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# The Moderating Effect of the COVID-19 Pandemic on the Relation between Corporate Governance and Firm Performance

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**Abstract:** The present study aims to investigate the association between corporate governance mechanisms and financial performance among companies listed on the Tehran Stock Exchange (TSE). We also want to know if the COVID-19 global crisis moderates the relationship between them. The study sample consists of 1098 observations and 183 companies listed on the TSE from 2016 to 2021; furthermore, the statistical method used to test the hypotheses is panel data with random effects. In line with our expectations, the results show that the coronavirus pandemic worsened Iranian corporate performance. In support of agency theory, we figure out that board independence, board meeting frequency, and board financial expertise are correlated positively with firm value. In favor of resource dependency theory, this study finds robust evidence that audit committee size and independence have a positive effect on corporate performance. Most importantly, the positive linkage between board independence, board financial expertise, size, and independence of audit committee with firm performance was reversed during the COVID-19 pandemic, although the positive role of board meeting frequency in corporate profitability remained stable even during the COVID-19 outbreak. Furthermore, the outcomes indicate that CEO duality affects firms negatively, and this devastating effect became even stronger with the COVID-19 pandemic. Finally, we find that firms involved in mergers and acquisitions (M&A) managed to increase shareholders' wealth using competitive advantage even during the pandemic.

**Keywords:** the COVID-19 pandemic; corporate governance; corporate performance; Tehran Stock Exchange



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## 1. Introduction

With the wide spread of the deadly coronavirus all over the world, the adoption of serious policies regarding social distancing, stay-at-home orders, community quarantine, and so on have been seen, which has had devastating effects on all economies, especially for the operations of companies listed on the stock exchange of a country (Shen et al. 2020; Khatib and Nour 2021; Jebran and Chen 2023). This phenomenon symbolizes the deepest global recession since the Second World War (Ellul et al. 2020). In other words, restrictions have caused gross domestic product (GDP) drops and augmented joblessness to reach levels worse than the Great Depression (Gelter and Puaschunder 2020). For this reason, some researchers have worked on the effects of the COVID-19 global crisis on macroeconomic issues (Boissay and Rungcharoenkitkul 2020; Narayan 2020; Apergis and Apergis 2020; Njindan Iyke 2020; Gil-Alana and Monge 2020), whereas other scholars have focused on the impact of the COVID-19 pandemic at the micro-level and on corporate performance (Rababah et al. 2020; Shen et al. 2020; Khan et al. 2020; Aifuwa et al. 2020; Zhang et al. 2021; Atayah et al. 2021; Nguyen 2022). At the micro-level, a large number of researchers have investigated various issues, such as capital structure (Oktaria and Alexandro 2020; Mohd

Azhari et al. 2022), dividend policy (Krieger et al. 2021; Cejnek et al. 2021; Tinungki et al. 2022), cost of equity capital (Arianpoor and Tajdar 2022; Ke 2022), firm risk (Grondys et al. 2021; Størdal et al. 2021; Arianpoor and Tajdar 2022), earnings management (Lassoued and Khanchel 2021; Usheva and Vagner 2021; Ali et al. 2022b), corporate social responsibility (Huang and Ye 2021; Kim 2022; He and Harris 2020; Meirun et al. 2022), and other cases during the COVID-19 global crisis. However, corporate governance can still be considered one of the most controversial financial issues during the COVID-19 outbreak (Jebran and Chen 2023). Most of the research regarding corporate governance during the COVID-19 pandemic has been conducted in developed countries and mostly within a theoretical structure (Koutoupis et al. 2021), and the lack of comprehensive analysis of corporate governance mechanisms in an emerging market such as Iran, which has completely different economic conditions, is still clearly felt. The most important point is that because good corporate governance mechanisms can improve company image, increase shareholders' confidence, and reduce financial misreporting risk, the excellent performance of companies is largely influenced by them (Guluma 2021). However, the fatal blow of the COVID-19 event to the global economy has the potential to affect the corporate governance system overpoweringly (Gelter and Puaschunder 2020). From this point of view, so far, few studies have been conducted on the impact of the COVID-19 crisis on the association between corporate governance mechanisms and financial performance (Khatib and Nour 2021; El-Chaarani et al. 2022), and the research gap in this regard is still strongly found in the research literature. Thus, the main focus of this exact research is to fill this research gap so that it can contribute a lot to the research literature in this field. Most of the financial crises during the last two decades, such as the dot-com bubble in 2000, the Global Financial Crisis in 2007, and the European Sovereign Debt Crisis in 2011, were endogenous and caused by managerial misbehavior, including financial information manipulation and excessive risk taking (Zattoni and Pugliese 2021), many of which are controlled by the formulation of strict corporate governance mechanisms (Conyon et al. 2011). Considering that the crisis caused by COVID-19 neither originated from the wrong behavior of companies nor the weakness of control systems, this research aims to understand if the mechanisms of corporate governance can be an obstacle to preventing this systematic risk in an emerging market such as Iran.

The main reason for conducting this research on the Iranian market is because of its unique characteristics compared to other emerging and developed markets, which can add very key points to the research literature. As for Iran's market, Iranian companies are under disastrous financial pressure because Iran's market has been subjected to the cruelest and unprecedented economic sanctions during the last decade (Salehi et al. 2020a, 2022; Moradi et al. 2021; Zimon et al. 2021; Tarighi et al. 2022b). In the inflationary economy of Iran, prices are increasing sharply. On the one hand, product prices are going up, owing to an increase in the cost of raw materials by factories; on the other hand, the social welfare and purchasing power of people are decreasing. These cases cause the demand for firms' products to decrease sharply (Moradi et al. 2021; Tarighi et al. 2022c). First, considering that investors and creditors are less attracted to such Iranian companies, managers are encouraged to present a better image of their companies by manipulating financial information (Moradi et al. 2020, 2021; Zimon et al. 2021; Tarighi et al. 2022b). Second, robust evidence has demonstrated that managers mainly are keen on distorting earnings upward by easing the level of reported losses to reconstruct investor and stakeholder confidence to dispose of the economic crisis (Lassoued and Khanchel 2021; Usheva and Vagner 2021). As a result, combining the financial crisis caused by economic sanctions and the COVID-19 pandemic has increased management's motivation for conducting profit management by double. Third, in the Iranian market, managers have a natural tendency to manipulate profits as much as possible so that they can receive the maximum reward and remain in their position because their performance is evaluated solely based on firm profitability (Salehi et al. 2018a; Zimon et al. 2021; Tarighi et al. 2022b, 2022c). To the best of our knowledge, the global crisis in 2008 opened a new window for further discussion of CEO compensation (OECD 2017; El-

Chaarani et al. 2022). CEO compensation caused itself to attract the attention of more media, different supervisory bodies, and principal setters, and to be questioned more (Lagasio 2018; El-Chaarani et al. 2022). Despite some managers adopting a moderate risk-taking approach to making profitability during the COVID-19 pandemic (El-Chaarani et al. 2022), there were some CEO who tended to be more risk taking, whose firms encountered failure in times of financial crunch (Bebchuk and Weisbach 2010). Hence, due to the features such as the market recession because of economic sanctions, the performance evaluation system of managers based on profitability and attracting the trust of investors and lenders, Iran has turned into a market whose managers have high incentives to mislead stakeholders about their actual corporate performance.

The most important point about Iran's market is that it has weak legal protection (Mashayekhi and Mashayekh 2008). Despite the fact that a common-law legal framework can protect shareholders' rights and leads to the development of strong equity markets, code-law countries such as Iran have an equity market that is weak and firms have a preference for using debt as a source of financing. The presence of a code-law framework in Iran has caused fundamental elements, such as judicial inefficiencies, weak investor protection, and fragile enforcement instruments to financial reporting inefficiency (Mashayekhi and Mashayekh 2008). Many studies have proved that public institutions can fill the gap in investor protection if there is weak legal protection in a market (Klapper and Love 2004; Kutan et al. 2017; Bermpei et al. 2018); however, can the investor protection gap in Iranian firms be filled? The structure of most Iranian companies is mainly composed of institutional owners, who have a connection with government sectors. The second factor that makes the conditions of the Iranian market special is the basic question of whether public institutions, which are linked to Iranian firms' institutional owners, can protect investors' rights against corruption by strengthening the control process. The existence of investors' weak legal protection in the Iran setting has made it difficult to expect shareholders to be protected from managers' expropriation. There is no room for doubt that once there is a low level of legal protection, managers have more ability to misuse their position to maximize personal profits (Beck et al. 2003; El-Chaarani et al. 2022). Even during the East Asian financial crisis of 1997–1998, individual firms in regions of Indonesia, Korea, Malaysia, the Philippines, and Thailand had the power to stop the expropriation of minority shareholders because legal protection was weak (Mitton 2002). The reality is that the presence of a strong corporate governance system can lead to firms' growth during financial crises as it not only improves the control process, but also protect investors (Kutan et al. 2017; Bermpei et al. 2018). It appears that there is a possibility to increase opportunistic behaviors and lack of transparency by managers in Iran's market characterized by the existence of a low level of investor legal protection. In addition, there are hidden political connections in the structure of the companies. The lack of legal protection and the absence of independence from political pressures in the Iranian market is somewhat evident, so the average of Iran's legal protection and government oversight indicators were $-1.4619$ and $-0.9928$ in turn, ranked as the weakest performance amongst countries around the Persian Gulf and North African (El-Chaarani et al. 2022). Another characteristic of the Iranian market is that the process of mergers and acquisitions (M&A) is not welcomed by Iranian companies. For instance, Tarighi et al. (2022a) showed that although Iranian companies participating in M&A activity have significantly reduced their probability of bankruptcy during the economic crisis, two-thirds of the firms listed on the TSE, however, did not want to do such a thing. In a market, companies that do not have suitable business conditions are more exposed to an easy takeover objective (El-Chaarani et al. 2022). After a takeover, a large number of managers are seen to lose their positions and be replaced by other CEOs (Lehn and Zhao 2006). For this reason, managers are threatened with M&A and try to take antitakeover measures to maintain their job positions so that the control of power does not fall into the hands of hostile bidders (Bebchuk et al. 2009; El-Chaarani et al. 2022). During the pandemic, in the case of M&A activity, CEOs mostly focused on maintaining their management positions instead of focusing on using creativity and innovation to create economic growth

(El-Chaarani et al. 2022). According to value creation theory, mergers and acquisitions (M&A) lead to improvements in labor productivity and corporate growth, while transfer theory argues that M&A increases the shareholders' share in the acquired firm because it is accompanied by a lack of changing productivity (Zimon et al. 2021; Tarighi et al. 2022a). Considering that M&A can create competitive advantages by improving current products, seizing market power in a particular area, declining financing costs, tax advantages, etc. (Pavliuk and Nechay 2019), we are curious to know if Iranian firms engaging in M&A can dispose of the COVID-19 financial crisis.

According to all the important reasons for conducting earnings management in the Iranian market, this research seeks to investigate whether corporate governance mechanisms can be a deterrent to opportunistic management actions and take steps toward maximizing shareholder wealth. In other words, we first want to investigate if each of the corporate governance mechanisms affect corporate profitability. It should be also noted that the TSE was founded in the 1960s, and corporate governance was introduced in the early 1980s by TSE officials of the Parliament Research Center. Accordingly, a specific committee was devoted to corporate governance in the Ministry of Economic Affairs and Finance in Iran (Qeisari and Ahmadi 2016). For the period of the Asian financial crises, experience has shown that countries that did not have a proper corporate governance system were more likely to face the problem of asset value reduction (Johnson et al. 2000). Therefore, the presence of an efficient and dynamic corporate governance system is necessary for the continued commercial survival of companies and the ability to deal with economic problems in crisis times (Jebran and Chen 2023). The efficiency and quality of corporate governance mechanisms may be completely different in normal and turbulent times, and for this reason, companies need to use dissimilar methods of corporate governance in different economic conditions (Lin et al. 2006; Jebran and Chen 2023). During recent decades, especially in the last several years when the economy of all countries has come across the COVID-19 crisis, many efforts have not been made by Iranian market legislators regarding the re-evaluation of corporate governance mechanisms to ensure their effectiveness. Considering the detrimental economic effects of the COVID-19 crisis on companies in different markets of the world (Baky Haskuee et al. 2020; Shen et al. 2020; Rababah et al. 2020; Devi et al. 2020; Hu and Zhang 2021; Kubiczek and Derej 2021; Nguyen 2022), we are then going to know whether this pandemic crunch moderates the association between corporate governance and firm value. In simpler terms, this research seeks to determine whether the effectiveness of corporate governance mechanisms concerning maximizing corporate value is affected by the COVID-19 spread. In fact, the answer to this key question can reveal whether regulators in the Iranian market have learned from past events during financial crises to take steps to develop the efficiency of corporate governance and maximize shareholders' wealth.

The findings of this study have effective theoretical and practical applications for different groups. This research is considered to be one of the first papers that examines the impact of corporate governance on the financial performance of companies in a market that simultaneously experiences the risks of economic sanctions and confronts the challenges of the COVID-19 pandemic. Although economic sanctions and the COVID-19 crunch are both systematic risks, they are slightly different. That is why it is very important to examine which financial crises are an obstacle to corporate governance efficiency and to maximize the shareholders' wealth. In fact, this investigation created a good opportunity to show which of the corporate governance mechanisms can protect the interests of shareholders and maximize their wealth in a market where the incentives of profit management are strong and investors' legal protection is weak. This paper employs agency theory to prove how board independence and audit committee independence improve corporate performance during economic sanction periods, while stewardship theory confirms that both of them can be a hindrance to financial growth during the COVID-19 pandemic. In line with resource dependency theory, audit committee size has also been identified as a key factor in corporate performance improvement during economic sanctions, whereas we found that oversight activities in larger audit committees were weaker during the

COVID-19 era, which is completely consistent with agency theory. Furthermore, a similar scenario happened regarding other corporate governance mechanisms, such as board financial expertise, in such a way that it had the opposite effect during the pandemic. In addition, our findings warn regulators in markets with weak legal protection that if they do not take effective measures to improve legal protection, it will provide the opportunity for opportunistic managers to abuse their position for personal gain and cause serious damage to corporate performance. Especially in markets where there is no strong legal protection and exerts political pressure on the board, this research conveys an important message to policymakers that unbiased evaluation of management performance is more important during times of crisis than during usual commercial times because corporate board members must autonomously assess new strategies being implemented to increase liquidity. In addition, auditors are strongly advised during financial crises in markets with weak legal protection systems to apply harsher audit tests to discover possible financial frauds because opportunistic directors often tend to mislead different groups over financial statements. The results of this study can also be beneficial to investors, creditors, and supervisory bodies who are seeking to diminish any unsuitable actions that could be created by executives and CEOs for the duration of economic turmoil.

