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Internal corporate governance mechanisms and earnings manipulation practices in MENA countries

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ABSTRACT

This study has the objective of examining how internal corporate governance mechanisms are related to earnings manipulation, measured by real-based earnings manipulation (REM) and accrual-based earnings manipulation (AEM). The internal corporate governance mechanisms discussed in this study signify two main kinds of board characteristics (board size and board independence) and three main kinds of ownership structure (institutional ownership, foreign ownership and business group affiliation). The study models were examined from eight countries selected from the Middle East and North Africa (MENA) region. A total of 480 non-financial firms listed between 2012 and 2019 were examined. Based on panel data-based generalised methods of moments (GMM) estimation, the findings showed that institutional ownership in MENA nations limits the use of REM and AEM. Additionally, we found that larger boards are more likely to participate in REM practices. Board independence has a positive association with REM and AEM. The results also reveal that business group affiliation has a significant effect on both methods of earnings manipulation. Foreign ownership does not seem to significantly impact either of the two manipulation methods. Finally, these results help regulators and policymakers pursue reforms to enhance national governance quality in the MENA region.

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1. Introduction

Corporate governance refers to the practices, policies and processes that are used to manage and control an organization (Saona et al., 2020). Governance approaches and principles help in assigning responsibilities and rights to a firm's stakeholders (Lemma et al., 2018; Bajra & Čadež, 2019). However, a possible conflict of interest among professional managers and stakeholders is presented by corporate governance (Shleifer & Vishny, 1986). The conflict emerges from the fact that a firm's assets are controlled by managers, whereas shareholders use the earnings to decide whether

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they should invest in the firm's shares (Dechow et al., 2010; Lemma et al., 2018; Sabău et al., 2021). Furthermore, earnings are evaluated and compensation is given on the basis of the managers' performance (Shayan-Nia et al., 2017). Therefore, managers may have the incentive of reporting exaggerated earnings to deceive the investors regarding the firm's earning potential (Almasarwah et al., 2021; Afifa et al., 2022). Exaggerating financial reports with the intention of misleading investors is referred to as earnings manipulation (Zhang et al., 2018).

Earnings manipulation can be classified into two groups: real-based earnings manipulation (REM) and accrual-based earnings manipulation (AEM) (Braam et al., 2015; Enomoto et al., 2015; Lemma et al., 2018). According to Dechow et al. (1995), several accounting operations are used by AEM to improve baseline earnings, and these can be shifted to future periods, thus having no impact on the firm's cash flow. However, in REM, the normal business functions are changed and do have an impact on the firm's cash flow (Roychowdhury, 2006; Zang, 2012). REM may lead to more long-term costs for shareholders in comparison to AEM because of the negative impact on potential cash flows and on the firm's long-term value (Cohen et al., 2008; Kałdoński & Jewartowski, 2020). This means that a firm's value is decreased by manipulating real activities because the actions taken to increase earnings can have a negative impact on future cash flow (Mellado & Saona, 2020).

Empirical studies, such as those by Bajra and Čadež (2018a) and El Dirir et al. (2020) show that corporate governance structure is considered as an effective way of enhancing the degree of control in firms and hence, decreasing earnings manipulation. Therefore, a vital function performed by the corporate governance mechanism is limiting opportunistic earnings manipulation and making sure that managers act in the interests of the shareholders (Tang & Chang, 2015). These studies show the progress of developed countries in the quality of earnings due to the implementation of corporate governance mechanisms.

Earnings manipulation is more widespread in developing countries than in developed countries such as the USA and Europe (Al-Duais et al., 2022). Alzoubi (2016) finds that firms in emerging economies experienced with concentrated ownership, where controlling shareholders can use their control rights to gain personal benefits, thus affect the activities of earnings manipulation (Toumeh et al., 2021). In addition, Al-Haddad and Whittington (2019) stated that the ownership structure of most firms in the Middle East and North Africa (MENA) region has controlling shareholders. Hence, MENA firms serve as ideal markets to perform empirical analysis to link earnings manipulation with corporate governance. Therefore, this study is motivated to fill the gaps by reviewing the role of corporate governance in terms of real and accruals-based activities earnings manipulation, concentrating on board characteristics and ownership structure using eight MENA markets.

There are several ways in which the study contributes to the literature. First, the study incorporates new empirical evidence from MENA countries regarding earnings manipulation and corporate governance, concentrating on non-financial firms. In other studies that have examined MENA countries, the focus is on internal governance structures in financial sectors (Abdelsalam et al., 2016; Lassoued et al., 2017, 2018; Mersni & Othman, 2016). Most of the previous literature has also concentrated

on single-country analysis (e.g., Roychowdhury, 2006; Gunny, 2010; Zang, 2012; Farooqi et al., 2014; Mellado & Saona, 2020). The fact that eight MENA countries (Jordan, Kuwait, Qatar, Saudi Arabia, Oman, the United Arab Emirates (UAE), Tunisia, and Egypt) are examined in this study means that more generalizable findings will be attained. Second, in earlier studies, it was asserted that in developed countries, earnings could only be manipulated by AEM (Bajra & Čadež, 2018a; Palacios-Manzano et al., 2021). This study examines whether AEM and REM can be regulated by corporate governance variables in MENA countries, which are an under-researched emerging market. The study also contributes to the agency theory literature by analysing control methods (like corporate governance) and how they help in restricting opportunistic activities in firms. Third, specific firm characteristics that may affect earnings manipulation are included in our analysis. For instance, the study examines how foreign ownership and family business groups affect controlling and disciplining earnings manipulation practices in the eight MENA countries. The study also offers the biggest firm-year observation sample for these countries.

The structure of the paper is as follows: an overview of literature and hypotheses development are presented in Section 2, the research design, data and methodology are discussed in Section 3. Section 4 explains the baseline findings regarding the impact of internal corporate governance mechanisms on earnings manipulation practices. Section 5 contains a discussion of the findings. The last section serves as a conclusion.

2. Literature review and hypotheses development

Agency problems are faced when ownership is separated from control. As a manager has more insider information than a financial provider, the financial provider incurs agency costs in keeping a check on the manager's behaviour. It is also likely that managers will increase their self-interest at the expense of the interest of other parties (Jensen, 1986; Almasarwah et al., 2021; Safta et al., 2020; Sabău et al., 2021). However, Gompers et al. (2003) argue that corporate governance decreases agency conflicts among managers and financial providers and enhances contract efficiency.

The board of directors is a significant aspect of the internal corporate governance that is responsible for supervising financial report quality and integrity (Bajra & Čadež, 2018b). The board of directors has the legal permission to monitor managerial activities, examine executive manager performance and reward or punish performance, and Jensen and Meckling (1976) argue that the board can effectively monitor the agency and decrease the conflict that emerges from separating management and ownership. Lasfer (2006) states that corporate governance systems (such as board size and board independence) are vital for decreasing agency costs. A firm's ownership structure is also found to have an impact on control mechanisms (Siregar & Utama, 2008).

