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The Impact of Managerial Ability and Business Strategy on Real Earnings Management: Evidence from Egypt

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Abstract:

This study examines how managerial ability and a firm's business strategy typology affect real earnings management practices. Forty-four non-financial firms from the EGX-100 index were sampled, with 220 balanced observations covering the period from 2017 to 2021. The study used three real earnings management proxies as individual and aggregate indicators based on Roychowdhury (2006). It also used Bentley et al.'s (2013) composite strategy index as a proxy for a firm's business strategy, following the business strategy typology of Miles and Snow (2003) as defender and prospector strategies. Managerial ability is measured using the DEA-Tobit approach established by Demerjian *et al*. (2012). Panel regression models using fixed and random effects models were then used for data analysis. The findings indicate that managers with higher abilities are less prone to participate in real earnings management. The results also show business strategy negatively influences real earnings management proxies, and firms with prospector strategies are less likely to engage in real earnings management practices than those with defender strategies. Likewise, the results show a significant positive influence of the z-score on the preference for real earnings management. Further, the findings support the political costs and debt covenant hypotheses in positive accounting theory, as firm size negatively affects real earnings management proxies, but financial leverage positively affects them,

Based on existing literature, there have been limited research studies about the impact of business strategy on real earnings management practices in general. However, no studies have investigated such a relationship in Egypt or Middle Eastern countries. Furthermore, studies investigating how managerial ability affects real earnings management practices are rare in Egypt. This study supports the idea that contingency theory might explain why some organizations prefer certain real earnings management practices over others.

Keywords: Managerial Ability, Business Strategies, Real Earnings Management, Positive Accounting Theory, Theory.

ملخص الدراسة

تهدف الدراسة إلى اختبار أثر القدرة الإدارية واستراتيجية أعمال الشركة على ممارسات إدارة الأرباح الحقيقية. تتكون عينة البحث من 44 شركة غير مالية موجودة في مؤشر EGX-100خلال الفترة 2017-2021، باجمالي 220 مشاهدة متوافقة. استخدمت الدراسة ثلاثة مقاييس لإدارة الأرباح الحقيقية كمؤشرات فردية وإجمالية بناءً على Roychowdhury (2006). اتبعت الدراسة Miles and Snow (2003) لتصنيف إستراتيجية الاعمال إلى استراتيجيات مدافع ومنقب. كما استخدمت مؤشر الإستراتيجية المركب الذى طوره Bentley *et al.* (2013) كمقياس لاستراتيجية أعمال الشركة. وتم قياس القدرة الإدارية باستخدام منهج DEA-Tobitالذي وضعه Demerjian *et al.* (2012). تم استخدام نماذج انحدار البيانات المقطعية الطولية Panel regression models من خلال نماذج التأثيرات الثابتة والعشوائية لتحليل البيانات. تشير النتائج إلى أن المديرين ذوي القدرات العالية أقل عرضة للمشاركة في إدارة الأرباح الحقيقية. تظهر النتائج أيضًا أن إستراتيجية العمل تؤثر سلبًا على ممارسات إدارة الأرباح الحقيقية وأن الشركات التي لديها استراتيجيات التنقيب أقل عرضة للانخراط في ممارسات إدارة الأرباح الحقيقية من تلك التي لديها استراتيجيات مدافعة. كما تظهر النتائج تأثيرًا إيجابيًا معنويًا لـ z-score على تفضيل إدارة الأرباح الحقيقية. وتدعم نتائج الدراسة فرضية التكاليف السياسية وفرضية عقود الديون في النظرية المحاسبية الإيجابية، حيث ان حجم المنشآة له تأثير سلبي على مقاييس إدارة الأرباح الحقيقية بينما يكون للرافعة المالية تأثير إيجابي.

استنادًا إلى الأدبيات الموجودة، هناك دراسات بحثية محدودة حول تأثير استراتيجية عمل الشركة على ممارسات إدارة الأرباح الحقيقية بشكل عام. ومع ذلك، لم تحقق أي من الدراسات في مثل هذه العلاقة في مصر أو دول الشرق الأوسط. علاوة على ذلك، الدراسات التي تبحث في كيفية تأثير القدرة الإدارية على ممارسات إدارة الأرباح الحقيقية نادرة في مصر. وتدعم هذه الدراسة فكرة أن نظرية الطوارئ قد تفسر سبب تفضيل بعض المؤسسات لبعض ممارسات إدارة الأرباح الحقيقية على غيرها.

الكلمات المفتاحية: القدرة الإدارية، استراتيجيات الأعمال، إدارة الأرباح الحقيقية، نظرية المحاسبية الإيجابية، نظرية الوكالة

1. Introduction

The earnings management literature reports opportunistic earnings management employing accrual and real earnings management (Roychowdhury, 2006; Fasipe & Sun, 2020). Based on cost, constraints, and time, managers can select between accrual and real earnings management to meet the earnings target (Beyer *et al.*, 2018). If real earnings management (hereafter REM) is more expensive than accrual earnings management (hereafter AEM), a firm will expand its AEM operations and vice versa (Zang, 2012).

REM has become more popular as regulatory restrictions tighten because it is unlikely to be caught by auditors and regulators as they view it as less risky and scrutinized than AEM (Cohen *et al.*, 2008). However, REM deviates from management's best practices to meet earnings targets and negatively impacts future performance (Gunny, 2010). According to agency theory, management-owner conflict is the root of earnings management. In addition, due to information asymmetry and incomplete contracts, management may want to use earnings management to smooth income or fulfill analysts' estimates.

REM involves managerial, not accounting, decisions; hence, it may be harder to be controlled through governance mechanisms and more burdensome for investors and regulators to identify (Tulcanaza & Lee, 2022). Accounting choices are made in preparing financial reports at the fiscal year-end, while managerial decisions related to REM occur during the financial year (Zang, 2012). Managers use REM to increase earnings by manipulating operational policies and activities. However, unlike AEM, REM affects economic transactions and lowers earnings quality. Mellado & Saona (2020) emphasized the REM significance and indicated that one set of governance mechanisms might not decrease managers' desire to participate in earnings management practices.

Based on prior studies (e.g., Roychowdhury, 2006; Cohen *et al*., 2008; Zang, 2012; Brown, 2015; Kothari, 2016; Huang & Sun, 2017), this study uses two manipulations of real activities by overproducing inventory and reducing discretionary expenditures like R&D, advertising, and SG&A costs. The aggregate REM measure represents the total effects of the two REM individual proxies by adding abnormal production costs and discretionary expenditures.

Recent accounting literature emphasizes managerial ability. It concerns managers' understanding of a firm's economic position, the industry, and future opportunities' performance (Arora *et al.*, 2017). Learning and experience help managers understand the firm's financial position and industry structure, accurately assessing the firm's opportunities and future performance (Demerjian *et al.*, 2012). High-capability managers understand the macroeconomic environment and company operations. High-quality financial reports from capable managers can increase targets' desire to collaborate, lower negotiation barriers, and lower transaction payments (Demerjian *et al.*, 2013).

In agency theory, manager-shareholder conflict increases information asymmetry (Schauble, 2019). When the pressure of earnings objective attainment arises, managers may engage in REM by abusing the circumstances of information asymmetry (Abad *et al*., 2018). The literature argues that more experienced managers can easily engage in REM (Alhmood *et al*., 2020). Higher-ability managers are more adept at estimation and judgment (Demerjian *et al*., 2013), which is essential for complex strategies like earnings management (Demerjian *et al*., 2020). In addition, managers, especially higher-ability managers, are under pressure to meet or exceed earnings goals. Therefore, those managers may exploit their ability to manage real earnings. However, superior-ability managers are more inclined to participate in the efficient than opportunistic REM to improve earnings quality, as they must maintain their reputation (Demerjian *et al*., 2013). Higher-ability managers also

manage income smoothing more than other managers (Demerjian *et al*., 2020).

On the other hand, managers can employ their ability to enhance typical corporate operations and meet earnings targets without adopting REM (Huang & Sun, 2017; Demerjian *et al*., 2020). Second, superior-ability managers avoid REM activities since they know it could lower performance (Filip *et al*., 2015; Vorst, 2016). In addition, managers' time and energy are limited; thus, they optimize normal business activities rather than REM. Accordingly, this study hypothesized that firms with higher-ability managers are less likely to engage in REM. The DEA-Tobit approach is utilized, where Demerjian *et al*. (2012) suggest measuring managerial ability based on revenue creation efficiency.

Accounting indicators reflect business strategy tendencies in the management literature. The business strategy enhances the company's market share; hence, firms must establish a proper strategy to improve performance to survive and utilize their strengths and shortcomings (Di-Meo *et al*., 2017). Miles & Snow (2003) divided business strategy typology into prospector strategy (innovation-oriented) and defender strategy (efficiency-focused).

Prospector strategy firms focus on innovation, cause more significant uncertainty in outcomes, and confront more agency problems. However, prospectors' production and distribution could be more efficient since they care about organizational stability, minimize extended commitments, and maintain low-level technicality and routine. As a result, prospectors are more likely to create a competitive margin than defenders as they allocate R&D and marketing costs more efficiently (Rahman *et al.*, 2021). In addition, investors are more conservative regarding cutting SG&A costs for fear of damaging future competitive advantage.

The defensive strategy firm has a narrow but stable product and market area. It focuses on cost efficiency and offers reliable performance and organization as they are efficient producers and distributors (Miles & Snow, 2003). Defenders promote similar products and services instead of new ones, reducing product development efforts. Defenders "protect" finance and production, while prospectors "protect" marketing and R&D. Defenders expand slowly by infiltrating the market, unlike prospectors. Defenders extend employment tenures and internal promotions, promoting cost-effective technology and ongoing development to enable routine and mechanization for efficient production and distribution (Elhabashy, 2023).

