The Effect of Ownership Structure on Real Activities Earnings Management: The Case of the Egyptian Stock Exchange

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الملخص

الغرض: تهدف هذه الدراسة لاستكشاف أثر هيكل الملكية على إدارة الأرباح بالأنشطة الحقيقية (RAEM)، مع الأخذ بعين الاعتبار أربعة أنواع من الملكية: تركز الملكية، والملكية المؤسسية، والملكية الأجنبية، والملكية الإدارية.

المنهجية: تستخدم هذه الدراسة نموذج المعادلة الهيكلية للمربعات الصغرى الجزئية (PLS-SEM) لتحليل عينة تم جمعها يدويًا مكونة من ٣٥٤ ملاحظة للشركات غير المالية المدرجة في البورصة المصرية والتي تمتد من ٢٠١٧ إلى ٢٠١٩.

النتائج: تشير هذه الدراسة إلى أن درجة تركز الملكية تؤثر بشكل كبير على إدارة أرباح بالأنشطة الحقيقية (RAEM) من خلال نموذج التدفقات النقدية التشغيلية غير العادية (Ab_CFO). ومع ذلك، يصبح هذا التأثير أقل وضوحًا عند اختباره في سياق النموذج الإجمالي الأكثر شمولاً. علاوة على ذلك، تسلط الدراسة الضوء على وجود علاقة إيجابية جديرة بالملاحظة بين الملكية الإدارية وإدارة الأرباح بالأنشطة الحقيقية، خاصة من خلال نموذج تكاليف الإنتاج غير العادية (Ab_PROD). وعلى العكس من ذلك، لا تظهر الملكية المؤسسية والملكية الأجنبية تأثيرًا ملحوظًا على إدارة الأرباح بالأنشطة الحقيقية في جميع النماذج التي تم تقييمها. وتسلط هذه الدراسة الضوء على قضايا هيكل الملكية التي تؤثر على مصالح مساهمي الأقلية وتؤكد على ضرورة أخذ هذه القضايا في الاعتبار في النقاش الدائر حول حوكمة الشركات في مصر، خاصة في ضوء القوة المفرطة للمديرين الراسخين الذين قد ينخرطون في إدارة الأرباح بالأنشطة الحقيقية العدوانية لتحقيق مكاسبهم الخاصة.

الكلمات الرئيسية: هيكل الملكية، إدارة الأرباح بالأنشطة الحقيقة، البورصة المصرية.

ABSTRACT

Purpose: This research seeks to explore the effect of ownership structure on real-activities earnings management (RAEM), taking into account four types of ownership: ownership concentration, institutional ownership, foreign ownership, and managerial ownership.

Methodology: This research employs partial least squares structural equation modeling (PLS-SEM) to assess a manually gathered sample of 354 firm-year observations of non-financial companies listed on the Egyptian stock exchange spanning from 2017 to 2019.

Findings: This study indicate that the degree of ownership concentration significantly influences real-activities earnings management (RAEM) through the Abnormal Cash Flows from Operations (Ab_CFO) model. However, this impact becomes less pronounced when examined within the context of the more comprehensive aggregate model. Moreover, the study highlights a noteworthy positive correlation between managerial ownership and RAEM, especially through the Abnormal Production Costs (Ab_PROD) model. In contrast, institutional ownership and foreign ownership do not show a significant impact on RAEM in all models assessed. This study highlights ownership structure issues that affect minority shareholders' interests and emphasizes the need for these issues to be considered in Egypt's ongoing corporate governance debate, especially in light of the excessive power of entrenched managers who may engage in aggressive RAEM for their own gain.

Keywords: ownership structure; real-activities earnings management; Egyptian stock exchange.

1. Introduction

Accounting profit stands out as a pivotal figure within financial statements, given its significance as a primary indicator of a company's financial performance. This profit figure serves as vital information for making investment and credit decisions. In addition, earnings information typically takes precedence in financial reports, playing a fundamental role in evaluating management performance. Moreover, theses earnings information aid owners and other stakeholders in estimating the company's future earning potential (Istianingsiha and Bawono, 2021). Management practices can impact earnings through a phenomenon termed "Earnings Management," which entails companies utilizing diverse strategies to improve or manipulate their earnings figures, aiming to enhance their reputation among stakeholders, secure bonuses, attract investments, or bolster market returns on shares (Olotu et al., 2019).

Earnings management involves the manipulation of profits with the intention of meeting predetermined targets set by management. It creates a shadowy realm where accounting practices are disadvantaged, enabling administrators to selectively manipulate elements to suit their preferences. Consequently, income statements may reflect the desires of management rather than offering an accurate portrayal of the organization's financial position. Therefore, earnings management garners significant attention from researchers and is a subject of extensive discussion within academic circles. (Dang and Tran, 2020). Earnings management refers to managerial actions taken during the preparation of financial reports to manipulate accounting profit either upward or downward to align with the interests of the management (Scott, 2015). corporate managers might manipulate earnings upward in order to cover up underperformance (Rusmin et al., 2014), and they might opt for downward earnings management to mitigate the negative impact of suboptimal projects in future years by smoothing earnings (Chung et al., 2005).

Two different ways to managing earnings are recognized: Accrual-based Earnings Management (AEM) and Real-Activities Earnings Management (RAEM). AEM involves employing various accounting practices during financial reporting to manipulate earnings through the adjustment of accounting policies or methods. This manipulation can mislead stakeholders regarding the true performance of the company (Shaikh et al., 2019).

On the other hand, RAEM involves utilizing operational decisions to control and manage earnings, thereby influencing the outcomes of the accounting system. RAEM represents a deviation from the normal operational activities of the company (Sugiyanto, 2018). RAEM involves adjustments in the time frame and structure of investment, operational, and financing transactions, as outlined by Vorst (2016). This type of management focuses on handling operational activities that directly affect the cash flow of the business. Examples include temporarily boosting sales through generous price discounts or adjusting discretionary costs either downward or upward, as noted by Mughal et al. (2021). Setiawan et al. (2019) discovered that companies switch to RAEM instead of AEM following the implementation of International Financial Reporting Standards (IFRSs). Moreover, they exhibit a preference for manipulating sales and overproduction over the manipulation of discretionary expenses. Therefore, the present study focuses on examining RAEM.