According to agency theory, earnings manipulation is an example of the principal-agent problem (Waweru & Prot, 2018). Earnings are manipulated by a firm's managers (the agents) so that they gain personal short-term benefits; however, in the long run, these activities may have a negative impact on the principal shareholder value

(Bhojraj et al., 2009; Abu Afifa et al., 2021; Safta & Achim, 2020). It is asserted by Alzoubi (2016) that the future earnings and shareholder value of a firm can be adversely affected by accounting distortions that emerge from AEM. It is also shown by Al-Shattarat et al. (2018) that the operational performance of firms involved in REM decreases.

2.1. Corporate governance and earnings manipulation

This study evaluates the role of internal corporate governance mechanisms by concentrating on the characteristics of the board of directors and the firm's ownership structure in relation to accruals and real-based earnings manipulation. It is evident from the literature review that board characteristics and ownership structure have an impact on earnings manipulation (Chouaibi et al., 2018; Saona et al., 2020; Chen et al., 2015; Batten & Vo, 2015; Al-Duais et al., 2022; Abdou et al., 2021). In our study, we examine the impact of board characteristics by analysing the aspects of board size and board independence, while ownership structure is studied in relation to the factors of institutional ownership, foreign ownership and business group affiliation. These five factors are used to develop the hypotheses for this study, as discussed subsequently.

2.1.1. Board size and earnings manipulation

A board of directors represents a firm's internal corporate governance as it plays a significant part in deciding the firm's direction and strategy (Faleye, 2004). Berger et al. (1997) show that a bigger board is able to decrease debt in a firm's capital structure more effectively than a smaller board because they can offer better monitoring. However, smaller boards are considered better for firm governance because bigger boards may have to face free-riding issues, which is why they would be less active in their monitoring activities (Jensen, 1993; Chatterjee et al., 2003). Hence, board size plays a significant part in firms' decision-making.

The empirical findings of existing studies are quite inconclusive regarding the effect of board size on AEM. Xie et al. (2003) and Obigbemi et al. (2016) find an adverse relationship between AEM and board size, with larger boards more effective in restricting earnings manipulation. In contrast, Ball and Shivakumar (2008) and Al-Haddad and Whittington (2019) find that there is higher AEM with larger boards. With respect to REM, it is determined that an increase in the board size reduces REM (Kang & Kim, 2012; Chouaibi et al., 2018).

Though varying findings were obtained in previous studies regarding how board size influenced earnings manipulation, this study pertains to the board's monitoring role; this, it is argued that there is higher monitoring capability of bigger boards. Therefore, the following hypotheses are formulated:

H1a: Board size positively affects real-based earnings manipulation.

H1b: Board size positively affects accrual-based earnings manipulation.

2.1.2. Board independence and earnings manipulation

It has been found in the literature that independent directors are indicative of the board's independence or composition (Boone et al., 2007; Al-Najjar & Hussainey,

2009; Saona et al., 2020). According to Huang et al. (2013), independent directors are a significant monitoring tool for firms as they are usually experienced in offering professional advice. The authors note that the greater the number of independent directors, the larger the level of control and the better the firm's operational activities. Schellenger et al. (1989) and Adams and Ferreira (2007) assert that independent directors offer higher protection to shareholders' interests in comparison to executive directors. In studies that examine the role of independent directors in REM rather than AEM, there is positive evidence pointing towards enhancing the integrity of management behaviours by independent directors. Osma (2008) finds that independent directors are able to identify and restrict earnings manipulation achieved by making cuts in research and development (R&D) costs. Similarly, it was found by Kapoor and Goel (2019) that REM is likely to decrease if there is an independent board of directors. This illustrates that external directors can bring about better disclosure of financial information by firms, which makes their reports increasingly transparent and thus reduces earnings manipulation. However, Busirin et al. (2015) find that independent directors lead to the alleviation of AEM, where they are responsible for controlling the management so as to secure shareholders' interests.

Since it is expected that there is a possible negative relationship between earnings manipulation and the level of board independence, the hypotheses given below are developed:

H2a: The board's independence negatively affects real-based earnings manipulation.

H2b: The board's independence negatively affects accrual-based earnings manipulation.

2.1.3. Institutional ownership and earnings manipulation

As an ownership structure proxy, specifically on a large scale and in the long run, institutional structure is a significant factor in decreasing agency costs (Jensen & Meckling, 1976, Shleifer & Vishny, 1986). The use of discretionary accruals as a substitute for earnings manipulation has been analysed in certain studies. It is reported by Koh (2003), Velury and Jenkins (2006), González and García-Meca (2013) and Chen et al. (2015) that there is a significant negative relationship between discretionary accruals' manipulation and the percentage of shares of institutional investors, indicating that institutional investors restrict the flexibility of managers' in earnings manipulation by using AEM. However, a positive correlation was found by Agnes Cheng and Reitenga (2009) between earnings manipulation and institutional ownership, showing that institutional investors can use AEM to increase earnings, particularly in the short run.

Focusing on REM, Bushee (1998) finds that in firms that have low institutional ownership, there is a significant decrease in R&D costs, which is possibly motivated by a desire to prevent earnings manipulation. Zang (2012), Kałdoński and Jewartowski (2020) and Piosik and Genge (2020) also determine that firms with large institutional investors were less likely to engage in REM, indicating that institutional investors can effectively monitor the manipulative behaviour of managers. In contrast, Cornett et al. (2008) and Mellado and Saona (2020) find that institutional investors pressure managers to achieve their desired earnings using techniques like sales manipulation. This means that institutional investor ownership brings about an

increase in earnings manipulation using REM as they are incentivized to manipulate earnings for personal benefits.

It is asserted that firm behaviour can be affected positively by greater institutional ownership as managers would not have the incentive to perform earnings manipulation because of the pressure from institutional investors to focus on the long term. Thus, the following hypotheses were put forward:

H3a: Institutional investors negatively affect real-based earnings manipulation.

H3b: Institutional investors negatively affect accrual-based earnings manipulation.

2.1.4. Foreign ownership and earnings manipulation

With the increasing penetration of developing markets into global economies, a substantial monitoring role is played by foreign investors in managing firms (Le et al., 2022). A critical part is performed by foreign investors in corporate governance because they are able to monitor a firm more effectively in comparison to a local investor (Young et al., 2008). Earlier studies suggest that foreign investors play a vital role in maintaining governance efficiency, leading to a decrease in earnings manipulation (Koh, 2007; Batten & Vo, 2015). Other studies find there is a significant and positive correlation between foreign ownership and earnings manipulation (Aharony et al., 2000). However, no significant correlation is determined by Ali et al. (2008) between foreign investors' ownership and earnings manipulation using AEM. Guo et al. (2015) observe that foreign investors function independently in restricting REM, while Al-Amri et al. (2017) find that there is lower prevalence of REM in public firms compared to private firms because of the potential advantage of capital market globalisation and investment.

In this study, we hypothesize that foreign investors in MENA firms can monitor the firms in which they have invested and also supervise the quality of their financial reporting. The hypotheses given below are formulated in this regard:

H4a: Foreign investors negatively affect real-based earnings manipulation.