Prospector and defender strategies have an earnings-management incentive; managerial compensation is one reason the prospector strategy manages earnings (Bentley *et al.*, 2013). Prospectors' complex processes require decentralized and adaptive control systems allowing managers more earnings-management discretion than defenders with centralized operating control. Defenders also manage earnings because the compensation contract is often tied to short-term performance targets (Bentley *et al.*, 2013). Prospectors have lower incentives to engage in REM than defenders for various reasons. First, R&D and marketing costs are higher in the prospector strategy than the defenders, as managers can reduce them more easily. Second, Prospectors focus more on product creation and market expansion than defenders, so they depend more on these expenditures (Elhabashy, 2023).

Consistent with the organizational theory of Miles & Snow (2003) and based on Bentley *et al.* (2013) and Ittner *et al.* (2003), this study utilizes a composite strategy index be a proxy for a firm's business strategy. Firms with higher ratings have a prospector strategy, whereas those with lower scores have a defender strategy.

This study seeks to answer the question of what extent managerial abilities and business strategies affect engaging in REM activities in listed Egyptian firms through the following sub-questions:

- To what extent does managerial ability impact REM activities in Egyptian firms?
- To what extent does business strategy typology impact REM activities in Egyptian firms?
- To what extent do some firm characteristics (the control variables) affect REM activities in Egyptian firms?

1.1. Objectives of the Study

According to those above, this study aims to identify the influence of managerial ability score and a firm's business strategy on engagement in REM activities in Egyptian firms, which extends the research on earnings management by investigating whether the business strategy is a factor.

1.2. Significance of the Study

This study contributes to the existing literature by linking organizational and market competition theories from management literature and earnings management from accounting literature to investigate business strategy and REM, which, insofar as the researcher observes, has rarely been investigated by previous research in general. Moreover, no existing literature has examined such a relationship in Egypt or Middle Eastern countries. As a result, the literature still needs to investigate such a relationship in Egypt.

Furthermore, previous studies investigating how managerial ability affects real earnings management practices are rare in the Egyptian context. This study supports the idea that contingency theory might explain why some organizations prefer certain real earnings management practices over others.

Finally, this study also assists investors in evaluating the firm for investment by analyzing the firm's business strategy, which is expected to encourage REM activities that, in the end, negatively influence the firm.

1.3. Scope of the study

Only non-financial EGX100 index companies with available data for all study variables are used in the analysis. The data cover 2017-2021, the most recent information available during the study. Financial firms are excluded as they differ from non-financial firms, and specific characteristics might not be comparable.

The study's residual is divided as the next section covering the relevant literature to deduct the research hypotheses. Section three describes the research method, which illustrates variables measurement, specifies study models, and describes statistical analysis methods. The fourth section examines the practical study and hypotheses testing, the statistical analysis results, and their interpretation. The final section contains conclusions, future research, and recommendations.

2. Literature Review and Hypotheses Development

2.1. Managerial Ability and Real Earnings Management

Managers' characteristics influence corporate investment decisions because managers with varying abilities have varying future expectations and risk preferences (Rozen-Bakher, 2018); thus, decisions and competencies are affected (Gan, 2019). For example, the efficiency with which managers generate revenues was used as a measure of managerial ability by Demerjian *et al.* (2012). They argue that more capable managers better understand technology and industry trends, constantly assess product demand, invest in higher-value projects, and manage their employees more efficiently than less-capable qualified managers.

Abernathy *et al.* (2014) demonstrate that REM might impair a firm's future performance. For instance, cutting R&D to increase earnings may damage future performance due to lost possibilities. However, most research has examined how REM affects future business performance as a function of firm-level variables and not individual managers.

Upper echelon theory implies that managerial characteristics determine a firm's strategy and results and affect decision-making (Hambrick, 2007). For example, managerial characteristics affect earnings quality, information disclosure, tax management, and accounting policy (Ge *et al.*, 2011). In addition, Demerjian *et al.* (2012) linked managerial ability with financial performance, stock returns, CEO reputation, and tenure. According to resource-based theory, managerial ability brings value to firms by efficiently using resources (Holcomb *et al.*, 2009). Furthermore, the efficiency hypothesis indicates that Higher-ability managers have superior knowledge, experience, and performance (Holcomb *et al.*, 2009).

Managerial ability increases innovation success and business growth (Chen *et al.*, 2015). Higher-ability managers improve earnings quality and reduce financial restatements (Demerjian *et al.*, 2013). Higher-ability managers issue more accurate earnings forecasts, which financial market investors respond to, improving stock market returns (Luo & Zhou, 2017) and lowering information risks, which reduces debt costs (De Franco *et al.*, 2017). Higher-ability managers are also income smoothing without opportunism, which increases earnings and stock price informativeness (Baik *et al.*, 2019; Demerjian *et al.*, 2020).

Using data from all non-financial firms in COMPUSTAT during 1987–2012, with a final sample of 69,429 firm years, Huang & Sun (2017) investigate the effect of managerial ability on engaging REM and future firm performance. They show a significant negative association between managerial ability and the three proxies of REM utilized in the study. Additionally, they show how higher-ability

managers might alleviate REM's negative effect on future firm performance. Finally, they argued that higher-ability managers could generate optimal revenue using the resources of the given firms. Their results agree with previous studies, which associate managers with a superior ability to better firm resource management and more positive outcomes.

Hussein (2018) examines how managerial ability mitigates real earnings management's negative effects on a firm's future performance. Panel data regression analyzed data from 55 firms listed in Egyptian Stock Exchange during 2005–2015. The findings showed that managerial ability positively affects real earnings management. The result suggests that managers invest their abilities and skills in manipulating earnings by increasing fictitious sales, achieving extraordinary levels of production, and controlling optional expenses to direct profits to certain pre-targeted levels rather than using their skills and managerial capabilities to achieve the targeted profits without engaging in those practices, that negatively affects the future performance of firms.

Demerjian *et al.* (2020) argue that earnings management is a complex strategy. They anticipate the managerial ability to affect REM because managerial characteristics affect reported earnings adjustments and operational business decisions. They found that higher-ability managers were significantly more likely to adopt intentional smoothing and lower REM.

Salehi *et al.* (2020) investigate whether there is an association between managerial ability, earnings management, internal control quality, and audit fees. The study sample consists of 190 firms listed on the Tehran Stock Exchange between 2009 and 2016. Study hypotheses were tested using multivariable linear regression and the DEA platform. The results show a significant and direct association between managerial ability and REM with internal control quality. The results also revealed a significant association between managerial

ability and internal control quality in firms with lower audit fees. However, their study has not investigated the relationship between managerial ability and REM.

Kumar & Goswami (2021) investigate whether higher-ability managers of Indian listed firms desist from engaging in REM. A fixed-effect model was employed on a balanced panel of 108 non-financial firms from 2006 to 2017. The study found that managers with higher abilities were less prone to participate in REM in overproduction. REM was also found to be positively associated with AEM.

Oskouei & Sureshjani (2021) examine the function of managerial ability in REM under economic and financial crisis conditions using 312 non-financial firms in the TSE with observations of 1,872 years-firms during 2012–2017. The study demonstrates that higher-ability managers use less REM. The findings also show that managerial ability and economic and financial crises negatively and significantly impact REM. Furthermore, the negative impact of managerial ability on REM increases in the conditions of economic crisis. They conclude that activist investors will make more accurate decisions if they heed a company's managerial skills, particularly under adverse circumstances.

Simamora (2021) examines how a manager's ability affects REM and earnings quality. 846 Indonesian Stock Exchange-listed firms from 2008-2016 were sampled. The results indicate that higher-ability managers apply their knowledge, skill, and experience to practice in REM and increase earnings quality. Higher-ability managers also use efficient earnings management rather than opportunistic because REM can lower earnings quality.

Simamora (2022) examines the impact of managerial ability on REM and the effects of REM by higher-ability managers on future profitability at various crime rates. The sample consists of 864

manufacturing companies listed on the Indonesian Stock Exchange. DEA calculates an efficiency score for managerial ability and abnormal activities to measure REM. The natural logarithm of crimes per 100,000 residents in the company headquarters area is the proxy for the crime rate. In data analysis, fixed-effect regression is used. The results indicate that managerial ability increases REM in regions with a higher crime rate where the firm's headquarters are located. In comparison, it decreases REM in regions with a lower crime rate. In addition, REM by managerial ability indicates improved future profitability in the region where the company's headquarters are located, which has a lower crime rate.

According to the aforementioned preceding literature, it can be concluded that

- While the relationship between managerial ability and REM has been investigated in developed and developing economies, such as Huang & Sun (2017) in the United States, Salehi *et al.* (2020) in Iran, Kumar & Goswami (2021) in India, Oskouei & Sureshjani (2021) in Japan, and Simamora (2021; 2022) in Indonesia, such research has been conducted in Egypt only infrequently. Moreover, according to contingency theory, the relationship between managerial ability and REM varies depending on the institutional context. Therefore, it is necessary to examine this relationship within the Egyptian context.
- Managers' ability is predicted to negatively influence REM for efficiently converting firm resources into revenues. First, higher-ability managers can generate more sales revenue for a given set of company resources to exceed earnings targets and are less likely to be under earnings management pressure (Demerjian *et al.*, 2012; Francis *et al.*, 2020; Oskouei and Sureshjani, 2021). Second, high-ability managers know that REM negatively affects future firm performance (Roychowdhury, 2006; Cohen & Zarowin, 2010), so they avoid it. Furthermore, managers'

decision-making models include opportunity cost. Thus, higher-ability managers better understand their firms' operating environments (Demerjian *et al.*, 2013) and can align REM with reporting strategies. Finally, due to time and effort constraints, more talented managers would focus on normal operations rather than REM.

Based on the previous literature and discussion mentioned and by considering the objective and nature of the research given, Hypothesis H1 is formed as follows:

Hypothesis (H1): ***Firms with higher-ability managers are less likely to engage in real earnings management.***

2.2. Business Strategy and Real Earnings Management

Managers can use REM in various ways, including offering discounts to customers, extending payment periods for accounts receivable, expanding production to lower unit product costs, and reducing operating costs (Roychowdhury, 2006). However, several factors combine to make the prospector type less likely to use REM than the defender strategy. Under the prospector strategy, where expenditures are substantially greater than in the defender strategy, it is easier for management to decrease R&D and marketing spending. Nevertheless, firms that adopt a prospector strategy rely more on these investments as the prospector strategy emphasizes innovation and growth in the marketplace (Rahman *et al.*, 2021). As a result, prospectors can acquire a competitive edge over defenders through strategic marketing and R&D budgets (Rahman *et al.*, 2021). In addition, investors are more conservative regarding cutting SG&A costs for fear of damaging future competitive advantage (Balla *et al.*, 2020).