The aftermath of the substantial accounting scandals that shook the United States in the early 2000s, causing substantial harm to stakeholders, underscored the critical importance of detecting and preventing earnings management (Mellado and Sauna, 2020). Egypt has encountered its share of institutional and corporate scandals, including banking collapses in 2000 due to significant bad loans and a scandal involving the mismanagement of public pension funds spanning from 2002 to 2004. Moreover, Transparency International's Corruption Perception Index (CPI) for 2015 ranked Egypt 88th, reflecting persistent challenges with corruption (El-Diftar, 2016).

Scholars often utilize agency theory to elucidate management behavior across various contexts, including earnings management. This theory posits that when the interests of principals (such as stockholders) and agents (such as management) diverge, an effective contract design is crucial. The primary objective of the agency contract is to minimize discrepancies between the conflicting interests of principals and agents. In this context, the agent's benefits are contingent upon the attainment of the principal's objectives (Scott, 2015).

According to Nizam (2022), corporate governance plays a vital role in ensuring that organizational objectives are aligned by considering the interests of all stakeholders, ultimately leading to the improvement of firm performance. Ownership structure has always been considered a crucial component of corporate governance techniques in addressing earnings management using both real and accrual methods as emphasized by Liu and Tsai (2015).

Ownership structure encompasses the diverse categories of owners within a company, each with varying motives, expectations regarding the company's products, and approaches to utilizing its resources (Hoang, 2017). It delineates how representative rights allocate a company's capital among one or more individuals or legal entities (Gultomb, 2022). Crucially, it also influences the behavior and actions of management, shaping the company's policies and strategic direction (Abdul Nabi, 2019), while also serving as a mechanism to oversee the performance and activities of executive management, aiming to reduce agency expenses related to ownership and management separation (Gyampah et al., 2019).

Earnings management is observed to be more prevalent in emerging markets compared to developed markets like the USA and Europe (Zweig, 2019). Egypt, as an emerging country, introduces an intriguing perspective to this study for several reasons. To begin, the Egyptian stock market exhibits distinctive characteristics, including highly concentrated ownership, family- run enterprises, and firms with government affiliations (Omran et al., 2008; Dahawy, 2009). These distinct characteristics of ownership structures in Egypt serve as a compelling rationale for further exploration into the correlation between corporate ownership structures and earnings management in the Egyptian business context. Furthermore, while a considerable body of research on RAEM exists in advanced economies, such as those by Cohen and Zarowin (2010) and Guo et al. (2015), where diverse ownership types prevail, fewer studies have been conducted in developing countries like Egypt, characterized by a high concentration of corporate ownership.

Based on the aforementioned, the objective of this study is to contribute to the existing body of literature on ownership structure and explore the potential impact of ownership concentration, institutional ownership, foreign ownership, and managerial ownership on RAEM, determining whether they serve as managerial opportunism or constraints.

2. Literature Review and Hypotheses Development

Goh et al. (2013) conducted an analysis of the influence of majority shareholder ownership on RAEM within the context of Korea, during the period spanning from 1991 to 2007, where majority shareholders wield significant influence over management decisions. The study sought to ascertain whether the interests of the majority and minority shareholders are in conflict or aligned. Despite the heavy influence of majority shareholders in Korea, the study did not identify a consistent correlation between majority shareholder ownership and RAEM. Nevertheless, it did find a noteworthy trend: upward incentive for RAEM significantly decreased as majority shareholder ownership increased. These findings suggest that greater ownership by majority shareholders tends to have a positive impact on mitigating RAEM, particularly in situations where there is an incentive for upward earnings management.

Liu and Tsai (2015) conducted a study examining the effects of board member characteristics and ownership structure on RAEM within Taiwanese listed firms over the years 2006–2010. Their conclusions indicated that institutional investor ownership significantly mitigates RAEM practices. They presented evidence demonstrating that companies with greater institutional ownership are better equipped to monitor and deter opportunistic RAEM behaviors. Conversely, they observed that higher managerial ownership correlates with increased incidence of RAEM.

Guo et al. (2015) aimed to investigate if foreign investors have a substantial impact over RAEM of a sample of Japanese companies. they found that foreign investors have an autonomous role in restricting RAEM, as indicated by abnormal production costs, abnormal discretionary expenditures, abnormal operational cash flow, or any combination of the aforementioned indicators. Also, the outcomes indicated that seasoned foreign investors, who have comparatively modest company interactions with the regional administration, enhance accounting scrutiny of domestic companies by reducing RAEM manipulation.

Hsu and Wen (2015) delved into the impact of ownership structure and board characteristics on discretionary accruals and RAEM, utilizing data from A-shares in the securities market of the Chinese Shanghai and Shenzhen Stock Exchange between 2002 and 2012. Their findings revealed that as the proportion or concentration of institutional shareholdings increases, managers tend to upward production costs. Conversely, the proportion of insider shareholding demonstrates a negative and significant correlation with abnormal production costs, suggesting that insiders with higher holdings are more inclined to supervise and deter managers from engaging in earnings management practices related to production costs. Regarding the influence of ownership structure on discretionary expenses, they highlighted significantly positive effects of both the percentage and concentration of institutional shareholdings. Higher percentages or greater concentrations of institutional shareholdings enable effective monitoring, thereby prohibiting managers from reducing discretionary expenses. However, the impact of insiders on discretionary expenses displays a significant negative correlation. In essence, the empirical results suggest that institutional owners with high shareholding percentages or concentrations, as well as insiders with high shareholding percentages, possess the ability to monitor managers effectively and discourage RAEM from being manipulated at the expense of the value of the company.

Susanto and Pradipta (2016) attempted to obtain empirical evidence that corporate governance (including managerial and institutional ownership) affects the RAEM using a sample of manufacturing firms listed on the Indonesia Stock Exchange between 2011 and 2014. They discovered that there is no relationship between managerial ownership and RAEM. Furthermore, they found that institutional ownership has a negative impact on RAEM, suggesting that majority shareholders with institutional ownership possess substantial knowledge of the company's operations, which allows them to lessen RAEM.

Swai and Mbogela (2016) investigated the impact of ownership structure on both AEM and RAEM using a sample of non-financial East African listed firms spanning from 2003 to 2013. Their study revealed no evidence to indicate that ownership structure affects AEM. However, they found that institutional ownership and ownership concentration have a considerable negative influence on RAEM suggesting that firms having higher institutional ownership and greater ownership concentration tend to engage in considerably lower levels of earnings management. They also argued that their findings hold relevance for countries with an institutional environment, particularly those characterized by concentrated ownership, similar to that of East Africa.