H4b: Foreign investors negatively affect accrual-based earnings manipulation.

2.1.5. Business group affiliation and earnings manipulation

According to the agency perspective, larger block holders have significant ownership and hence they have welfare benefits and by employing power-enhancing measures (e.g., a pyramid structure), they can continue to have control of firms with a small percentage of equity ownership (Bebchuk et al., 2000). This shows that established owners have the power and the incentive to give priority to their personal interests rather than those of minority shareholders. According to Kim and Yi (2006), business groups work through several firms and provide earnings flexibility to group-affiliated firms. Large business groups with complex structures can increase the likelihood of controlling shareholders for the expropriation of wealth, as it is possible to easily disguise internal market transactions (Huei, 2014). This can lead to lower quality of earnings (Bae & Jeong, 2007). Bae and Jeong (2007) find that there was poor earnings quality in Korean firms with controlling shareholders, while Alhebri and Al-Duais

(2020) determine that Saudi Arabian family businesses are involved in AEM as well as REM, and hence, there is a positive relationship between family businesses and both kinds of earnings manipulation.

To sum up, considering that conflicting perspectives are presented by the agency theory on the correlation between earnings manipulation and pyramid ownership, the hypotheses given below have been formulated:

H5a: There is a significant relationship between business group affiliation and real-based earnings manipulation.

H5b: There is a significant relationship between business group affiliation and accrual-based earnings manipulation.

3. Research design

3.1. Data and sample selection

To explore the relationship between internal corporate governance mechanisms and earnings manipulation, measured by both real and accrual earnings manipulation in MENA countries, a sample of 480 non-financial firms was collected between 2012 and 2019; this timeframe was selected as it includes the events that occurred in the aftermath of the Arab Spring. The events of the Arab Spring resulted in considerably less stable capital markets, which resulted in a drop in regional economic growth. However, there may be other explanations for this, such as the political and economic change that began in 2012 in the MENA context, which has resulted in a weak financial environment. Consider, for instance, the exports, foreign direct investment (FDI), consumption, tourism, and national income and growth, all of which have been negatively affected as a result of these factors. Therefore, the investigation of the mechanisms of the internal corporate governance and the earnings manipulation practices is done in this study by employing the outcomes of the conflicts linked with the Arab Spring that have been initiated since early 2010.

The countries included in the study are Jordan, Kuwait, Qatar, Saudi Arabia, Oman, the UAE, Tunisia and Egypt. The choice of countries was made due to stock market developments, as some MENA countries' stock markets might have been affected or frequently interrupted by internal conflicts or war that occurred during the study period (e.g., Yemen, Syria, Libya, Algeria, Morocco, and Iran), which might bias our research outcomes. Furthermore, we excluded the financial firms, as their regulation specifications, capital structures and conventional practices are different from non-financial firms.

Our corporate governance and financial variables are judiciously populated from the Bloomberg database. The sample for our primary measure starts with 623 firms that make up our first selection on the basis of their market capitalisation. We exclude firms with missing values for variables used in the baseline model. Following cross-country studies (e.g., Mersni & Othman, 2016), we also require that there be at least 10 valid firms for a sample country to tackle potential issues arising from outliers. The final sample comprises an unbalanced panel of 480 firms over the period 2012–2019 across eight countries (see [Appendix I](#)). The selected sample offers ample information for the analysis to be performed, providing 3,840 firm-year observations.

Table 1. Company in each country.

Country	Number of companies	Percentage (%)	Observations
Jordan	64	.133	512
Kuwait	75	.156	600
Qatar	22	.046	176
Saudi Arabia	92	.192	736
Oman	61	.127	488
UAE	57	.119	456
Tunisia	22	.046	176
Egypt	87	.181	696
Total	480		3840

Source: authors.

The number of firms in each country are as follows: 64 in Jordan, 75 in Kuwait, 22 in Qatar, 92 in Saudi Arabia, 61 in Oman, 57 in UAE, 22 in Tunisia, and 87 in Egypt. Table 1 shows each country's data.

3.2. Measurement of variables

3.2.1. Real-based earnings manipulation

As with the majority of REM measures, abnormal real activities manipulations are obtained by subtracting the predicted value of each real activity via manipulation of the measurements on the basis of expectations of the model from the actual value of the real activities measure (e.g., cash flow from operations, production costs, discretionary expenses, and aggregate REM activities) (Roychowdhury, 2006; Cohen et al., 2020; Al-Duais et al., 2022). The expectations models and the abnormal real activities manipulation measures are as follows.

First, abnormal cash flow from operations:

$$\frac{CFO_{i,t}}{A_{i,t-1}} = a_1 \left(\frac{1}{A_{i,t-1}} \right) + a_2 \left(\frac{Sales_{i,t}}{A_{i,t-1}} \right) + a_3 \left(\frac{\Delta Sales_{i,t}}{A_{i,t-1}} \right) + \varepsilon_{i,t}$$

where CFO is the cash flow from operations; A is the total assets; Sales is the annual sales; Δ Sales is the change in annual sales; i is the firm and t is the year. Abnormal cash flow levels from operations (REMCFO) are estimated residuals (ε) from equation. High residuals mean the greater the amount of abnormal cash flow from operations as well as the greater reported earnings from increased sales.

Second, abnormal production costs:

$$\begin{aligned} \frac{PROD_{i,t}}{A_{i,t-1}} = & a_1 \left(\frac{1}{A_{i,t-1}} \right) + a_2 \left(\frac{Sales_{i,t}}{A_{i,t-1}} \right) \\ & + a_3 \left(\frac{\Delta Sales_{i,t}}{A_{i,t-1}} \right) + a_4 \left(\frac{\Delta Sales_{i,t-1}}{A_{i,t-1}} \right) + \varepsilon_{i,t} \end{aligned}$$

where PROD is the total of the cost of goods sold and the changes in inventories from year t - 1 to t: Abnormal levels of production costs (REMPROD) are measured as estimated residuals (ε) from equation. The greater the residuals, the greater the

abnormal production costs and the greater the rise in reported earnings by reducing the cost of goods sold (e.g., a stronger indicator of real activities manipulation).

Third, abnormal discretionary expenditures:

$$\frac{DISX_{i,t}}{A_{i,t-1}} = a_1 \left(\frac{1}{A_{i,t-1}} \right) + a_2 \left(\frac{Sales_{i,t-1}}{A_{i,t-1}} \right) + \varepsilon_{i,t}$$

where DISX is the discretionary expenditure defined as the sum of R&D, marketing, and selling, general and administrative expenditure. Abnormal levels of discretionary expenditure (REMDISX) are measured as estimated residuals (ε) from the equation. The larger the residuals, the bigger the discretionary expenditure cut by firms to increase reported earnings.

