				
AEDUC	0.15*	0.14*	0.01	0.14*	0.03	0.11	-0.14*	-0.06	0.00	0.23*	-0.04	0.21*	0.07	1			
Size	0.27*	0.18*	-0.44*	0.46*	0.23*	0.05	0.38*	0.33*	0.02	0.35*	0.17*	0.15*	0.32*	0.07	1		
Leverage	-0.23*	-0.25*	-0.67*	0.09	0.23*	0.01	0.12	0.11	-0.07	-0.01	0.01	0.00	0.07	-0.09	0.22*	1	
Liquidity	0.18*	0.13*	0.37*	-0.17*	-0.18*	-0.08	-0.15*	-0.24*	0.07	-0.01	-0.04	0.00	-0.15*	0.02	-0.18*	-0.64*	1

Notes: ROA, the ratio of net income to total assets; ROE, the ratio of net income to total equity; TQ (Tobin's Q), the ratio of (equity + current liabilities) to total assets; BSIZE, board size; BMEET, board meetings; BINDEP, board independence; BEXP, board experience; BEDUC, board education; BGENDER, board gender; ASIZE, audit committee size; AMEET, audit committee meetings; AINDEP, audit committee independent; AEXP, audit committee experience; Size, the natural logarithm of total assets; Leverage, the ratio of total liabilities to total assets; Liquidity, the ratio of current assets to current liabilities. * indicates the statistical significance at the 5% level.

market performance (TQ) is significantly and negatively correlated with leverage (LEV) (−0.67) and size (SIZE) (−0.44). Moreover, leverage is significantly and negatively associated with liquidity (LEQ) (−0.64). However, board size (BSIZE) is significantly and positively associated with board experience (BEXP) (0.68), board education (BEDUC) (0.61), size (SIZE) (0.46) and board independence (BINDEP) (0.40). Moreover, board experience (BEXP) is significantly and positively correlated with board education (BEDUC) (0.63) and audit committee experience (AEXP) (0.45). In addition, board education (BEDUC) is significantly and positively associated with audit committee experience (AEXP) (0.47). Furthermore, audit committee size (ASIZE) is significantly and positively correlated with audit committee experience (AEXP) (0.55).

5.2. Empirical results

Table 5 presents the empirical results of the first stage analysis. It can be seen that compared with the pre COVID-19 period, there were small insignificant changes that occurred in the performance variables of Saudi firms during the COVID-19 pandemic. This indicates that, on average, Saudi firms were resilient to the COVID-19 pandemic. This suggests that the Saudi Arabian government authorities have succeeded in alleviating the severity of the COVID-19 pandemic in the Saudi economy by introducing various initiatives and services to support the private sector (see MISA, 2021). However, the number of audit meetings and independents has increased compared with the pre COVID-19 period by 0.45 and 0.10, on average, respectively, which are statistically significant at the 90% confidence level. This increase seems to be helpful in mitigating the impact of the COVID-19 crisis on Saudi firms. According to Badolato et al. (2014), the role of the audit committee is to monitor the financial reporting process and prevent any misconduct by the firm's managers due to the agency conflict problem.

With regard to the second-stage multiple regression analysis, Table 6 illustrates the results of the random effects model (REM) regression for the entire sample period, before and during COVID-19, which assesses the impact of corporate governance on the performance of Saudi-listed firms. The regression results show some interesting variations in corporate governance factors across the three firm performance proxies for the entire sample. Board size is significantly and negatively correlated with firm market performance (TQ) before the COVID-19 pandemic and is significant at the 5% level, providing support for the agency theory and Hypotheses 1 and 2. This suggests that an increase in the size of the board increase agency problem and is less effective and creates a free-rider problem, which in turn generates a decrease in firms' market performance (TQ) as a result of poor communication and slowness in the decision-making process (Boshnak, 2021; Zayed, 2017). This result is consistent with existing empirical research, which indicates that board size has a negative influence on firm market performance (Arora & Sharma, 2016; Boshnak, 2021; H. A. M. G. Khalifa et al., 2020; Jesuka & Peixoto, 2021; Paniagua et al., 2018; Saidat et al., 2019; Zhou et al., 2018).