Wu *et al.* (2015) examined 2010–2012 Chinese A-share listed enterprises using Porter's (1980) business strategy typology. They found that cost leadership (defender) firms are more likely to perform

REM than differentiation (prospectors) firms. However, according to the preceding findings, prospectors conduct AEM less often than defenders. Therefore, this study extends prior research by investigating the influence of business strategy types on engaging in REM. Moreover, internal factors can influence the choice of a company's business strategy (Porter, 1980) or a decision to engage in REM (Kouaib & Jarboui, 2017).

Robiansyah *et al.* (2020) examined the influence of cost leadership (defender) strategy and differentiation (prospector) strategy on REM and investigated the moderate role of market competition in such relationships. The results showed that the cost leadership strategy positively affected REM and firm performance; however, the prospectors had an insignificant negative impact on REM. In addition, market competition moderated the impact of the defenders' strategy on REM in a positive manner. In contrast, market competition negatively moderated the prospectors' strategy influence on REM.

Purba *et al.* (2022) investigated the preference for earnings management based on business strategies, cost leadership strategies (defenders), and differentiation strategies (prospectors). They analyzed 262 samples of non-financial firms listed on the Indonesian Stock Exchange in 2019. Logistic regression analysis tests the firm's earnings management preferences based on its business strategy. The findings indicate that the firm's business strategy significantly influences its preferred earnings management strategy. Firms implementing a cost leadership strategy (defenders) tend to use AEM rather than REM. However, firms that adopt a differentiation strategy (prospectors) use a REM form.

Herusetya *et al.* (2023) investigate the association between business strategy typologies and earnings management (accrual and REM). They also examine if prospectors (defenders) engage in earnings management more (less) for accrual and REM. Indonesian-listed firms from 2012 to 2018 were the study sample. They used

Miles & Snow (1978, 2003) to establish each firm's business strategy typology. They found that firms with a prospector business strategy have lower accrual and REM than firms with a defender business strategy. Finally, they discovered that prospectors prefer earnings management less than defenders.

The pecking order theory (Myers & Majluf, 1984) argues that the company initially uses internal finance to lower financing costs. Prospectors generally need to exploit new goods and market prospects, which requires more R&D expenditure than other organizations, increasing risk. Prospectors' assets are specialized in manufacturing and tailored design and are less valued in factor markets than what they can develop within the organization (Banker *et al.*, 2013). Hence, these assets cannot be used as loan collateral, raising borrowing costs. Prospectors require less external financing than defenders. Thus, earnings management is less significant for prospectors with better profit margins and fewer financing needs.

Prospector strategy firms prioritize innovation and long-term performance. Operational complexity and transactional scope are greater for prospectors than defenders (Bentley *et al.*, 2017). In addition, Prospectors are more likely to face financial difficulties than defenders (Chen *et al.*, 2017), making it difficult to restructure sales in actual practice. However, Defenders have more precise performance measurements of existing products and markets. Prospectors' over-production technique is more complicated since their product area is more extensive and diverse than the defenders'. Hence, utilizing REM activities at the individual and aggregate levels is less flexible for the prospectors than for the defenders (Herusetya *et al.*, 2023). Due to market and product maturity, defenders can more accurately measure their success. Therefore, it is argued that firms with prospector strategies are less likely to perform REM activities than defenders.

According to the aforementioned preceding literature, it can be concluded that

- Previous studies have rarely examined the influence of a firm's business strategy on engaging in REM in general. Recently, limited studies reviewed the impact of opposing sides of the strategy chain, prospector's and defender's business strategies, on REM (Robiansyah *et al.*, 2020; Purba *et al.*, 2022; Herusetya *et al.*, 2023). However, no studies have investigated such a relationship in Egypt or Middle Eastern countries. As a result, the literature still needs to examine such a relationship in Egypt.
- Prior research that covered the relationship between a firm's business strategy and REM shows that firms that adopt a prospector business strategy are less likely to perform REM compared to those with a defender strategy (Wu *et al.*, 2015; Robiansyah *et al.*, 2020; Purba *et al.*, 2022; Herusetya *et al.*, 2023).
- Accordingly, it is argued that firms with a prospector business strategy are less prone to perform REM than those with a defender strategy.

Based on the present theoretical principles, the study aims to identify the influence of a firm's business strategies on REM in Egypt through the following hypotheses:

Hypothesis (H2):

A firm's business strategy statistically impacts engaging in Real Earnings Management.

Hypothesis (H3):

Firms with prospector strategies are less likely to engage in Real Earnings Management than those with defender strategies.

3. Research Method

This section describes the research methodology, which determines the sample and data sources, clarifies the measurement of the variables, specifies the study models, and describes the statistical analysis tools.

3.1. Sample and Data Sources

The study uses data from firms in the EGX-100 index as a proxy for the Egyptian economy. The EGX-100 index contains 100 of Egypt's most active firms, as the EGX-100 index includes the EGX-30 index and EGX-70 index firms. As a result, it is assumed that the EGX-100 firms have strong internal controls and reporting. The data spans the period from 2017 to 2021 as data availability. The samples of firms are selected based on data accessibility. Data on banking and

Table (1): Study Sample's Observations

Sector	*Observations*	*%*
Automotive and industrial products	15	7
Basic resources	25	11
Building Materials	25	11
Communications, media, and IT.	15	7
Food, drinks, and tobacco	35	16
Health care and medicine	35	16
Real estates	50	23
Tourism and Leisure	20	9
Total	***220***	***100***

non-banking finance firms are excluded as they have a distinct technical and accounting nature, and regulations be incompatible with other firms. In addition, the study sample excludes firms with financial years ending on June 30. The study sample firms' currency is the Egyptian pound and should include at least three firms in each sector.

Thus, the study sample covers 44 firms from 8 sectors with 220 balanced observations. Published financial statements are often available on the Mubasher Info Egypt web at https://www.mubasher.info/countries/eg. Likewise, the Egyptian Stock Exchange web at https://www.egx.com.eg/en/homepage.aspx and a firm's website have shareholders' general assembly meeting minutes and board reports. Table (1) displays the study sample's observations by sector.

3.2. Variables Measurement

3.2.1. Dependent Variable

REM is considered the study's dependent variable. Roychowdhury (2006) defined REM activities as deviations from regular operating practices encouraged by management to deceive shareholders considering that specific financial reporting targets are accomplished through ordinary operations. Executives control real earnings through temporary discounts, reduced discretionary expenses, and overproduction. Managers oversell by using price discounts and increasing credit sales. Managers overproduce to decline the cost of goods sold as increased production reduces fixed production costs. In addition, managers can decrease or delay advertising, research, and development to save discretionary expenses (Cohen & Zarowin 2010).

Based on prior studies (e.g., Roychowdhury, 2006; Cohen *et al.*, 2008; Zang, 2012; Brown *et al.*, 2015; Kothari *et al.*, 2016; Huang &. Sun, 2017), this study uses two manipulations of real activities (1) declining production costs by overproducing inventory, and (2) reducing discretionary expenditures such as R&D, advertising, and SG&A costs. This study measures the first real manipulation using abnormally high production costs and the second using abnormally high discretionary spending.

Using the Roychowdhury (2006) model, estimating the normal level of production costs to measure overproduction (RM_{PROD}) is possible as follows:

$$\mathbf{PROD_{it}/A_{t-1} = a + \beta_1(1/A_{it-1}) + \beta_2(S_{it}/A_{it-1}) + \beta_3(\Delta S_{it}/A_{it-1}) + \beta_4(\Delta S_{it-1}/A_{it-1}) + \varepsilon_{it}} \quad \mathbf{(1)}$$

Where:

$PROD_{it}$: the production costs measured by the change of inventory period plus the cost of goods sold for firm i at the period t.

A_{it-1} : total assets for firm i at period t-1.

S_{it} : total sales of firm i during the period t.

ΔS_{it} : change of sales of firm i during the period t.

ΔS_{it-1} : change of sales of firm i during the period t-1

ε_{it} : Model residual value showing abnormal production costs.

The measure (RM_{PROD}) is the Model residual value (ε_{it}) indicates abnormally high overproduction costs, which decreases the cost of goods sold and raises earnings.

Following Roychowdhury (2006), the normal levels of discretionary spending are estimated to calculate the abnormal decline in discretionary spending (RM_{DISK}).

$$\boldsymbol{DISEXP_{it}/A_{it-1} = a + \beta_1(1/A_{it-1}) + \beta_2(S_{it-1}/A_{it-1}) = \varepsilon_{it}} \quad \boldsymbol{(2)}$$

Where:

$DISEXP_{it}$: the discretionary expenditures (DISEXP) equal the sum of R&D, advertising, and SG&A expenses of firm i at the period t.

S_{it-1} : total sales of firm i during the period t-1.

The abnormal discretionary spending RM_{DISX} is measured by multiplying the model residuals (ε_{it}) by (-1) (Zang (2012). The higher

the discretionary expenses value measure, the lower the discretionary expenses to raise earnings.

Manage earnings through REM are likely to use one or both methods mentioned above (McGuire *et al.*, 2012). An aggregate REM measure (RM_{AGG}) is the sum of abnormal production costs and discretionary expenditures to represent the total effects of the two REM individual proxies. The firm is more likely to do REM if the aggregate measure is high. The aggregate is estimated as in equation (3) (Huang &. Sun, 2017; Zang, 2012; Cohen *et al.*, 2008):

$$RM_{AGG} = RM_{PROD} + RM_{DISX} \quad (3)$$

Thus, this study uses three REM proxies: RM_{PROD}, RM_{DISX}, and RM_{AGG}.