Fourth, aggregate abnormal real activities:

Since these three measurements display various signs of REM upwards, as based on Zhu et al. (2015), Zang (2012) and Cohen et al. (2008), we multiply REMCFO and REMDISX by -1 and add this to REMPROD to obtain a comprehensive score (REM). A higher REM, REMCFO, REMDISX and REMPROD value is representative of higher level of earnings manipulation upwards. The REM equation is as follows:

$$REMi, t = ((-1)*REMCFOi, t) + ((+1)*REMPRODi, t) + ((-1)*REMDISXi, t)$$

3.2.2. Accrual-based earnings manipulation

This study also used the modified Jones model to measure earnings manipulation (Jones, 1991; Dechow et al., 1995). The modified Jones model has been used in previous research (e.g., Chang & Sun, 2009; Sun & Liu, 2011; Bajra & Čadež, 2018b; Afifa et al., 2021). This model is used to calculate the non-discretionary accruals in order to detect earnings manipulation, and, therefore, Chen (2010) claims that the modified Jones model is best suited to this field. The modified Jones model states that AEM is calculated using the following equation:

$$\frac{TA_{i,t}}{A_{i,t-1}} = a_1 \left(\frac{1}{A_{i,t-1}} \right) + a_2 \left(\frac{\Delta REV_{i,t} - \Delta REC_{i,t}}{A_{i,t-1}} \right) + a_3 \left(\frac{PPE_{i,t}}{A_{i,t-1}} \right) + \varepsilon_{i,t}$$

where TA is the total accruals; Δ REV is the change in the revenues; Δ REC is the change in net account receivables; PPE is gross property, plant and equipment; A is the total assets; i is the firm and t is the year. The non-discretionary accruals are measured as estimated residuals (ε) from the equation.

3.2.3. Internal corporate governance

The internal corporate governance mechanisms set out in this study represent a variety of respects, including two main types of board characteristics (board size (BSIZE) and board independence (BIND)) and three main types of ownership structure (institutional ownership (INSOWN), foreign ownership (FOROWN) and business group affiliation (BGROUP)). Following Khalil and Ozkan (2016) and Abdou et al. (2021),

amongst others, BSIZE is computed as the total number of board directors of the firm i for the year t . BIND is measured by the share of the board's independent directors to the total number of board directors of the firm i for the year t . Additionally, following Affan et al. (2017), INSOWN is equal to the division of the common shares held by the firms by the total outstanding shares for the firm i for the year t . FOROWN is equal to the division of the common shares held by the foreign investors by the total outstanding shares for the firm i for the year t . BGROUP is measured as a dummy variable equal to 1 if the firm i in the year t is part of a business group, otherwise 0.

3.2.4. Control variables

Numerous controls are considered by this study for dividing the effect of internal corporate governance mechanisms on earnings manipulation practices. Firstly, in prior studies (e.g., Dechow & Dichev, 2002; Saleh et al., 2020), the characteristics of larger firms were accounted, which includes activities that are more predictable and diverse, and therefore earnings should be of higher quality and truly reported to the stakeholders of those firms. Nevertheless, an analysis of prior studies (e.g., Dechow & Dichev, 2002; Mao & Renneboog, 2015) reveals that the managers of such firms have considerable ability to manipulate earnings due to the vast number of transactions they conduct. Additionally, by considering the extended research that has been done (e.g., Alhadab et al., 2015; Goh et al., 2013; Liu & Tsai, 2015), the size of the firm, quality of the external auditor, leverage, loss, and return on assets (ROA) are also included in this study. It can be said that these factors, for example the losses, may push managers to manipulate earnings. Consider, for instance, when there are losses in the past, there exists a greater probability that higher earnings manipulation is done in order to achieve the investors' expectations of making a profit. Furthermore, these variables can influence the quality of financial reports. As a result, these variables are included in our analysis.

The firm size (SIZE) is measured by the natural logarithm of total assets. To measure a firm's leverage (LEV), the debt-to-equity ratio is used, since it indicates the financial structure of the firm. A dummy variable is used to measure the quality of the external auditor (Big_4), which uses the value 1 if one of the Big Four audit firms is responsible for auditing the firm and 0 otherwise. Loss (LOSS) is measured using a dummy variable, which has a value of 1 if the firm has experienced losses in the previous two years and 0 otherwise. ROA is the ratio of the firm's income to total assets.

Additionally, countries with high growth in GDP per capita (GDPC) and high levels of governance (GOVQUALITY) are more likely to disclose earnings manipulation-related information. Lastly, the sector of activity variables (INDUSTRY) and year (YEAR) are crucial elements as a result of measurement since specific sectors and years may produce better results. Thus, all these variables are also used in our analysis.

Appendix II summarises the definitions of all variables and presents the detailed calculations for each of the previous mentioned variables.

Table 2. Descriptive statistics.

Variable	Mean	Std.	Min.	Max.
REMCFO	0.0000	0.1392	-0.6682	0.7524
REMPROD	0.0000	0.1531	-1.2058	1.6437
REMDISX	0.0000	0.0956	-0.8514	2.8925
REM	0.0000	0.0745	-0.5310	1.2519
AEM	0.0000	0.0955	-0.4831	0.5781
BSIZE	8.0972	2.7495	3	25
BIND	0.4228	0.3901	0.0000	0.5802
INSOWN	0.3763	0.2149	0.0001	0.8050
FOROWN	0.1951	0.0932	0.0000	0.7244
BGROUP	0.4862	0.4550	0.0000	1.0000
SIZE	12.4412	2.2865	0.6526	21.1650
LEV	0.4125	0.1607	0.0166	0.9846
BIG_4	0.3084	0.3953	0.0000	1.0000
LOSS	0.2521	0.4266	0.0000	1.0000
ROA	0.0240	0.1142	-0.5175	0.4273
GDPC	0.4538	0.5043	3.4205	4.8303
GOVQUALITY	0.2600	0.4186	-0.6625	0.9585

Source: authors.

3.3. Model specification

The estimation equation produces a standard regression model as follows:

$$EM_{i,t} = \beta_0 + \beta_n X_{i,t} + \beta_n Controls_{i,t} + \varepsilon_{i,t}$$

where EM represents either real and accrual-based earnings manipulation proxies (i.e., REMCFO, REMPROD, REMDISX, REM and AEM) for the firm i for the year t ; The parameter β_n is the regression coefficient associated with $X/Controls$; X represents the independent variables (i.e., BSIZE, BIND, INSOWN, FOROWN and BGROUP) for the firm i for the year t ; $Controls$ represent the control variables (i.e., SIZE, LEV, Big_4, LOSS, ROA, GDPC, GOVQUALITY, INDUSTRY and YEAR) for the firm i for the year t .

Consequently, the general final model adopts the following dynamic (autoregressive) form:

$$EM_{i,t} = \gamma_1 EM_{i,t-1} + \beta_n X_{i,t} + \beta_n Controls_{i,t} + \varepsilon_{i,t}$$

where $\gamma_1 EM_{i,t-1}$ denotes the lagged dependent variable (i.e., $REMCFO_{i,t-1}$, $REMPROD_{i,t-1}$, $REMDISX_{i,t-1}$, $REM_{i,t-1}$ and $AEM_{i,t-1}$).

4. Data analysis and regression results

The following sections describe the results of the descriptive statistics, correlation analysis, and regression models.