Board experience is significantly and positively correlated with firm market performance (TQ) before the COVID-19 pandemic and is significant at the 1% level, providing support for the resource dependence theory and Hypotheses 1 and 2. Thus, in accordance with resource dependence theory, a board with a higher degree of experience may provide advice and counsel depending on its knowledge and experience, allowing the CEO and top management team to make better decisions and improve firm performance (Withers & Fitza, 2017). Moreover, Yameen et al. (2019) argue that more experienced and knowledgeable board members result in more careful learning and decision-making, and thus improve firm performance. This finding is consistent with resource dependence theory in that board experience serve as a key link between a company and valuable external resources necessary for the firm's growth (Pearce & Zahra, 1992). In addition, the experienced board of directors improve business performance while increasing stockholder and firm value (Pearce & Zahra, 1992). This result is in line with that of Zayed (2017), who indicated that board experience has been positively associated with firm market performance before and during the COVID-19 pandemic.

Table 5. The results of the pre and post COVID-19 for Saudi firms

Variable	Pre-COVID-19 (1)			Post-COVID-19 (2)			Differ (2) - (1)			Paired T-Test ^a			Wilcoxon Test ^b		
	Mean	SD		Mean	SD		(2) - (1)	t-test	p-value	z-test	p-value				
<i>Firm performance</i>															
ROA	0.013	0.117		0.012	0.086		-0.001	-0.105	0.917	-0.027	0.978				
ROE	-0.041	0.667		-0.026	0.315		0.015	0.280	0.780	-0.551	0.581				
TQ	0.793	0.178		0.807	0.159		0.014	1.215	0.227	-0.542	0.588				
<i>Corporate governance</i>															
BFSIZE	8.220	1.537		8.310	1.509		0.090	1.614	0.109	-1.509	0.131				
BMEET	5.140	1.694		5.230	2.090		0.090	0.633	0.528	-0.288	0.774				
BINDEP	3.860	1.345		3.920	1.260		0.060	0.700	0.485	-0.361	0.718				
BEXP	6.760	2.113		6.820	2.116		0.060	0.97	0.334	-0.945	0.345				
BEDUC	6.085	2.305		6.124	2.281		0.039	0.673	0.502	-0.662	0.508				
BGENDER	0.100	0.350		0.110	0.359		0.010	0.446	0.656	-0.447	0.655				
ASIZE	3.630	0.848		3.570	0.726		-0.060	-1.068	0.287	-0.915	0.360				
AMEET	5.500	2.299		5.950	2.346		0.450	2.174*	0.032	-3.194*	0.001				
AINDEP	1.590	0.957		1.690	0.925		0.100	2.231*	0.027	-2.208*	0.027				
AEXP	2.840	1.223		2.780	1.015		-0.060	-1.021	0.309	-0.907	0.365				
AEDUC	1.810	1.180		1.860	1.217		0.050	1.044	0.299	-1.16	0.246				
<i>Firm characteristics</i>															
Size	25,028.86	140,306.58		28,163.11	175,161.50		3,134.25	0.962	0.338	-0.528	0.598				
Leverage	0.452	0.245		0.445	0.234		-0.007	-0.678	0.499	-0.485	0.627				
Liquidity	2.111	2.142		2.059	1.902		-0.052	-0.427	0.670	-0.582	0.561				

Notes: ^a is the parametric paired samples t-test; ^b is the non-parametric Wilcoxon signed ranks test; * indicates the statistical significance at the 10% level.