3.2.2. Independent Variable

Managerial ability score (ManAbility) and business strategy (BusSt) are the independent variables in this study.

3.2.2.1. Managerial Ability (ManAbility)

Managerial ability is measured using the DEA-Tobit approach. Demerjian *et al.* (2012) suggest quantifying managerial ability based on managers' relative efficiency in creating revenues. They introduced a two-step approach as follows:

Step one: Data Envelopment Analysis (DEA) from equation (4):

$$Max\theta = Sales / (v_1 COGS + v_2 SG\&A + v_3 R\&D + v_4 PPE + v_5 GW + v_6 Intan) \quad (4)$$

Based on the output and input variables, the DEA platform evaluates the values of total efficiency θ between 0 and 1. Firm and manager-specific characteristics drive total efficiency (θ).

Where:

Output	*Sales*	Total sales over year t
Inputs	*COGS*	Cost of goods sold over year t
	SG&A	SG&A expenses over year t
	R&D	R&D cost over year t
	PPE	Plant and equipment at the beginning of year t
	GW	Goodwill at the beginning of year t
	Intan	Other intangibles at the beginning of year t

Step two:

A firm's overall efficiency will be changed by figuring out the managerial ability after excluding the impact of some firm characteristics and business operations that affect a firm's overall efficiency. Also, excluding the effects of changes in industry and time using the Tobit Regression model as Tobit regression residuals represent managerial ability using the following equation:

$$\textit{Firm efficiency}_i = \alpha + \beta_1\ \textit{Ln(Total Assets)}_i + \beta_2\ \textit{Market Share}_i + \beta_3\ \textit{Free Cash Flow Indicator}_i + \beta_4\ \textit{Ln(Age)}_i + \beta_5\ \textit{Business Segment Concentration}_i + \beta_6\ \textit{Foreign Currency Indicator}_i + \textit{Year}_i + \varepsilon_i \quad (5)$$

Where:

Firm efficiency: is the total efficiency estimated using the output of equation (4) from the DEA platform. DEA scores are in the range of zero to one.

Ln (Total Assets): refers to the natural logarithm of total assets.

Market Share: is the ratio of the firm's sales to the entire industry sales in the given year.

Free Cash Flow Indicator: is a dummy indicator, equal to one when a firm has a positive Free Cash Flow in a year t and zero otherwise.

Ln (Age): is the firm age's natural logarithm.

Business Segment Concentration: is the ratio of a company's segment sales to all business segments sales in year t.

Foreign Currency Indicator: is a dummy indicator, equal to one if a firm has a positive value for foreign exchange adjustment in a year t and zero otherwise.

ε_i*:* is the residual value, which expresses the extent of the managerial ability in the business.

This measure of managerial ability is more objective and accurate than other measures; it contains fewer errors than other measures because it is a direct assessment of the managerial ability score, not a proxy. This measure also depends on freely accessible data since it uses information from corporate financial statements. It evaluates the team's managerial ability, not just the CEO's. Several factors also tested this measure's validity, proving to be a reliable indicator of management ability (Abernathy *et al.*, 2018).

3.2.2.2. Business Strategy (BusSt)

The second study's independent variable is the business strategy (BusSt). Consistent with the organizational theory of Miles & Snow (2003) and based on Bentley *et al.* (2013) and Ittner *et al.* (2003), this study utilizes a composite strategy index be a proxy for a firm's business strategy. Firms with higher ratings have a prospector strategy, whereas those with lower scores have a defender strategy. R&D costs were not included in the financial statements of the study sample firms because they were included in SG&A expenses. Consequently, the five accounting variables listed below are used to decide a company's strategy:

(1) *Production efficiency:* This is calculated by dividing the firm's number of staff by net sales.
(2) *Growth*: is calculated as $[(Sales_t – Sales_{t-1}) / Sales_{t-1}]$.

(3) *Marketing efforts: are* measured as SG&A costs divided by net sales.
(4) *Organizational stability:* is measured as StdDev of the employee number's natural logarithm.
(5) *Capital intensity:* is calculated as net fixed tangible assets divided by total assets.

All variables are figured out over five years. The collected observations are then divided into quintiles for each firm-year. The first lowest quintile takes a score of 1, while the second lowest quintile score is 2. The score for the third-lowest quintile is 3. The scores for the fourth and fifth quintiles are 4 and 5, respectively. However, capital density scored inversely in the top (lowest) quintile, scoring 1 (5).

Each of the five variables is rated by generating quintiles for each industry year. Firms will take a score of between 5 and 25. The maximum potential score is 25, which suggests a prospector business strategy, and the minimum possible score is 5, which indicates a defensive business strategy. Raising the score means a shift from a defensive to a prospecting business strategy.

Then, firms are divided into two categories based on their business strategies using K-Means Cluster as a non-hierarchical method. A firm is called a defender (DFST) if its business strategy's mean value is less than its industry's. In contrast, a firm is considered a prospector or aggressive (AGST) if the mean value of a firm's business strategy is higher than the mean value of the industry.

3.2.3. Control Variables

The literature indicates several variables that could impact REM. As shown by prior research, it is predicted that using REM increases along with Assets Turnover (ATO) (Banker *et al.*, 2013; Wang & Lin, 2013; Wu *et al.*, 2015). Furthermore, Big4 and sales growth (SGR) are correlated with abnormal operating activities (Jones, 1991; Huang & Sun, 2017). In addition, prior studies show that corporate financial

distress (Z-Score) significantly and negatively affects REM (Huang & Sun, 2017; Agustia *et* al., 2020; Oskouei & Sureshjani, 2021). Likewise, market-to-book value (MTB), size (SIZE), financial leverage (LEV), and return on assets (ROA) are considered control variables (Roychowdhury, 2006). Control variables are defined as governing variables as follows:

ATO: is the assets turnover measured as operating sales/average operational assets, where operating assets are equal (total assets – cash – short-term investments). High ATO indicates efficient business operations and resource use (Wu *et al.*, 2015).

LEV: a firm's financial leverage computed as total liabilities divided by total assets.

ROA: is the return on assets computed as net income divided by average total assets.

SIZE: the firm's size is calculated by the natural logarithm of total assets.

SGR: refers to the sales growth frequency calculated as: ($Sales_t$ –$Sales_{t-1}$/$Sales_{t-1}$).

MTB: is the market-to-book equity ratio.

Age: the firm's age is measured by the natural logarithm of firm age Ln(Age).

BIG4: dummy variable is one if the auditor is a Big4 firm or accountability state authority and zero otherwise.

Z-Score: corporate financial distress is computed based on the Model of Altman (1968) as shown in equation (6):

$$\textbf{\textit{Z-score} = 1.2(WC) + 1.4(RE) + 3.3(EBIT) + 0.6(MVE) + 1.0 (S)} \qquad \textbf{(6)}$$

Where:

WC : working capital / total assets
RE : retained earnings / total assets
$EBIT$: earnings before interests and taxes / total assets
MVE : market value of equity / total liabilities
S : sales / total asset

Table (2): Variable Definitions and Measurement

Code	Description	Measurements	
Dependent Variables			
RM_{PROD}	Abnormal Production	The estimated residual of ε_t in the equation: $PROD_t/A_{t-1} = a + \beta_1(1/A_{t-1}) + \beta_2(S_t/A_{t-1}) + \beta_3(\Delta S_t/A_{t-1}) + \beta_4(\Delta S_{t-1}/A_{t-1}) + \varepsilon_t$	Roychowdhury (2006)
RM_{DISX}	Abnormal discretionary exp.	(-1) × the estimated residual of ε_t in the equation: $DISEXP_t/A_{t-1} = a + \beta_1(1/A_{t-1}) + \beta_2(S_{t-1}/A_{t-1}) = \varepsilon_t$	
RM_{AGG}	Aggregate REM	$RM_{AGG} = RM_{PROD} + RM_{CFO}$. The higher value of RM_{AGG} suggests that managers manage earnings more broadly based on activities.	
Independent Variables			
Man Ability	Managerial ability	Using the DEA-Tobit approach based on Demerjian *et al.* (2012) as indicated in equations (4) and (5).	
BusSt	Business Strategies	Following Bentley *et al.* (2013), the study uses a composite index as a proxy for a firm's business strategy.	
AGST	Prospector business strategy	Firms whose average BusSt value is higher than the industry average.	
DFST	Defensive business strategy	Firms whose average BusSt value is less than the industry average.	
Control Variables			
Z-Score	Corporate financial distress	Based on the Model of Altman (1968), as indicated in equation (6).	
ATO	Asset Turnover	Operating sales /Average operating assets	
LEV	Financial leverage	Total Liabilities / Total Assets	Jiang *et al.* 2020; Ji *et al.*, 2020; (Ezeani, *et al.*, 2022a & 2022b)
ROA	Return on assets	Net profit/Average total assets	
SIZE	Firm size	Total assets' natural logarithm	
SGR	Sales growth	Measured as ($Sales_t$ - $Sales_{-1}$ / $Sales_{t-1}$)	
MTB	market-to-book equity ratio	Equity market value / Equity book value	
Age	Company Age	The natural logarithm of firm age	
BIG4	Audit quality	A dummy variable equals one if the audit firm is a big4 firm or accountability state authority and zero otherwise.	

The Z-score is a formula for forecasting a firm's likelihood of insolvency. The higher the score, the less likely of failure. A score below 1.23 (1.1 for non-manufacturing) implies a high probability of failure, while a score closer to 2.9 (2.6 for non-manufacturing) suggests a solid financial positioning. A score between the two is a grey area indicating that risk is there but not highly significant. Table (2) presents the study variables' codes and measurements.

3.3. Models Specification

Three models are developed, one for each REM proxy, and the following regression is employed:

$$RM_{it} = \beta_0 + \beta_1 MA_{it} + \beta_2 BusSt_{it} + \beta_n \sum CONTROLS_{it} + \varepsilon_{it} \quad (7)$$

RM: alternatively, represent one of the three REM proxies: RM_{PROD}, RM_{DISX}, and RM_{AGG}

β_0: constant part of the regression model

β_1 - βn: coefficient of the regression model,

ϵ_{it}: the residual value.