4.1. Descriptive statistics

Table 2 displays the findings of the descriptive statistics for the study's variables. The mean values of earnings manipulation proxies were 0.0000, which means that, in general, our sample's MENA firms did not manipulate their results. To some extent,

these results match the empirical studies' results, such as Almasarwah et al. (2021), Al-Duais et al. (2022) and Hassan et al. (2020). However, the Std, Min, and Max values of earnings manipulation proxies show that some of the MENA firms manipulated their results by increasing profits as a fiscal strategy to indicate higher firm profitability, or by reducing them with the intention of paying fewer taxes and contributions. The number of board directors (BSIZE) is about eight on average, and the average proportion of independent directors is about 42%. These results are consistent with the previous literature (e.g., Baatour et al., 2017; Chouaibi et al., 2018). Therefore, our findings indicate that our sample's MENA firms have adopted good governance practices through the hiring of independent directors.

The average percentage of institutional ownership is about 38% of total outstanding common shares. Institutional ownership percentages range between 0.01% (minimum) and 80.50% (maximum) with a standard deviation of 21.49%. The mean value of FOROWN indicates that 19.51% of foreign ownership exists in MENA firms. These results match with the work of Alzoubi (2016). The mean value of BGROUP shows that on average 48.62% of MENA firms use a business group affiliation to intensify their control in firms. With regard to the control and country variables, the mean values of SIZE, LEV, BIG_4, LOSS, ROA, GDPC and GOVQUALITY are 12.4412, 41.25%, 30.84%, 25.21%, 2.40%, 45.38% and 26% respectively.

4.2. Correlation analysis

In order to verify the validity of the regression models (multicollinearity), a Pearson correlation test was performed to assess the intensity of the correlation (beta) between the study variables. Bryman and Cramer (2002) suggest that the intensity of the correlation (beta) between the independent variables should be less than 0.80 to confirm that there are no issues with multicollinearity in the panel data model. Table 3 shows the results of the Pearson correlation between the study variables. The highest significant correlation value was 0.624 between REMPROD and AEM, and the lowest significant correlation value was 0.005 between FOROWN and LEV. However, the results indicate that all intensity of the correlations (beta) between the study variables are less than 0.80, which means that there are no issues with multicollinearity in the panel data model.

4.3. Results of regression models

Based on the study's aims, an investigation was performed into the effect of internal corporate governance mechanisms on earnings manipulation in the MENA context, whereby each REM and AEM proxy serves as the dependent variable. We employed standard estimation methods for analysing panel data, using random effect (RE) and fixed effect (FE) regression models. We used the Hausman specification test to compare the RE and FE models. The statistics were found to consistently and efficiently reject the RE model's null hypothesis. We therefore conclude that the FE model results are more suitable.

Table 3. Pearson correlation matrix.

Variable	REMCFO	REMPROD	REMDISX	REM	AEM	BSIZE	BIND	INSOWN	FOROWN	BGROUP	SIZE	LEV	BIG_4	LOSS	ROA	GDPG	GOVQUALITY
REMCFO	1																
REMPROD	-0.036	1															
REMDISX	-0.049	0.091 ^c	1														
REM	0.038 ^b	0.581 ^b	0.465 ^a	1													
AEM	0.040 ^b	0.624 ^a	0.482 ^c	0.210 ^a	1												
BSIZE	0.026 ^c	0.088 ^a	0.411 ^a	0.062 ^a	-0.027 ^a	1											
BIND	-0.121 ^a	0.200	0.223 ^b	-0.070 ^b	0.155 ^a	-0.089 ^b	1										
INSOWN	0.087 ^a	0.019 ^a	-0.051 ^b	0.004 ^a	0.087 ^b	-0.024 ^c	0.087 ^c	1									
FOROWN	0.310	-0.087 ^c	-0.010	0.011 ^b	0.026 ^a	0.030 ^a	-0.012 ^c	-0.025 ^b	1								
BGROUP	0.209	0.021 ^c	0.037 ^a	-0.056	0.066 ^b	0.109 ^a	0.077 ^b	0.010 ^a	0.094 ^b	1							
SIZE	0.352 ^a	-0.146 ^b	0.160 ^a	-0.123 ^a	-0.095	-0.014 ^b	-0.114 ^b	0.119 ^c	0.214 ^a	0.175 ^b	1						
LEV	0.043 ^a	-0.060	-0.024 ^b	-0.040	-0.030 ^b	-0.027 ^b	-0.062 ^b	-0.063	0.005 ^c	0.022	0.103 ^c	1					
BIG_4	0.112 ^b	0.191	-0.101 ^b	0.098 ^b	-0.049	0.125 ^a	0.029 ^c	0.040	0.046 ^c	0.058 ^b	0.331 ^c	0.272 ^a	1				
LOSS	0.215 ^c	-0.085 ^b	0.030 ^b	-0.076 ^c	0.018	0.037 ^b	0.033 ^c	0.028 ^b	-0.037 ^c	-0.014 ^a	0.007	0.024 ^a	-0.044 ^c	1			
ROA	-0.345 ^a	0.114 ^a	0.085 ^b	0.039 ^a	0.331 ^a	0.086 ^b	0.091 ^c	-0.064 ^c	0.119 ^c	0.099 ^b	-0.205	-0.149 ^b	0.291 ^c	-0.044 ^b	1		
GDPG	0.116 ^a	0.055 ^a	0.103 ^a	0.105 ^a	0.068 ^a	-0.014	-0.144	0.104 ^a	0.013 ^a	-0.061 ^a	0.006	0.012	0.031 ^a	-0.101 ^a	0.112 ^a	1	
GOVQUALITY	-0.055 ^a	-0.031 ^a	-0.224 ^a	-0.247 ^a	-0.216 ^a	0.015	0.026	0.157 ^a	0.221 ^a	0.076 ^a	0.011 ^a	0.040	-0.236	0.100 ^b	0.211 ^a	0.106 ^a	1

Note: a, b and c present 1%, 5% and 10% significance levels respectively.

Source: authors.

Table 4. Regression results of internal corporate governance mechanisms on earnings manipulation using fixed effect.