The rest of this paper is structured as follows. The next part frames the study into a theoretical framework and hypotheses development and discusses the literature. Section three displays the research design and the sample selection procedure and outlines where the data are obtained; part four then explains the main outcomes and implications drawn from statistical analyses. To end, the last sector relates to the research conclusion and discussion.

## 2. Literature Review and Hypotheses Development

Undoubtedly one of the destructive effects of the spread of the COVID-19 virus is on global economies, so many companies around the world have faced many problems (Susilawati et al. 2020; Xu et al. 2021; Padhan and Prabheesh 2021; Nguyen 2022). The destructive effects of the coronavirus pandemic on the financial performance of companies can be argued to a large extent. With the dangerous outbreak of coronavirus, many governments were forced to adopt quarantine measures to prevent the spread of this deadly virus, which ultimately negatively affected aggregate demand, especially in terms of consumption and exports. On the one hand, people were asked not to go to crowded places such as shopping malls to prevent viral transmission; on the other hand, some countries imposed restrictions on imports (Shen et al. 2020). Operating expenditures during the COVID-19 pandemic not only caused companies to suffer from operating losses, but also placed a heavy burden on cash buffers (Almustafa et al. 2023). For example, Shen et al. (2020) showed that the performance of Chinese companies has deteriorated significantly due to the widespread outbreak of coronavirus; furthermore, this negative effect on firm value is more pronounced when corporate investment scale or sales revenue is smaller. In the Chinese market, Rababah et al. (2020) also realized that the COVID-19 global crisis has caused the most possible damage to Chinese small and medium enterprises. Using data obtained from Indonesian companies, Devi et al. (2020) realized that the COVID-19 pandemic has been detrimental to corporate profitability. Moreover, by investigating the financial performance of logistic firms listed on the Vietnam Stock Exchange, Nguyen (2022) indicated corporate profitability and efficiency have worsened during the COVID-19 pandemic. In another interesting study, among six countries, including Germany, Korea, Russia, Mexico, Saudi Arabia, and the UK, the weak financial performance of the logistics firms during the COVID-19 period has been seen (Atayah et al. 2021). By conducting very extensive research at the global level, Hu and Zhang (2021) came to the conclusion that firm performance weakened during the COVID-19 pandemic; however, this negative impact of COVID-19 on corporate value is less prominent in nations with more advanced financial systems and better institutions. Khan et al. (2020) explored the influence of the COVID-19 pandemic on the stock markets of sixteen countries and concluded that all of the stock market indices negatively reacted to the COVID-19 news in the short- and long-event window when human-to-human transmissibility was confirmed. In the Green Continent region, most of the industries in the Polish market have faced many problems during the COVID-19 crisis and their income has decreased significantly (Kubiczek and Derej 2021). There is also evidence on the African continent that the coronavirus pandemic has affected firm value negatively in Nigeria (Aifuwa et al. 2020). Mkadmi et al. (2023) also realized that COVID-19's negative effect on firms' performance is less seen among markets whose corporate governance system is more advanced. Finally, in Iran's context, Baky Haskuee et al. (2020) found that the COVID-19 outbreak has negatively affected the returns of oil companies' prices. At large, according to the results of research available all over the world, it is predicted that the COVID-19 global crisis has weakened the financial performance of companies in the Iranian market.

Mergers and acquisitions (M&A) can create extraordinary competitive advantages for companies, especially for worse financial markets (Tarighi et al. 2022a). Firms engaged in mergers and acquisitions have access to efficient and knowledgeable human resources, less expensive financing, tax benefits, high-quality domestic products, and takeover market power in a particular region (Pavliuk and Nechay 2019). Mergers and acquisitions (M&A) may be a vital tactical mechanism for incessant adaptation, sustainable business growth, and financial stability (Bauer et al. 2022; Muhindi 2022). Although we have seen significant growth in M&A activity in the markets over the last decade, it seems that with the onset of the COVID-19 crisis, financial liquidity has become the biggest concern of managers (Bauer et al. 2022). M&A volume is influenced by exchange rate parity, shadowed by liquidity (Vissa and Thenmozhi 2022). Various research has shown firms with merger and acquisition activity come across better profitability and liquidity (Muhindi 2022; Aggarwal and Garg 2022; Adhikari et al. 2023). For example, in the Indian market, better profitability was seen after M&A during the coronavirus crunch (Pon 2022), while Tarighi et al. (2022a), also in Iran's setting, showed that merger and acquisition actions have brought a lot of benefits to companies to escape bankruptcy during economic sanctions. It should be noted that mergers and acquisitions can be the basis for the formation of more innovation and creativity (Čirjevskis 2019; Wu and Qu 2021). There are strong documents proving that in both developed markets and emerging countries, innovation and creativity can have a moderating effect on the relationship between corporate governance and firm performance, which can be influenced by various socioeconomic elements and competencies of innovators involved in corporate governance structure (Kijkasiwat et al. 2023). Because the job security of managers in the Iranian market is weak, it is unlikely that managers will welcome M&A activities despite their competitive advantages because they see it as a threat to their position. However, considering that Iranian firms involved in the M&A process have better access to benefits, such as easier financing, a more skilled workforce, and more unique innovation, they are less likely to encounter liquidity problems during the COVID-19 downturn. Accordingly, we expect firms engaged in M&A actions to have better concentration on their current economic activities and to find more suitable solutions to escape the crisis more easily. Therefore, the negative relationship between the COVID-19 pandemic and corporate performance is predicted to be moderated among firms that participated in merger and acquisition (M&A) activities.

**H1.** *The COVID-19 global crisis deteriorates corporate performance.*

**H1a.** *Mergers and acquisitions (M&A) moderate the association between the COVID-19 pandemic and corporate performance.*

The COVID-19 global crunch has created unprecedented problems for boards of directors of companies and the committees under their formation, so the majority of these companies are faced with tough challenges of providing the required financial resources, performing contracts, and system breakdowns (Khatib and Nour 2021). Each of the corporate governance mechanisms is like a double-edged sword, which if used correctly can help the growth of companies and the interests of shareholders; otherwise, it can have destructive effects. The level of efficiency and effectiveness of board activities largely depends on its structure, composition, and characteristics, as well as the managers' expertise (Croci et al. 2020). According to the view of Khatib and Nour (2021), if the structure of boards of directors of companies is designed properly so that they have more monitoring power and flexibility, management can focus better on short-term challenges and overcome them (Khatib and Nour 2021). Therefore, when the corporate governance structure is well set and a more efficient board of directors is formed, firms can be expected to communicate with external environments to obtain the necessary resources so they can overcome the COVID-19 pandemic's unfavorable effects (Shahwan 2015; Song et al. 2021). Thus, in this research, after examining the relationship between each of the corporate governance mechanisms and financial performance, we seek to understand whether they have been able to overcome the economic problems caused by the coronavirus outbreak.

Board size is recognized as one of the most important corporate governance mechanisms. Actually, the more board members a company has, the larger its board size. In each country, the number of authorized members on the board of directors of each company depends on the commercial rules of that market (Salehi et al. 2018b). For example, the average number of board members in the US market is almost twelve members (Xie et al. 2003), whereas British enterprises have an average of eight board members (Peasnell et al. 2005). In an emerging market such as Iran, the presence of at least five members on the board of directors is required by corporate governance regulations (Salehi et al. 2018b). Regarding board size, there are two completely different views in the research literature. Opponents argue that the number of board members should not be too high; otherwise, it may seriously damage the company's performance (Kyere and Ausloos 2021). They believe that the number of board members should not exceed 10 (Lipton and Lorsch 1992). Opponents of larger boards are of the opinion that as the number of board members increases, companies encounter more acute difficulties in terms of coordinating, organizing, and co-thinking when making fundamental decisions (Yermack 1996; Pathan and Faff 2013; Bhattrai 2017; Constantatos 2018). In companies with larger boards of directors, there may sometimes be less control and oversight of management activities because there is a lack of motivation and consensus on decisions among members (Constantatos 2018). Dispersal of responsibility and the incidence of the 'free-rider' are other challenges firms with larger board sizes are encountering (Van den Berghe and Levrau 2004; Uchida 2011; Sanan 2019; Hu et al. 2022b). Experience has also shown that there are generally more disagreements and conflicts among the board members of larger companies in low-income markets (Bhattrai 2017; El-Chaarani et al. 2022). Some scholars, such as Hajer and Anis (2018), believe that the larger the board of directors, the worse the financial situation firms are likely to have because it deteriorates the governance mechanisms' efficiency. The results of various studies so far have been in line with this view, confirming there is a significant negative relationship between board size and company performance (Yermack 1996; Ghosh 2006; Dahya et al. 2008; Mashayekhi and Bazaz 2008; Christensen et al. 2010; Ujunwa 2012; Moradi et al. 2012b; Wang et al. 2012; Arora and Sharma 2015; Rostami et al. 2016; Arianpoor 2019; Abdeljawad and Masri 2020; Alabdullah et al. 2021; Altass 2022; Hong and Linh 2023). In this regard, some studies conducted on Iran's market have also shown that larger boards cannot contribute to firms' economic growth (Mashayekhi and Bazaz 2008; Salehi et al. 2018b), meaning that Iranian boards of directors are more individualistic than collectivist.

On the other hand, there is an expectation that directors will spend more time monitoring management's activities and action their supervisory responsibilities more effectively, consistent with agency theory (Constantatos 2018; Hsu and Yang 2022). To better perform supervisory and advisory duties, the larger the board size, the easier access to collective information is (Lehn et al. 2009). Resource dependency theory also argues that larger boards can drive corporate growth, not only because of their greater knowledge, expertise, and skills, but also through their powerful networks of relationships with customers, suppliers, and other stakeholders (Van den Berghe and Levrau 2004; Williams et al. 2005; Jackling and

Johl 2009; Kyere and Ausloos 2021). The results of many studies are consistent with the view that the larger the board of a company, the better its financial performance (Haniffa and Hudaib 2006; Mousavi et al. 2012; Oyerinde 2014; Huang and Wang 2015; Tulung and Ramdani 2018; Coleman and Wu 2020; Brogi et al. 2020; Puni and Anlesinya 2020; Al Farooque et al. 2020; Kanakriyah 2021; Kyere and Ausloos 2021; Neves et al. 2022; Hsu and Yang 2022; Abebe Zelalem et al. 2022; Silpachai 2023; Nguyen and Huynh 2023). In research conducted on UK companies listed in the FTSE, Alsadeq (2023) even found that board size has been a vital factor in solving the financial problems of firms during the COVID-19 pandemic. In general, based on the existing research literature worldwide, the size of the board of directors can have positive and negative effects on the economic trend of companies. Therefore, this study predicts there is a significant association between board size and firm performance. In addition, given the devastating effects of the COVID-19 pandemic on countries' economies and corporate financial performance (Rababah et al. 2020; Devi et al. 2020; Atayah et al. 2021), we expect it to have a moderating effect on the relationship between board size and financial performance. In cases where board size and firm value are positively correlated, this positive relationship will be maintained during the COVID-19 crisis when the same board members can supervise the opportunistic managers' activities effectively and develop their network strength with suppliers and customers. In the Iranian market where there is weak legal protection and where political pressures maybe question the decision-making power of the board members, the question arises whether the supervisory role of larger boards of directors can mitigate the risk caused by COVID-19. By contrast, if the linkage between board size and firm success is assumed to be negative, we expect Iranian companies to face more unfavorable and severe economic consequences during the COVID-19 outbreak.

**H2.** *There is a significant association between board size and corporate performance.*

**H2a.** *The COVID-19 pandemic moderates the association between board size and corporate performance.*

Another important corporate governance mechanism is related to board independence. Similar to board size, overwhelming evidence has shown that board independence is like a double-edged sword and can both improve companies' financial performance and hurt it, both of which can be justified by different financial theories. Independent members on the board are not considered employees and do not have any material interest in a company, which in turn can be reliable evidence for proving their unbiased assessment of management performance (El-Chaarani et al. 2022). Independent directors' unbiased assessment means they can freely avoid ineffective strategies and welcome effective new strategies, regardless of management views. The non-executive directors on the board are those people who are selected by the company's shareholders to assist in decreasing the agency's problems as much as possible (Fuzi et al. 2016). Building on agency theory, when boards of directors have sufficient independence and do not have executive responsibility in the company, they are more motivated to effectively monitor management activities to maintain their professional reputation (Fama and Jensen 1983; Christensen et al. 2010; Salehi et al. 2018a; Kyere and Ausloos 2021). When companies are in financial straits, the presence of independent members on the board helps them avoid risky actions as much as possible so that they can escape the financial crisis more easily (Constantatos 2018). Compared to inside directors, because independent board members are more inclined to make risk-hedging decisions, they can help companies grow financially under the worst economic conditions (Yeh et al. 2011). In markets where there is very weak legal protection for shareholders, the importance of financially linked independent directors becomes more prominent during crises (Yeh et al. 2011). Actually, communication with powerful financial institutions and access to financial resources are even more important than the supervisory roles of independent directors, which can be very effective for exiting an economic crisis (Arora 2018; Jebran and Chen 2023). In support of agency theory, many studies have shown that there is a positive linkage between independent directors and corporate financial situations because they can bring oversight to management actions effectively (Rosenstein and Wyatt 1990; Lefort and Urzúa 2008; Liu et al. 2015; Fuzi et al. 2016; Uribe-Bohorquez et al. 2018; Musallam 2020; Brogi et al. 2020; Al Farooque et al. 2020; Kyere and Ausloos 2021; Kanakriyah 2021; Hu et al. 2022a; Ali et al. 2022a).