The Model (1) is formed to test the effect of managerial ability and business strategies on REM using (RM_{PROD}) as a proxy for REM as follows:

Model$_1$

$$RM_{PROD} = \beta_0 + \beta_1 Man\ Ability_{it} + \beta_2 BusSt_{it} + \beta_3 Z\text{-}score + \beta_4 ATO + \beta_5 LEV + \beta_6 ROA + \beta_7 Size + \beta_8 SGR + \beta_9 MTB + \beta_{10} Age + \beta_{11} Big4_{it} + \varepsilon_{it}$$

For hypothesis H3, sample firms are divided into two business strategy categories. If a firm's business strategies with mean values are higher than its industry, a firm is considered prospecting or aggressive. In contrast, a firm is a defender if the mean value of its business strategy is lower than that of its industry. Thus, Model$_1$ will be applied to prospector firms $Model_{AGST}$ and defensive firms $Model_{DFST}$.

Model$_{1AGST}$:

$$RM_{PROD} = \beta_0 + \beta_1 Man\ Ability_{it} + \beta_2 AGST_{it} + \beta_3 Z\text{-}score + \beta_4 ATO + \beta_5 LEV + \beta_6 ROA + \beta_7 Size + \beta_8 SGR + \beta_9 MTB + \beta_{10} Age + \beta_{11} Big4_{it} + \varepsilon_{it}$$

Model$_{1DFST}$:

$$RM_{PROD} = \beta_0 + \beta_1 Man\ Ability_{it} + \beta_2 DFST_{it} + \beta_3 Z\text{-}score + \beta_4 ATO + \beta_5 LEV + \beta_6 ROA + \beta_7 Size + \beta_8 SGR + \beta_9 MTB + \beta_{10} Age + \beta_{11} Big4_{it} + \varepsilon_{it}$$

Likewise, Model (2) is formed to test the effect of managerial ability and business strategies on REM using (RM_{DISX}) as a proxy for REM as follows:

Model$_2$

$$RM_{DISX} = \beta_0 + \beta_1 Man\ Ability_{it} + \beta_2 BusSt_{it} + \beta_3 Z\text{-}score + \beta_4 ATO + \beta_5 LEV + \beta_6 ROA + \beta_7 Size + \beta_8 SGR + \beta_9 MTB + \beta_{10} Age + \beta_{11} Big4_{it} + \varepsilon_{it}$$

Likewise, Model$_2$ will be utilized for prospector firms with code Model$_{2AGST}$ and defender strategy firms with Model$_{2DFST}$ as follows:

Model$_{2AGST}$:

$$RM_{DISX} = \beta_0 + \beta_1 Man\ Ability_{it} + \beta_2 AGST_{it} + \beta_3 Z\text{-}score + \beta_4 ATO + \beta_5 LEV + \beta_6 ROA + \beta_7 Size + \beta_8 SGR + \beta_9 MTB + \beta_{10} Age + \beta_{11} Big4_{it} + \varepsilon_{it}$$

Model$_{2DFST}$:

$$RM_{DISX} = \beta_0 + \beta_1 Man\ Ability_{it} + \beta_2 DFST_{it} + \beta_3 Z\text{-}score + \beta_4 ATO + \beta_5 LEV + \beta_6 ROA + \beta_7 Size + \beta_8 SGR + \beta_9 MTB + \beta_{10} Age + \beta_{11} Big4_{it} + \varepsilon_{it}$$

Model (3) is formed to test the effect of managerial ability and business strategies on REM using (RM_{AGG}) as a proxy for REM as follows:

Model$_3$

$$RM_{AGG} = \beta_0 + \beta_1 Man\ Ability_{it} + \beta_2 BusSt_{it} + \beta_3 Z\text{-}score + \beta_4 ATO + \beta_5 LEV + \beta_6 ROA + \beta_7 Size + \beta_8 SGR + \beta_9 MTB + \beta_{10} Age + \beta_{11} Big4_{it} + \varepsilon_{it}$$

$Model_3$ is also applied for prospector firms with the symbol $Model_{3AGST}$ and defensive firms with the symbol $Model_{3DFST}$ as follows:

$Model_{3AGST}$:

$$RM_{AGG} = \beta_0 + \beta_1 Man\ Ability_{it} + \beta_2 AGST_{it} + \beta_3 Z\text{-}score + \beta_4 ATO + \beta_5 LEV + \beta_6 ROA + \beta_7 Size + \beta_8 SGR + \beta_9 MTB + \beta_{10} Age + \beta_{11} Big4_{it} + \varepsilon_{it}$$

$Model_{3DFST}$:

$$RM_{AGG} = \beta_0 + \beta_1 Man\ Ability_{it} + \beta_2 DFST_{it} + \beta_3 Z\text{-}score + \beta_4 ATO + \beta_5 LEV + \beta_6 ROA + \beta_7 Size + \beta_8 SGR + \beta_9 MTB + \beta_{10} Age + \beta_{11} Big4_{it} + \varepsilon_{it}$$

Coefficient β1 appraises managerial ability score, and β2 appraises business strategy composite index. B3 to β11 are the coefficients of the control variables. Further, ϵit is the residual value, representing the difference between the actual and expected REM for firm i in year t. Table (2) shows detailed model symbol definitions and measurements.

3.4. Statistical Analysis Tools:

The data used in the study are a longitudinal sample of items collected over time. There are cross-sectional (44 firms) and time-series data here (5 years). Panel Data is the result of combining the two types (McManus, 2015). Rather than relying on a time series or cross-sectional models, which have flaws, this study used a panel data model. Panel methods with random or fixed effects reduce multiple correlations between independent variables (McManus, 2015). Before testing the hypotheses, some tests were run to identify the appropriate statistical analysis tools as follows:

3.4.1. Best data representation model - Hausman test

Hausman's test differentiates between the fixed and random effects models in panel data analysis. If the p-value of the test is more than 0.05, the random effects model is the best to represent the data, and vice versa.

Table (3) presents the Hausman test results. STATA 17 program is used for data analysis, as illustrated in the empirical study and hypothesis testing section.

Table (3): Hausman test Results

Research Model	*chi2*	p-value	Result
$Model_1$	12.887	0.301	Random
$Model_{1AGST}$	2.185	0.781	Random
$Model_{1DFST}$	6.159	0.529	Random
$Model_2$	62.568	0.000	Fixed
$Model_{2AGST}$	1.202	0.996	Random
$Model_{2DFST}$	15.432	0.164	Random
$Model_3$	14.114	0.227	Random
$Model_{3AGST}$	4.344	0.921	Random
$Model_{3DFST}$	2.033	0.529	Random

3.4.2. Regression validity tests

After determining the best data representation model, the proposed regression models are subjected to three tests to ensure their validity and acceptability to select the most suitable statistical analysis tools as follows:

a) Jarque–Bera test

The skewness and kurtosis of the sample data are examined using the Jarque-Bera test to determine whether they conform to a normal distribution. If the Jarque–Bera test p-value is more than 0.05, data are consistent with skewness and excess kurtosis and are normally distributed.

a) Wooldridge test

Wooldridge's test for panel data is robust because it works with lesser assumptions about heterogeneous individual effects (Wooldridge, 2002). Fixed and random effects estimators require no serial correlation. If the Wooldridge test p-value is more than 0.05,

indicating no autocorrelation problem affects the study model accuracy and vice versa.

Table (4): Results of the Jarque–Bera, Wooldridge, and White tests

Models	Jarque–Bera test			Wooldridge test			White's test		
	Test Statistic	p-value	Result	*F-test*	p-value	Result	*chi2*	p-value	Result
$Model_1$	0.876	0.891	Sample data skewness and kurtosis match the normal distribution.	3.373	0.652	Absence of autocorrelation of error terms	61.28	0.877	Homoskedasticity of the variance error term
$Model_{1AGST}$	0.736	0.757		1.621	0.619		87.26	0.661	
$Model_{1DFST}$	0.529	0.550		2.857	0.491		75.35	0.943	
$Model_2$	0.645	0.636		3.714	0.491		77.52	0.658	
$Model_{2AGST}$	0.635	0.656		3.470	0.821		88.64	0.152	
$Model_{2DFST}$	0.763	0.784		3.576	0.529		97.20	0.051	
$Model_3$	0.769	0.781		0.438	0.921		79.65	0.586	
$Model_{3AGST}$	0.736	0.757		1.320	0.814		93.45	0.085	
$Model_{3DFST}$	0.635	0.656		2.033	0.529		79.85	0.198	

b) White test

White's test allows checking for heteroscedastic errors in regression analysis. Like the Breusch-Pagan test, the White test examines if the independent variable affects error variance non-linearly. If the test p-value is more than 0.05, it indicates no heteroskedasticity issues with the study models and vice versa.

Table (4) results indicate no worry about linearity as the residuals are normally distributed. Furthermore, the regression validity tests also show Homoskedasticity of the variance error term and the absence of error term autocorrelation, leading to the acceptance of the study's proposed regression models.

4. Empirical Results and Discussions

This section introduces the empirical study results and the testing of hypotheses reached through the application of various statistical

analyses. In addition, the interpretation of the study results is also presented.