Shayan-Nia et al. (2017) examined RAEM manipulation among Malaysian firms facing financial distress, using ownership structure variables—managerial ownership, institutional ownership, and foreign ownership—during the period from 2001 to 2011. Their results indicate that the prevalence of RAEM is unrelated to ownership by management or institutional investors. However, it showed that foreign shareholders have the ability to limit upward RAEM associated with discretionary expenditure, although they do not exert a similar constraint on manipulation related to the operating cycle. This finding demonstrates that foreign investors act as an agency mechanism in emerging nations. They promote dissemination of knowledge and sustain rigorous regulations of corporate governance from their home nations.

Piosik and Genge (2019) investigated how a company's ownership structure, including ownership concentration, managerial ownership, and institutional ownership, influences upward RAEM among firms listed on the Warsaw Stock Exchange in Poland. Their findings reveal an intriguing relationship between the extent of total upward RAEM and ownership concentration, exhibited as U-shaped. This suggests that the amount of upward RAEM may be minimized at an ideal degree of ownership concentration, consequently enhancing financial transparency. Moreover, their findings indicated a negative association between total upward RAEM and managerial ownership, affirming the alignment of interest hypothesis regarding RAEM. They also highlighted specific links between individual instruments of RAEM and ownership concentration as well as managerial ownership. Furthermore, they reaffirmed the effective monitoring role of institutional investors, as their presence tends to reduce the magnitude of total upward RAEM, contributing to improved corporate governance.

Al-Haddad and Whittington (2019) conducted a study to explore the influence of the mechanisms of corporate governance on both AEM and RAEM, as well as their Possible Connection, within Jordan's public enterprises between 2010 and 2014. Internal corporate governance mechanisms, including board characteristics and ownership structure, were examined. Their findings indicate that corporate governance indeed impacts companies' choice to falsify declared earnings. Specifically, Results show that RAEM and AEM were constrained by both management and institutional ownership. Conversely, a large shareholder’s existence was associated with an increased likelihood of employing both AEM and RAEM tactics. However, foreign ownership did not exhibit any significant impact. Moreover, their study revealed that RAEM and AEM are employed in a complementary way to achieve the intended effect on earnings. This suggests that firms may strategically combine different earnings management tactics to achieve their financial objectives.

Dong et al. (2020) contributed insights into the governance effect of ownership structure on RAEM by analyzing a sample of Chinese publicly listed companies potentially involved in in earnings management over the period from 2003 to 2014. They also uncovered a simultaneous and sequential relationship between RAEM and AEM in the Chinese context. Their findings suggested that the presence of influential largest shareholders exhibits a positive and statistically significant association with both REM and AEM levels. This implies that Chinese companies with more influential largest shareholders are more inclined towards engaging in RAEM practices, thereby inflating reported earnings. Additionally, they noted a significant negative association between management ownership and the degree of RAEM. This finding provides fresh insights supporting the notion that managerial ownership aligns with mitigating earnings management behaviors from an agency perspective. Conversely, they observed a positive correlation between management ownership and AEM, indicating that managers may have differing sensitivities to the costs associated with RAEM and AEM, leading to varied attitudes towards these practices.

Mellado and Sauna (2020) explored the influence of ownership structure characteristics and institutional settings on RAEM manipulation over the period from 2004 to 2016 using a dataset comprising non-financial companies listed in Argentina, Brazil, Chile, Colombia, Mexico, and Peru, encompassing the Latin American region. Latin America offers an ideal setting to investigate RAEM due to its prevalent highly concentrated firm ownership structures and the region's relatively lax enforcement of the law and protection of investors' rights. Their findings underscore the crucial role of the majority owners in monitoring and mitigating managerial opportunistic behavior (i.e. real activities manipulation) aimed at reducing the informativeness of financial statements. Nonetheless, their examination of insider holdings disclosed a contrasting result, indicating that higher levels of insider ownership corresponded to decreased transparency, with managers exhibiting more active involvement in real earnings management. Moreover, their study found that institutional ownership and the quality of the regulatory framework serve as useful means in curbing RAEM. These conclusions lend support to the notion that the institutional system significantly influences managerial opportunistic behavior concerning the misreporting of financial information.

Debnath et al. (2021) underscored the constructive role of corporate governance in curbing real earnings management practices as they examined the relationship between ownership structure and RAEM in Bangladesh spanning from 2000 to 2017. Their study reveals that both insider ownership and foreign ownership exhibit an inverse correlation with RAEM, whereas institutional ownership shows a positive correlation with RAEM. Specifically, companies tend to reduce discretionary expenses to manipulate earnings when insider ownership is minimal. Conversely, higher levels of institutional ownership prompt firms to engage in RAEM tactics such as offering price discounts, facilitating friendly credit terms, and reducing discretionary expenses. However, in the absence of foreign ownership, firms resort to managing earnings by operating at excessive production levels and reducing discretionary expenses.

Istianingsiha and Bawono (2021) aimed to investigate the impact of ownership structure on RAEM, focusing on institutional ownership, managerial ownership, and foreign ownership, with a sample of listed manufacturing firms on the Indonesia Stock Exchange from 2016 to 2018. Their findings suggest that ownership structure does not have a significant effect on earnings management measured by abnormal cash flow from operations and abnormal production costs. However, ownership structure does exhibit an impact on earnings management, particularly as measured by abnormal discretionary expenses. Specifically, institutional ownership does not demonstrate a significant effect on RAEM, as indicated by both the abnormal cash flow from operations and abnormal production cost models. This lack of significance could be attributed to the difficulty in detecting RAEM based on the company's operating cash flow statement, making it challenging for owners, banks, and financial institutions to identify such manipulations. Nevertheless, the abnormal discretionary expense model reveals a negative effect of institutional ownership on earnings management, suggesting that institutional ownership may help reduce earnings manipulation through abnormal discretionary expenses. In contrast, the managerial ownership variable is not significant in all models, indicating that managerial ownership does not have a discernible impact on earnings management through real activities. Foreign ownership, on the other hand, only demonstrates significance in the abnormal discretionary expense model, while it lacks significant influence in the abnormal cash flow from operations and abnormal production cost models.