By contrast, there is another view based on stewardship theory that supports the negative influence of non-executive directors of the board on financial performance. In other words, stewardship theory indicates that executive members on the board are more involved in business activities and have deep knowledge and high awareness of existing capacities and resources in the company, which can ultimately lead to the improvement of economic conditions (Kyere and Ausloos 2021). In keeping with stewardship theory, because executive directors have intrinsic non-financial incentives, such as esoteric satisfaction with a company's achievements, and cause information asymmetry, they can be good stewards of a company's assets (Donaldson 1990; Nicholson and Kiel 2007; Constantatos 2018; Le et al. 2023). Furthermore, unlike executive directors who can motivate managers to invest in profitable businesses (Jermias 2007), the existence of independent members on the board cannot help companies because they do not have access to very important information and therefore cannot have the proper flexibility and reaction (Van Essen et al. 2013). In line with the view of stewardship theory, many scholars around the world have proved that there is a negative connection between board independence and firm performance (Guest 2009; Wang et al. 2012; Shan 2019; Abdeljawad and Masri 2020; Al-Saidi 2020; Agyei-Mensah 2021; Fariha et al. 2021; Goel et al. 2022; Onyekwere and Babangida 2022). Finally, the results of some research on the Iranian market indicate a positive relationship between board independence and firm value (Mashayekhi and Bazaz 2008; Rostami et al. 2016; Salehi et al. 2018b), while other scholars prove an inverse correlation (Moradi et al. 2012b; Arianpoor 2019). Given the points made about agency and stewardship theories explaining the positive and negative effects of board independence on the financial condition of companies, this study predicts the third hypothesis of the research as follows. This paper also assumes that because the COVID-19 global crisis has adverse economic effects on companies, it can severely affect the impact of board independence as one of the main mechanisms of corporate governance on firm performance. Unfortunately, the absence of strong legal protection for the board in Iran's market may cause firms to be vulnerable to the political pressure of different groups. According to El-Chaarani et al. (2022), when innovative thinking and impartial assessment of management are not influenced by the political pressures of powerful forces, freedom of decision making among board members can be formed and lead to firms' economic improvement. During an economic crisis, the importance of unbiased assessment of management performance is greater than during normal economic times because the board members have to independently evaluate the new tactics being implemented to rise liquidity and replace lost fee income (El-Chaarani et al. 2022). Considering the special conditions of the Iranian market where boards of directors are not under legal protection and may also be affected by political pressures during an economic crisis, we seek to understand the role of independent boards in the economic situation of companies.

**H3.** *There is a significant association between board independence and corporate performance.*

**H3a.** *The COVID-19 pandemic moderates the association between board independence and corporate performance.*

As mentioned earlier, one of the main concerns is to ensure that there is adequate oversight of management activities to maximize shareholders' interests. Of all the characteristics of the board, it is no exaggeration to say that financial competency and expertise are one of the most important (Wan Yusoff and Armstrong 2012). To more effectively oversee management and participate in the company's critical decision making, board members need financial knowledge and skills to help increase the company's true value (Erickson et al. 2005; Güner et al. 2008; Francis et al. 2012). The premise is that board members without financial knowledge and expertise are unable to detect fraud in financial reporting and improve earnings quality (Garcia-Sanchez et al. 2017). The presence of an experienced financial member also stimulates other board members to be more sensitive and aware of management activities. The results of various studies have so far confirmed so that when the board of directors has more financial expertise, companies can grow more economically because their internal control system is implemented better (Kor and Sundaramurthy 2009; Johl et al. 2015), although some studies show the opposite relationship between them (Abdeljawad and Masri 2020). Even though a couple of Iranian studies have shown that the board's financial expertise has helped the growth of companies (Oradi et al. 2020; Rezaee et al. 2021), the question still arises as to whether such a mechanism is effective during the COVID-19 crunch. Generally, it is expected that the more companies have a board of directors with better financial knowledge, the more an ideal economic future awaits them, although the occurrence of the pandemic may adversely affect this.

**H4.** *There is a significant association between the financial expertise of board members and corporate performance.*

**H4a.** *The COVID-19 pandemic moderates the association between the financial expertise of board members and corporate performance.*

Gender diversity is one of the most important characteristics of an efficient board of directors that can play a vital role in improving companies' conditions as a control mechanism (Orazalin 2020). Even though the presence of women in senior management is still one of the main concerns (Desvaux et al. 2010), today it is seen in many different countries that many efforts have been made to emphasize the position of women on the board of directors (Adams and Funk 2012). Drawing on the upper echelon theory, many factors related to human nature, ethical characteristics, personal experiences, and knowledge are twisted by the decisions and actions of managers in companies (Hambrick and Mason 1984). There are some differences between men and women, with men being more resilient, power seeking, and result-oriented, while women behave kindlier and respectfully and are more interpersonally experienced (Burgess and Borgida 1999). There is a general belief that men can be more effective in board activities due to their greater self-confidence and optimism (Markoczy et al. 2020). However, because women are generally confident in their principles and beliefs, they have the courage to speak out and criticize, especially if the board's activities are in a direction that is not in line with their intellectual values (Simionescu et al. 2021). Building on resource dependency theory, the presence of women on the board due to having different personality traits, such as risk aversion, ethics, etc., can improve the quality of the information provided by the board to executives (Orazalin 2020). Agency theory also states that the conflict of interest between management and owners may result in information asymmetry (Reddy and Jadhav 2019; Simionescu et al. 2021). The greater the gender diversity on a company's board of directors, the more an active and effective oversight of management activities can be formed, which ultimately leads to a reduction in agency costs (Aggarwal et al. 2019; Ain et al. 2020). Furthermore, during the economic crisis of the coronavirus pandemic in which markets are facing a fall in oil prices, trade disruptions, and reduced exports, companies need to accept more risk and develop innovative strategies to improve their liquidity. The diverse experiences and knowledge of women on the board of directors can lead to the development of creative solutions and ultimately free companies from economic problems during the COVID-19 pandemic (El-Chaarani et al. 2022). Taken together, gender diversity in the board of directors for an appropriate response in times of uncertainty and financial crisis has been confirmed by various researchers (Carpenter 2002; Rost and Osterloh 2010; Jebran and Chen 2023).

The relationship between the board's gender diversity and company performance may be positive for several reasons. With the increasing presence of women on the board, the possibility of improving such elements as the quality of corporate governance mechanisms, corporate reputation due to gender non-discrimination in society, identification of consumer purchasing needs and supply of goods and services, and employment of employees based on the qualifications rather than the demographic features will increase dramatically (Simionescu et al. 2021). To emphasize the above points, the results of various research have shown that there is a positive relationship between the presence of a woman on the board and firm value (Đặng et al. 2020; Ozdemir 2020; Arioglu 2020; Niikura and Seko 2020; Abdeljawad and Masri 2020; Mastella et al. 2021; Kanakriyah 2021; Brahma et al. 2021; Nguyen and Huynh 2023). Sepasi and Abdoli (2016) also found indirect evidence that women on the board are positively related to financial performance in Iran. On the other hand, there are various scientific arguments that consider the negative effects of board gender diversity on company worth. With gender diversity on the board, it is not only expected that the decision-making process takes longer (Smith et al. 2006; Jebran and Chen 2023), but also that additional costs are expected to be imposed on companies that may not be easily offset (Marinova et al. 2016). In line with this view, the findings of some researchers around the world indicate that there are destructive effects of gender diversity on corporate price (Ahmad et al. 2019; Akram et al. 2020; Soare et al. 2021; Fariha et al. 2021; Kabir et al. 2023). For instance, by evaluating 19 European countries from 2010 to 2020, Kabir et al. (2023) argued that board gender diversity worsens ROA and ROE. Of course, the results of Moradi et al. (2012b) in the Iranian market were in the same direction and highlighted the negative impact of the presence of women on the economic value of companies. Given the theoretical foundations stated regarding the possibility of positive and negative effects of board gender diversity on firm performance, this study expects that there is a significant relationship between these two variables. Furthermore, because the COVID-19 global crunch has caused irreparable financial problems for companies and countries' economies, we anticipate the coronavirus pandemic to moderate the relationship between them.

**H5.** *There is a significant association between board gender diversity and corporate performance.*

**H5a.** *The COVID-19 pandemic moderates the association between board gender diversity and corporate performance.*

There are two completely different views of the school of thought explaining the kind of relationship between board meeting frequency and company value (Eluyela et al. 2018). As stated earlier, according to agency theory, because there is a separation of ownership from management, conflicts of interest may arise between company owners and managers and exacerbate information asymmetry (Salehi et al. 2022). In keeping with this theory, the shareholders of a company usually elect the board members so that efforts are made to create a coherent organizational atmosphere, to make timely and appropriate strategic plans, and to monitor management actions effectively and adequately to maximize shareholders' wealth (Eluyela et al. 2018). To be fully assured that steps are being taken to improve the company's performance and maximize shareholder wealth, the board of directors needs to hold more meetings per year to provide more timely advice, effective monitoring and control, and organizational discipline (Ntim and Osei 2011). In this regard, numerous documents have proved that the more annual board meetings, the more they help companies financially and maximize shareholder wealth (Adams and Ferreira 2009; Ntim and Osei 2011; Johl et al. 2015; Wijethilake et al. 2015; Francis et al. 2015; Eluyela et al. 2018; Wang et al. 2019; Puni and Anlesinya 2020; Al Farooque et al. 2020; Abdeljawad and Masri 2020; Fariha et al. 2021; Kanakriyah 2021; Nguyen and Huynh 2023).

Turning to the other side of the argument, due to the limited time spent by non-executive board members in the company, a large number of meetings cannot solve the company's problems and such precious time can be spent on exchanging thoughts, ideas, and strategies with managers (Vafeas 1999; Johl et al. 2015). Moreover, because frequent meetings of the board incur heavy costs related to managerial time, travel expenses, directors' meeting service costs, and administrative support requirements, a great deal of the company's valuable resources may be wasted or injected into low-yield activities (Johl et al. 2015; Al Farooque et al. 2020). In support of this argument, a large number of studies have highlighted the fact that board meeting frequency can affect firm value adversely (Johl et al. 2015; Musleh Alsartawi 2018; Altass 2022). On the whole, based on the theoretical foundations related to the positive and negative aspects of board meetings, it is expected that the number of board meetings will have a significant impact on the financial performance of companies. As with previous hypotheses, the coronavirus global crisis is expected to worsen the corporate situation and affect the efficiency of board meeting frequency, too. Therefore, the next hypothesis of this research is stated as follows.

**H6.** *There is a significant association between board meeting frequency and corporate performance.*

**H6a.** *The COVID-19 pandemic moderates the association between board meeting frequency and corporate performance.*

In companies whose CEO is also the chairman of the board, it can be said that CEO duality prevails (Elsayed 2007; El-Chaarani et al. 2022). Based on corporate governance rules, provided that a CEO is also the chairperson of the board, the concentration of power is generated within a firm (ASX Corporate Governance Council 2007). Therefore, if the corporate governance environment is not favorable and efficient, the directing managers may allow themselves to act only in the best interests of management and the board of directors (Fama and Jensen 1983; Kyere and Ausloos 2021). It is difficult to expect corporate governance mechanisms to be effective and to take steps to maximize shareholder wealth when CEO duality even undermines board independence (Lorsch and MacIver 1989). During an economic crisis such as the COVID-19 pandemic, if the corporate governance mechanisms are such that instead of taking too much risk, companies seek to find innovative measures, such as making the board of directors smaller and more independent and preventing CEO duality, liquidity problems are likely to fall (El-Chaarani et al. 2022). In the same vein, Anand and Fosso Wamba (2013) argued that CEO duality has been recognized as one of the biggest obstacles to criticizing and accurately evaluating managers' performance among less-developed countries. Accordingly, the outcomes of some scholars support agency theory based on the fact that CEO duality deteriorates corporate value because the dual position of a CEO can follow individual benefit instead of firm success (Wang et al. 2012; Tang 2017; Naseem et al. 2019; Musallam 2020; Al Farooque et al. 2020; Mubeen et al. 2021). Similarly, Manafi et al. (2015) noted that CEO duality seriously harms the maximization of shareholders' wealth and Iranian corporate value. Based on the entrenchment theory, because CEO duality can cause information about suboptimal commercial trades from other board members to be withheld, directors may feel confident in investing in low-return plans because they are less likely to be questioned about them by other board members. As a result, in times of economic crunch, CEO duality can lead to lobbying behavior for personally beneficial projects and subsequently damage firms' performance (El-Chaarani et al. 2022). The use of risky strategies by the CEO during financial crises can also be another reason for corporate failure (Grove et al. 2011).

By contrast, proponents of stewardship theory agree that the CEO's dualism can contribute to the financial success of companies. It can be stressed that the design and implementation of appropriate business strategies for companies can depend on the existence of decisive and clear leadership, which is possible through the duality of the CEO (Kyere and Ausloos 2021). The most important factor is that when a person is both the chairman of the board and the CEO of a company at the same time, their decision-making power improves because the uncertainty of organizing a company's strategies can be reduced to a minimum (Christensen et al. 2010; Kyere and Ausloos 2021). Consistent with stewardship theory, Hassan et al. (2023) argued that when firms have high information-gathering costs in times of uncertainty, such as the COVID-19 pandemic, CEO duality can contribute to corporate profitability. The findings of various researchers are in line with stewardship theory in that there is a positive correlation between CEO duality and corporate financial success (Boyd 1995; Van Essen et al. 2013; Wijethilake et al. 2015; Rostami et al. 2016; Ghasempour 2016; Pham and Pham 2020; Abdeljawad and Masri 2020). Overall, considering the pros and cons of CEO duality, this study predicts that CEO duality can affect firm performance. Furthermore, the COVID-19 crunch is anticipated to have a moderating effect on the relationship between CEO duality and firm value.