Variable	Model 1: REMCFO		Model 2: REMPROD		Model 3: REMDISX		Model 4: REM		Model 5: AEM	
	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value
BSIZE	0.0211 ^a	0.0001	0.0462 ^a	0.0000	0.0123 ^a	0.0028	0.0204 ^a	0.0018	-0.0105 ^b	0.0198
BIND	0.0387 ^b	0.0181	-0.0247	0.1522	0.0377	0.1151	0.0285 ^a	0.0013	0.0219 ^b	0.0262
INSOWN	-0.0106 ^a	0.0000	-0.0052 ^a	0.0041	-0.0252 ^a	0.0063	-0.0012 ^a	0.0001	-0.0202 ^a	0.0054
FOROWN	-0.0117 ^b	0.0149	0.0063 ^c	0.0772	-0.0329	0.2911	0.0583	0.2331	-0.0684	0.2751
BGROUP	0.0593 ^c	0.0643	0.0790 ^a	0.0016	-0.0580 ^a	0.0052	0.0284 ^a	0.0026	0.0736 ^a	0.0019
SIZE	0.0508 ^a	0.0001	0.0227 ^b	0.0252	0.0263 ^a	0.0017	0.0352 ^b	0.0137	-0.0660 ^b	0.0274
LEV	0.0413 ^a	0.0000	0.0437 ^a	0.0000	0.0426	0.3524	0.0403 ^a	0.0000	0.0595 ^a	0.0001
BIG_4	0.0578	0.1749	0.0754	0.2529	0.0535	0.1207	0.0437	0.1084	0.0574	0.1590
LOSS	0.0283 ^a	0.0041	0.0642 ^a	0.0012	0.0713	0.2221	0.0372 ^a	0.0022	0.0714 ^a	0.0024
ROA	0.0477 ^a	0.0000	0.0559 ^a	0.0027	0.0354 ^c	0.0620	0.0597 ^a	0.0000	0.0420 ^b	0.0401
GDPG	0.0124 ^b	0.0268	0.0115 ^b	0.0331	0.0475	0.2012	0.0309 ^b	0.0284	0.0555 ^a	0.0013
GOVQUALITY	0.0847 ^b	0.0573	0.0760 ^c	0.0669	0.0808	0.1377	0.0976 ^c	0.0222	0.0646	0.1298
INDUSTRY	YES		YES		YES		YES		YES	
YEAR	YES		YES		YES		YES		YES	
Constant	0.0674 ^a	0.0032	0.0904 ^c	0.0745	0.0486 ^a	0.0061	0.0113 ^a	0.0024	0.0423 ^b	0.0450
No. Obs	3840		3840		3840		3840		3840	
Adj. R ²	19.37%		11.25%		16.87%		15.74%		20.51%	
F statistics	37.84 ^a		7.58 ^a		22.38 ^a		25.88 ^a		38.62 ^a	

Note: a, b and c present 1%, 5% and 10% significance levels respectively.

Source: authors.

Table 4 shows the results and indicates that the majority of the coefficients are statistically significant at the 10% level or better. The variation in earnings manipulation for firms in MENA is explained by the chosen study variables. Analytical models well fit and most explanatory variables are statistically significant at the 1%, 5%, and 10% levels.

The FE model that is chosen is unfortunately not perfect because it is unable to pass the diagnostic tests. In particular, the error-variance that is collected by this model is not equal (i.e., heteroscedasticity) and there is a correlation between the residuals. In agreement with Dietrich and Wanzenried (2011) and Luo et al. (2017), a self-motivated model is used by the researchers to make sure that the conducted test was strong and to study the endogeneity, serial correlation, heteroscedasticity, and the tendency of persistence by the time. Precisely, the generalised methods of moments (GMM) estimator was used by researchers such as Arellano and Bond (1991), where they recommended it for more favourable results and for improved consistency and efficiency.

Nevertheless, previous research has argued firms' earnings manipulation is complex and dynamic in nature (González & García-Meca, 2013; Lemma et al., 2018; Mellado & Saona, 2020). The Hausman tests illustrate that the endogeneity problem is a major issue, implying that static panel estimations are inefficient. Previous studies, such as González and García-Meca (2013) and Mellado and Saona (2020), argue that when estimating earnings manipulation, researchers are challenged by endogeneity and unobservable heterogeneity. In this regard, the authors indicate that the dynamic GMM estimator is the best way to resolve these issues.

The GMM estimator results are presented in Table 5. The results show a positive and significant relationship between board size and two alternative REM proxies, namely REMCFO and REMDISX. Therefore, *H1a* is partially supported, while *H1b* is

Table 5. Regression results of internal corporate governance mechanisms on earnings manipulation using GMM.

Variable	Model 1: REMCFO		Model 2: REMPROD		Model 3: REMDISX		Model 4: REM		Model 5: AEM	
	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value
REMCFO _{t-1}	0.0748 ^a	0.0000								
REMPROD _{t-1}			0.0727	0.3780						
REMDISX _{t-1}					0.0875 ^a	0.0052				
REM _{t-1}							0.0791	0.2510		
AEM _{t-1}									0.3158 ^a	0.0002
BSIZE	0.0381 ^a	0.0019	-0.0671	0.2448	0.0354 ^a	0.0055	0.0353	0.1628	-0.0296	0.1362
BIND	0.0421	0.2645	0.0327	0.1160	0.0415	0.2873	0.0325 ^a	0.0062	0.0451 ^b	0.0218
INSOWN	-0.0213 ^a	0.0000	-0.0585	0.2014	-0.0574 ^b	0.0112	-0.0194 ^a	0.0026	-0.0489 ^b	0.0112
FOROWN	-0.0590	0.1782	0.0344	0.3714	0.0613	0.3267	0.0683	0.3137	-0.0663	0.3284
BGROU	0.1078	0.2643	0.0258 ^a	0.0021	-0.0741 ^a	0.0012	0.1090 ^a	0.0016	0.0925 ^b	0.0357
SIZE	0.0728 ^a	0.0028	0.0512	0.2619	0.0290 ^b	0.0342	0.0518	0.1689	-0.1245	0.3726
LEV	0.0719 ^a	0.0022	0.0701 ^a	0.0000	0.0532	0.3654	0.0670 ^b	0.0321	0.0733	0.2965
BIG_4	0.0841	0.3731	0.0811	0.3417	0.0614	0.2147	0.0312	0.2541	0.0495	0.3413
LOSS	0.0418 ^a	0.0040	0.0531 ^b	0.0222	0.0529	0.2703	0.0257 ^a	0.0023	0.0945 ^b	0.0192
ROA	0.0219 ^a	0.0000	0.0314 ^a	0.0037	0.0225	0.1590	0.0478 ^b	0.0110	0.0377	0.2102
GDP	0.0343 ^b	0.0175	0.0282 ^c	0.0465	0.0318	0.2047	0.0293 ^b	0.0197	0.0283 ^b	0.0441
GOVQUALITY	0.0442 ^c	0.0335	0.0503	0.2484	0.0466	0.1104	0.0207	0.1922	0.0812	0.1029
INDUSTRY	YES		YES		YES		YES		YES	
YEAR	YES		YES		YES		YES		YES	
No. Obs	3791		3791		3791		3791		3791	
AR1	-18.11 ^a		-8.61 ^a		-10.87 ^a		-16.72 ^a		-20.35 ^a	
Sargan test	32.4		47.78		53.6		44.13		56.92	

Note: a, b and c present 1%, 5% and 10% significance levels respectively.

Source: authors.

not. At the same time, the coefficient of BIND is positive and has significance at the 1% and 5% levels, where REM aggregate and AEM are the dependent variables. Finally, *H2a* and *H2b* are partially and fully supported respectively by a positive effect.

We have found a statistically significant and negative relationship between institutional ownership (INSOWN) and four alternative proxies of earnings manipulation, namely REMCFO, REMDISX, REM aggregate and AEM. Therefore, *H3a* is partially supported and *H3b* is fully supported. The results show a reduction in agency costs and that active manipulation of earnings is prevented by interests being aligned between majority shareholders and managers. In regard to foreign ownership, our findings indicate that the coefficient of FOROWN is insignificant in every model. This may be due to the geographic distance causing difficulties for foreign investors in overseeing the accounting departments of firms and the curbing of earnings manipulation practices (Dvorak, 2005). As a result, *H4a* and *H4b* are not supported.

