The Joint Effect of Earnings Management and Efficiency of Cash Management on Firms' Financial Well-being: Evidence from Egypt

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Abstract

Purpose – This study investigates the association between earnings management (EM) and the efficiency of cash management (ECM) as well as the extent to which this relationship affects a firm's financial well-being (FWB).

Design/methodology/approach – Using fixed-effects models and quarterly financial statements of 178 non-financial firms, this study analyses 3,376 firm-quarter observations listed on the Egyptian stock market from 2005 to 2019.

Findings—The empirical findings suggest that optimal cash holdings and cash holding excess increase with lower real earnings management (REM) of operating activities or higher accrual earnings management (AEM). This relationship positively impacts firms' FWB but is negatively influenced by REM.

Originality/value: This study examines the impact of sales manipulation and overproduction on cash holdings. This is also the first study to explore how managerial discretion over both earnings and excess cash holdings influences a firm's FWB. This study provides new empirical evidence of the joint effects of managerial opportunism in earnings and cash management on a firm's financial health.

Keywords: Accrual earnings management, cash holding excess, real earnings management, optimal cash holdings, financial well-being.

Paper type: Research paper

1. Introduction

Pass and Pike (1984, p. 2) suggest that "to increase the profitability of a company and to ensure that it has sufficient liquidity to meet short-term obligations as they fall due, thereby continuing in business, it is essential to effectively manage cash holdings and operational efficiencies." In the short term, managers may engage in EM, which refers to the opportunistic manipulation of financial statements through AEM or REM (Afifa et al., 2021; Bisogno and Donatella, 2022; Healy and Wahlen, 1999; Kayed and Meqbel, 2024; Ngo and Nguyen, 2024). These strategies can erode stakeholders' confidence in the financial reporting process and adversely affect economic resource allocation (Soon and Wee, 2011). Managers often pursue financial reporting using EM to mislead stakeholders into believing in certain financial reporting goals (Roychowdhury, 2006). However, this can potentially lead to inefficiencies and conflicts of interest between managers and shareholders, mainly the free cash flow problem, in which excess cash is available to managers to use at their discretion (Jensen, 1986), and issues related to maintaining liquidity to ensure operational efficiency (Opler et al., 1999).

Based on both Positive Accounting Theory and Agency Theory, separation between managers and ownership increases the problem of information asymmetry, incentivizing managers to behave opportunistically to maximize their interests and welfare at the expense of shareholders' wealth maximization. Managers may engage in EM and use accounting discretion over accruals to opportunistically alter reported earnings and align with earnings targets (Jensen and Meckling, 1976; Watts and Zimmerman, 1986). This leads to adverse selection between managers and shareholders due to information asymmetry, resulting in higher costs for external financing and a tendency to hold more cash (internal financing) to mitigate perceived risks (Myers and Majluf, 1984; Kim et al., 1998).

Furthermore, pecking-order theory suggests that firms driven by ex-ante information asymmetries hold cash to avoid external financing costs and pursue investment projects, using cash as a buffer between retained earnings and investment needs (Weidemann, 2018; Yun et al., 2021).

On the other hand, managers engage in REM activities, which directly impact cash holdings and lead to moral hazard. This occurs when managers do not act in the best interests of shareholders, resulting in the misuse of free cash flows for personal interests, such as investing in pet projects or empire-building (Bensoussan et al., 2009; Boujelben et al., 2020; Chen, 2008; Greiner, 2017; Salas-Molina et al., 2023). Moreover, holding excess cash can inhibit performance, because it is easy for entrenched managers to reserve liquid assets for their personal ambitions (Yun et al., 2021).

As shown in Appendix A, existing literature pays little attention to the impact of REM based on operating activities, such as overproduction and sales manipulation, on cash holdings. Additionally, the consequences of EM and ECM on firms' financial health remain underexplored. Based on the above discussion, this study aims to explore the impact of managerial opportunism in managing earnings upward, whether through AEM or REM, on the ECM. In addition, this study examines the consequences of the joint effect of EM strategies and excess cash holdings on a firm's FWB.

Consequently, this study aims to fill this gap in existing research by addressing the following research questions:

RQ1: Is there a relationship between EM strategies and ECM?