**H7.** *There is a significant association between CEO duality and corporate performance.*

**H7a.** *The COVID-19 pandemic moderates the association between CEO duality and corporate performance.*

The board is obliged to form an audit committee for the company from among the independent and non-executive directors that follow the shareholders' wealth maximization (Salehi et al. 2018b). One of the main goals of the audit committee has always been to improve the corporate financial reporting quality under the standards and guidelines of the corporate governance council (Kyere and Ausloos 2021). Given that the audit committee aims to oversee the activities of managers and evaluate financial information, it can be considered an effective control mechanism for reducing information asymmetry between internal and external members of the board. One of the most important mechanisms of corporate governance is the size of the audit committee. According to resource dependency theory, the larger the size of an audit committee, the more unlikely it is to be overestimated (Salehi et al. 2018b). There is no doubt that larger audit committees can have stronger monitoring and control and adopt more appropriate and accurate accounting procedures because they can apply people with different knowledge and expertise and have more work sessions (Raghunandan et al. 2001; Choi et al. 2004; Salehi et al. 2018b). In favor of resource dependency theory, a large number of studies have confirmed that the audit committee size and corporate profitability are positively correlated (Reddy et al. 2010; Wang et al. 2012; Al-Mamun et al. 2014; Alqatamin 2018; Musallam 2020; Dakhlallh et al. 2020; Mieseigha and Adeyemi 2021; Abeygunasekera et al. 2021). However, the opposite view is based on agency theory, suggesting that oversight and control activities in larger audit committees are weaker, which can cause economic damage to companies (Vafeas 1999; Hillman and Dalziel 2003). Along with agency theory, there have been studies showing that part of the poor financial condition of companies is due to the existence of larger audit committees (Vafeas 1999; Hillman and Dalziel 2003; Bozec 2005; Fariha et al. 2021; Al-Jalahma 2022). Uncertainty can also be seen in the results of Iranian market research; some scholars found that the audit committee size is a key factor in the financial success of companies (Rezaei and Abbasi 2015), while others discovered that it has no significant effect (Oradi et al. 2017; Salehi et al. 2018b; Fakoor Sany et al. 2021). Therefore, given the points mentioned about resource dependency and agency theories, this study anticipates audit committee size can affect firm value meaningfully. As with previous hypotheses, we also expect the coronavirus global crunch to affect the relationship between audit committee size and financial performance.

**H8.** *There is a significant association between audit committee size and corporate performance.*

**H8a.** *The COVID-19 pandemic moderates the association between audit committee size and corporate performance.*

Audit committee independence is one of the most effective corporate governance mechanisms to ensure that the audit process of a company is formed in an ideal state (Musallam 2020). Because non-executive members of the audit committee do not have specific personal motives to pursue their interests, they try hard to perform their duties as effective monitors in a way that does not damage their professional reputation in the market and is not subject to potential litigation risk (Constantatos 2018). To adequately and effectively monitor the quality of corporate financial reporting, many international laws, such as SOX, the New York Stock Exchange Standards, the UK Corporate Governance Code, the code of the Australian Stock Exchange Corporate Governance Council (ASX), and other cases, have been enacted in various areas to ensure the existence of audit committee independence (Sharma and Kuang 2014; Constantatos 2018). For instance, under UK and US developed markets law, companies are required to have at least three independent members on the audit committee to maintain their independence (Chen and Zhang 2014). In an emerging market such as Iran, the audit committee consists of three to five members, who are elected and appointed by the board. According to Iranian market laws passed in

2012, the majority of audit committee members must be non-executive and independent, and even the chairman of the audit committee must be an independent member of the board. As a whole, it is inferred that the greater the independence of the audit committee, the fewer agency problems will arise (Erickson et al. 2005; Salehi et al. 2018a). In line with theories of resource dependence as well as agency, making right and error-free decisions can be possible, thanks to the presence of more independent members (Salehi et al. 2018b). Independent directors on the audit committee can be a deterrent to opportunistic managerial behavior due to their adequate and effective oversight, thereby improving the quality of financial information presentation (Chen and Zhang 2014; Abubakar et al. 2021; Alkebsee et al. 2022). Accordingly, numerous studies so far have shown that due to the effective oversight role of the independent members of the audit committee, the financial performance of companies has improved significantly (Wijethilake et al. 2015; Alqatamin 2018; Dakhlallh et al. 2020; Abeygunasekera et al. 2021; Ehiedu and Toria 2022), even though some studies have indicated there is a negative association between the presence of independent members on the audit committee and financial results (Mohid Rahmat et al. 2009; Palaniappan 2017; Oudat et al. 2021; Fariha et al. 2021; Al-Jalahma 2022; Abdullah and Tursoy 2023). Similar to research in all parts of the world, the flow of research results related to audit committee independence in Iran has sometimes been in line with the financial theories of resource dependence and agency and, in some cases, has been against them (Oradi et al. 2017; Fakoor Sany et al. 2021). Therefore, given the above, as well as awareness of the adverse economic effects of the corona global crisis, this study predicts that the next hypothesis of the research will be as follows.

**H9.** *There is a significant association between audit committee independence and corporate performance.*

**H9a.** *The COVID-19 pandemic moderates the association between audit committee independence and corporate performance.*

Typically, the audit committee is responsible for overseeing internal controls, financial reporting, and ensuring compliance with the rules and procedures governing the organization's activities. To fulfill such important responsibilities, having financial knowledge greatly helps the audit committee (Musallam 2020). Acquisition of financial expertise is not only possible through experience, and having education and experience together can create a financial expert (Giacomino et al. 2009). After the scandal and the collapse of big companies such as Enron and WorldCom, Section 407 of the Sarbanes-Oxley Act in 2002 required companies to set up an audit committee consisting of independent members and at least one financial expert (Salehi et al. 2018b). In addition, based on the charter of the audit committee in the Iran market, the majority of audit committee members are forced to possess financial expertise (Salehi et al. 2018b). The finance and accounting knowledge of the audit committee improve their conservatism, oversight role, and effectiveness (Krishnan and Visvanathan 2007). Accordingly, the greater the number of financial experts on the audit committee, the better the quality of corporate financial reporting, and agency problems reduce dramatically (Abbott et al. 2004; Schmidt and Wilkins 2013; Badolato et al. 2014; Zalata et al. 2018; Alkebsee et al. 2022; Cheung and Adelopo 2022). Song et al. (2023) noted that the act of misrepresenting corporate financial performance can be reduced if the level of financial literacy of audit committee members improves. Generally, despite the little evidence that the audit committee's financial expertise harms corporate growth (Mieseigha and Adeyemi 2021), there is a lot of research showing the audit committee's financial expertise leads to an improvement in firm value (Rezaei and Abbasi 2015; Oradi et al. 2017; Salehi et al. 2018b; Musallam 2020; Dakhlallh et al. 2020; Safari Gerayli et al. 2021; Ehiedu and Toria 2022). Hence, we expect that there is a significant relationship between the financial expertise of the audit committee and corporate performance and that this relationship can also be affected by the COVID-19 crisis.

**H10.** *There is a significant association between audit committee financial expertise and corporate performance.*

**H10a.** *The COVID-19 pandemic moderates the association between audit committee financial expertise and corporate performance.*

## 3. Research Methodology

This study can be considered quantitative research in terms of process and has a practical purpose. Not only is this a descriptive-correlation study in terms of data collection and analysis, but it is also inductive research in logical terms. The post-event method usually refers to research in which the researcher examines the possible causes of its occurrence according to the dependent variable. In other words, post-event research is retrospective and tries to find out the effect of the possible causes because cause and effect (independent and dependent variables) are examined after the occurrence. Accordingly, our research is quasi-experimental and of a post-event type in terms of research methodology in that it is conducted with real information. The statistical population of this research consists of 1098 observations and 183 companies listed on the TSE for six years between 2016 and 2021. When a set of cross-sectional variables are selected mostly randomly over a period, a study is going to deal with panel data (Tarighi et al. 2022c). Accordingly, in accounting papers like this, because research data are gathered for several firms over a particular period, these kinds of data are called longitudinal/pooled/panel data (Tarighi et al. 2022b). There are lots of robustness tests out there to apply to any given analysis. As for the robustness tests, we conduct tests for heteroskedasticity, serial correlation, linearity, multicollinearity, endogeneity, and other important cases in this study to confirm the validity of our findings. All statistical tests of this research completely follow the principles of econometrics and are performed with Eviews software. Because the existence of outlier observations can question the classical assumptions of regression and damage the validity of the results of a study (Zimon et al. 2022; Bottmer et al. 2022), we used the method of winsorizing based on which the outlier observations lower than the 5th percentile are removed and those greater than the 95th percentile were replaced. In this paper, we then used the Jarque–Bera test to assess the normality of the distribution of our variables' observations. In the first step, this study takes the F-Limer (Chow) test to evaluate if the research model is suitable for the ordinary least-squares (OLS) or panel data method. At this time, if the use of the data panel method is approved, we need to perform the Hausman test to identify if panel data with fixed effects should be used or if panel data with random effects should be used. We also carry out Durbin–Watson and Breusch–Godfrey tests to investigate the problems of serial autocorrelation among residuals. In addition, the variance inflation factor (VIF) is used to analyze the severity of multicollinearity, whereas the white test is carried out to explore heteroskedasticity issues. Furthermore, we use different methods of the two-stage least squares (2SLS), generalized method of moments (GMM), and limited information maximum likelihood (LIML) to investigate the endogeneity concerns.

### *3.1. Research Sample*

The statistical sample of this research consists of all the manufacturing firms listed on the TSE during the period of 2016–2021. Similar to many previous studies in the Iranian market that have used the systematic removal method to determine sample size, we aim to use the following criteria in this study.

- The audited financial statement of each of the companies under study must be available.
- The financial periods of companies should be finished at the end of the solar year (March 20). In other words, to strengthen the comparability and homogeneity of firms in terms of the period, almost all the research conducted in the Iranian market considered the end of the financial year of the companies on March 20 (Salehi et al. 2018b, 2020b). The reason for using this condition is to neutralize the effect of business cycles on the research results.

- The enterprises should not have changed their fiscal year during the study period, and they should not have more than six months of trading halts.
- According to the period of this research, which coincides with the years 2016 to 2021, the enterprise has to be listed on the TSE before the year 2016 and its name cannot have been removed from the listed firms by the end of 2021.
- Because the nature of the business activity has to be productive, investment companies, leasing, credit, financial institutions, and banks are not included in our sample because these companies have quite different natures in terms of reporting and ownership structure.

Taking into account the above measures that have been used in many local studies (Salehi et al. 2018b, 2020b, 2022; Moradi et al. 2021; Zimon et al. 2021; Tarighi et al. 2022b), a sample size of 183 manufacturing firms was selected in Table 1.

**Table 1.** Sample selection criteria.

| Limitations | Firms |
|---|---|
| All listed firms on TSE by the end of March 2021 | 473 |
| Companies whose fiscal year is not March 20 | (104) |
| Investment firms, leasing, credit and financial institutions, and banks | (38) |
| Companies that have more than six months of trading halt or have changed fiscal year during the period under study | (119) |
| Companies whose information is not available or removed from the stock exchange | (29) |
| The remaining companies in the sample | 183 |

Source: Own research.

### 3.2. Research Model and Variables

In this study, the main purpose is to investigate the relationship between corporate governance mechanisms and corporate financial performance in an emerging market such as Iran. Then, considering the negative effects of the COVID-19 global crisis on firm value, we seek to examine whether the COVID-19 pandemic moderates the relationship between each of the corporate governance mechanisms and corporate performance. To analyze each of the hypotheses, our research model is designed as follows.

$$\begin{aligned}
CP_{it} = {} & \beta_0 + \beta_1 BSIZE_{it} + \beta_2 BIND_{it} + \beta_3 BFE_{it} + \beta_4 BGD_{it} + \beta_5 BMF_{it} + \beta_6 \text{CEO duality}_{it} + \beta_7 ACSIZE_{it} + \beta_8 ACIND_{it} + \\
& \beta_9 ACFE_{it} + \beta_{10} COVID19_{it} + \beta_{11}(BSIZE_{it} \times COVID19_{it}) + \beta_{12}(BIND_{it} \times COVID19_{it}) + \beta_{13}(BFE_{it} \times COVID19_{it}) + \\
& \beta_{14}(BGD_{it} \times COVID19_{it}) + \beta_{15}(BMF_{it} \times COVID19_{it}) + \beta_{16}(\text{CEO duality}_{it} \times COVID19_{it}) + \beta_{17}(ACSIZE_{it} \times COVID19_{it}) + \\
& \beta_{18}(ACIND_{it} \times COVID19_{it}) + \beta_{19}(ACFE_{it} \times COVID19_{it}) + \beta_{20}(M\&A_{it} \times COVID19_{it}) + \beta_{21} M\&A_{it} + \beta_{22} INFLATION_{it} + \\
& \beta_{23} FIRMSIZE_{it} + \beta_{24} FIRMAGE_{it} + \beta_{25} CURRENT_{it} + \beta_{26} LEVERAGE_{it} + \text{INDUSTRY INDICATOR} + \text{YEAR INDICATOR} + \varepsilon_{it}
\end{aligned}$$

where corporate performance (CP) is regarded as our dependent variable in this study. In line with many domestic and international studies that have widely used both of accounting-based (return on assets—ROA) and market-based (Tobin's Q) ratios (Mashayekhi and Bazaz 2008; Alipour 2013; Pozzoli and Venuti 2014; Shahzad et al. 2015; García-Meca et al. 2015; Constantatos 2018; Appiah et al. 2020; Moradi et al. 2021; Zimon et al. 2021; Fariha et al. 2021; Rezaei Pitenoei et al. 2021; Ganda 2022; Carmo et al. 2022; Al-Jalahma 2022; Onyekwere and Babangida 2022; El-Chaarani et al. 2022; Almustafa et al. 2023), this study uses these two criteria to measure the financial performance of companies. It is very interesting to note that the positive relationship between accounting-based (e.g., ROA) and market-based (e.g., Tobin's Q) criteria for measuring corporate performance is fully justified through signaling theory, as it is assumed that when the financial performance of companies improves, it attracts more investors, mean it can ultimately boost the market value of firms (Alajlani 2019; El-Chaarani et al. 2022). Different corporate governance mechanisms have been selected as independent variables in this study, too. In general, our independent variables include a set of corporate governance mechanisms, such as board size (BSIZE), board independence (BIND), board financial expertise (BFE), board gender diversity (BGD), board meeting frequency (BMF), CEO duality, audit committee size (ACSIZE), audit committee independence (ACIND), and audit committee financial expertise (ACFE). To analyze the influence of the COVID-19 global crunch on firm value, we also construct a dummy variable named COVID-19. Then, to examine the moderating effect of the coronavirus global crisis on the relationship between each of the corporate governance mechanisms and corporate performance, we tend to use the multiplication of this dummy variable in other independent variables. Apart from the corporate governance mechanisms, we use another moderator variable called (M&A*COVID19) that is obtained by multiplying COVID-19 by M&A so that we can understand whether merger and acquisition activities, due to their competitive advantages, can affect firm performance during the pandemic.