Table 6. The random effect model (REM) regression for the whole sample period

	(1)	(2)	(3)	(4)	(5)	(6)
Variables	ROA	ROE	TQ	ROA	ROE	TQ
BSIZE	0.0118 (0.00965)	0.0498 (0.0388)	-0.0276** (0.0112)	0.0138 (0.0103)	0.0560 (0.0455)	-0.0142 (0.0113)
BMEET	0.000118 (0.00541)	-0.0170 (0.0245)	-0.00529 (0.00370)	-0.00199 (0.00515)	-0.0231 (0.0236)	-0.00610 (0.00410)
BINDEP	-0.00743 (0.00514)	-0.00947 (0.0223)	-0.0130 (0.0108)	-0.00334 (0.00471)	-0.00379 (0.0245)	-0.0113 (0.0110)
BEXP	-0.000298 (0.00625)	0.00248 (0.0190)	0.0189*** (0.00588)	-0.00128 (0.00471)	0.00540 (0.0152)	0.00660 (0.00672)
BEDUC	-0.000363 (0.00420)	-0.0142 (0.0190)	0.0155*** (0.00493)	-0.00356 (0.00426)	-0.0125 (0.0169)	0.00985** (0.00469)
BGENDER	0.0313** (0.0128)	0.0603 (0.0719)	0.0431** (0.0214)	0.0410*** (0.0136)	0.0536 (0.0456)	0.0378* (0.0226)
ASIZE	-0.00390 (0.00897)	-0.00800 (0.0417)	0.00789 (0.0121)	-0.00197 (0.00899)	-0.0237 (0.0365)	0.0121 (0.0122)
AMEET	0.00247 (0.00351)	0.0225 (0.0218)	0.000693 (0.00350)	0.00169 (0.00362)	0.0198 (0.0232)	0.00105 (0.00364)
AINDEP	0.0150 (0.0129)	0.0585 (0.0875)	-0.00965 (0.00999)	0.0153 (0.0101)	0.0440 (0.0653)	-0.00427 (0.00918)
AEXP	0.0144 (0.00935)	0.0142 (0.0642)	0.0160 (0.0111)	0.00974 (0.0101)	0.0218 (0.0458)	0.00565 (0.0108)
AEDUC	-0.00243 (0.00676)	0.0386 (0.0236)	-0.00563 (0.00836)	0.00404 (0.00657)	0.0519 (0.0344)	-0.000687 (0.00744)
Size	0.0144* (0.00851)	0.0581 (0.0384)	-0.0373** (0.0164)	0.0147* (0.00797)	0.0582 (0.0357)	-0.0379*** (0.0136)
Leverage	-0.125** (0.0496)	-0.608** (0.308)	-0.627*** (0.0872)	-0.101** (0.0501)	-0.683* (0.383)	-0.566*** (0.0842)
Liquidity	0.00276 (0.00332)	0.00930 (0.0155)	-0.0186*** (0.00599)	0.00231 (0.00397)	-0.00400 (0.0155)	-0.0138** (0.00572)
D2020	-0.00429 (0.00789)	-0.00807 (0.0422)	0.0126* (0.00765)			
Constant	-0.237*** (0.0828)	-0.822** (0.355)	1.358*** (0.114)	-0.188** (0.0821)	-0.723* (0.410)	1.401*** (0.0934)
Observations	258	258	258	258	258	258
R ²	0.376	0.314	0.673	0.226	0.176	0.609
LM test	14.87***	2.07*	36.25***	19.86***	5.94***	35.51***
Robust standard errors	YES	YES	YES	YES	YES	YES
Sector dummies	YES	YES	YES	-	-	-
Sector dummies × D2020	-	-	-	YES	YES	YES

Notes: ROA, net income to total assets ratio; ROE, net income to total equity ratio; TQ (Tobin's Q), (equity + current liabilities) to total assets ratio; BSIZE, board size; BMEET, board meetings; BINDEP, board independence; BEXP, board experience; BEDUC, board education; BGENDER, board gender; ASIZE, audit committee size; AMEET, audit committee meetings; AINDEP, audit committee independent; AEXP, audit committee experience; Size, the natural logarithm of total assets; Leverage, total liabilities to total assets ratio; Liquidity, current assets to current liabilities ratio; D2020, the dummy variable of the year 2020. ***, ** and * are the statistical significance levels at the 1%, 5% and 10% respectively.

Board education is also significantly and positively associated with firm market performance (TQ) before and during the COVID-19 pandemic and is significant at the 1% and 5% levels, providing support for the resource dependence theory and Hypotheses 1 and 2. Therefore, in the line with resource dependence theory, different educational backgrounds on the board of directors can help encourage discussions about the importance of corporate plans, allow the team to generate a wider range of planned options, and better evaluate each alternative's potential outcomes, resulting in more innovative solutions and improved firm performance (Harjoto et al., 2019). This result is consistent with the existing empirical research and resource dependence theory, which indicates that board education has a positive impact on firm market performance (Harjoto et al., 2019; Khanna et al., 2014).