The coefficient related to BGROU is positive and significant at the 1% level for two REM proxies, namely REMPROD and REM aggregate. The results also show that there is a negative and significant link between BGROU and REMDISX. However, the results with AEM and BGROU was positive and significant at the 5% level. Therefore, *H5a* and *H5b* are partially and fully supported, respectively.

Regarding firm-specific factors, we discovered a positive relationship between firm size and two proxies of REM, namely REMCFO and REMDISX. The leverage position also plays a significant role in assessing how much the financial reports are manipulated. When firms have raised levels of debt (LEV), REM is more actively exercised in

Table 6. Real-based earnings manipulation and accrual-based earnings manipulation.

Variable	Dependent variable: REM aggregate	
	Coeff.	p-values
AEM	0.3824 ^a	0.0000
BSIZE	0.0370	0.1260
BIND	0.0290 ^a	0.0052
INSOWN	-0.0132 ^a	0.0011
FOROWN	0.0541	0.1263
BGROUP	0.0317 ^a	0.0028
SIZE	0.0452 ^b	0.0146
LEV	0.0447 ^b	0.0362
BIG_4	0.0381	0.2457
LOSS	0.0233 ^a	0.0036
ROA	0.0517 ^b	0.0208
GDPC	0.0259 ^b	0.0333
GOVQUALITY	0.0528	0.1972
INDUSTRY	YES	YES
YEAR	YES	YES
Constant	0.0157 ^a	0.0014
No. Obs	3840	
Adj. R ²	16.65%	
F statistics	27.24 ^a	

Note: a, b and c present 1%, 5% and 10% significance levels respectively.

Source: authors.

terms of operating cash flows (REMCFO) and production costs (REMPROD). Additionally, our results show that the Big Four audit firms are insignificant in every model, which indicates that these firms have no significant role in mitigating REM or AEM practices in MENA firms. The results also show that the loss has a positive relationship with three proxies of REM, namely REMCFO, REMPROD and REM aggregate, as well as AEM. Finally, ROA significantly and positively impacts three proxies of REM, namely REMCFO, REMPROD and REM aggregate.

4.4. Additional results

We tested the relationship between REM aggregate and AEM based on Cohen et al. (2008) and Doukakis (2014). The REM aggregate measure is the dependent variable and the discretionary accruals (AEM) proxy is the independent variable. Table 6 shows that there is a positive and significant coefficient of AEM. This result indicates that MENA firms treat REM and AEM as jointly complementary instead of as substitute earnings manipulation tools. Therefore, MENA firms adopt an overall earnings manipulation method and utilise both real-based and accrual-based earnings manipulation to get the required effects on earnings strategies using a coordinated methodology.

5. Discussion

Our GMM estimator results document that larger boards are more likely to raise operating cash flow and raise discretionary expenditure to boost the firm's reputation on the market. A possible reason for these findings is that the boards of MENA firms are heavily dominated by families who are active in the management of the firm as

senior managers or board members, and who are appointed on the basis of friendship or affiliation rather than expertise and education. This weakens the board's monitoring and coordination, thereby increasing managerial discretion over the firm's earnings. These findings are consistent with previous research (such as Kang & Kim, 2012; Chouaibi et al., 2018) that shows that a larger board is positively related to REM.

The results also show that BIND is engaged with real and accrual-based manipulations. A possible reason for this is that large shareholders have the right to appoint their friends and relatives as outside directors, which may explain why independent directors of MENA firms might not be adequately independent to properly perform their supervisory function. These results are consistent with those of Mohammad et al. (2016), Waweru and Prot (2018) and Al-Haddad and Whittington (2019), who discovered a positive association between earnings manipulation using both REM and AEM and board independence. Additionally, Al-Haddad and Whittington (2019) state that directors must not only be independent on the basis of regulatory instructions and market requirements but must also be independent on the basis of thinking and action-qualitative independence. Sun and Liu (2016) affirm that independent boards are more likely to participate in REM.

Moreover, the results show that institutional investors in MENA firms can further evaluate the long-term effects of existing management decisions and deter managers from engaging in the activities of earnings manipulation, since institutional investors can have more control over the firm's activities. This is consistent with the results of REM studies by Mellado and Saona (2020) and Shayan-Nia et al. (2017), as well as with the results of AEM studies by Lemma et al. (2018) and Chen et al. (2015). In terms of foreign ownership, our results show that the FOROWN coefficient is negligible in all models. This might be due to geographical distance posing problems for foreign investors in inspecting firms' accounting divisions and limiting earnings manipulation practices (Dvorak, 2005).

Continuously, the results indicate that family group firms can intervene in firm management and push managers to engage in earnings manipulation using abnormal production costs to maximise their private benefits. At the same time, firms with a business group may result in a conflict of interest between firms and their controlling shareholders, increase agency issues, and lead to more engagement in AEM activities. Alhebri and Al-Duais (2020) argue that family group firms are likely to be involved in both AEM and REM, as in seeking to attain their aims as the largest investors, they do not consider the interests of minority rights. Furthermore, family group firms in MENA can intervene in firm management to reduce discretionary expenses and thus improve their worth. Al-Haddad and Whittington (2019) state that Middle Eastern firms are characterised by a high level of ownership concentration, primarily in the form of family-controlled businesses.

In terms of firm-specific characteristics, the results show that large MENA firms are more likely to participate in REM utilizing operating cash flows and discretionary expenses. Following that, highly leveraged firms have a greater likelihood of manipulating operating cash flows and production costs to avoid a debt covenant violation. This contradicts the results of Chamberlain et al. (2014) and Alzoubi (2016), who

indicated that high levels of debt (LEV) contribute to the elimination of abnormal activities, including unnecessary costs, in order to boost a firm's ability to pay off its debts. Next, the Big Four audit firms have no significant impact in reducing REM or AEM practices in MENA firms. A possible reason for this is that real or accrual-based earnings manipulation practices often do not violate instructions, principles and international accounting standards (Alzoubi, 2016; Almasarwah et al., 2021).

Our results document that MENA firms that suffered losses in previous years prefer to engage in managing their earnings by REM or/and AEM (e.g., increase cash flows or decrease production costs) in order to restore or minimise their losses and thus strengthen the competitive image of the firm. This is consistent with the findings of Achleitner et al. (2014), who discovered a positive impact between operating losses and earnings manipulation. In other words, the results demonstrate that firms with operating losses are more likely to engage in real and accruals earnings manipulation than firms without operating losses. At the same time, our results show that improved firm performance in MENA increases the likelihood of engaging in REM through sales manipulation. This contradicts the results of Al-Haddad and Whittington (2019), who find that ROA has a significant positive association with REM.