As for control variables, we can say that different items, such as inflation annual rate, firm size, firm age, mergers and acquisitions, current ratio, and financial leverage, are regarded as the control variables in this study. The existing research literature has proved that there is a close relationship between each of the control variables of this research and the financial performance of companies. For instance, to examine the impact of economic sanctions on the Iranian market, the annual inflation rate can be used (Tarighi et al. 2022a). Given that larger companies have more access to information resources than smaller companies, they can more easily create economically added value and meet shareholder expectations (Nobakht and Acar 2021; Zimon et al. 2021). Based on the fact that the existence of more assets in larger companies also helps them to have a higher market value (Tarighi et al. 2022a), we seek to control this impact on firm value by including firm size as a control variable. In addition, the number of years of company activity is considered a definition of the firm age's variable (Moradi et al. 2021; Fan and Wang 2021). In this regard, firm age has both positive and negative effects on financial success (Papadogonas 2007; Ilaboya and Ohiokha 2016; Liu 2020), both of which can be justified through theories of learning by doing, as well as the liability of obsolescence, respectively (Tarighi et al. 2022a). Given that the mergers and acquisitions (M&A) process can bring competitive pros to firms (Pavliuk and Nechay 2019; Tarighi et al. 2022a; Muhindi 2022), we argue that those enterprises participating in M&A actions are expected to have better financial growth in the periods of pre- and post-COVID-19 pandemic. To analyze this argument more precisely, we examined the control effects of the M&A variable. The current ratio can also be used to measure a company's ability to repay its short-term liabilities. The closer it is to one, the stronger the company's ability is to pay its short-term debts, while if this ratio is greater than one, it indicates that the company has not been able to use its liquidity to maximize shareholder wealth (Zimon et al. 2021; Tarighi et al. 2022b). Hence, previous studies have experienced contradictory results about the effect of the current ratio on financial performance; in some studies, it had a positive effect (Amanda 2019; Zimon et al. 2021), while in others it had the opposite effect (Sukmawardini and Ardiansari 2018), although in others it has been completely ineffective (Amir and Wuu 2020; Qamara et al. 2020). The importance of using financial leverage for Iranian firms can be justified under the pecking order theory (POT) and the market timing theory (MTT). Based on the pecking order theory (POT), when firms face financial trouble, they have a preference for debt financing over equity financing (Homapour et al. 2022). In the Iranian market, the continuous increase in inflation has caused the price of a company's assets and resources to increase automatically, which can have a destructive effect on the valuation of the company's shares by investors and analysts. In this regard, the market timing theory (MTT) states that when the market price of a company's stock is overvalued, firms are likely to take debt financing for undervalued conditions (Setyawan 2012; Homapour et al. 2022). Another important point is that when debt interest rates are stable, companies tend to use financial leverage to help increase shareholder wealth (Zimon et al. 2021); otherwise, it may have destructive effects. In the same vein, some scholars have seen a positive connection between financial leverage and firm value (Anetoh and Anetoh 2016), while others have witnessed reversal effects (Alarussi and Alhaderi 2018; Chollet and Sandwidi 2018; Appiah et al. 2020; Zimon et al. 2021). Thus, to control the debt structure that can affect company risk and performance (Gander 2012; Almustafa et al. 2023), we use the ratio of financial leverage. Finally, to control the effects of different industries and different years, we use the year index and industry indicator in this research. In Table 2, the definition of each of the variables of this research is presented.

**Table 2.** Definition of the variables.

| Variable | Type | Measurement |
|---|---|---|
| ROA | Dependent | Return on assets (ROA) consists of earnings before interest and taxes (EBIT) divided by the sum of a firm asset (Mashayekhi and Bazaz 2008; Moradi et al. 2021; Zimon et al. 2021; El-Chaarani et al. 2022; Hong and Linh 2023). |
| Tobin's Q | Dependent | Tobin's Q ratio is a firm's market value divided by the replacement cost of a firm's assets (Eluyela et al. 2018; Khanifah et al. 2020; Brogi et al. 2020; Al Farooque et al. 2020; Zimon et al. 2021; El-Chaarani et al. 2022; Hong and Linh 2023). |
| BSIZE | Independent | Board size (BSIZE) is equal to the number of members of a company's board of directors (Musallam 2020; Brogi et al. 2020; Orazalin 2020; Khatib and Nour 2021; El-Chaarani et al. 2022) |
| BIND | Independent | Board independence (BIND) shows the ratio of the number of non-executive members to the total number of the board members of a firm (Salehi et al. 2018b; Bradford et al. 2019; Orazalin 2020; Musallam 2020; Khatib and Nour 2021; El-Chaarani et al. 2022) |
| BFE | Independent | Board financial expertise (BFE) is the proportion of members who have the financial expertise to the total members on the board (Johl et al. 2015; Khatib and Nour 2021). |
| BGD | Independent | Board gender diversity (BGD) is an indicator variable that if at least one member of the board is a woman, it equals one; otherwise, it equals zero (Orazalin 2020; Khatib and Nour 2021; Simionescu et al. 2021) |
| BMF | Independent | Board meeting frequency (BMF) includes the total number of meetings held by the board throughout the financial year (Johl et al. 2015; Eluyela et al. 2018; Khatib and Nour 2021). |
| CEO duality | Independent | CEO duality as an indicator variable equals one if the CEO of a company is also the chairman of the board, otherwise it equals zero (Salehi et al. 2018a; Bradford et al. 2019; Musallam 2020; Kyere and Ausloos 2021; El-Chaarani et al. 2022). |
| ACSIZE | Independent | Audit committee size (ACSIZE) is measured by the number of members of a company's audit committee (Musallam 2020; Khatib and Nour 2021). |
| ACIND | Independent | Audit committee independence (ACIND) represents the number of independent and non-executive directors divided by the total number of audit committee members of a firm (Musallam 2020) |
| ACFE | Independent | Audit committee financial expertise (ACFE) shows the ratio of the number of financial expertise directors divided by the total members of the audit committee (Salehi et al. 2018b; Musallam 2020; Namakavarani et al. 2021). |
| COVID-19 | Independent | COVID-19 is a dummy variable that equals one when it is during the COVID-19 pandemic, and if the time is related to before the coronavirus crisis, it equals zero (Zimon and Tarighi 2021; Almustafa et al. 2023). |
| M&A | Control | Mergers and acquisitions (M&A) is an indicator that takes one if a firm has participated in mergers and acquisitions during the given period; otherwise, it equals zero (Lashgari and Gawradar 2015; Sakawa and Watanabel 2020; Zimon et al. 2021; Tarighi et al. 2022a). |
| Inflation Rate | Control | It shows the annual inflation rate in Iran's market (Moradi et al. 2021; Tarighi et al. 2022b). |
| Firm Size | Control | The natural logarithm of a company's total assets (Bradford et al. 2019; Raguseo et al. 2020; Brogi et al. 2020; Musallam 2020; Simionescu et al. 2021; Zimon et al. 2021; Moradi et al. 2021; Tarighi et al. 2022a; Hong and Linh 2023). |
| Firm Age | Control | The number of years of company activity (Al Farooque et al. 2020; Musallam 2020; Brogi et al. 2020; Moradi et al. 2021; Fan and Wang 2021; Almustafa et al. 2023). |
| Current Ratio | Control | The current assets divided by the current liabilities (Orazalin 2020; Zimon et al. 2021; Simionescu et al. 2021; Tarighi et al. 2022b). |
| Lev | Control | It is calculated through long-term debt scaled by total assets (Salehi et al. 2018b; Bradford et al. 2019; Zimon et al. 2021; Almustafa et al. 2023; Hong and Linh 2023) |

## 4. Results

### *4.1. Descriptive Statistics*

Descriptive statistics can be used to analyze the basic features of the data in research (Moradi et al. 2021; Zimon and Tarighi 2021; Hayaeian et al. 2021; Salehi et al. 2022). In Table 3, descriptive statistics, such as the minimum, maximum, mean, median, and standard deviation are presented. Furthermore, the qualitative variables of this research are fully analyzed using the newly updated winsorized sample. Moreover, the descriptive statistics of research variables are compared in Table 4 in the era pre- and post-COVID-19 to provide more accurate details of the sample study.

**Table 3.** Descriptive statistics of quantitative variables.

| Variable | Mean | Median | S.D. | Max | Min | Prob.Jarque-Bera |
|---|---|---|---|---|---|---|
| ROA | 0.0476 | 0.0490 | 0.1969 | 0.2532 | −0.2038 | 0.7604 |
| TOBIN'S Q | 1.6823 | 1.4625 | 0.6859 | 5.5275 | 0.5913 | 0.6305 |
| BSIZE | 5.0592 | 5 | 0.3169 | 7 | 5 | 0.3527 |
| BIND | 0.6507 | 0.60 | 0.1507 | 0.80 | 0.40 | 0.1402 |
| BFE | 0.1463 | 0.20 | 0.1374 | 0.40 | 0 | 0.4157 |
| BMF | 15.0409 | 12 | 4.6532 | 25 | 12 | 0.2391 |
| ACSIZE | 3.0617 | 3 | 0.3637 | 5 | 2 | 0.0864 |
| ACIND | 0.3364 | 0.3333 | 0.2235 | 1 | 0 | 0.1321 |
| ACFE | 0.6656 | 0.6666 | 0.3252 | 1 | 0 | 0.6003 |
| INFLATION | 24.5316 | 24.30 | 15.7506 | 43.39 | 7.25 | 0.0914 |
| FIRM SIZE | 14.4329 | 14.4191 | 1.1582 | 16.7637 | 12.2658 | 0.3207 |
| FIRM AGE | 38.0213 | 41.50 | 13.4402 | 57 | 7 | 0.5216 |
| CURRENT | 1.2364 | 1.2022 | 0.5368 | 2.5015 | 0.3364 | 0.1792 |
| LEVERAGE | 0.6751 | 0.6436 | 0.2719 | 1.5241 | 0.2917 | 0.1285 |

Descriptive statistics of qualitative variables

| | Status | Description | Frequency | Percentage |
|---|---|---|---|---|
| COVID-19 | 1 | If a firm operates during the COVID-19 global crisis | 549 | 0.50 |
| | 0 | If a firm operates before the COVID-19 global crisis | 549 | 0.50 |
| BGD | 1 | If one member on the board of a firm is a woman | 123 | 0.11 |
| | 0 | If there is no woman on the board of a firm | 975 | 0.89 |
| CEO duality | 1 | If the CEO of a firm is also the board chairman | 385 | 0.35 |
| | 0 | If the CEO of a firm is not also the board chairman | 713 | 0.65 |
| M&A | 1 | If a firm participates in the mergers and acquisitions process | 319 | 0.29 |
| | 0 | If a firm does not have involvement in mergers and acquisitions | 779 | 0.71 |

Source: Own research.

Based on econometrics, the Jarque–Bera test can be used to evaluate the normality of the distribution of variables' observations of an investigation (Tarighi et al. 2022c; Zimon et al. 2022). According to the rules and principles of this statistical test, in the case that probability ($p$-value) is more than five percent, one of the most important assumptions based on the normal distribution of observations of the variables is established (Tarighi et al. 2022a; Zimon et al. 2022). In keeping with our expectations, after winsorizing outlier data, the outcomes of the Jarque-Bera test in the last column of Table 3 confirm that the data are normally distributed. Taking a closer look at the descriptive statistics, we find that on average, the financial performance of Iranian companies has been good in terms of Tobin's Q ratio, while they have not performed well from the aspect of the ratio of return on assets (ROA). A high average Tobin's Q ratio just indicates that Iranian companies have opportunities to grow and better use their assets. In other words, considering that Tobin's Q index calculated for Iranian companies is greater than one, this is usually a valuable sign of growth opportunities. Unfortunately, the average annual inflation rate of 25% indicates that severe economic sanctions have greatly increased prices in the Iranian market. The results also show that the average number of board and audit committee members are five and three people, respectively. Moreover, approximately 65% of board members are independent and non-executive on average. Meanwhile, one-third of audit committee members have sufficient independence. Although two-thirds of audit committee members are financial experts, few members of the board of directors in Iran have the financial knowledge to be able to effectively monitor the activities of managers. Another interesting point is that Iranian companies hold an average of 15 meetings a year by the board of directors, and the highest number reached was 25. This implies that board members in Iranian companies seem to have the desire to hold more meetings so that they can take steps to maximize shareholder wealth. In addition, our study sample has relatively high experience because almost four decades have passed since the beginning of their activities. Considering that the average current ratio is greater than one, Iranian managers seem to have not been able to make the most of their liquidity to maximize firm value. Finally, on average, the amount of financial leverage is 0.67. This means that two-thirds of the companies' assets are financed by long-term debts, which itself can be a sign of increased firms' risk. As for qualitative variables, among one-third of Iranian companies, it is seen that the CEO of the company is also the chairman of the board of directors, whereas in the overwhelming majority of Iranian companies, women are not members of the board of directors. Because there is a weak legal protection level, Iranian firms are more willing to increase CEO duality and decrease gender diversity on the board. Because management job security in Iran is weak, managers often consider M&A risky for their position and try to prevent hostile bidders from gaining control. For this reason, less than a third of Iranian companies are willing to participate in M&A activities, despite having many financial problems during the economic uncertainty.

Considering that economic uncertainty can cause many problems for companies, the comparative descriptive statistics in Table 4 confirm that the average financial performance of Iranian enterprises in terms of ROA and Tobin's Q indexes has dropped slightly since the beginning of the COVID-19 pandemic. Among the various mechanisms of corporate governance, no significant changes in the level of knowledge and expertise of the members of the board of directors and the audit committee between normal and turbulent times are seen. By comparing the era before and after the pandemic, there is a completely similar scenario regarding the board size of Iranian companies, and no attempt seems to have been made to correct its size. On the opposite side, we find that there are major differences in the mean value of three variables called board independence, board meeting frequency, and audit committee size. In fact, the mean of the board of directors' independence and the audit committee size have decreased during the COVID-19 crisis, while the number of board meetings has followed an upward path. The pressure of economic sanctions against the Iran market has been so severe that there was an average annual inflation rate of 25% during the entire research period. Worst of all, the annual inflation rate during COVID-19 has reached nearly 38%, and even a 43% annual inflation rate can be observed as the highest value in these scandalous economic conditions. In the unstable and turbulent economic times of COVID-19, companies have turned more towards debt, and this risk-taking behavior can have serious consequences for them. Finally, in the pre-COVID-19 era, almost two-thirds of Iranian companies were willing to participate in M&A activities, while the peak reached 75% during the pandemic. This means that Iranian companies like to use M&A activities to dispose of their economic problems because they can create tremendous competitive advantages. In line with POT and MTT, Iranian firms during COVID-19 economic uncertainty preferred using financial leverage. Statistically, the extent of board meeting frequency, inflation annual rate, current ratio, and merger and acquisition (M&A) activities during the COVID-19 pandemic has gone up remarkably compared to previous years. Furthermore, there are significant differences in the variables of Tobin's Q, BSIZE, BIND, BFE, ACSIZE, and ACIND between pre- and post-COVID-19.