Al-Duais et al. (2022) conducted a study in Malaysia, a developing country, to explore how ownership structure influences the practice of RAEM. They highlighted the impact of certain ownership structures on RAEM, aligning with established corporate governance theories and practical perspectives, within firms listed on the Malaysian Stock Exchange from 2013 to 2016. Their findings indicate that ownership structure significantly shapes corporate governance and influences financial reporting quality. Particularly, companies with substantial levels of foreign and institutional ownership demonstrate effectiveness in monitoring management and mitigating RAEM practices. However, managerial ownership did not exhibit any significant effect on RAEM.

After reviewing prior studies, the researcher concludes that there is a lack of consensus among them regarding the effect of ownership structure, encompassing ownership concentration, institutional ownership, foreign ownership, and managerial ownership, on RAEM.

Regarding the correlation between ownership concentration and RAEM, various studies have presented differing perspectives. For instance, Swai and Mbogela (2016) and Mellado and Sauna (2020) argue in favor of the monitoring hypothesis, which suggests that controlling owners, possessing a larger portion of outstanding shares, are more likely to discourage financial manipulation as they are motivated and empowered to oversee management (Shayan-Nia et al., 2017).

Conversely, other studies such as those by Al-Haddad and Whittington (2019) and Dong et al. (2020) advocate the entrenchment hypothesis, positing that large (controlling) shareholders may enhance their wealth by exploiting the interests of minority (non-controlling) shareholders, thus potentially increasing earnings management (Le and Nguyen, 2023). However, Goh et al. (2013) did not identify a consistent relationship between ownership concentration and RAEM. Thus, the first hypothesis in its alternative form is formulated as follows:

H1: There is a statistically significant effect of ownership concentration on RAEM.

In reference to the relationship between institutional ownership and RAEM, prior studies consistently support the efficient monitoring hypothesis, which suggests that institutional investors play a vital role as a governance mechanism (Almazan et al., 2005). According to this view, institutional investors actively monitor managerial opportunistic behavior, thereby reducing RAEM (Liu and Tsai, 2015; Susanto and Pradipta, 2016; Swai and Mbogela, 2016; Piosik and Genge, 2019; Al-Haddad and Whittington, 2019; Mellado and Sauna, 2020; Al-Duais et al., 2022).

Nonetheless, certain studies, like the one by Debnath et al. (2021), provide an opposing view indicating that institutional investors may not actively oversee managerial activities, thereby increasing RAEM. This perspective corresponds to the private benefit hypothesis, which holds that large institutional investors may use confidential information for trading purposes because of their access to it (Grossman and Hart, 1980). They claim that institutional investors usually take a passive investment approach, opting to abstain from underperforming companies rather than allocating resources to monitor and improve their performance. Furthermore, there was no statistically significant correlation found between institutional investors and RAEM in the studies conducted by Shayan Nia et al. (2017) and Istianingsiha and Bawono (2021). Thus, the second hypothesis in its alternative form is formulated as follows:

H2: There is a statistically significant effect of institutional ownership on RAEM.

With regard to the association between foreign ownership and RAEM, several investigations, such as those by Al-Duais et al. (2022), Debnath et al. (2021), Shayan Nia et al. (2017), and Istianingsiha and Bawono (2021), have consistently uncovered evidence supporting the notion of the knowledge spillover effect. These studies assert that increased foreign ownership can function effectively as a form of oversight, thereby reducing RAEM. They argue that the introduction of new knowledge and managerial practices through foreign investment improves the supervision of accounting processes and operational efficiency within the invested companies (Guo et al., 2015).

Meanwhile, Al-Haddad and Whittington (2019) confirmed that foreign investors may not effectively regulate management opportunistic conduct, since they found no significant influence of foreign ownership on RAEM. Thus, the third hypothesis in its alternative form is formulated as follows:

H3: There is a statistically significant effect of foreign ownership on RAEM.

In reference to the relationship between managerial ownership and RAEM, research conducted by Liu and Tsai (2015) and Mellado and Sauna (2020) offers supportive evidence for the entrenchment hypothesis. This hypothesis suggests that managers and other insiders could excessively exercise their decision-making authority when corporate governance mechanisms are lacking (Aygun et al., 2014). Their findings align with the idea that higher levels of managerial ownership within a company are associated with decreased financial transparency and a heightened likelihood of RAEM. However, diverging from this viewpoint, several other studies have presented conflicting evidence, demonstrating a negative correlation between managerial ownership and RAEM (Hsu and Wen, 2015; Piosik and Genge, 2019; Al-Haddad and Whittington, 2019; Dong et al., 2020; Debnath et al., 2021). These studies propose that firms with significant managerial ownership tend to experience lower levels of RAEM. They argue that such firms are less inclined to engage in aggressive reporting practices that could jeopardize the benefits associated with their ownership stake. This perspective supports the alignment of interest hypothesis, which suggests that managerial ownership aligns the interests of managers with those of the owners (Bennedsen and Nielsen, 2010).

Moreover, another stream of studies has indicated that managerial ownership does not exert a significant influence on RAEM. This conclusion is supported by studies conducted by Al-Duais et al. (2022), Istianingsiha and Bawono (2021), Shayan Nia et al. (2017), and Susanto and Pradipta (2016). Thus, the fourth hypothesis in its alternative form is formulated as follows:

H4: There is a statistically significant effect of managerial ownership on RAEM

3. Research Methodology

In order to determine the effect of ownership structure on real activities earnings management in the Egyptian listed companies from 2017 to 2019, this empirical investigation utilizes various analytical tools including the Statistical Package for the Social Sciences (SPSS V26) for descriptive and inferential statistical analysis, SmartPLS 3.2.7 for Partial Least Squares Structural Equation Modeling (PLS-SEM), and the R programming language for implementing Machine Learning Algorithms.

3.1. Population and Sample

The study population consists of all Egyptian Stock Exchange (EGX) listed companies. Depending on a purposive sampling technique, there exists 354 firm-year observations in the final sample, which comprises 118 non-financial companies. The purposive sampling criteria encompass several key factors: continuous listing on the EGX, availability of data, classification as a non-financial company, and inclusion of industries with a minimum of seven companies. The sample selection procedures are outlined in Table 1, while Table 2 provides the industry classification.