Board gender is significantly and positively associated with firm operational performance (ROA) and market performance (TQ) for the entire sample period and is significant at the 1% and 5% levels, respectively, providing support for the agency theory and the resource dependence theory, as well as Hypotheses 1 and 2. According to the agency theory, board gender diversity decreases the agency conflicts that arise from the separation of ownership and management. Thus, the results suggest that board gender diversity enhances board effectiveness and improve Saudi firms' operational and market performance before and during the COVID-19 pandemic. This positive relationship can be explained by two factors: First, board diversity can improve a firm's performance and value by introducing new perspectives, abilities, and skills to the board (Carter et al., 2008). Second, gender diversity in board meetings can help enhance problem-solving skills by bringing new perspectives to the board (Lazaretti et al., 2013; Torchia et al., 2011). Thus, a diverse board of directors with varied abilities, cultures, and genders serves as a strategic resource that can improve firm performance (Kılıç & Kuzey, 2016). These results are consistent with those of previous studies (Brahma et al., 2021; Gordini & Rancati, 2017; Green et al., 2017; Simionescu et al., 2021; Song et al., 2020).

Regarding the control variables, firm size seems to have a positive correlation with firm operational (ROA) performance before and during COVID-19 pandemic, providing support for Hypotheses 1 and 3, while it has a negative relationship with firm market performance (TQ) before and during COVID-19 pandemic, providing support for Hypotheses 1 and 3. This suggests that large firms have had better operational performance (ROA) than small firms before and during the COVID-19 pandemic. Mura (2007) explains that larger firms are expected to be more profitable because of economies of scale. Larger firms can also obtain lower cost resources and funds. Furthermore, if a firm makes the best use of its assets, an increase in its asset base would result in improved performance. This positive relationship suggests that larger firms can benefit more from economies of scale than smaller firms (Joh, 2003). Moreover, investment in a firm's fixed asset base (its productive capacity) clearly provides some protection when the business environment deteriorates (Shen et al., 2020; Song et al., 2021). These results are consistent with those of previous studies (Akbar et al., 2016; Al-Gamrh et al., 2020a; Arora & Sharma, 2016; Atayah et al., 2021; Ciftci et al., 2019; Mardnly et al., 2018; Paniagua et al., 2018; Saidat et al., 2019; Zhou et al., 2018). However, small firms appear to have a much better market performance (TQ) than large firms, especially during the COVID-19 pandemic. This result is consistent with those of previous empirical studies (Akbar et al., 2016; Asghar et al., 2020; Jesuka & Peixoto, 2021; Mertzanis et al., 2019).

Firm leverage, however, is significantly and negatively related to each performance measure (ROA, ROE, and TQ) before and during the COVID-19 pandemic, providing support for Hypotheses 1 and 3, and indicating that highly leveraged firms are performing worse before and during the COVID-19 pandemic. These results concur with a range of empirical studies (Akbar et al., 2016; Al-Gamrh et al., 2020a; Arora & Sharma, 2016; Asghar et al., 2020; Atayah et al., 2021; Ciftci et al., 2019; Mertzanis et al., 2019; Saidat et al., 2019).

Firm liquidity is also significantly and negatively associated with firm market performance (TQ) before and during the COVID-19 pandemic, implying that highly liquid firms are displaying worse

market performance than less liquid firms before and during the COVID-19 pandemic. Eljelly (2004) argues that when a firm's assets exceed its liabilities, this may be a sign that the firm is passing up investment opportunities that could yield profits. These results concur with extant empirical studies (Dalci, 2018; K. M. Khalifa & Shafii, 2013).

5.3. Robustness check

As a robustness check, we split the sample into two subsample periods (2019 and 2020) and re-estimated the regression model using a pooled OLS method while controlling for sample heterogeneity by introducing sector dummy variables. Table 7 presents the results of the pooled OLS regression for the two subsamples. The main results still hold, with some interesting variation in corporate governance factors across the three firm performance measures before and during the COVID-19 pandemic.

Board size is significantly and negatively associated with firm market performance (TQ) before and during the COVID-19 pandemic, and is significant at the 1% and 10% levels, respectively, providing support for the agency theory and Hypotheses 1 and 2. This result is consistent with the results reported in Table 6, which indicate that larger board size increase agency problem and has a negative impact on firm market performance before and during the COVID-19 pandemic. Board meetings are negatively associated with firm market performance (TQ) only during the COVID-19 pandemic and are significant at the 10% level, providing support for the stewardship theory and Hypotheses 1 and 2. This result is consistent with that of Vafeas (1999), who argued that a firm that held frequent board meetings had poor performance. Although a large number of board meetings can indicate effective board participation, firms with vital or critical issues are more likely to hold frequent board meetings. This result is consistent with extant empirical research (Arora & Sharma, 2016; Davide & Greco, 2013).