RQ2: Does opportunistic EM and excess cash holdings positively or negatively affect a firm's FWB?

This study contributes to accounting literature in several important ways. First, it adds to extant empirical research, as shown in Appendix A, by focusing on the relationship between REM activities and cash holding management. To the best of our knowledge, there is limited evidence on this relationship (Chang et

al., 2018; Greiner, 2017). As shown in Appendix A, previous studies have primarily examined irregular activities, such as cutting discretionary expenses like R&D (Chang et al., 2018; Greiner, 2017), accretive stock repurchases, and selectively timed asset sales (Chang et al., 2018). However, the impact of sales manipulation and overproduction, which directly and regularly relate to cash and day-to-day operations, has not been tested thoroughly.

Unlike other EM strategies, REM directly influences a firm's liquidity and financial flexibility. Firms that engage in suboptimal business activities to boost short-term performance do so at the expense of cash holdings. As a result, these firms are more likely to forgo valuable projects, miss out on important investments, and encounter adverse shocks to cash flow. The limitation of this argument is that unproductive liquid assets can exacerbate investment inefficiency (Chang et al., 2018).

This study is the first to explore how managerial discretion over earnings and cash holdings jointly impact a firm’s FWB. While previous studies may not have thoroughly addressed this interplay, this research fills this gap by providing new insights and empirical evidence on the effects of managerial opportunism in earnings and cash management on financial health.

This study provides new evidence from Egypt, a key emerging market in the MENA region (Saleeb Agaiby Bakhiet 2024a). Egypt’s unique context, shaped by significant economic reforms, frequent economic and political shocks, and evolving accounting and auditing practices influenced by legal, cultural, and governmental factors (Abdel-Meguid, 2021; Ebaid, 2016; Farghaly et al., 2024), offers a valuable setting to explore managerial behaviour. Unlike developed economies, Egypt’s financial markets, corporate governance, and investor protection mechanisms are in their early stages (Saleeb Agaiby Bakhiet, 2024b). By addressing an underrepresented market, this study fills a gap in accounting literature and provides globally relevant insights for other emerging economies.

The findings of this study support the adverse selection and moral hazard hypotheses, showing that firms engage in REM, impairing ECM by reducing their cash reserves and risking short-term obligations. While AEM may increase cash holdings, it also harms ECM by retaining excess cash that could be more profitably invested. Consistent with Faulkender and Wang (2006), cash reserves enable firms to invest in long-term projects, avoid external financing, reduce financial distress costs, and maintain flexibility in seizing opportunities (Zhao et al., 2023).

This study results have two important implications for standards regulators and decision makers. First, the findings provide valuable insights into the interrelationship between opportunistic EM and EFM and the resulting financial health consequences. For corporate governance practices, this highlights the need for stricter oversight and monitoring of managerial discretion in EM to prevent decisions that could harm a firm's long-term viability. For regulatory policies, especially in emerging markets where regulation might be underdeveloped, these findings suggest that standards regulators should be more proactive in creating policies that limit EM's scope of EM.

Second, the study sheds light on the impact of accounting discretion in terms of managerial efforts to alter reported earnings and the implications for short-term working capital management and ECM. Such practices can erode stakeholders' trust in financial reporting by distorting financial statements and undermining their confidence in their integrity.

The remainder of this paper is organized as follows: Section 2. covers the literature review and hypothesis development. Section 3 presents the research design. Section 4 discusses the empirical findings. Finally, Section 5 concludes the paper.

2. Literature review and hypotheses development

2.1 Accrual earnings management and efficiency of cash management

Drawing on the agency theory, cash reserves can trigger managerial agency problems by using cash reserves for empire-building for personal interests. This embraces the potential for the high agency costs associated with cash holdings and can be aggravated by the presence of information asymmetry (Mansali et al., 2019).

Under the information asymmetry hypothesis, firms with poor earnings quality[2] tend to accumulate excess cash, possibly as a buffer against information asymmetry, that can lead shareholders to doubt the motivations behind cash management decisions made by managers (Farinha et al., 2018). Furthermore, Almeida et al. (2004) show that financially constrained firms, where investors lack complete information about a company's financial health, tend to accumulate more internally generated cash flows to manage operations to mitigate the effects of financial constraints, as these firms face difficulty raising costly external funding due to investor scepticism.