Table 1 Sample selection procedures

Sample selection procedures		No. of firms
Total number of firms listed on EGX for the study period		218
Excluded firms		
Banking and financial firms	47	
sectors with less than seven firms (e.g. Hotels, Technology, Trading and Services, and Mining)	17	
firms that do not have information for three years	4	
firms with missing data	32	
Total excluded firms		(100)
Total firms included in the final sample		118
Total of observations for three years (N) (118 companies * 3 years)		354

Table 2 Classification of sample firms by industry

Sector	No. of firms	Observation	% of the sample
Basic Resources	7	21	5.93
Chemicals	8	24	6.78
Industrial Goods, Services and Automobiles	13	39	11.01
Real Estate	23	69	19.5
Food and Beverages	24	72	20.34
Construction and Building Materials	19	57	16.10
Personal and Household Products	8	24	6.78
Travel and Leisure	8	24	6.78
Healthcare and Pharmaceuticals	8	24	6.78
Total	118	354	100

The distribution of sampled firms across industry categories shows that the highest number of firms in the sample belong to the food and beverage sector (20.34%), followed by real estate (19.50%), and construction and materials (16.10%). In contrast, the category with the fewest firms in the sample is basic resources (5.93%).

3.2. Data collection Sources

The researcher manually gathered and obtained the secondary data from firms listed on the EGX to measure the study variables, including the independent, dependent, mediator, and control variables. These data were obtained from the following sources:

- Annual disclosure report of the composition of board of directors and shareholders
- Annual financial statements and reports
- Corporate Governance report
- Annual disclosure books by EGX
- Audit committee report
- Board of directors' report
- Minutes of ordinary general assembly meeting

These data were procured from various outlets, including EGX website, Egypt Mubasher website, companies' official websites, and Misr Information Services & Trading (MIST) where data are obtained for a fee.

3.3. Variables and Their Measurements

3.3.1. RAEM

In order to identify measures for RAEM, this research relies on previous investigations (Roychowdhury, 2006; Cohen et al., 2008; Cohen and Zarowin, 2010). These measures consist of three models aimed at manipulating RAEM: abnormal operating cash flows, abnormal production costs, and abnormal discretionary expenses. To identify these abnormal levels, the difference between the actual observed levels and the expected normal levels is computed. These abnormal levels represent the residuals obtained from conducting separate cross-sectional regressions by industry and year for each model, as detailed below:

- Abnormal cash flows from operations (Ab_CFO) model:

$$\frac{CFO_{i,t}}{A_{i,t-1}} = \alpha_0 + \alpha_1 \frac{1}{A_{i,t-1}} + \beta_1 \frac{S_{i,t}}{A_{i,t-1}} + \beta_2 \frac{\Delta S_{i,t}}{A_{i,t-1}} + \varepsilon_{i,t} \quad (1)$$

Higher Ab_CFO indicates lower RAEM (Guo et al., 2015).

- Abnormal production costs (Ab_PROD) model:

$$\frac{PROD_{i,t}}{A_{i,t-1}} = \alpha_0 + \alpha_1 \frac{1}{A_{i,t-1}} + \beta_1 \frac{S_{i,t}}{A_{i,t-1}} + \beta_2 \frac{\Delta S_{i,t}}{A_{i,t-1}} + \beta_3 \frac{\Delta S_{i,t-1}}{A_{i,t-1}} + \varepsilon_{i,t} \quad (2)$$

Higher Ab_PROD indicates higher RAEM (Guo et al., 2015).

- Abnormal discretionary expenses (Ab_DIS) model:

$$\frac{DISC\_EXP_{i,t}}{A_{i,t-1}} = \alpha_0 + \alpha_1 \frac{1}{A_{i,t-1}} + \beta \frac{S_{i,t-1}}{A_{i,t-1}} + \varepsilon_{i,t} \quad (3)$$

Higher Ab_ DIS indicates lower RAEM (Guo et al., 2015).

where: $CFO_{i,t}$ cash flow from operations for company i in period t; $S_{i,t}$ net sales for company i in period t; $\Delta S_{i,t}$ change in sales for company i relative to the previous period $(t-1)$; $A_{i,t-1}$ total assets for company i for the previous period (t-1); $PROD_{i,t}$ production costs calculated as total cost of goods sold plus the change in inventory for company i in period t; $\Delta S_{i,t-1}$ change in sales for company i between the preceding period $(t-1)$ and the period prior $(t-2)$.

Chi et al. (2011) argued for the significance of three individual RAEM indicators, while combining them into one variable enhances overall RAEM tracking (Cohen et al., 2008). This study follows prior works like Cohen et al. (2008), Eng et al. (2019), Al-Duais et al. (2022), Goh et al. (2013), and Al-Haddad and Whittington (2019), using Roychowdhury's aggregate model. It sums the residuals of abnormal operating cash flows, discretionary expenses, and production costs as depicted in equation (4). Consequently, a higher aggregate value indicates a higher likelihood of RAEM involvement.

$$\text{RAEM} = (-1)\ \text{Abnormal operating cash flows} + \text{Abnormal Production costs} + (-1)\ \text{Abnormal Discretionary Expenses} \quad (4)$$

3.3.2.Ownership Structure

Ownership concentration is calculated by assessing the share percentage of the largest stockholders holding 5% or more of total outstanding shares.

Institutional ownership is based on the share percentage held by institutions to total outstanding shares.

Foreign ownership is based on the share percentage held by foreign investors (non-Egyptian) relative to total outstanding shares.

Managerial ownership is computed by evaluating the share proportion held by management in relation to total outstanding shares.

3.3.3.Control Variables

In order to improve the empirical model's capacity for explanation, the following characteristics are taken into consideration: return on assets (ROA), determined by the ratio of a firm’s net income to its total assets; firm size (SIZE), assessed by the natural logarithm of a firm’s total assets; company leverage (LEV), computed as the ratio of a firm’s total liabilities to its total assets; and market-to-book ratio (MTB), calculated as the market value of equity divided by the book value of equity. Additionally, year and industry dummies are included as control variables.

4. Data Analysis

Prior to conducting fundamental analysis, it is crucial to establish a checklist for data validation to assess how data characteristics might impact the outcomes. Screening at this stage

is essential because decisions made early on will influence subsequent steps in the analysis process. Therefore, it is imperative to test the data for normality, consistency, and correlation issues before applying Structural Equation Modeling (SEM) to ensure its validity for the analysis. Cleaning the data before analysis is crucial to enhance the reliability of the findings.

4.1. Descriptive Statistics and Normal Distribution Test

Prior to hypothesis testing, it is imperative to confirm the normal distribution of the study variables to ascertain the appropriate tests. In this study, the skewness and kurtosis test is employed, where the study variables are deemed to follow a normal distribution if their skewness and kurtosis values fall within the range of ±2.58, particularly for sample sizes surpassing 200 (Mishra et al., 2019). As illustrated in Table 3, given the total number of observations (N) in the study, which amounts to 354, the study variables demonstrate a normal distribution.