**Table 4.** Comparative descriptive statistics.

| Variable | Mean | Median | S.D. | Max | Min | Difference t-Statistic |
|---|---|---|---|---|---|---|
| ROA (Pre-COVID19) | 0.0595 | 0.0759 | 0.1864 | 0.2532 | −0.1209 | 0.4209 |
| ROA (Post-COVID19) | 0.0357 | 0.0450 | 0.2519 | 0.0981 | −0.2038 | |
| TOBIN'S Q (Pre-COVID19) | 1.8109 | 1.7091 | 0.0914 | 5.5275 | 0.5913 | −0.7051 * |
| TOBIN'S Q (Post-COVID19) | 1.5537 | 1.3501 | 0.9134 | 3.0082 | 0.8602 | |
| BSIZE (Pre-COVID19) | 5.0601 | 5 | 0.3196 | 7 | 5 | −1.1082 |
| BSIZE (Post-COVID19) | 5.0583 | 5 | 0.3471 | 7 | 5 | |
| BIND (Pre-COVID19) | 0.6817 | 0.62 | 0.1623 | 0.80 | 0.40 | −0.9234 ** |
| BIND (Post-COVID19) | 0.6197 | 0.60 | 0.1509 | 0.80 | 0.40 | |
| BFE (Pre-COVID19) | 0.1477 | 0.20 | 0.1362 | 0.40 | 0 | −1.0557 * |
| BFE (Post-COVID19) | 0.1449 | 0.20 | 0.1466 | 0.40 | 0 | |
| BMF (Pre-COVID19) | 13.5686 | 12 | 6.1251 | 19 | 12 | 2.3080 *** |
| BMF (Post-COVID19) | 16.5132 | 13 | 7.1816 | 25 | 14 | |
| ACSIZE (Pre-COVID19) | 3.2923 | 3 | 0.3668 | 5 | 2 | −1.6295 ** |
| ACSIZE (Post-COVID19) | 2.8311 | 3 | 0.4420 | 5 | 3 | |
| ACIND (Pre-COVID19) | 0.3656 | 0.3333 | 0.2278 | 1 | 0 | −0.8166 * |
| ACIND (Post-COVID19) | 0.3072 | 0.20 | 0.7169 | 1 | 0 | |
| ACFE (Pre-COVID19) | 0.6544 | 0.6466 | 0.3387 | 1.6666 | 0 | 1.7354 |
| ACFE (Post-COVID19) | 0.6768 | 0.6666 | 0.3496 | 2.3333 | 0 | |
| INFLATION (Pre-COVID19) | 11.1071 | 8.0400 | 5.9972 | 18.01 | 7.25 | 7.2303 * |
| INFLATION (Post-COVID19) | 37.9633 | 39.9100 | 6.6183 | 43.39 | 30.59 | |
| FIRM SIZE (Pre-COVID19) | 13.9961 | 14.0873 | 1.1465 | 15.1843 | 12.2658 | 2.0304 |
| FIRM SIZE (Post-COVID19) | 14.8697 | 14.7071 | 1.3609 | 16.7637 | 13.0924 | |
| FIRM AGE (Pre-COVID19) | 37.8163 | 39.64 | 13.8637 | 55 | 7 | 1.9338 |
| FIRM AGE (Post-COVID19) | 38.2263 | 41.30 | 11.0091 | 57 | 10 | |
| CURRENT (Pre-COVID19) | 1.1776 | 1.1801 | 0.8693 | 1.8220 | 0.3364 | 3.2168 * |
| CURRENT (Post-COVID19) | 1.2952 | 1.2605 | 0.9214 | 2.5015 | 0.7109 | |
| LEVERAGE (Pre-COVID19) | 0.6092 | 0.5480 | 0.4117 | 1.5241 | 0.3509 | 2.3572 |
| LEVERAGE (Post-COVID19) | 0.7410 | 0.6325 | 0.5436 | 1.3997 | 0.2917 | |
| The summary data on the qualitative variables | | | | | | |
| | **Status** | **FRQ (Pre)** | **FRQ (Post)** | **PCT (Pre)** | **PCT (Post)** | **Diff. t-Statistic** |
| BGD | 1 | 278 | 269 | 0.51 | 0.49 | 1.2649 |
| | 0 | 271 | 280 | 0.49 | 0.51 | |
| CEO duality | 1 | 181 | 203 | 0.33 | 0.37 | 2.2308 |
| | 0 | 368 | 346 | 0.67 | 0.63 | |
| M&A | 1 | 368 | 412 | 0.67 | 0.75 | 4.0120 *** |
| | 0 | 181 | 137 | 0.33 | 0.25 | |

(***): 99% Confidence level; (**): 98% Confidence level; (*): 95% Confidence level. Source: Own research.

### *4.2. Correlation Matrix*

In most research, after presenting the descriptive statistics, the correlation matrix table can be reported. Correlation coefficients are used to check the intensity and direction of linear dependence between variables (Afyouni et al. 2019; Moradi et al. 2020; Dashtbayaz et al. 2023). Normally, different correlation coefficients such as that of Pearson, Spearman, and Kendal have been used in recent research, and the use of each one depends on the scale and position of each variable. In this paper, we use the Pearson correlation coefficient in Table 5. Accordingly, if the Pearson correlation coefficient becomes close to zero, it is clear that there is no linear relationship between the two variables. On the other hand, if this coefficient is close to or equal to 1 or -1, the existence of a strong linear relationship between the two variables is confirmed. In general, the common approach used in various studies is that when the intensity of correlation is between 0.8 and 1, the type of correlation is called very strong (Moradi et al. 2020). Finally, note that the diagonal elements of the correlation matrix is 1 since they are the correlation of a column with itself.

**Table 5.** Correlation Matrix.

| | **BSIZ** | **BIND** | **BFE** | **BGD** | **BMF** | **DUA** | **ACS** | **ACI** | **ACE** | **COV** | **INF** | **SIZE** | **AGE** | **M&A** | **CUR** | **LEV** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BSIZ | **1** | | | | | | | | | | | | | | | |
| BIND | −0.085 | **1** | | | | | | | | | | | | | | |
| BFE | −0.046 | 0.081 | **1** | | | | | | | | | | | | | |
| BGD | 0.011 | 0.049 | 0.099 | **1** | | | | | | | | | | | | |
| BMF | 0.036 | 0.108 | 0.123 | −0.001 | **1** | | | | | | | | | | | |
| DUA | 0.096 | −0.178 | 0.008 | −0.050 | −0.221 | **1** | | | | | | | | | | |
| ACS | −0.019 | 0.052 * | 0.663 | 0.055 | 0.041 | −0.034 | **1** | | | | | | | | | |
| ACI | −0.059 | 0.016 | 0.012 | 0.164 | 0.050 | −0.038 | 0.028 | **1** | | | | | | | | |
| ACE | 0.066 | 0.023 | 0.098 | 0.131 | 0.131 | 0.016 | 0.006 | 0.032 | **1** | | | | | | | |
| COV | 0.032 | −0.046 | −0.007 | −0.063 | −0.063 | 0.021 | −0.007 | −0.018 | 0.039 | **1** | | | | | | |
| INF | 0.001 | −0.009 | 0.003 | −0.002 | −0.002 | 0.070 | −0.025 | −0.024 | −0.002 | 0.066 * | **1** | | | | | |
| SIZE | 0.018 | 0.021 | 0.061 | 0.012 | 0.702 | −0.072 | 0.082 | −0.061 | 0.006 | −0.115 | −0.110 | **1** | | | | |
| AGE | −0.034 | 0.067 | 0.084 | 0.026 | 0.056 ** | 0.054 | 0.031 | −0.051 | 0.036 | −0.039 | −0.052 | 0.080 | **1** | | | |
| M&A | 0.036 | 0.048 | 0.021 | 0.016 | 0.916 | −0.075 | 0.029 | 0.159 | 0.025 | 0.020 | 0.010 | 0.068 | 0.360 * | **1** | | |
| CUR | −0.023 | 0.040 | 0.047 | 0.008 | 0.008 | −0.034 | 0.056 | 0.078 * | 0.070 | −0.038 | −0.025 | 0.219 *** | 0.310 | 0.249 | **1** | |
| LEV | 0.030 | −0.052 * | −0.029 | 0.025 | −0.025 | 0.093 | −0.007 | −0.138 | −0.141 | 0.070 | 0.070 * | −0.037 | −0.496 | −0.274 | −0.481 | **1** |

(***): 99% Confidence level; (**): 98% Confidence level; (*): 95% Confidence level.

According to the outputs of Table 3, we can figure out that the more independent the companies' boards of directors are, the less they tend to use financial leverage, and parallel to the increase in inflation, the desire to use financial leverage is seen more. Additionally, during the COVID-19 pandemic, the annual inflation rate has also increased. Another important point is that there is a significant correlation between audit committee independence and firm size with the current ratio. Finally, the evidence confirms older companies believe more strongly in holding board meetings and pay more attention to merger and acquisition activity. We also realize that board independence and audit committee size are correlated positively. This means that more independent boards have larger audit committees.

### *4.3. F-Limer and Hausman Tests*

Based on the science of econometrics, when the data of research are longitudinal, it must first be determined how the research model should be evaluated (Tarighi et al. 2022b). To achieve such a goal, first, we need to perform an F-Limer (Chow) test to determine exactly whether the research model has to be estimated by the least-squares (OLS) technique or the panel data method (Moradi et al. 2021; Zimon et al. 2021; Zimon and Tarighi 2021; Salehi et al. 2022). The null hypothesis (H0) of the F-limer (Chow) test suggests that there is no difference between the estimated coefficients for individual cross-sections and the estimated coefficient for individual mass. Confirmation of the Chow test's null hypothesis states there is no necessity to estimate the model by using the panel data (Salehi et al. 2020b; Moradi et al. 2021; Zimon and Tarighi 2021; Tarighi et al. 2022b). In the second phase, when the panel data method is confirmed, we need to carry out the Hausman test to examine if panel data with fixed effects or panel data with random effects have to be used. In other words, failure to reject the null hypothesis in the Hausman test means that there is no significant correlation between individual effects and the error term of the model. This shows that the values of individual effects are created randomly (exogenous), and the research model should be estimated with random effects (Bell et al. 2019; Moradi et al. 2021; Zimon et al. 2021; Salehi et al. 2022; Dashtbayaz et al. 2023). In short, given the *p*-values for the null hypothesis (H0) of the F-limer test for the first and second models are 0.0124 and 0.0270 in order and less than five percent, the use of the panel data method is approved, and there is a need to conduct the Hausman test. Finally, considering that the probability values of Chi-Sq. statistics for the first and second models are 0.3109 and 0.1804, respectively, both of them should be estimated using the panel data method with random effects.

### *4.4. Heteroskedasticity and Multicollinearity Tests*

One of the most important basic assumptions of a regression model is not having the problem of heteroskedasticity (Tarighi et al. 2022c). There is no room for debate that if there are homoscedastic disturbances once heteroskedasticity is present, this will yield consistent estimation results of coefficients that are not real and effective (De Jager 2008; Salehi et al. 2020b; Zimon and Tarighi 2021; Tarighi et al. 2022b). To examine heteroskedasticity issues, this study uses the white test. The outputs of the white test show that there are no heteroskedasticity concerns in both our models as their probability values are more than five percent. Furthermore, one of the other important assumptions of the regression model is the lack of a collinearity problem; otherwise, the results are not reliable. The variance inflation factor (VIF) index can be used to analyze the intensity of multicollinearity in a regression model (Orazalin 2020; Zimon and Tarighi 2021; Salehi et al. 2022; Nguyen and Huynh 2023). In other words, this VIF index can evaluate how much the variance of an estimated regression coefficient has surged thanks to collinearity (Tarighi et al. 2022c; Dashtbayaz et al. 2023). According to the existing research literature, we cannot consider the linearity problem in a regression model if the VIF of the estimated coefficients is less than 10 (Akinwande et al. 2015; Thompson et al. 2017; Salehi et al. 2020b; Kim 2019; Tarighi et al. 2022b). Therefore, as the VIF index's results in the last column of Table 3 are all less than 10, we can conclude with sufficient certainty that there is no linearity problem in this study. Aside from the VIF index, the correlation matrix already proved that the multicollinearity problem could not have existed.

### *4.5. Serial Correlation Test*

The error sentences should not have a significant correlation with each other, and this is one of the most fundamental assumptions of a regression model (Zimon et al. 2021; Tarighi et al. 2022c). Durbin–Watson and Breusch–Godfrey tests can be used to investigate the serial autocorrelation problems among residuals (Savin and White 1977; Anetoh and Anetoh 2016; Moradi et al. 2020; Salehi et al. 2022). To investigate the low level of serial autocorrelation (Lag 1) in residuals, the Durbin–Watson can be used, although the Breusch–Godfrey test is suitable for recognizing higher levels of serial autocorrelation (Lag 2) (Moradi et al. 2020; Salehi et al. 2022). As a result, considering that the figures obtained by the Durbin–Watson test for both research models are 1.89 and 2.17, respectively, and both of them are in the range between 1.5 and 2.5, the error terms do not have serial autocorrelation (lag 1). Based on the results obtained from the Breusch–Godfrey test, this study concludes that the serial autocorrelation problem (Lag 2) in the residuals of both models does not exist because their *p*-value is more than five percent.