6. Conclusion

This study attempts to introduce empirical evidence on how internal corporate governance mechanisms are related to earnings manipulation, measured by real-based earnings manipulation (REM) and accrual-based earnings manipulation (AEM). This study tested the study models by investigating 480 MENA non-financial firms listed between 2012 and 2019, using a distinctive panel dataset from Jordan, Kuwait, Qatar, Saudi Arabia, Oman, the UAE, Tunisia and Egypt. Panel data-based GMM estimation is utilised in this study.

The empirical results show that most of the internal corporate governance mechanisms influence firms' decisions concerning manipulating reported earnings. Our results demonstrate the institutional ownership in MENA countries has a negative impact on real and accrual earnings manipulation, confirming that institutional ownership plays a vital role in protecting the interests of shareholders and deterring managers from engaging in the activities of earnings manipulation. Additionally, we found that board size influences the decision to participate in REM practices to boost the firm's reputation on the market. Board independence has a positive association with earnings manipulation (i.e., real and accrual-based earnings manipulation), suggesting that board independence cannot control earnings manipulation practices. In addition, the results reveal that business group affiliation has a significant effect on both methods of earnings manipulation, confirming that managers engaged in earnings manipulation to maximise their private benefits. Foreign ownership does not seem to significantly impact either of the two manipulation methods. Finally, we conducted additional tests on the effect of accrual-based earnings manipulation on real-based earnings manipulation, and the result indicates that MENA firms treat real-based and accrual-based earnings manipulation as jointly complementary instead

of as substitute earnings manipulation tools. Therefore, MENA firms adopt an overall earnings manipulation method and utilise both real-based and accrual-based earnings manipulation to get the required effects on earnings strategies using a coordinated methodology.

There are a number of implications arising as a result of the findings of this study. Firstly, the role of the board of directors in monitoring the firm should be strengthened by policymakers. This can be done by encouraging MENA firms to employ active independent directors who can offer improved monitoring services. Additionally, it was determined through the study that family members in business groups engaged in earnings manipulation to maximise their private benefits. As a result, it should be required that the role and the position of shareholders be increased by legislating new provisions for the regulation and the protection of their rights. This can be done through the adoption of cumulative voting that offers the shareholders the opportunity to elect those members who represent their interests on the board.

Finally, developing countries require the provision of increased compliance with international governance standards. The findings of our study can be generalised or compared to other countries in the MENA region, as the economic and non-economic social factors (e.g., culture, legal systems and historical developments) among these countries differ only slightly. So, our study will help regulators and policymakers in these countries pursue reforms to enhance national governance quality in the MENA region. This can be achieved by using good governance practices, improvements to shareholder rights, and the activation of regulations and laws governing the performance of firms.

Based on the discussion above, this study revealed some limitations that may stimulate further research. We have placed the focus on some variables of corporate governance mechanisms. However, we also recommend other features be considered in relation to the board of directors such as the number of women on the board (board gender diversity), CEO duality and CEO tenure, which do not feature in this study. For example, it would be beneficial to investigate the leadership structure in relation to gender and whether this factor directly impacts earning management in order to offer additional answers about what influences would exist if there were more women in leadership, how it would influence, or whether it influences. Likewise, this study provides limited conclusions in regard to other alternative owners; for instance, the case of state-owned firms, which may lead to real and accrual activities being manipulated.

Disclosure statement

We hereby confirm that the manuscript has no any actual or potential conflict of interest with any parties.

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Appendix I. Sample selection procedure

Description	Observations
Firm-year observations from 2012-2019 in Bloomberg	4984
Less: missing earnings management variables data	368
Less: missing corporate governance variables data	536
Less: missing control variables data	240
Final sample	3840

Appendix II. Definition of variables

Acronym	Description	Data source
Earnings manipulation measurements		
REMCFO	This variable estimated the abnormal cash flow from operations using the following model: $\frac{CFO_{i,t}}{A_{i,t-1}} = a_1 \left(\frac{1}{A_{i,t-1}} \right) + a_2 \left(\frac{Sales_{i,t}}{A_{i,t-1}} \right) + a_3 \left(\frac{\Delta Sales_{i,t}}{A_{i,t-1}} \right) + \varepsilon_{i,t}$	Bloomberg
REMPROD	This variable estimated the abnormal production costs using the following model: $\frac{PROD_{i,t}}{A_{i,t-1}} = a_1 \left(\frac{1}{A_{i,t-1}} \right) + a_2 \left(\frac{Sales_{i,t}}{A_{i,t-1}} \right) + a_3 \left(\frac{\Delta Sales_{i,t}}{A_{i,t-1}} \right) + a_4 \left(\frac{\Delta Sales_{i,t-1}}{A_{i,t-1}} \right) + \varepsilon_{i,t}$	Bloomberg
REMDISX	This variable estimated the abnormal discretionary expenditures using the following model: $\frac{DISX_{i,t}}{A_{i,t-1}} = a_1 \left(\frac{1}{A_{i,t-1}} \right) + a_2 \left(\frac{Sales_{i,t-1}}{A_{i,t-1}} \right) + \varepsilon_{i,t}$	Bloomberg
REM	This variable estimated the aggregate abnormal real activities using the following model: $REMi,t = ((-1) * REMCFOi,t) + ((+1) * REMPRODi,t) + ((-1) * REMDISXi,t)$	Bloomberg
AEM	This variable estimated the non-discretionary accruals using the modified jones model as follows: $\frac{\Delta A_{i,t}}{A_{i,t-1}} = a_1 \left(\frac{1}{A_{i,t-1}} \right) + a_2 \left(\frac{\Delta REV_{i,t} - \Delta REC_{i,t}}{A_{i,t-1}} \right) + a_3 \left(\frac{PPE_{i,t}}{A_{i,t-1}} \right) + \varepsilon_{i,t}$	Bloomberg
Corporate governance characteristics		
BSIZE	Board size, defined as the number of directors on a corporate board in year t.	Bloomberg
BIND	Board independence, defined as the number of independent directors on a corporate board as a percentage of all directors on a corporate board in year t.	Bloomberg
INSOWN	Equal to the division of the common shares held by the institutions by the total outstanding shares for the company i for the year t	Bloomberg
FOROWN	Equal to the division of the common shares held by the foreign investors by the total outstanding shares for the company i for the year t	Bloomberg
BGROUP	A dummy variable equal to one if the company i in the year t is part of a business group, otherwise zero.	Bloomberg
Control Variables		
SIZE	Firm size, defined as the natural logarithm of total assets in year t.	Bloomberg
LEV	Financial leverage, defined as the ratio of long-term debt to total assets in year t.	Bloomberg
Big_4	A dummy variable equal to 1 if one of the big four audit firms is responsible for auditing the company, 0 otherwise.	Bloomberg
LOSS	A dummy variable which a value 1 if the company has experienced losses in the previous two years, 0 otherwise.	Bloomberg
ROA	Profitability, defined as the return on total assets in year t.	Bloomberg
Country Variables		
GDP	Annual logarithm of GDP per capita (constant 2010 US\$) in year t	World Bank (WDI)
GOVQUALITY	The yearly index of rule of law as a proxy for a country's institutional quality in year t	World Governance Indicators (WGI)