Board independence is significantly and negatively associated with firm operational performance (ROA) during the COVID-19 pandemic, and is significant at the 10% level, providing support for the stewardship theory and Hypotheses 1 and 2. In the case of Saudi firms, the negative association may be due to high block holder ownership, which may make non-executive directors powerless in board discussions. Anderson and Reeb (2004) argue that in an emerging market setting, firms controlled by families may pursue a policy of appointing directors who are not truly independent because many are friends of the controlling family and/or inside directors, and thus do not add any value to the firm. This finding support the the stewardship theory in that outside independent directors are unnecessary because agents are the best corporate stewards and are not motivated by personal goals (Davis et al., 1997; Luan & Tang, 2007). The result is consistent with existing research (Boshnak, 2021; Vintila et al., 2015; Zhou et al., 2018).

Board experience is significantly and positively correlated with firm market performance (TQ) only before the COVID-19 pandemic and is significant at the 5% level, providing support for the resource dependence theory and Hypotheses 1 and 2. The results reveal that board experience is positively associated with firm market performance only before the COVID-19 pandemic. The number of boards of education is also positively correlated with firm market performance (TQ) and significant at the 5% level. The results show that board education is positively associated with firms' market performance before and during the COVID-19 pandemic. This result is consistent with those reported in Table 6.

Board gender has had a significant and positive impact on firm market performance (TQ) before the COVID-19 pandemic and is significant at the 1% level, whereas it has had a significant positive impact on firm operational performance (ROA) during the COVID-19 pandemic at the 10% level, providing support for the agency theory, the resource dependence theory, and Hypotheses 1 and 2. This result suggests that board gender diversity decreases agency problem and has played a crucial role in enhancing operational performance during the COVID-19 pandemic.

Table 7. The pooled OLS regression for separate years 2019 and 2020

Variables	2019			2020		
	(1)	(2)	(3)	(4)	(5)	(6)
	ROA	ROE	TQ	ROA	ROE	TQ
BSIZE	0.0177 (0.0123)	0.0852 (0.0635)	-0.0428*** (0.0141)	-0.00320 (0.0101)	0.00171 (0.0458)	-0.0238* (0.0134)
BMEET	-0.0151 (0.00959)	-0.0616 (0.0476)	0.000844 (0.00695)	0.00503 (0.00304)	0.00919 (0.0178)	-0.0108* (0.00610)
BINDEP	-0.00258 (0.00730)	-0.00238 (0.0353)	-0.00381 (0.0111)	-0.0106* (0.00632)	-0.0239 (0.0204)	0.0101 (0.0102)
BEXP	-0.00323 (0.00767)	0.00170 (0.0302)	0.0198** (0.00818)	0.00266 (0.00794)	0.0110 (0.0191)	0.00591 (0.00752)
BEDUC	-0.000440 (0.00575)	-0.0197 (0.0304)	0.0160** (0.00657)	-0.00131 (0.00456)	-0.00247 (0.0147)	0.0159** (0.00659)
BGENDER	0.0290 (0.0200)	0.0734 (0.127)	0.0792*** (0.0295)	0.0383** (0.0167)	0.0560 (0.0606)	0.0435 (0.0290)
ASIZE	-0.00866 (0.0163)	-0.0164 (0.0896)	0.0174 (0.0186)	0.00989 (0.00940)	0.0338 (0.0349)	0.0153 (0.0157)
AMEET	0.00232 (0.00465)	0.0296 (0.0291)	0.00141 (0.00543)	0.00127 (0.00354)	0.00399 (0.0134)	0.00219 (0.00597)
AINDEP	0.00443 (0.0137)	0.00535 (0.0836)	-0.00281 (0.0151)	0.00270 (0.00752)	0.00859 (0.0478)	-0.0153 (0.0111)
AEXP	0.0156 (0.0151)	-0.00107 (0.118)	0.0122 (0.0155)	0.0138 (0.00942)	0.0291 (0.0529)	0.00604 (0.0145)
AEDUC	-0.00105 (0.00822)	0.0750* (0.0447)	-0.00242 (0.0110)	0.00511 (0.00837)	0.0103 (0.0218)	0.00188 (0.0108)
Size	0.0188* (0.0102)	0.0842 (0.0580)	-0.0247*** (0.00778)	0.0124* (0.00675)	0.0223 (0.0206)	-0.0285*** (0.00712)
Leverage	-0.0505 (0.0585)	-0.390 (0.336)	-0.547*** (0.0895)	-0.148*** (0.0452)	-0.693** (0.271)	-0.409*** (0.0686)
Liquidity	0.00709 (0.00552)	0.0276 (0.0230)	-0.0161** (0.00693)	0.00368 (0.00534)	-0.00678 (0.0155)	-0.0107* (0.00562)
Constant	-0.252** (0.107)	-1.160* (0.617)	1.242*** (0.0994)	-0.158** (0.0663)	-0.300* (0.172)	1.185*** (0.0967)
Observations	129	129	129	129	129	129
R ²	0.399	0.322	0.690	0.459	0.372	0.695
Robust standard errors	YES	YES	YES	YES	YES	YES
Sector dummies	YES	YES	YES	YES	YES	YES