Table 3 Normality diagnostics for all variables

Variables	N	Mean	SD	Skewness		Kurtosis	
				Statistic	Std. Error	Statistic	Std. Error
CFO	354	0.03	0.47	0.14	0.13	-1.29	0.26
DISCEXP	354	-0.10	0.51	0.47	0.13	-1.19	0.26
PROD	354	-0.03	0.45	-0.39	0.13	-1.16	0.26
RAEM	354	$0.0e^{-10}$	1.04	-0.45	0.13	-1.09	0.26
Ownership Concentration	354	7.60	0.67	0.06	0.13	-1.43	0.26
Managerial Ownership	354	0.50	0.31	-0.22	0.13	-1.05	0.26
Foreign Ownership	354	0.02	0.05	1.50	0.13	0.37	0.26
Institutional Ownership	354	0.52	0.31	-0.46	0.13	-1.06	0.26
SIZE	354	20.57	1.33	-0.17	0.13	-1.27	0.26
ROA	354	0.05	0.06	0.25	0.13	-1.22	0.26
LEV	354	0.51	0.20	0.12	0.13	-1.33	0.26
MTB	354	1.25	0.73	0.67	0.13	-0.94	0.26
Year dummies	Included						
industry dummies	Included						

4.2. Correlation

This investigates the relationships between variables, examining both the direction and degree of their associations. A correlation matrix displays correlation coefficients that quantify these relationships among the variables. In this research, the Pearson correlation coefficient was employed to explore associations between study variables. Initially, it was targeted to find the value and the direction of the relationships between independent and dependent variables. The results of the Pearson correlation are presented in Table 4, values between 0 and 0.3 indicate weak correlation, between 0.3 and 0.7 indicate moderate correlation, and values above 0.7 indicate strong correlation.

Table 4 Pearson correlation matrix

variables	**Y**	**X1**	**X2**	**X3**	**X4**	**Z1**	**Z2**	**Z3**	**Z4**
REAM **(Y)**	**1**								
Concentration **(X1)**	**0.009**	**1**							
Managerial **(X2)**	**0.094**	**0.178****	**1**						
Institutional **(X3)**	**0.013**	**0.265****	**0.026**	**1**					
Foreign **(X4)**	**0.028**	**0.258****	**0.489****	**0.147****	**1**				
SIZE **(Z1)**	**0.007**	**0.680****	**0.212****	**0.309****	**0.298****	**1**			
ROA **(Z2)**	**-0.418****	**-0.002**	**0.068**	**-0.206****	**0.005**	**0.195****	**1**		
MTB **(Z3)**	**0.169****	**0.177****	**0.098**	**0.202****	**0.248****	**0.339****	**-0.239****	**1**	
LEV **(Z4)**	**-0.342****	**0.149****	**0.052**	**-0.118***	**0.105***	**0.134***	**0.415****	**0.107***	**1**

*P < 0.05; **P < 0.01; ***P < 0.001

4.3. Collinearity test

When there is a high correlation between two constructs, it is known as collinearity and can cause issues with interpretation. Typically, measures such as tolerance or the variance inflation factor (VIF) are used to evaluate collinearity. The VIF is calculated as the reciprocal of tolerance, denoted as "1/Tolerance". As a rule of thumb, to mitigate collinearity issues, it is advised to maintain VIF values of 5 or below, corresponding to tolerance levels of 0.2 or higher (Hair et al., 2017). According to the findings presented in Table 5, all variables have VIF values below 5, suggesting no collinearity issues. Pearson correlations in table 4 mentioned above confirmed that the dataset is devoid of collinearity. None of the correlations observed reached the recommended threshold of (r= 0.90). This reinforces the conclusion that collinearity issues are not present in the dataset.

Table 5 Correlation coefficient matrix

Variable	VIF	Tolerance
RAEM	1.000	1.000
ICQ	1.000	1.000
Ownership Concentration	1.142	0.875
Managerial Ownership	1.326	0.754
Institutional Ownership	1.384	0.722
Foreign Ownership	1.088	0.919
SIZE	1.000	1.000
ROA	1.000	1.000
MTB	1.000	1.000
LEV	1.000	1.000

5. PLS Model

5.1. Assessment of the Measurement Model

At the outset of our analysis, our primary focus is on establishing the measurement model. This approach adheres to conventional practices in social science research, where the emphasis lies on guaranteeing the reliability and validity of variables. Through a comprehensive evaluation of these factors, we establish the essential foundation required to advance our examination of the structural model within the framework of PLS-SEM.

5.1.1. Internal Consistency Reliability and Convergent Validity

Following the guidelines set forth by Bagozzi and Yi (1988), composite reliability values of 0.7 or greater are typically preferred. In this study, all constructs exhibit a composite reliability score equals 1 which exceeds 0.7, indicating strong levels of internal consistency reliability across all constructs investigated. To determine convergent validity, the Average Variance Extracted (AVE) for each construct is calculated. To demonstrate convergent validity in reflective measurement models, Bagozzi and Yi (1988) advocate a minimum AVE threshold of 0.5. In our analysis, the AVE value exceeds 0.5 for all variables, with a value of one, indicating that all constructs surpass the acceptable threshold for convergent validity as shown in table 6.

Table 6 Internal reliability and convergent validity

Construct	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
RAEM	1	1	1
ICQ	1	1	1
Ownership Concentration	1	1	1
Managerial Ownership	1	1	1
Institutional Ownership	1	1	1
Foreign Ownership	1	1	1
SIZE	1	1	1
ROA	1	1	1
MTB	1	1	1
LEV	1	1	1

5.1.2. Discriminant Validity

The Fornell-Larcker criterion suggested by Fornell and Larcker (1981) serves as a tool for evaluating discriminant validity by comparing the square root of each construct's Average Variance Extracted (AVE) against its correlations with other constructs. According to this criterion, for discriminant validity to be confirmed, the square root of the AVE for each construct should surpass its correlations with other constructs. Based on the findings delineated in Table 7, the Fornell-Larcker criterion affirms discriminant validity across all variables. This signifies that the square root of each construct's AVE exceeds its correlations with other constructs, thus satisfying the requisite criteria for discriminant validity (Hair et al., 2017).