### *4.6. Endogeneity Test*

Many statistical researchers think that the explanatory variables are exogenous because they appear in the outside world; on the contrary, the error terms are endogenous naturally because they originate from the relationships within a research model. Accordingly, one of the most basic assumptions of a regression model states that there should never be a significant correlation between the explanatory variables and the error terms of a research model (Zimon et al. 2021; Tarighi et al. 2022a). When this key assumption is not made and there is endogeneity bias, the estimator of regression is no longer trustworthy, and researchers cannot rely on the results of the research model with sufficient confidence (Zimon et al. 2021). One of the best approaches to solving the problem of endogeneity bias is the use of instrumental variables, an approach that has been strongly validated by econometrics science (Tarighi et al. 2022a). Using Eviews software, different methods, such as the two-stage least squares (2SLS), generalized method of moments (GMM), and limited information maximum likelihood (LIML), can be used to estimate the model with the approach of instrumental variables. When the volume of observations is small, the LIML performs better than other estimators; meanwhile, once the volume of observations like in our study is large, using 2SLS and GMM may bring more suitable results. In the same vein, some scholars such as McKnight and Weir (2009), Ali et al. (2021), and Arayakarnkul et al. (2022) argue that approaches of instrumental variable (IV) are usually used in accounting studies, such as in corporate governance when the regressor variables are endogenous. The most important key point to note is that to estimate the main research model using instrumental variables, three important issues must be checked. First are the variables that we think are endogenous (regressor endogeneity test). The second is whether the considered instrumental variables are correlated with the error terms or not (Instrument Orthogonality Test). The third is whether the instrumental variables have a significant correlation with the endogenous variables or not (Instrument Diagnostics Test). In this paper, the authors shows the results of the regressor endogeneity test in Table 6 to investigate if our independent variables are endogenous or exogenous.

**Table 6.** Regressor Endogeneity Test.

| Difference in J-States | Value | Probability |
|---|---|---|
| BSIZE | 38.1705 | 0.1327 |
| BIND | 54.6834 | 0.0935 |
| BFE | 5.0785 | 0.4761 |
| BGD | 41.8034 | 0.1465 |
| BMF | 11.0903 | 0.7954 |
| CEO duality | 7.9589 | 0.0713 |
| ACSIZE | 28.1108 | 0.6329 |
| ACIND | 8.0607 | 0.8595 |
| ACFE | 16.9538 | 0.1257 |

Source: Own research.

Building on the outputs obtained from Table 6, it can be interpreted that the exogeneity of the variables is supported with a 95% confidence level because the probability value for the regressor endogeneity test is more than five percent. Accordingly, using instrumental variables in the approach of 2SLS or GMM is not justified enough.

### *4.7. The Results of the Research Models*

The results of the first and second research models are presented in Table 7 as follows.

After performing various statistical tests in the previous sections, we realize that our research models are required to be estimated based on the method of panel data with random effects. Furthermore, because the $p$-values calculated for the F-statistic related to both models are less than 0.05, the significance of the whole model can be confirmed at the 5 percent error level. Another point is that R-squared (R2) is a statistical measure that represents the proportion of the variance for a dependent variable that is explained by independent variables in a regression model. What qualifies as a "good" R-squared value depends on the research context. In general, in finance and accounting research, an R-squared value above 0.4 would show a fairly good correlation. R-squared values above 0.4 have been seen in much financial research (Reddy et al. 2010; Palaniappan 2017; Zimon et al. 2021; Moradi et al. 2021; Tarighi et al. 2022c). For instance, in our study, because the R2 value of the first model is 0.63, then approximately two-thirds of the observed variation can be explained by the model's inputs, and this research model has good predictive power. Moreover, we do not find any linearity problem in this paper because the estimated model coefficients of variance inflation factor (VIF) index is less than ten. In line with our expectations, the results of this article indicate that the spread of coronavirus has caused a lot of problems for Iranian firms listed on the TSE, and their financial performance has suffered a sharp decline. It is interesting to note that those Iranian enterprises were interested in the mergers and acquisitions process during the pandemic; they had overcome economic problems and stepped on the path of financial progress. To analyze the financial performance of companies, this research uses both accounting-based and market-based scales. When the performance of the companies listed on the TSE is evaluated based on the ratio of return on assets (ROA), our results show that some corporate governance mechanisms, such as board size, board gender diversity, and audit committee financial expertise, do not have a significant effect on firm value. It is necessary to think correctly about what important reasons could be behind the lack of meaning of such relationships. It may be essential to seriously reassess the corporate governance rules regarding the sufficient number of board members. Assume that if the number of at least five members of the board of directors is high considering the volume and complexity of the commercial activities of Iranian companies, it can seriously damage the organization process and the efficiency of the fundamental economic decisions of the companies. On the other hand, if this number is imagined to be low in practice, then legislators should look for a way to increase it so that companies can use the knowledge and experience of more people to solve their financial problems. In our study, more than 90% of the firms' board of directors consists of five members. From the point of view of Nikbakht et al. (2010), the legal requirements only determine the size of the board of directors in the Iranian market and important issues, such as the nature of the company's activity, the size, and structure of the company, etc., are not paid attention to. Regarding the non-significance of the coefficient of the board gender diversity variable, it can be said that the main reason is the lack of trust in Iranian women's abilities. According to the catalyst census, only 12.4% of managers are women in America, while this number is only 6.4% in England, and the percentage of female executives in both of these modern countries is only 2% (Singh and Vinnicombe 2004). In a third-world country such as Iran, where patriarchal and misogynistic thoughts dominate the whole society, less attention is paid to the importance of women in doing important work. In confirmation of this statement, the findings of Moradi et al. (2012b) show approximately 4% of Iranian companies have had female members on the board of directors. Even the descriptive statistics of this research demonstrate that almost one-tenth of Iranian companies have used women on their boards of directors. In reality, when women are not given enough space and opportunity to carry out important managerial responsibilities, how can we expect them to be able to create economic value for Iranian companies? To promote the presence of more women in important management activities and to prevent misogyny in the Iranian market, Sepasi and Abdoli (2016) firmly believe that Iranian legislators should take the necessary measures for the mandatory presence of women on the board.

First of all, we witness a positive association between board independence and firm value, which is supported by agency theory. This means that the non-executive members of the board of directors seem to have had sufficient motivation to continuously monitor the actions of the company's managers so as to not only maximize shareholders' interests, but to also not allow management to harm their professional reputation. By contrast, we find that the COVID-19 pandemic had a destructive effect on the relationship between them, which is consistent with stewardship theory. It appears that the attitude and capabilities of independent members can be different in a calm environment of the financial market with a tense economic atmosphere. Several possible interpretations can be put forward for this obtained result. First, compared to the executive members, Iranian independent directors are likely to be overly optimistic about the future of the market and do not avoid risky actions because they do not have full knowledge of the capacities and resources of commercial activities. Second, Iranian independent directors have not penetrated financial institutions during the COVID-19 pandemic to inject the required financial resources into their companies. Our result in emerging markets such as Iran cautions that legislators should enact laws that independent directors of the board of directors, in addition to their supervisory duties, should have the ability to communicate closely with financial and credit institutes to be injected as financial resources in emergencies. Third, in conditions of a financial crisis, most companies that have more appropriate financial flexibility are more successful. According to the theory of stewardship, the independent members of the board do not have access to critical and specific information in the market, and they could not escape the COVID-19 crisis with their lack of appropriate financial flexibility. Fourth, the simultaneous membership of independent directors on the board of several companies during the COVID-19 crisis may be another reason for reducing their effectiveness. Finally, some researchers believe that the most effective board of directors is formed when there is a "balance" between its executive and non-executive members because a severe imbalance in favor of each party causes power to shift in the wrong direction (Moradi et al. 2012a, 2012b). For example, our findings show that companies with non-executive directors suffer more financial losses, highlighting the fact that there is a need for access to critical information in the market, as well as more appropriate financial flexibility during the COVID-19 crisis. If there is a balance between executive and independent members of the board, whether in a normal situation or during a crisis, power is not under the control of any of the parties, and it makes it possible to find more logical solutions to solve financial problems. Furthermore, because there is weak legal protection in Iran's market and the board members may be under heavy political pressure, the board's independence for innovative thinking and impartial assessment of the management appears to be distorted during uncertain times.

Similarly, we also find that board financial expertise affects corporate performance positively, although this relationship is reversed dramatically by the COVID-19 global crunch. In fact, Iranian directors might not have had the necessary knowledge and experience to deal with the risk caused by COVID-19 and may not have been able to use useful solutions to establish relative certainty of the effectiveness of the internal control system's implementation. Because managers' incentives to manipulate earnings go up during the economic crisis so that they can hide their poor performance from creditors and investors, an emergent need is felt to amend corporate governance regulations in Iran so that the presence of at least one independent board member who has financial knowledge has to be required. By examining more details, we notice the fact that the majority of board members with financial expertise consist of executive directors and not independent members. Despite such conditions, it cannot be expected that the same quality of the supervisory role of the independent members will be maintained by the executive members of the board who are likely to be under severe managerial pressure during an economic crisis such as COVID-19. Taking a closer look at the findings of this research, we find that a completely similar scenario has happened for the role of two characteristics of the audit committee in firms' success. To put it another way, there is a positive connection between audit committee size and audit committee independence with corporate performance, while this relationship has been severely damaged by the spread of the coronavirus pandemic. This means that financial problems during the coronavirus pandemic have been so severe that even larger and more independent audit committees have not been able to be a deterrent to them. This relationship raises a question about the effectiveness and inclusion criteria of the members of the audit committee during the COVID-19 pandemic. This result can be justified by the fact that during the coronavirus pandemic, managers' incentives to manipulate profits and carry out financial fraud were greater than before. Accordingly, because the number of audit committee members remained unchanged compared to the number pre-COVID-19, they may have not been able to evaluate the correctness of financial statements very well, and this has increased information asymmetry and harmed the companies. From this point of view, the result of this research may be a serious push for the legislators in the Iranian market, who should reconsider the number of the audit committee to be three to five people during a crisis so that it can still maintain its efficiency as before. Furthermore, during the

COVID-19 spread, a lot of side pressures from different groups in the market may have been so high that the independence and impartiality of the audit committee were damaged; hence, they did not put obstacles in the way of management opportunistic behaviors. In this regard, Saghafi and Talebi (2016) believe that the structure of audit committees in Iran is mainly problematic and is under the control of company managers, and the authorities written in the charter of the audit committees are practically unenforceable (Saghafi and Talebi 2016).

**Table 7.** The results of the research models.

| Variable | The First Model (ROA) | | The Second Model (Tobin's Q) | | |
|---|---|---|---|---|---|
| | Coefficient | Std. Error | Coefficient | Std. Error | VIF |
| C | −0.7951 *** | 0.6257 | −0.2832 | 0.1135 | - |
| BSIZE | 0.2813 | 0.9594 | 1.2134 | 0.8927 | 1.7805 |
| BIND | 2.0582 * | 1.9136 | 1.9010 * | 0.8054 | 2.0031 |
| BFE | 0.8694 *** | 0.3729 | 0.9828 | 1.0105 | 1.2673 |
| BGD | 2.0758 | 0.9271 | 1.1035 | 0.9806 | 1.8094 |
| BMF | 3.8063 ** | 1.5034 | 1.3105 *** | 2.0134 | 2.6421 |
| CEO duality | −0.6809 * | 0.5647 | −0.8395 * | 0.6791 | 1.0347 |
| ACSIZE | 1.9105 *** | 0.9316 | 0.7693 ** | 1.1032 | 1.7579 |
| ACIND | 1.1018 * | 0.9082 | 0.9531 | 0.0728 | 2.4605 |
| ACFE | 5.5043 | 2.0695 | 3.9535 | 0.9286 | 1.3304 |
| COVID-19 | −4.3645 ** | 1.7283 | −3.4291 * | 1.6125 | 1.5048 |
| COVID-19 × BSIZE | −1.6604 | 0.0547 | −0.8725 | 0.5601 | 1.1945 |
| COVID-19 × BIND | −0.9549 * | 0.8764 | −1.0302 ** | 1.4035 | 1.1628 |
| COVID-19 × BFE | −3.2735 * | 1.2004 | −2.4052 | 0.9067 | 1.6531 |
| COVID-19 × BGD | 1.3150 | 0.6784 | 0.8057 | 0.3915 | 1.2051 |
| COVID-19 × BMF | 5.1384 ** | 2.3519 | 3.3748 * | 1.9035 | 2.3991 |
| COVID-19 × CEO duality | −2.3024 * | 1.0558 | −1.2547 ** | 0.8534 | 4.3861 |
| COVID-19 × ACSIZE | −1.3905 ** | 0.8346 | −0.7672 *** | 1.010 | 3.5107 |
| COVID-19 × ACIND | −0.9572 * | 0.0897 | −0.3511 | 0.8321 | 1.0246 |
| COVID-19 × ACFE | 3.7705 | 1.4190 | 2.2834 | 1.0038 | 2.9904 |
| COVID-19 × M&A | 5.9891 * | 2.0614 | 9.3510 ** | 1.9603 | 3.0937 |
| M&A | 8.6284 ** | 3.2507 | 6.0386 *** | 2.9524 | 4.0319 |
| Inflation Rate | −2.7305 | 0.0094 | −2.0013 | 0.8395 | 3.7061 |
| Firm Size | 4.1934 ** | 2.6538 | 3.2805 ** | 0.8499 | 1.9057 |
| Firm Age | 1.0624 *** | 0.5351 | 2.5917 ** | 1.3102 | 1.6245 |
| Current Ratio | 1.3208 *** | 0.9505 | 2.6603 ** | 0.0872 | 2.3715 |
| Leverage | −0.8103 *** | 0.3046 | −1.0615 ** | 0.0994 | 1.7264 |
| Industry Indicator | Yes | | Yes | | |
| Year Indicator | Yes | | Yes | | |

(***): 99% Confidence level; (**): 98% Confidence level; (*): 95% Confidence level. **First Model (ROA):** Method: panel data with random effects: R-squared: 0.634; F-statistic: 41.0954; Prob F-statistic: 0.005; White Test: 0.1108; F-limer Test (Prob Period F): 0.0124; Hausman Test (Prob Chi-Sq. Statistic): 0.3109; Durbin–Watson state: 1.89; Breusch–Godfrey Test: 0.1408. **Second Model (Tobin's Q):** Method: panel data with random effects: R-squared: 0.481; F-statistic: 12.1937; Prob F-statistic: 0.017; White Test: 0.2309; F-limer Test (Prob Period F): 0.0270; Hausman Test (Prob Chi-Sq. Statistic): 0.1804; Durbin–Watson state: 2.17; Breusch–Godfrey Test: 0.1699.