4.1. Descriptive Analysis

Table (5) shows descriptive statistics of study variables and sample characteristics as follows:

- The mean values of the REM indicators, RM_{PROD}, RM_{DISX}, and RM_{AGG}, are 0.497, -0.008, and 0.489, respectively, with StdDev of 0.509, 0.069, and 0.509, showing that the REM at the individual and aggregate indicators are distinct and consistent with prior research. It also shows that the degree of REM of listed firms highly varies across firms.
- The average value of managerial ability is 1.081, with a StdDev of 1.596, which indicates an increasing managerial ability level among study sample managers. The managerial ability ranges from -1.403 to 4.868 indicating significant differences between the study sample firms.
- The mean value of the business strategy (BusSt) is 15.145, with a StdDev of 3.462, suggesting sample firms have a neutral business strategy. The business strategy minimum value is 5, and the maximum value is 23.
- Turning to control variables, financial leverage (LEV) ranges from 0.143 to 0.864 with a mean of 0.553 with a StdDev of 0.189, which indicates that the study sample, on average, has a high indebtedness.
- The Z-score is a formula for forecasting a firm's likelihood of insolvency. Z-score ranges from 0.222 to 8.449 with a mean of 2.515 with a StdDev of 1.63, highlighting key dissimilarities among the study sample firms. The higher the score, the less likely of failure. A score below 1.23 (1.1 for non-manufacturing) implies a high probability of failure, while a score closer to 2.9

(2.6 for non-manufacturing) suggests a solid financial positioning. A score between the two is a grey area indicating that risk is there but not highly significant.

- Sales growth (SGR) ranges from -6.099 to 5.013 with a mean of 0.216 with a StdDev of 0.809; similarly, the market-to-book value (MTB) ratio ranges from -5.071 to 76.925 indicating significant differences between the study sample firms.
- Significant differences in ATO across firms, with an average of 0.884, a StdDev of 0.719, a minimum value of 0.105, and a maximum value of 4.011, indicating that not all Egyptian firms adopt a cost leadership strategy.

Table (5): Descriptive Statistics

Variable	***Obs***	***Mean***	***StdDev***	***Min***	***Max***
RM_{PROD}	220	0.497	0.509	-0.144	2.867
RM_{DISX}	220	-0.008	0.069	-0.285	0.241
RM_{AGG}	220	0.489	0.509	-0.194	3.108
ManAbility	220	1.081	1.596	-1.403	4.868
BusSt	220	15.145	3.462	5	23
Z-Score	220	2.515	1.63	0.222	8.449
ATO	220	0.884	0.719	0.105	4.011
LEV	220	0.553	0.189	0.143	0..864
ROA	220	0.05	0.077	-0.174	0.296
SIZE	220	21.964	1.501	18.834	25.656
SGR	220	0.216	0.809	-6.099	5.013
MTB	220	2.457	6.468	-5.071	76.925
Age	220	2.745	0.751	0.000	3.689
Big4	***Dummy***		***Freq.***		***Ratio***
	Coded 0		84		38*%*
	Coded 1		136		62*%*

- Return on assets (ROA) ranges from -0.174 to 0.296, with a mean value of 0.048, an indicator of the sample accounting performance. Firm size (SIZE) ranges from 18.834 to 25.656, averaging 21.964, indicating that the sample contains large firms.

- 62% of the study sample, one of the big4 firms or accountability audits their financial reports.

4.2. Difference Test

Table (6) presents the prospector and defending firms' difference test. Business strategies divide firms into two categories. A firm is a defender if its business strategy's mean value is less than its industry's (120 observations). A company is a prospector if its business strategy's mean value is higher than the industry's (100 observations).

Table (6): Difference Test

	Prospectors Business Strategy		***Defenders Business Strategy***		**T-statistics**	**p-value**
	Obs.	***Mean***	**Obs.**	***Mean***		
RM_{PROD}	100	0.474	120	0.516	1.986*	0.047
RM_{DISX}	100	0.001	120	-0.015	-4.660***	0.000
RM_{AGG}	100	0.475	120	0.501	2.400**	0.017
BusSt	100	0.571	120	0.588	-10.252**	0.000
ManAbility	100	17.41	120	13.26	-2.397*	0.016
Z-Score	100	2.431	120	2.585	0.186	0.853
ATO	100	0.828	120	0.930	0.440	0.661
LEV	100	0.542	120	0.563	0.884	0.378
ROA	100	0.059	120	0.042	-2.036*	0.043
SIZE	100	21.845	120	22.064	2.495*	0.013
SGR	100	0.207	120	0.225	0.269	0.788
MTB	100	2.655	120	2.292	-0.206	0.837
Age	100	2.594	120	2.871	2.892**	0.004
Big4	00	0.65	120	0.59	-10.252**	0.000
** *p<.01*, * *p<0.05*						

Table (6) shows that the significance level of the REM proxies of variables RM_{PROD}, RM_{DISX}, and RM_{AGG} is less than 5%, indicating differences between the firms based on the two categories of business strategies. Likewise, the p-value of the t-statistics of managerial ability (ManAbility), return on assets (ROA), and firm size (Size) is

less than 5%, which indicates that there are differences between firms based on business strategies.

4.3. Correlation Analysis

The univariate analysis determines the correlation between the variables using the Pearson Correlation coefficient. Coefficients are shown above, and p-values below as shown in Table (7).

Table (7): Pearson Correlation Matrix

Variables	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11	-12	-13	-14
(1) M_{PROD}	1													
(2) RM_{DISX}	.309**	1												
	0.000													
(3) RM_{AGG}	.992**	.424**	1											
	0.000	0.000												
(4) *BusSt*	-0.062	-0.372**	-0.113**	1										
	0.358	0.000	0.005											
(5) *Man Ability*	-0.009	-0.113	-0.023	-0.094	1									
	0.897	0.003	0.737	0.166										
(6) *Z-Score*	0.287*	-0.211*	0.316*	-0.049	0.490*	1								
	0.000	0.002	0.000	0.474	0.000									
(7) *ATO*	.192**	0.076	.193**	-.190**	.775**	.531**	1							
	0.004	0.264	0.004	0.005	0.000	0.000								
(8) *LEV*	-.135*	-0.062	-.137*	-0.011	-0.121	-.717**	-0.124	1						
	0.045	0.357	0.043	0.877	0.074	0.000	0.066							
(9) *ROA*	0.034	-.139*	0.015	0.093	.487**	.652**	.440**	-.461**	1					
	0.612	0.040	0.827	0.168	0.000	0.000	0.000	0.000						
(10) *SIZE*	-.444**	-.230**	-.453**	0.020	-.142*	-.399**	-.262**	.347**	0.007	1				
	0.000	0.001	0.000	0.770	0.036	0.000	0.000	0.000	0.920					
(11) *SGR*	0.033	-0.063	0.023	.176**	0.110	-0.016	0.039	0.065	.155*	0.087	1			
	0.631	0.352	0.736	0.009	0.103	0.815	0.569	0.334	0.021	0.199				
(12) *MTB*	0.027	0.112	0.040	-0.002	0.124	-0.019	.183**	.196**	-0.063	-0.121	-0.028	1		
	0.690	0.099	0.553	0.974	0.067	0.776	0.007	0.004	0.355	0.073	0.685			
(13) *Age*	-0.003	-0.021	-0.006	-0.045	-0.075	-0.131	-.220**	0.085	-.336**	-.240**	-0.061	-0.004	1	
	0.964	0.755	0.933	0.503	0.270	0.052	0.001	0.210	0.000	0.000	0.365	0.954		
(14) *Big4*	-.249**	-.228**	-.267**	0.109	-0.045	-.192**	-0.029	.137*	0.080	.479**	-0.005	-0.108	-.347**	1
	0.000	0.001	0.000	0.107	0.507	0.004	0.672	0.043	0.235	0.000	0.946	0.111	0.000	
** $p<.01$, * $p<.05$														

Table (7) shows a negative, statistically significant correlation between the REM indicators (RM_{DISX} and RM_{AGG}) and the business strategy (BusSt) at a level of 0.1. with coefficients of -0.372 and -0.113, respectively, which supports hypothesis H2 in its initial form.

The REM indicator RM_{DISX} statistically showed a significant negative correlation with the managerial ability (Man Ability) at a level of 0.01.

According to the control variables, the z-score and the REM indicators (RM_{PROD}, RM_{DISX}, and RM_{AGG}) have a significant positive correlation at 1%. Also z-score positively correlated with managerial ability (ManAbility). This finding demonstrates that firms with solid financial positioning are more likely to participate in REM, and higher-ability managers firms have a stable financial positioning.

Table (7) shows that abnormal production (RM_{PROD}) and aggregate REM (RM_{AGG}) are positively correlated with asset turnover (ATO) and negatively correlated with financial leverage (LEV), firm size (SIZE), and the Big4. However, abnormal discretionary spending (RM_{DISX}) negatively correlates with the Z-Score, a firm size (SIZE), Big4, and return on assets (ROA). Table (7) also presents the correlation between all other variables.

4.4. Multicollinearity Diagnostics

The Variance Inflation Factor (VIF) test ensures no multicollinearity among the study's independent variables. Multicollinearity can lead to imprecise regression coefficients, failure to reach statistical significance, changing coefficient signs, and suboptimal models (Asteriou *et al.*, 2016).

Table (8) details collinearity diagnostics for all variables included in the study models. VIF values are less than ten, showing no multicollinearity probability between the independent variables. Likewise, Tolerance values for each variable are acceptable as all values are more than 0.10, meaning no multicollinearity between such variables was found.

Table (8): Results of Collinearity Statistics

	Models (1-3)		*Models (1-3)* $_{AGST}$		*Models (1-3)* $_{DFST}$	
	VIF	**Tolerance**	**VIF**	**Tolerance**	**VIF**	**Tolerance**
Man Ability	2.975	0.336	4.422	0.226	2.994	0.334
BusSt	1.157	0.864	1.230	0.813	1.436	0.696
Z-Score	4.436	0.225	7.261	0.138	3.61	0.277
ATO	3.602	0.278	8.503	0.118	3.423	0.292
LEV	2.830	0.353	6.258	0.160	2.546	0.393
ROA	2.509	0.399	5.302	0.189	1.830	0.547
SIZE	1.897	0.527	2.318	0.431	2.678	0.373
SGR	1.102	0.908	1.236	0.809	1.209	0.827
MTB	1.137	0.880	1.247	0.802	1.163	0.860
Age	1.429	0.700	3.11	0.322	1.366	0.732
Big4	1.481	0.675	1.523	0.657	2.185	0.458

4.5. Regression Analysis - Tests of Hypotheses

4.5.1. Results of Testing Hypotheses (H1 and H2)

This section explains the empirical results of the regression analysis and their interpretations. The models examine how managerial ability and business strategy affect REM practices. This study replicated the empirical analysis using three-panel regression models, Models (1-3). REM indicators (RM_{PROD}, RM_{DISX}, and RM_{AGG}) replace each Model's dependent variable.