García-Teruel and Martínez-Solano (2009) suggest that firms with higher-quality accounting information in the form of accrual quality tend to hold higher cash levels to mitigate the negative effects of information asymmetry and adverse selection costs, ultimately allowing them to manage their cash holdings more effectively. In addition, Harford et al. (2014) find that managers in the U.S. with weaker governance control tend to have smaller cash reserves. Moreover, Farinha et al. (2018) found that the information conveyed by earnings quality is a more important determinant of cash reserve levels for the UK Main market firms than for AIM firms, where the level of financial disclosure and oversight is lower. Similarly, Ferreira and Vilela (2004) show that firms with higher information

[2] The terms 'accrual quality,' 'earnings quality,' and 'accounting information quality' refer to managers' involvement in accrual earnings management to manipulate earnings. Based on this, lower discretionary accruals indicate higher quality.

asymmetry and lower financial disclosure tend to hold more cash. Overall, the results suggest that cash balances are positively influenced by greater information asymmetries arising from poor earnings quality, lower levels of regulatory oversight, and the occurrence of losses. Firms with higher earnings opacity benefit from higher cash holdings in order to avoid relying on costly external funding.

In contrast, Sun et al. (2012) find that poor earnings quality negatively impacts the value of corporate cash holdings while simultaneously positively impacting the level of cash reserves, suggesting that the negative effect of poor earnings quality may offset the positive effect of excess cash on firm value.

Based on these findings, the prediction, referred to as the ***Adverse Selection Hypothesis***, is that firms that signal growth opportunities and reduce information asymmetry may engage in higher levels of AEM to alter reported earnings and hold higher levels of cash reserves justified with higher reported earnings. This precautionary strategy helps mitigate the effects of information asymmetry related to the costs of external financing and ensures financial flexibility.

Based on this argument, the first hypothesis is as follows:

H1: AEM is positively associated with optimal cash holding level and cash holding excess.

2.2 Real earnings management and efficiency of cash management

Focusing on REM activities, Greiner (2017) shows that aggressive REM to increase earnings through aggressive cuts in discretionary expenses, which allows managers to report higher earnings, is positively associated with higher cash holdings. In addition, firms with aggressive RAM and higher cash holdings tend to spend more on future investments.

Similarly, Chang et al. (2018) show that managers, to meet or beat consensus analyst forecasts, engage in REM activities related to cash flows from operating (discretionary expenditure reductions), investing (selectively timed asset sales), and financing activities (stock repurchases). These activities may impair the value

of cash holdings, supporting the agency costs of cash holdings caused by entrenched investments, instead of distributing them to shareholders.

Based on these findings, the prediction—referred to as the *Moral Hazard Hypothesis*— posits that firms may engage in operational REM activities to pursue personal interests by boosting reported earnings and meeting short-term goals. However, this behaviour might impair the value of cash holdings due to suboptimal investments or personal empire-building, which raises the agency cost problem in conveying their prospects for future performance. *Drawing on this argument, the second hypothesis is as follows:*

H2: REM is negatively associated with the optimal cash holding level and cash holding excess.

2.3 Earnings management, efficiency of cash management, and firms' financial well-being:

Prior research implies that firms in financial distress might boost their cash holdings to mitigate the risk of default and ensure that they have sufficient cash reserves to meet their obligations (Guney et al., 2003; Ferreira and Vilela, 2004; Ozkan and Ozkan, 2004). By contrast, Kim et al. (1998) argues that firms with a greater likelihood of financial distress might have lower liquidity levels because they use any available liquid resources to pay off their debts. According to Easterbrook (1984), managers may prioritize their interests over shareholders by maintaining large cash reserves to reduce net debt, risk, and/or dividend levels. Li, et al. (2020) point out that Chinese-listed firms with a higher level of financial distress conduct more AEM but less REM.

Extending to the positive accounting theory and agency theory, managers engage in AEM to inflate reported earnings. According to adverse selection, this leads to holding more cash reserves and increasing working capital, which factually enhances the firm's FWB. Conversely, altering reported earnings using REM to meet earnings forecasts under moral hazard leads managers to act in their interests using cash reserves to maximize personal benefits. This behaviour

decreases cash reserves and working capital, which may impair a firm's short-term FWB. *Thus, the following hypotheses were developed:*

H3: Firms with higher levels of AEM hold higher levels of cash excess, positively impacting the firm's FWB.