Table 7 Fornell-Larcker criterion

Variables	**X3**	**X4**	**Z3**	**Z4**	**X2**	**X1**	**Y**	**Z2**	**Z1**
Institutional Ownership **(X3)**	**1.00**								
Foreign Ownership **(X4)**	**0.15**	**1.00**							
MTB **(Z3)**	**0.20**	**0.25**	**1.00**						
LEV **(Z4)**	**-0.12**	**0.11**	**0.11**	**1.00**					
Managerial Ownership **(X2)**	**0.03**	**0.49**	**0.10**	**0.05**	**1.00**				
Ownership Concentration **(X1)**	**0.26**	**0.26**	**0.18**	**0.15**	**0.18**	**1.00**			
RAEM **(Y)**	**0.01**	**0.03**	**0.17**	**-0.34**	**0.09**	**0.01**	**1.00**		
ROA **(Z2)**	**-0.21**	**0.01**	**-0.24**	**0.42**	**0.07**	**0.00**	**-0.42**	**1.00**	
SIZE **(Z1)**	**0.31**	**0.30**	**0.34**	**0.13**	**0.21**	**0.68**	**0.01**	**0.19**	**1.00**

5.2. Assessment of the Structural Model

5.2.1. Hypotheses Testing

Figure 1 illustrates the structural model which aims to investigate how ownership structure, comprising ownership concentration, institutional ownership, managerial ownership, and foreign ownership, influences RAEM in Egyptian listed companies. The research hypotheses are tested using the bootstrapping technique developed by Preacher and Hayes (2008).

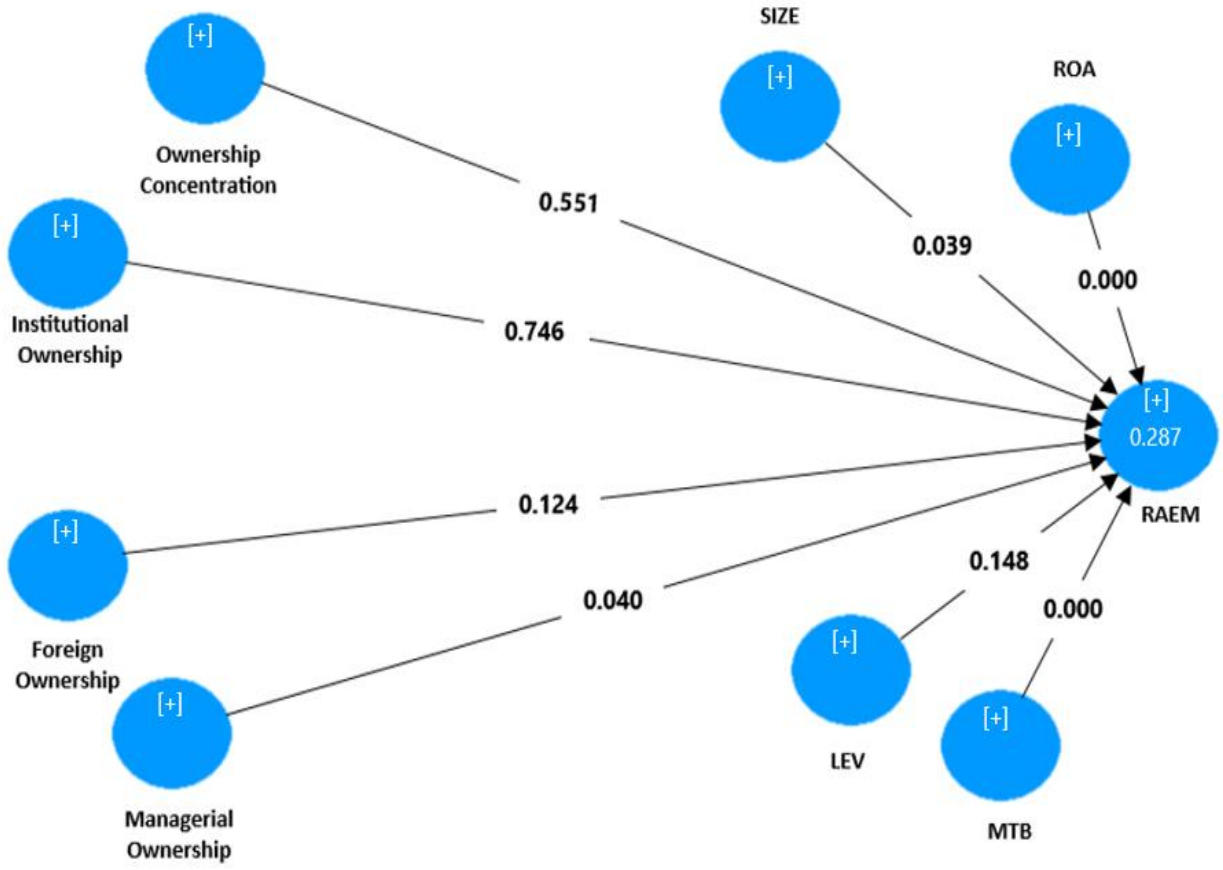

Figure 1 Bootstrapping and hypotheses testing

Table 8 shows the estimated path coefficients of the main hypotheses along with the corresponding p-values.

Table 8 Hypotheses testing

	β	T-statistics	P–values	Sign
Ownership Concentration –> RAEM	-0.041	0.596	0.551	Negative
Institutional Ownership –> RAEM	-0.017	0.324	0.746	Negative
Foreign Ownership –> RAEM	-0.074	1.540	0.124	Negative
Managerial Ownership –> RAEM	0.102	2.052*	0.040	Positive
MTB –> RAEM	-0.217	3.748***	0.000	Negative
ROA –> RAEM	-0.272	4.310***	0.000	Negative
SIZE –> RAEM	0.152	2.064*	0.039	Positive
LEV –> RAEM	0.082	1.448	0.148	Positive

*P < 0.05; **P < 0.01; ***P < 0.001

The hypothesis testing results in Table 8 indicate that ownership concentration does not significantly influence RAEM (β = -0.041, P > 0.05), leading to the rejection of H1a. Similarly, institutional ownership (β = -0.017, P > 0.05) and foreign ownership (β = -0.074, P > 0.05) show no significant effects on RAEM, resulting in the rejection of H1b and H1c, respectively. Conversely, managerial ownership demonstrates a significant positive effect on RAEM (β = 0.102, P < 0.05), thus accepting H1d. Concerning control variables, MTB, SIZE, and ROA exhibit significant effects on RAEM, whereas LEV does not demonstrate a significant effect.