According to the Hausman test results in Table (3), the fixed effects model is best for Model 2, and the random effects model is best for Models (1 and 3). Table (9) shows the panel regression model findings. The F-value on Model 2 and Wald tests (Chi2) on Models (1 and 3) show substantial explanatory powers and are highly significant at 0.01; this suggests that the three regression models are accepted. Additionally, the R2 of the three models are 0.244, 0.297, and 0.276, respectively, which indicates that managerial ability, business strategies, and control variables may account for 24.4%, 29.7%, and

27.6% of the REM indicators (RM_{PROD}, RM_{DISX}, and RM_{AGG}) in Egyptian firms.

Table (9): Regression Analysis Results (*Models 1-3*)

	RM$_{PROD}$		***RM$_{DISX}$***		***RM$_{AGG}$***	
	Coef.	**p-value**	**Coef.**	**p-value**	**Coef.**	**p-value**
Man Ability	-0.367**	0.037	-0.162**	0.016	-0.421***	0.001
BusSt	-0.064***	0.009	-0.003***	0.000	-0.010***	0.005
Z-Score	0.106***	0.003	0.005	0.352	0.114***	0.002
ATO	0.106	0.154	-0.042***	0.000	0.073	0.331
LEV	0.688***	0.008	0.023	0.534	0.738***	0.005
ROA	0.612	0.143	0.008	0.885	0.588	0.167
SIZE	-0.117***	0.005	-0.023**	0.030	-0.123***	0.002
SGR	0.020	0.328	-0.006**	0.019	0.015	0.486
MTB	-0.004	0.172	0.001*	0.066	-0.003	0.250
Age	-0.097	0.129	0.024**	0.031	-0.083	0.188
Big4	-0.002	0.986	0.004	0.810	-0.017	0.860
Constant	2.758***	0.004	0.462**	0.049	2.874***	0.002
Models Summary						
Overall R2:	0.244		0.297		0.276	
Chi^2 (F-test):	49.932		(4.845)		47.982	
P-value	0.000		0.000		0.000	
*** $p<.01$, ** $p<.05$, * $p<0.1$						

As predicted, the results show a significant negative association between managerial ability (ManAbility) and REM indicators. Models (1-3), which have coefficient values of -0.367, -0.162, and -0.421, respectively, imply that managerial ability may mitigate REM (RMP_{ROD}, RM_{DISX}, and RM_{AGG}) practices. Such results support hypothesis H1. The significant negative association between managerial ability (ManAbility) and REM is consistent with Huang & Sun (2017), Demerjian *et al.* (2020), and Kumar & Goswami (2021). However, these findings contradict Hussein (2018). Such results may be clarified because higher-ability managers in Egypt may generate more sales revenue for a given set of company resources to exceed earnings targets. In addition, high-ability managers know that REM

negatively affects future firm performance (Cohen & Zarowin, 2010; Roychowdhury, 2006), so they avoid it as managers' decision-making models include opportunity cost. Thus, higher-ability managers better understand their firms' operating environments (Demerjian *et al.*, 2013) and can align REM with reporting strategies. Due to time and effort constraints, more talented managers would focus on normal operations rather than REM.

The findings also show a significant negative association between business strategy (BusSt) and REM indicators (RMP_{ROD}, RM_{DISX}, and RM_{AGG}) at 0.01, Models (1-3). These findings strongly support hypothesis H2. Such results can be interpreted by prospectors acquiring a competitive edge over defenders through strategic marketing and R&D budgets (Rahman *et al.*, 2021). In addition, investors are more conservative regarding cutting SG&A costs for fear of damaging future competitive advantage. This is necessary if sales growth and economic benefits are to be maintained or increased (Ballas *et al.*, 2020).

For control variables, the results show a significant positive influence of z-score on the REM indicators (RM_{PROD} and RM_{AGG}) at 1%. The Z-score is a formula for forecasting a firm's likelihood of insolvency. The higher the score, the less likely of failure. This finding demonstrates that firms with solid financial positioning are more likely to participate in REM.

As expected, firm size (SIZE) negatively affects REM proxies (RMP_{ROD}, RM_{DISX}, and RM_{AGG}). These findings agree with the political costs hypothesis in the positive accounting theory, as big-size firms are less likely to use accounting discretion to manage earnings as political costs rise (Watts and Zimmerman, 1978, 1986). Likewise, the findings show that financial leverage (LEV) is positively associated with RM_{PROD} and RM_{AGG}. These findings agree with the debt covenant hypothesis in the positive accounting theory. In high-leverage firms, the managers shift future incomes to the current period

to increase net income and minimize technical problems to avoid debt covenant violations (Watts and Zimmerman, 1978, 1986).

Moreover, RM_{DISX} is positively influenced by company age (Age) and negatively affected by assets turnover (ATO) and the sales growth rate (SGR). However, the results indicate an insignificant impact of the return on assets (ROA) and market-to-book equity ratio (MTB) on REM. In addition, audit quality (Big4) is not associated with REM indicators which is inconsistent with Huang & Sun (2017). Such results may be explained by the fact that REM is unlikely to be caught by auditors and regulators as they view it as less risky and scrutinized than AEM (Cohen *et al.*, 2008).

Based on Table (9), regression models for hypotheses (H1 and H2) can be formed to show how managerial ability and business strategy affect the probability of REM in the presence of control variables as follows:

$Model_1$

$$RM_{PROD} = \mathbf{2.758} + \mathbf{-0.367\ ManAbility_{it}} + \mathbf{-0.064\ BusSt_{it}} + \mathbf{0.106\ Z\text{-}score_{it}} + 0.106\ ATO_{it} + \mathbf{0.688\ LEV_{it}} + 0.612\ ROA_{it} + \mathbf{-0.117\ Size_{it}} + 0.020\ SGR_{it} + -0.004\ MTB_{it} + -0.097\ Age_{it} + -0.002\ Big4_{it} + \varepsilon_{it}$$

$Model_2$

$$RM_{DISX} = \mathbf{0.462} + \mathbf{-0.162\ ManAbility_{it}} + \mathbf{-0.003\ BusSt_{it}} + 0.005\ Z\text{-}score + \mathbf{-0.042\ ATO_{it}} + 0.023\ LEV_{it} + 0.008\ ROA + \mathbf{-0.023\ Size_{it}} + \mathbf{-0.006\ SGR_{it}} + \mathbf{0.001\ MTB_{it}} + \mathbf{0.024\ Age_{it}} + \beta_{11}\ Big4_{it} + \varepsilon_{it}$$

$Model_3$

$$RM_{AGG} = \mathbf{2.874} + \mathbf{-0.421\ ManAbility_{it}} + \mathbf{-0.010\ BusSt_{it}} + \mathbf{0.114\ Z\text{-}score} + 0.073\ ATO + \mathbf{0.738\ LEV} + 0.588\ ROA + \mathbf{-0.123\ Size} + 0.015\ SGR + -0.003\ MTB + -0.083\ Age + -0.017\ Big4_{it} + \varepsilon_{it}$$

4.5.2. Results of Testing Hypothesis (H3)

Table (10) shows the regression results for the prospector and defensive firms individually. The results show a significant negative association between the prospector's business strategy and REM indicators, as shown by the coefficient values of -0.306, -0.005, and -0.011 for RM_{PROD}, RM_{DISX}, and RM_{AGG} at the level of 5%. However, the results for defender firms are positive but insignificant. These results support hypothesis H3 and comply with the results of (Wu *et al.* 2015; Robiansyah *et al.*, 2020; Herusetya *et al.*, 2023) that firms with a prospector business strategy are less prone to perform REM than those with a defender strategy. These findings may be explained by the prospector's overproduction technique being more complicated than the defenders' due to the size and diversity of their product area. Hence, utilizing REM activities at the individual and aggregate levels is less flexible for the prospectors than for the defenders (Herusetya *et al.*, 2023). In addition, due to market and product maturity, defenders can more accurately measure their success.

The findings also show a significant positive impact of managerial ability (ManAbility) on the RM_{DISX} in firms engaging in prospector business strategies at 1% and insignificant with the other REM indicators. However, in firms engaging in defender business strategies, the findings indicate a significant negative impact of managerial ability (ManAbility) on the REM indicators RM_{PROD}, RM_{DISX}, and RM_{AGG} at the level of 1% in firms engaging in defensive business strategies with coefficient values of -0.836, -0.155 and -0.782, respectively. The results support the efficiency hypothesis as higher-ability managers in defender firms know that REM negatively affects future firm performance (Cohen & Zarowin, 2010; Roychowdhury, 2006), so they avoid it (Holcomb *et al.*, 2009).