Notes: ROA, net income to total assets ratio; ROE, net income to total equity ratio; TQ (Tobin's Q), (equity + current liabilities) to total assets ratio; BSIZE, board size; BMEET, board meetings; BINDEP, board independence; BEXP, board experience; BEDUC, board education; BGENDER, board gender; ASIZE, audit committee size; AMEET, audit committee meetings; AINDEP, audit committee independent; AEXP, audit committee experience; Size, the natural logarithm of total assets; Leverage, total liabilities to total assets ratio; Liquidity, current assets to current liabilities ratio. ***, ** and * are the statistical significance levels at the 1%, 5% and 10% respectively.

Audit committee education was noted to be significantly and positively associated with firm financial performance (ROE) only before the COVID-19 pandemic and is significant at the 10% level, providing support for the resource dependence theory and Hypotheses 1 and 2. Thus, firm performance is positively associated with an audit committee comprising members with prior financial knowledge (Defond et al., 2005). In addition, Hillman and Dalziel (2003) confirm that members with higher qualifications can improve a firm's financial performance by improving their ability to monitor management processes and contribute to strategic decision-making. This result is consistent with resource dependence theory argument and a few extant empirical studies which indicate that audit committee members' education is significantly and positively associated with a firm's financial performance (Aldamen et al., 2012; Badolato et al., 2014; H. A. M. G. Khalifa et al., 2020). Regarding the control variables, firm size, leverage, and liquidity, the results are consistent with the earlier results reported in Table 6.

6. Conclusion

This study explores the impact of corporate governance mechanisms on firm performance during the COVID-19 pandemic in Saudi Arabia. This study applies univariate, bivariate, and multivariate analyses to data collected from 258 annual reports over the period 2019–2020, thereby examining two years before and during the COVID-19 pandemic. The multiple regression analyses comprised of two modelling methods. The REM regression for the entire sample period and the pooled OLS regression for the separate years 2019 and 2020 were used to capture the drivers of firm performance before and during the COVID-19 pandemic separately.

The first set of models of operational (ROA), financial (ROE), and market performance (TQ) for the entire sample period shows that firm market performance (TQ) decreases with greater board size, large firm size, high leverage, and liquidity firms, while firm market performance (TQ) increases with board experience, board education, and board gender (number of women on the board). Moreover, the results reveal that firm operational performance (ROA) increases with large firm size and board gender, but decreases with highly leveraged firms. This indicates that larger firms with more female members on the board and lower leverage generate greater operational performance (ROA) before and during the COVID-19 pandemic. Furthermore, the results show that firm financial performance (ROE) decreases only with highly leveraged firms, which means that less leveraged firms have had better financial performance (ROE) before and during the COVID-19 pandemic. The findings provide support for the agency theory, the resource dependence theory and stewardship theory arguments. In relation to agency theory, the results show that large board size increases agency problem before and during the COVID-19 pandemic as larger boards increase free-riding and thereby should lower performance (Eisenberg et al., 1998; Yermack, 1996). Moreover, board gender diversity decreases agency conflicts that arise from the separation of ownership and management, and enhances board effectiveness and improve firm performance before and during the COVID-19 pandemic. As regards to resource dependence theory, the findings also reveal that board experience and audit committee education provide positive support for the resource dependence theory only before the COVID-19 pandemic, as experienced and educated outside directors serve as a key link between a company and valuable external resources necessary for the firm's growth (Pearce & Zahra, 1992). However, board education provide positive support for the resource dependence theory both before and during the COVID-19 pandemic. In respect to stewardship theory, the finding show that outside independent directors are unnecessary because agents are the best corporate stewards and are not motivated by personal goals (Davis et al., 1997; Luan & Tang, 2007).