Our evidence also indicates that the higher the number of board meetings, the greater the financial success of companies, this positive correlation has even been kept during the COVID-19 outbreak. In other words, by offering timely advice, keeping organizational discipline, and monitoring carefully, board meeting frequency is the only corporate governance mechanism in the Iranian market that has been able to move in the direction of maximizing the shareholders' interests during the COVID-19 global crisis. Because the number of board meetings has been sufficient during the COVID-19 pandemic, they have been able to monitor management step by step and give the best practical advice to solve possible problems at the right time. Although holding meetings of the board of directors, in addition to its costs, may cause managers to deviate from the operational responsibilities of the companies (Johl et al. 2015; Al Farooque et al. 2020), board meetings are a place where board members share information about the company's performance, policies, and economic plans, which can lead to effective returns for companies (Nikbakht et al. 2010; Ntim and Osei 2011). In this context, Nikbakht et al. (2010) suggest that boards of directors in the Iranian market should try to establish a balance between the cost–benefit principle of the meeting's numbers. Our results show that during the coronavirus crisis, boards of directors seemed to be able to create an optimal balance for holding meetings so that they could quickly react appropriately to unexpected market events. One cannot ignore the fact that the appropriate number of board meetings during poor performances of companies makes the recovery from bad performance happen faster (Vafeas 1999). Thanks to the competitive advantages of M&A activities that can be created by easier access to the required financial resources, using skilled and educated labor instead of a loyal workforce, and tax benefits, we figure out that the firms with mergers and acquisitions processes have developed their business operations even during the coronavirus pandemic. Therefore, M&A activities, as well as board meeting frequency are known as two effective tools for Iranian companies to escape the COVID-19 crisis and move towards economic growth. Moreover, we find that there is a significant negative relationship between CEO duality and corporate performance in the Iran market, which is completely contrary to stewardship theory and bears a resemblance to agency theory. It is also found that the coronavirus global crisis has worsened this negative relationship. Perhaps this obtained result can be interpreted in such a way that when the CEO of a company is the chairman of the board of directors at the same time, it will encourage Iranian managers to pursue their personal goals instead of maximizing the shareholders' wealth because sufficient and effective monitoring does not take place (Jebran and Chen 2023. Because the management performance of Iranian companies is measured based on profitability (Salehi et al. 2018b; Zimon et al. 2021; Tarighi et al. 2022b, 2022c), they have a high motivation to pursue their interests and receive maximum rewards through profit manipulation. If stakeholders carefully question the opportunistic behavior of CEOs in times of economic crises, it is unlikely that CEO duality will have destructive effects (Jebran and Chen 2023). In a bankrupt market such as Iran, the CEO's duality makes honest evaluation of the management's performance impossible and makes managers more daring to withhold information about low-profit business transactions from board members and push them into lobbying behaviors to provide personal benefits. With the onset of the coronavirus crisis when the economic problems became more severe, various political pressures on board members increased and therefore their supervisory activities also decreased. As a result, the companies will ultimately be exposed to financial damage.

On the other hand, when this research uses a market-based proxy called Tobin's Q ratio for measuring firm performance, the results of many variables are the same as in the previous model, although in some cases, important differences are seen between them. As a matter of fact, unlike the prior model, we did not find any significant association between board financial expertise (BFE), audit committee independence (ACIND), and Tobin's Q ratio. By looking at the details of the control variables, it can be noted that firm size, as well as firm age, are positively correlated with corporate value. To put it simply, the positive effect of company size on the financial success in the Iran market is probably because larger companies not only have more assets and richer financial resources, but also have better access to vital information resources. In addition, the positive relation between firm age and Iranian firms' value can be justified using the theory of learning by doing. Drawing on this theory, it can be stressed that older companies can improve their production efficiency and quality by taking advantage of their experiences over recent years, which ultimately leads to better financial growth (Zimon et al. 2021; Tarighi et al. 2022a). Eventually, the results indicate a positive link between the current ratio and corporate profitability, although financial leverage and corporate growth are negatively linked to each other. The greater the ability of companies in the Iranian market to pay their short-term debts, the better they are able to compete with others in the market. Similar to previous studies indicating that an increase in financial leverage leads to deteriorating company risk (Taylor et al. 2010;

Chollet and Sandwidi 2018; Almustafa et al. 2023), the results of our research also confirm that risk due to excessive financial leverage weakens firm performance. This problem is partly because, in recent years, the debt interest rate in Iran has been constantly changing, and this has caused companies that have more long-term debts to suffer serious losses. Considering the non-significance of the inflation rate variable, it can be also concluded that the Iranian government has been able to support various industries with its financial policies so that they do not suffer heavy losses.

## 5. Conclusions

According to the research literature, the desire of company managers to hide their poor financial performance and mislead stakeholders has always been one of the main factors of their collapse during financial crisis periods (Kumari and Pattanayak 2017; Marchini et al. 2018; Zimon et al. 2021). After the collapse and financial corruption of world-famous companies, such as Enron and WorldCom, the Sarbanes–Oxley Act (SOX) was passed in 2002 to further protect the rights of stakeholders against opportunistic managers (Li et al. 2020; Zimon et al. 2021). Because the most severe economic sanctions during the last decade against Iran's market have imposed unfortunate financial problems on companies, Iranian managers mainly have had many opportunistic goals in mind and seek to show a better picture of their financial performance by manipulating financial statements (Moradi et al. 2021; Zimon et al. 2021; Tarighi et al. 2022b; Salehi et al. 2022). Accordingly, the most important concern of this research is to investigate which of the corporate governance mechanisms in the Iranian market have been able to be an obstacle to management's opportunistic actions and ultimately maximize shareholders' wealth. To achieve this research goal, we examine the relationship between each of the corporate governance mechanisms and the financial performance of companies listed on the TSE between 2016 and 2021. Another interesting point is that with the wide spread of coronavirus, the world economy has faced a financial crisis and many companies all around the world have been struggling with serious financial problems (Shen et al. 2020; Susilawati et al. 2020; Xu et al. 2021; Atayah et al. 2021; Padhan and Prabheesh 2021; Nguyen 2022). Thus, our second purpose in this paper is to evaluate if the COVID-19 global crisis affects the association between corporate governance attributes and firm profitability.

Similar to the results of previous studies (Shen et al. 2020; Rababah et al. 2020; Devi et al. 2020; Hu and Zhang 2021; Kubiczek and Derej 2021; Nguyen 2022), our outcomes show that the COVID-19 global crunch has exacerbated Iranian corporate performance. Anyway, one cannot deny the bitter fact that the spread of coronavirus has disrupted the three main channels of the world economy, i.e., supply, demand, and financing, and the Iranian market is no exception to this rule. The supply shock has not only disrupted the financing chain but also harmed aggregate demand. In other words, with the desire of households to avoid unnecessary purchases and save costs on the one hand, and with the decrease in the consumption of intermediate goods by companies on the other hand, the concept of demand in the markets has also been damaged. From this point of view, the value chains have been severely affected and with the increase in uncertainty in the economic environment, problems such as capital flight, reduction in foreign direct investment, and the risk of debt default can endanger firms. Despite the destructive economic effects of the COVID-19 crisis, we find that those firms welcoming the mergers and acquisitions (M&A) process, can escape the financial crisis by using unique competitive advantages and have better financial prosperity during the pandemic. Regarding the corporate governance mechanisms of this study, we do not find any robust evidence that board size, board gender diversity, and audit committee financial expertise affect both ROA and Tobin's Q ratio; moreover, the COVID-19 outbreak did not have any significant effect on the relationship between them. In addition, our results display that board independence is positively correlated with firm value, which is in line with the studies of Fuzi et al. (2016), Uribe-Bohorquez et al. (2018), Musallam (2020), Kyere and Ausloos (2021), Hu et al. (2022a), and El-Chaarani et al. (2022). In support of agency theory, this study shows that the more independent the board members of Iranian companies are, they will not only move in the direction of shareholders' interests but also effectively monitor the activities of managers to prevent them from damaging their professional reputations. In line with the research of Reddy et al. (2010), Wang et al. (2012), Rezaei and Abbasi (2015), Alqatamin (2018), Dakhlallh et al. (2020), and Abeygunasekera et al. (2021), this study experiences a positive linkage between audit committee size and corporate success. In favor of resource dependency theory, as the Iranian larger audit committee probably holds a lot of work sessions and hires individuals who have different knowledge and expertise, they are likely to have stronger monitoring and control and can contribute to corporate progress. However, the positive impacts of board independence along with audit committee size on firm performance have been severely reversed during the COVID-19 pandemic. Despite the efficiency of the two mechanisms of board independence and audit committee size, it can be understood that even they could not be a suitable solution to deal with the economic problems caused by the systematic risk of the spread of COVID-19.

Furthermore, there is a significant association between board financial expertise, audit committee independence, and ROA ratio. The existence of the financial knowledge of board members appears to play an effective role in discovering management fraud and improving the quality of profits, which ultimately leads to the financial growth of companies. In keeping with theories of resource dependence and agency, independent directors on audit committees appear to pose an effective oversight role in improving the quality of financial information presentation and attracting investors' trust. Conversely, the coronavirus crunch has negatively moderated the relationship between board financial expertise, audit committee independence, and firm value. Contrary to stewardship theory, our findings indicate that CEO duality deteriorates corporate performance because it has caused individual interests to be prioritized instead of corporate victory. We also find that this negative relationship has become stronger during the COVID-19 pandemic. The most important result obtained from this research is that board meeting frequency (BMF) is the only corporate governance mechanism that has been able to play a positive role in financial performance even during the COVID-19 crisis. In this regard, our outcomes are consistent with the studies of Adams and Ferreira (2009), Wijethilake et al. (2015), Eluyela et al. (2018), Wang et al. (2019), Abdeljawad and Masri (2020), and Kanakriyah (2021), while it is in contradiction to scholars such as Musleh Alsartawi (2018). It seems that by holding numerous meetings, the boards of Iranian firms have been able to provide timely consultations and sufficient supervision both before and during the coronavirus crisis. With respect to control variables, it can be noted that financial leverage seriously damages company value, matching the POT as well as MTT. However, there is a positive relationship between the variables of firm age, firm size, current ratio, and M&A with corporate growth.

The results of this research have many applications for different groups in the market. First of all, this research gives a serious warning to policymakers and regulators to reconsider corporate governance policies because the effectiveness of these mechanisms in normal conditions may be completely different from financial crisis conditions. In fact, instead of using corporate governance mechanisms before the coronavirus crisis, it is suggested that governments formulate corporate governance policies that can better protect the interests of stakeholders against the COVID-19 crunch. As an example, given Iran's turbulent market, which has not only been threatened with economic sanctions but also faced a new form of global crisis called COVID-19, this article strongly feels the lack of risk-management committees. Having such independent risk-management committees that are not under the burden of political and social pressures from different groups can help firms to deal with ongoing crises easily. Truthfully, the outputs of this paper make capital market officials aware of the fact there should be a need for increasing orientation toward 'stakeholder' interests and a return to resilience and nationalism in corporate governance structures to protect different groups against systematic risk caused by the COVID-19 outbreak to prevent heavy losses. As stated before, most of the recent economic systematic risks around the world have been inherently endogenous because they either originated from the wrong behavior of companies or were rooted in the weaknesses of control systems, many of them through supervisory interventions on corporate governance mechanisms. Additionally, creating rewards and punishments for committed and delinquent companies are solvable (Zattoni and Pugliese 2021). The results of our research show that the systematic risk caused by the coronavirus crisis is completely exogenous because almost all of the corporate governance mechanisms had completely lost their effectiveness during the COVID-19 pandemic. In such a pitiful situation, if Iran's government could extend expansionary financial policies, direct subsidies, and incentive systems at the individual and corporate levels, it might have been expected that the financial situation of companies would improve during the COVID-19 pandemic. This paper also conveys the message to investors to be more careful and sensitive in their investments during the coronavirus pandemic so as not to suffer heavy losses. According to the existing research literature, countries with weak corporate governance systems that do not support minority shareholders are more exposed to heavy losses during financial crises (Johnson et al. 2000; Jabbouri and Jabbouri 2021; Jebran and Chen 2023). To the best of our knowledge, if legislators and policymakers in emerging markets such as Iran make efforts to protect the interests of minority shareholders, it can send a clear signal to potential investors about corporate governance progress and cause their trust in these markets to be placed. Similarly, auditors are advised to apply stricter audit tests to detect fraud during the COVID-19 pandemic because company managers are much more concerned about withholding their actual financial information from investors and creditors.

Finally, we encountered some limitations while conducting this research. For instance, one of the limitations of this research is the non-disclosure of audit committee information by some Iranian companies during the research period, so these companies were inevitably removed from the study sample. Additionally, we used two ratios of ROA and Tobin's Q to measure the financial performance of companies. Accordingly, how to calculate some of our variables in this study may be somewhat different from other studies, so in generalizing or comparing the outcomes, scholars are warned to be more sensitive to these important issues. Because the period of conducting this research in the Iranian market matches the financial crisis caused by economic sanctions and because our study sample may be diverse in terms of size, organizational structure, and type of products, future researchers are advised to be a little more conservative to generalize and expand upon our results. Furthermore, as ensuring financial health and protecting shareholders' rights is one of the main goals of the corporate governance system and companies may face various business risks during an economic crisis, this research recommends comparing the impact of corporate governance on risk management in the periods of pre- and post-COVID-19 pandemic to future scholars. Because corporate governance, as well as various external factors, can affect the way a company makes decisions during the pandemic (Jebran and Chen 2023), we also recommend that other researchers investigate if the presence of different monetary policies, along with effective corporate governance, can mitigate the adverse impacts of the COVID-19 pandemic. Lastly, given that the economic infrastructure and social conditions in emerging markets such as Iran are completely different from those of developed nations, one of the limitations of our research is that it is a bit difficult to have a comprehensive analysis of corporate governance mechanisms' effectiveness during the COVID-19 crisis because the pandemic effects are a little dissimilar in different economies. Therefore, future scholars are recommended to conduct similar research in developed and developing markets at the same time so that they can better comment on the quality of corporate governance mechanisms according to the specific characteristics of each market.

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