Table (10): Regression Analysis Results for Prospector and Defender Firms

Panel A: Prospector Strategy firms, Obs. 100, *Models (1-3)* $_{AGST}$						
	RM_{PROD}		RM_{DISX}		RM_{AGG}	
	Coef.	***p-value***	***Coef.***	***p-value***	***Coef.***	***p-value***
Man Ability	-0.064	0.773	0.078***	0.007	0.001	0.997
BusSt -AGST	-0.306*	0.053	-0.005***	0.000	-0.011**	0.047
Z-Score	-0.035	0.701	0.020	0.971	-0.031	0.732
ATO	0.043	0.792	-0.079***	0.000	-0.038	0.814
LEV	0.223	0.687	-0.116	0.123	0.121	0.823
ROA	1.680**	0.019	0.084	0.374	1.755**	0.013
SIZE	-0.162***	0.006	0.004	0.663	-0.162***	0.004
SGR	-0.008	0.750	-0.004	0.198	-0.011	0.644
MTB	-0.008*	0.097	0.001*	0.058	-0.006	0.160
Age	-0.005	0.950	-0.001	0.967	-0.006	0.942
Big4	0.048	0.683	0.003	0.836	0.046	0.687
Constant	3.994***	0.004	0.053	0.797	4.115***	0.002
Models Summary						
Overall R^2:	0.211		0.301		0.217	
Chi^2:	20.386		57.909		19.754	
P-value:	0.040		0.000		0.0488	
Panel B: Defenders Strategy firms, Obs. 120, *Models (1-3)* $_{DFST}$						
	RM_{PROD}		RM_{DISX}		RM_{AGG}	
	Coef.	***p-value***	**Coef.**	**p-value**	***Coef.***	***p-value***
Man Ability	-0.836***	0.008	-0.155***	0.000	-0.782**	0.012
BusSt - DFST	0.010	0.371	0.001	0.539	0.009	0.467
Z-Score	0.115***	0.005	0.019***	0.001	0.126***	0.002
ATO	0.185*	0.052	0.036***	0.003	0.170*	0.082
LEV	0.622**	0.046	0.085**	0.026	0.729**	0.023
ROA	0.485	0.388	-0.018	0.795	0.429	0.462
SIZE	-0.123**	0.042	-0.043***	0.001	-0.135**	0.024
SGR	0.062	0.125	-0.016***	0.001	0.047	0.265
MTB	-0.002	0.607	0.050	0.878	-0.002	0.602
Age	-0.324***	0.004	0.048**	0.014	-0.312***	0.005
Big4	0.019	0.912	-0.019	0.346	-0.021	0.899
Constant	3.666**	0.011	0.185	0.274	3.847***	0.007
Models Summary						
Overall R^2:	0.316		0.208		0.384	
Chi^2:	47.755		27.099		46.588	
P-value:	0.000		0.004		0.000	
*** $p<.01$, ** $p<.05$, * $p<0.1$						

Concerning the control variables, for prospector business strategy firms, REM indicators (RM_{PROD} and RM_{AGG}) are significantly negatively influenced by firm size (SIZE) at 1% and significantly positively by return on assets (ROA) at 5%. Likewise, the REM indicator (RM_{DISX}) is significantly negatively influenced by assets turnover (ATO) and significantly positively by the market-to-book equity ratio (MTB) at 1%.

Moreover, for defender business strategy firms, the findings show that Z-Score, assets turnover (ATO), and financial leverage (LEV) have a significant positive impact on REM indicators (RM_{PROD}, RM_{DISX}, and RM_{AGG}) at 5%. However, firm age (Age) significantly negatively impacts REM indicators (RM_{PROD}, RM_{DISX}, and RM_{AGG}) at 1%.

Hypothesis H3 regression models for REM indicators (RM_{PROD}, RM_{DISX}, and RM_{AGG}) are possible based on Table (10). The following are the regression models for hypothesis H3 related to declining production costs by overproducing inventory (RM_{PROD}) as a proxy for REM:

Model$_{1AGST}$:

$$RM_{PROD} = \mathbf{3.994} + -0.064\,\text{Man Ability}_{it} + \mathbf{-0.306\ AGST_{it}} + -0.035\ \text{Z-score}_{it} + 0.043\ ATO_{it} + 0.223\ LEV_{it} + \mathbf{1.68\ ROA_{it}} + \mathbf{-0.162\ Size_{it}} + -0.008\ SGR_{it} + \mathbf{-0.008\ MTB_{it}} + -0.005\ Age_{it} + 0.048\,Big4_{it} + \varepsilon_{it}$$

Model$_{1DFST}$:

$$RM_{PROD} = \mathbf{3.666} + \mathbf{-0.836}\,\textit{Man Ability}_{it} + 0.01\ DFST_{it} + \mathbf{0.115}\ \textit{Z-score}_{it} + \mathbf{0.185}\ \textit{ATO}_{it} + \mathbf{0.622}\ \textit{LEV}_{it} + 0.485\ ROA_{it} + \mathbf{-0.123}\ \textit{Size}_{it} + 0.062\ SGR_{it} + 0.062\ MTB_{it} + \mathbf{-0.324}\ \textit{Age}_{it} + 0.019\,Big4_{it} + \varepsilon_{it}$$

Hypothesis H3 regression models related to reducing discretionary expenditures such as R&D, advertising, and SG&A costs (RM_{DISX}) as a proxy for REM are as follows:

Model$_{2AGST}$:

$$RM_{DISX} = 0.053 + \mathbf{0.078\ Man\ Ability_{it}} + \mathbf{-0.005\ AGST_{it}} + 0.020\ Z\text{-}score_{it} + \mathbf{-0.079\ ATO_{it}} + -0.116\ LEV_{it} + 0.084\ ROA_{it} + 0.004\ Size_{it} + -0.004\ SGR_{it} + \mathbf{0.001\ MTB_{it}} + -0.001\ Age_{it} + 0.003\ Big4_{it} + \varepsilon_{it}$$

Model$_{2DFST}$:

$$RM_{DISX} = 0.185 + \mathbf{-0.155\ Man\ Ability_{it}} + 0.001\ DFST_{it} + \mathbf{0.019\ Z\text{-}score_{it}} + \mathbf{0.036\ ATO_{it}} + \mathbf{0.085\ LEV_{it}} + -0.018\ ROA_{it} + \mathbf{-0.043\ Size_{it}} + \mathbf{-0.016\ SGR_{it}} + 0.050\ MTB_{it} + \mathbf{0.048\ Age_{it}} + -0.019\ Big4_{it} + \varepsilon_{it}$$

The following are the regression models for hypothesis H3 using aggregate REM (RM_{AGG}), which is measured according to the sum of declining production costs and abnormal discretionary expenditures to represent the total effects of the two REM individual proxies (RM_{AGG}) as a proxy for REM:

Model$_{3AGST}$:

$$RM_{AGG} = \mathbf{4.115} + 0.001 Man\ Ability_{it} + \mathbf{-0.011\ AGST_{it}} + -0.031\ Z\text{-}score_{it} + -0.038\ ATO_{it} + 0.121\ LEV + \mathbf{1.755\ ROA_{it}} + \mathbf{-0.162\ Size_{it}} + -0.011\ SGR_{it} + -0.006\ MTB_{it} + -0.006\ Age_{it} + 0.046\ Big4_{it} + \varepsilon_{it}$$

Model$_{3DFST}$:

$$RM_{AGG} = \mathbf{3.847} + \mathbf{-0.782 Man\ Ability_{it}} + 0.009\ DFST_{it} + \mathbf{0.126\ Z\text{-}score_{it}} + \mathbf{0.170\ ATO_{it}} + \mathbf{0.729\ LEV_{it}} + 0.429\ ROA_{it} + \mathbf{-0.135\ Size_{it}} + 0.047\ SGR_{it} + -0.002\ MTB_{it} + \mathbf{-0.312\ Age_{it}} + -0.021\ Big4_{it} + \varepsilon_{it}$$

5. Conclusions

This study examines how managerial ability and a firm's business strategy typology affect real earnings management practices in Egyptian firms, which extends the research on earnings management by investigating whether the business strategy is a factor. Forty-four non-financial firms from the EGX-100 index were sampled to create 220 balanced observations covering 2017 - 2021. The study used three

real earnings management proxies as individual and aggregate indicators based on Roychowdhury (2006). The study followed Miles and Snow's (2003) to classify firms into defender and prospector strategies. It also used Bentley *et al.*'s (2013) composite strategy index as a proxy for a firm's business strategy. Managerial ability is measured using the DEA-Tobit approach established by Demerjian *et al.* (2012). Panel regression models using fixed and random effects models were then used for data analysis.

The results indicate a significant negative association between managerial ability and real earnings management preference at the individual and aggregate levels. The findings also show that firms with prospector strategies are less prone to engage in REM than those with defender strategies. Likewise, the results show a significant positive influence of the Z-score on the preference for REM. Additionally, results are consistent with the positive accounting theory's political costs and debt covenant hypotheses. Where firm size (SIZE) negatively affects REM proxies as big-size firms are less likely to use accounting discretion to manage earnings as political costs rise (Watts and Zimmerman, 1978, 1986). Also, financial leverage (LEV) is positively associated with REM proxies. High financial leverage firms motivate managers to shift future incomes to the current period to increase net income and minimize technical problems for a firm that violates debt covenant (Watts and Zimmerman, 1978, 1986).

For firms engaging in prospector business strategies, firm size (SIZE) significantly negatively impacts real earnings management, whereas the return on assets (ROA) has a significant positive effect. For firms engaging in defender business strategies, Z-score, assets turnover (ATO), and financial leverage (LEV) significantly impact real earnings management. However, firm age (Age) significantly negatively impacts real earnings management.

This study links organizational and market competition theories from management literature and earnings management from

accounting literature to analyze business strategy and REM. Based on existing literature, there have been limited research studies on the impact of business strategy on real earnings management practices in general. However, no studies have investigated such a relationship in Egypt or Middle Eastern countries. Furthermore, studies investigating how managerial ability affects real earnings management practices have been rare in Egypt. Therefore, this study supports the idea that contingency theory might explain why some organizations prefer certain real earnings management practices over others.

Finally, this study helps investors assess the firm's investment potential by analyzing its business strategy, which is expected to promote REM activities that negatively influence the firm. The study provides an overview of REM determinants to assist Egyptian stakeholders in making decisions and investing in less-risk firms. The study will also help investors to understand the REM of the Egyptian Stock Exchange, mitigate it through management and business strategy, and change their investment habits. The findings emphasize the necessity of having high-ability managers and support Francis *et al.*'s (2013; 2022) argument that higher-ability managers engage in less opportunistic behavior.

Future research can address the association between managerial ability and REM in financial organizations. It is also suggested that research be conducted into the moderate influence of ownership structure on the relationship between management ability and REM. Similarly, research is being conducted on the moderating effect of ownership structures on the association between business strategies and REM. An investigation on how management ability influences stock liquidity for Egyptian Stock Exchange-listed companies. Finally, the influence of ownership concentration on the relationship between management ability and stock liquidity in Egyptian Stock Exchange-listed companies.

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