H4: Firms with higher levels of REM hold lower levels of cash excess, which negatively impacts the firm's FWB.

3. Research design

3.1 Data and sample selection

This study is primarily based on the quarterly financial statements of 178 non-financial firms listed on the Egyptian stock market, including 16 industries, manually grouped into five sectors based on the Two-digit UK SIC code classification. Moreover, the study's data were collected from robust databases, including Bloomberg and Eikon Refinitiv. Appendix B provides detailed sources of the data.

Collected data cover the period from the first quarter of 2005 to the fourth quarter of 2019. Due to limitations in data availability, the study period did not include the years before 2005. To avoid potential bias due to the effects of COVID-19, the study period ended in 2019. Drawing on Veerhoek (2023), cash holding balances changed significantly during the COVID-19 period, with an increase at the beginning of the pandemic and a decline by its end. Recently, Elamer and Utham (2024) reveals that during the COVID-19 pandemic, firms preserved their cash holdings more to avoid financial uncertainties.

The data has been Winsorized at the 1% and 99% levels to drop the influence of outliers. Table 1 shows the frequency, percentage, and firm-year observations by sector for the final sample of 3,376 firm-quarter observations, and the frequency and percentage per division group.

Table 1

3.2 Dependent variable - Firm's Financial Well-being

Brüggen et al. (2017, p. 299) defined FWB as "the perception of being able to sustain current and anticipated desired living standards and financial freedom". The firm's FWB is a new, broad concept that reflects a business's overall financial health and sustainability, as well as the firm's ability to survive in the short term and long term financially (Hessian et al. 2024a). Based on that, I can define the firm's FWB as follows: "The firm's FWB is defined by its financial health, resilience, and sustainability." This definition of the firm's FWB is based on three financial pillars: financial health, which describes the overall economic health of the firm (Altman, 1968); financial resilience, which pertains to the firm's ability to financially survive financial shocks or downturns and recover (Dunn, 2012; Ponomarov and Holcomb, 2009); and finally, financial sustainability, which refers in this context to the firm's ability to sustain and maintain positive financial conditions over time (Bansal and DesJardine, 2014).

Following Hessian et al. (2024a), this study employs the inverse Altman Z-score to reflect a firm's overall financial health, default risk, and financial sustainability over time. Consistently high Z-scores across multiple periods indicate a firm's ability to maintain positive financial conditions, demonstrating its long-term financial sustainability (Altman, 2000). Additionally, the Z-score predicts bankruptcy risk, which can negatively impact employability and economic growth (Elmarzouky et al., 2022a; 2022b). Consequently, firms may need to innovate their CSR strategies to mitigate the effects of financial crises on stakeholders (Mintah and Elmarzouky, 2024) as follows:

$$FWB_{i,t} = [\ ((6.56\ (\text{Working Capital}_{t-1}/\ A_{t-1})) + (3.26\ (\text{Retained Earnings}_{t-1}/\ A_{t-1})) + (6.72\ (\text{EBIT}_{t-1}/\ A_{t-1})) + (1.05\ (\text{Common equity}_{t-1}/\text{Total liabilities}_{t-1}))) \times -1] \quad (1)$$

A higher FWB indicates a lower level of FWB, suggesting distress for the firm, whereas a lower FWB indicates a financially healthy firm (Hessian et al., 2024a).

3.3 Independent variables

3.3.1 Efficiency of cash management

This study follows the OPSW model developed by Opler et al. (1999), which has been used extensively in numerous accounting and finance studies (Al-Najjar, 2013; Bates et al., 2009; Bigelli and Sánchez-Vidal, 2012; Dittmar and Mahrt-Smith, 2007; Duchin, 2010; Faleye, 2004; Ferreira and Vilela, 2004; Fritz et al., 2007; Hanlon et al., 2017; Kusnadi et al., 2015; Ozkan and Ozkan, 2004; Palazzo, 2012; Pinkowitz et al., 2006; Wang, 2015). The OPSW model is based on the following cross-sectional regression model:

$$\text{Ln}(\text{Cashholding}_{i,t}) = \alpha_0 + \alpha_1 \text{MTB}_{i,t} + \alpha_2 \text{Ln}(\text{A}_{i,t}) + \alpha_3 \text{OCF}_{i,t}/\text{A}_{i,t} + \alpha_4 \text{NWC}_{i,t}/\text{A}_{i,t} + \alpha_5 \text{Debt}_{i,t}/\text{A}_{i,t} + \alpha_6 \text{R\&D}_{i,t}/\text{Revenue}_{i,t} + \alpha_7 \text{IndustrySigma} + \alpha_8 \text{DummyDividend}_{i,t} + \alpha_9 \text{DummyRegulation} + \varepsilon_{i.t} \quad (2)$$

(A detailed description of the variables can be found in Appendix B.)

The second step in calculating the optimal cash holding balance $Cash\hat{}holding_{i,t}$ involves applying the exponential equation as follows:

$$Cash\hat{}holding_{i,t} = e^{ln(Cash\hat{}holdingi,t)} \quad (3)$$

Based on the OPSW model, The ECM is the degree to which a firm can minimize the absolute difference between its actual cash holdings and its optimal cash holdings ($\text{absCashExcess}_{i,t}$). A smaller absolute difference indicates a higher ECM, implying a firm's ability to align its actual cash reserves with this optimal level.

3.3.2 Earnings Management

Managers deliberately manipulate and influence reported earnings and alter financial reports through practices such as AEM and REM (Hessian et al. 2024b). The current study employs the modified Jones model developed by Pae (2005) to calculate the absolute value of discretionary accrual ($\text{AEM}_{i,t}$) as follows:

$$\text{TA}_{it}/\text{A}_{it-1} = \alpha_0 + \alpha_1 (1/\text{A}_{t-1}) + \beta_1(\Delta\text{Revenue}_{it}/\text{A}_{t-1}) + \beta_2(\text{PPE}_{it}/\text{A}_{it-1}) + \beta_3(\text{OCF}_{it}/\text{A}_{it-1}) + \beta_4(\text{OCF}_{it-1}/\text{A}_{it-1}) + \beta_5(\text{TA}_{it}/\text{A}_{it-1}) + \varepsilon_{it} \quad (4)$$

(A detailed description of the variables can be found in Appendix B.)

Next, we run Equation (4) quarterly for two-digit SIC industries with a minimum of eight yearly observations to estimate discretionary accruals. A higher absolute value of discretionary accruals indicates a greater use of AEM.

In terms of REM, this study follows extant research (Alhadab et al., 2024; Chen and Gong, 2023; Cohen et al., 2008; Cohen and Zarowin, 2010; Cohen et al., 2023; Hunjra et al., 2023; Xu et al., 2021) and uses the model developed by Roychowdhury (2006). This study estimates the abnormal level of operating cash flow ($DISOCF_{i,t}$) and abnormal production costs ($DISPROD_{i,t}$) using equations (5) and (6), as follows:

$$OCF_t / A_{t-1} = \alpha_0 + \alpha_1(1/A_{t-1}) + \alpha_2(Revenue_t /A_{t-1}) + \alpha_3(\Delta Revenue_t /A_{t-1}) \quad (5)$$

$$PROD_t / A_{t-1} = \alpha_0 + \alpha_1(1/A_{t-1}) + \alpha_2(Revenue_t /A_{t-1}) + \alpha_3(\Delta Revenue\_t /A_{t-1}) + \alpha_4(\Delta Revenue\_t\text{-}1/A_{t-1}) \quad (6)$$

(A detailed description of the variables can be found in the appendix B.)

Drawing on prior studies (Boujelben et al., 2020; Cohen and Zarowin, 2010; Roychowdhury, 2006; Kuo et al., 2014; Zang, 2012), income-increasing REM activities, such as price discounting and credit sales, are understood to increase reported earnings while reducing OCF. Conversely, cutting the cost of sales through overproduction can increase both reported earnings and OCF. To ensure directional consistency, DISOCF is multiplied by -1 before aggregation so that higher values uniformly represent higher levels of EM. To avoid ambiguous results, this study aggregates these measures into a single robust metric (Attia et al. 2024).

$$REM_{i,t} = -DISOCF_{i,t} + DISPROD_{i,t} \quad (7)$$

For REM, the higher the likelihood that the firm engages in sales-based manipulation and overproduction to manage reported earnings upward and decrease OCF.