The positive and significant effect of managerial ownership on RAEM, indicates that as managerial ownership increases, RAEM also increases within companies listed on the Egyptian stock exchange. The researcher concludes that, given the excessive power concentration of insiders and the limited investor protection for minority shareholders within the Egyptian companies, the entrenchment hypothesis trumps the alignment of interests' hypothesis. Due to their status as dominating groups, these insiders may be more inclined to engage in RAEM manipulation for their own self-interest, private rent seeking, and empire-building endeavours. This is consistent with the findings of Liu and Tsai (2015), who observed a positive association between managerial ownership and RAEM. In a similar vein, Mellado and Sauna (2020) discovered that higher insider ownership could lead to managerial entrenchment, shielding managers from shareholder oversight and potentially resulting in more aggressive reported earnings. This finding supports the argument proposed by Debnath et al. (2021), which suggests that the pervasiveness of EM is prevalent in countries with inadequate legal protection for outside investors. In such countries, insiders enjoy

greater private control benefits compared to those with robust legal mechanisms, as seen in the case of Egypt.

5.2.2. Additional Analysis

While exploring the overall effect of ownership structure on RAEM, an additional analysis of RAEM's decomposition into its three individual models uncovers insightful outcomes. Table 9 displays the outcomes of the Structural model when RAEM is broken down into its three distinct measures: Ab_CFO, Ab_PROD, and Ab_DIS, separately. Consequently, there are three sub-models. Thus, the following sub-hypotheses are formulated:

H1a: There is a statistically significant effect of ownership concentration on RAEM through Ab_CFO.

H1b: There is a statistically significant effect of ownership concentration on RAEM through Ab_PROD.

H1C: There is a statistically significant effect of ownership concentration on RAEM through Ab_DIS.

H2a: There is a statistically significant effect of institutional ownership on RAEM through Ab_CFO.

H2b: There is a statistically significant effect of institutional ownership on RAEM through Ab_PROD.

H2C: There is a statistically significant effect of institutional ownership on RAEM through Ab_DIS.

H3a: There is a statistically significant effect of foreign ownership on RAEM through Ab_CFO.

H3b: There is a statistically significant effect of foreign ownership on RAEM through Ab_PROD.

H3C: There is a statistically significant effect of foreign ownership on RAEM through Ab_DIS.

H4a: There is a statistically significant effect of managerial ownership on RAEM through Ab_CFO.

H4b: There is a statistically significant effect of managerial ownership on RAEM through Ab_PROD.

H4C: There is a statistically significant effect of managerial ownership on RAEM through Ab_DIS.

Table 9 Additional analysis hypotheses testing

	β	T-statistics	P–values
Ownership Concentration –> Ab_CFO	0.150	2.124*	0.034
Institutional Ownership –> Ab_CFO	0.048	0.849	0.396
Foreign Ownership –> Ab_CFO	0.081	1.645	0.100
Managerial Ownership –> Ab_CFO	-0.052	0.978	0.328
Ownership Concentration –> Ab_PROD	0	0.006	0.995
Institutional Ownership –> Ab_PROD	0.033	0.634	0.526
Foreign Ownership –> Ab_PROD	-0.052	1.084	-0.052
Managerial Ownership –> Ab_PROD	0.133	2.714**	0.007
Ownership Concentration –> Ab_DIS	-0.119	1.385	0.166
Institutional Ownership –> Ab_DIS	0.016	0.259	0.796
Foreign Ownership –> Ab_DIS	-0.079	1.210	0.226
Managerial Ownership –> Ab_DIS	-0.073	1.187	0.235
Adjusted R^2 for Ab_CFO model	0.211		
Adjusted R^2 for Ab_PROD model	0.352		
Adjusted R^2 for Ab_DIS model	0.024		

*P < 0.05; **P < 0.01; ***P < 0.001

The positive and statistically significant coefficient of Ownership Concentration –> Ab_CFO confirms H1a which predicts a statistically significant effect of ownership concentration on RAEM through Ab_CFO. Higher Ab_CFO means lower RAEM, indicating that ownership concentration is effective in deterring practicing sales manipulation. However, coefficients of ownership concentration in the other two models are insignificant. Therefore, both H1b and H1c are rejected. Institutional ownership and foreign ownership both fail to hold in all three models. Thus, H2a, H2b, H2c, H3a, H3b, and H3c are all rejected. Hence, institutional and foreign

investors are found ineffective in mitigating RAEM within the Egyptian context. This finding may stem from the similarity in the monitoring functions fulfilled by institutional and foreign investors.

Managerial ownership is only significant in Ab_PROD model and is insignificant in the other two models. Thus, the results reject H4a and H4c and confirm H4b as the coefficient Of Managerial Ownership –> Ab_PROD is positive and statistically significant. Higher Ab_PROD means higher RAEM, indicating that managerial ownership exacerbates RAEM. This is consistent with the findings of Liu and Tsai (2015), who observed a positive association between managerial ownership and RAEM. Similarly, Mellado and Sauna (2020) discovered that higher insider ownership could lead to managerial entrenchment, shielding managers from shareholder oversight and potentially resulting in more aggressive reported earnings. However, it contradicts a body of research by Hsu and Wen (2015), Piosik and Genge (2019), Al-Haddad and Whittington (2019), Dong et al. (2020), and Debnath et al. (2021), all of which identified a negative correlation between managerial ownership and RAEM. Moreover, the findings of Susanto and Pradipta (2016), Shayan-Nia et al. (2017), Istianingsiha and Bawono (2021), and Al-Duais et al. (2022) all reported no association between management ownership and RAEM, which is in contrast to this finding.

6. Conclusion

This research explores the effect of ownership structure on real activities earnings management. The results reveal that ownership concentration has a substantial impact on real activities earnings management (RAEM) through Ab_CFO. Nonetheless, its significance diminishes when considered within the broader aggregate model. Results also reveal a notable positive correlation between managerial ownership and RAEM, particularly via Ab_PROD. This implies that, given the high-power concentration of insiders, the entrenchment hypothesis overshadows the alignment of interests' hypothesis and the limited investor protection for minority shareholders within the Egyptian companies. As dominating groups, these insiders may be more inclined to participate in RAEM manipulation for the sake of empire expansion, self-interest, and private rent seeking. Moreover, it's intriguing to note that across all models assessed, institutional and foreign investors turn out to be ineffectual in curbing RAEM.

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