The results of the pooled OLS regression for 2019 and 2020 confirm that the results are reported in Model 1 (Table 6), except for board meetings, board independence and audit committee education. Board meetings are negatively correlated with firm market performance (TQ) during the COVID-19 pandemic, suggesting that firms with fewer board meetings are improving market performance (TQ) only during the COVID-19 pandemic. This finding supports the stewardship theory argument. Board independence is significantly and negatively associated with firm

operational performance (ROA) during the COVID-19 pandemic, providing support for the stewardship theory argument, and indicates that firms with less board independence are improving operational performance (ROA) only during the COVID-19 pandemic.

However, audit committee education is positively associated with firm financial performance (ROE) only before the COVID-19 pandemic, which supports the resource dependence theory argument, and implies that audit committee members' educational background in accounting and finance improves firm financial performance only before the COVID-19 pandemic. It was also found that board gender (number of women on the board) has a significant positive impact on firm operational performance (ROA), implying that board gender diversity plays a crucial role in the time of crisis.

The recent adoption of the Saudi Corporate Governance Regulations in 2017 brought about accounting reforms as well as strong corporate governance practices and securities exchange laws. The findings of this study indicate that Saudi firms that implement these reforms are more likely to improve their performance, particularly during crises such as COVID-19. The findings of this study can help managers and corporate boards determine the optimal corporate governance mechanisms that can enhance firm performance. Furthermore, the findings can also help inform how board members and audit committees can be structured to ensure effectiveness and contribute to overall performance, particularly during times of crises.

This study makes a number of important contributions to the existing literature. First, most empirical evidence in this field relates to firms in developed markets, with only a few studies focusing on firms in emerging markets. Second, evidence on the impact of corporate governance mechanisms on firm performance during the COVID-19 pandemic in a Saudi context is limited (Boshnak et al., 2021), and this study addresses this shortcoming. This study improves upon such existing study in a number of regards. First, it adds to the body of evidence for emerging markets on corporate governance and firm performance with new data covering the period 2019–2020. Second, it explores the impact on firm operational (ROA), financial (ROE) and market (Tobin's Q) performance, of a new comprehensive range of corporate governance mechanisms include board characteristics (members' characteristics, size, meetings, independence, experience, education, and gender), and audit committee characteristics (size, meetings, independence, experience, and education). Further, it contains a number of potential firm-specific determinants, including firm size, leverage, and liquidity, to address the mixed results of previous research. Finally, it provides new evidence and discussion on the importance and effectiveness of corporate governance mechanisms that influence Saudi firm performance during times of crises.

This study's findings have several implications. The findings have significant implications for Saudi firms, managers, investors, policymakers, and regulators. Furthermore, the implementation of the most recent corporate governance regulations in Saudi Arabia is almost certain to have a significant impact on firm performance, particularly during times of crises. Moreover, corporate governance regulations should consider the importance of small board size, less board independence, board members' experience and education, and board gender diversity to enhance corporate performance, particularly during times of crisis. Governments and regulatory agencies should work together to mitigate the financial and economic consequences of the COVID-19 pandemic. Comprehensive policies are required to address the negative consequences of both current and future crises.

Despite these important implications, this study has some limitations that should be addressed in future research. First, the data set is restricted as the research focuses solely on non-financial Saudi-listed firms for the period 2019–2020 to address the impact of corporate governance mechanisms on performance before and during the COVID-19 pandemic. Thus, future research could be expanded to include additional years of observation. Second, future studies may include other mechanisms, such as ownership structure, including government, institutional, family,

managerial, and foreign ownership, when examining firm performance before and during the COVID-19 pandemic. Finally, future research should examine how corporate governance affects firm value, earnings quality, and earnings management practices during times of crises.

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Correction

This article has been corrected with minor changes. These changes do not impact the academic content of the article.

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