3.3.3 Control Variables

Following Roychowdhury (2006), this study controls for firm-specific factors to address firm performance using Return on Assets (ROA), firm size

(Size), market-to-book ratio (MTB), and revenue growth ($\Delta Revenue_{i,t}/At_{-1}$). Additionally, the debt ratio may be negatively related to cash holdings because of the higher cost of funds invested in liquid assets as financial leverage increases (Baskin, 1987; García-Teruel et al., 2009). Loss is a dummy variable that equals 1 if a firm reports a net loss, and 0 otherwise (Roychowdhury, 2006). In addition, the firm fixed effect (η) and time (year-quarter) fixed effects (v).

3.4 Empirical model

To explore the relationship between the EM strategy and ECM. This study uses the following fixed-effects models:

$$Cash\text{^}holding_{i,t} = \alpha_0 + \beta_1 AEM_{i,t} + \beta_2 ROA_{i,t} + \beta_3 Size_{i,t} + \beta_4 MTB_{i,t} + \beta_5 Loss_{i,t} + \beta_6 Debt_{i,t} + \beta_7 RevGrowth_{t-1} + \eta + v + \varepsilon_{i.t} \quad (8)$$

$$absCashExcess_{i,t} = \alpha_0 + \beta_1 AEM_{i,t} + \beta_2 ROA_{i,t} + \beta_3 Size_{i,t} + \beta_4 MTB_{i,t} + \beta_5 Loss_{i,t} + \beta_6 Debt_{i,t} + \beta_7 RevGrowth_{t-1} + \eta + v + \varepsilon_{i.t} \quad (9)$$

$$Cash\text{^}holding_{i,t} = \alpha_0 + \beta_1 REM_{i,t} + \beta_2 ROA_{i,t} + \beta_3 Size_{i,t} + \beta_4 MTB_{i,t} + \beta_5 Loss_{i,t} + \beta_6 Debt_{i,t} + \beta_7 RevGrowth_{t-1} + \eta + v + \varepsilon_{i.t} \quad (10)$$

$$absCashExcess_{i,t} = \alpha_0 + \beta_1 REM_{i,t} + \beta_2 ROA_{i,t} + \beta_3 Size_{i,t} + \beta_4 MTB_{i,t} + \beta_5 Loss_{i,t} + \beta_6 Debt_{i,t} + \beta_7 RevGrowth_{t-1} + \eta + v + \varepsilon_{i.t} \quad (11)$$

(A detailed description of the variables can be found in Appendix B.)

To test H1 and H2, β1 represents the relationship between AEM (or REM) and ECM, with β1 expected to be positive for AEM (H1: $\beta 1 > 0$) and negative for REM (H2: $\beta 1 < 0$).

In addition, to test H3 and H4, the interaction between the AEM or REM dummy variables (AEMD or REMD) and cash holding excess was added to the following fixed-effects models:

$$FWB_{i,t} = \alpha_0 + \beta_1 absCashExcess_{i,t} + \beta_2 AEM_{i,t} + \beta_3 AEMD_{i,t} * CashExcess_{i,t} + \beta_4 ROA_{i,t} + \beta_5 Size_{i,t} + \beta_6 MTB_{i,t} + \beta_7 Loss_{i,t} + \beta_8 Debt_{i,t} + \beta_9 RevGrowth_{t-1} + \eta + v + \varepsilon_{i.t} \quad (12)$$

$$FWB_{i,t} = \alpha_0 + \beta_1 \text{absCashExcess}_{i,t} + \beta_2 \text{REM}_{i,t} + \beta_3 \text{REMD}_{i,t} * \text{CashExcess}_{i,t} + \beta_4 \text{ROA}_{i,t} + \beta_5 \text{Size}_{i,t} + \beta_6 \text{MTB}_{i,t} + \beta_7 \text{Loss}_{i,t} + \beta_8 \text{Debt}_{i,t} + \beta_9 \text{RevGrowth}_{t-1} + \eta + \nu + \varepsilon_{i.t} \quad (13)$$

The interaction coefficient (β2) is expected to be positive for AEM (H3: $\beta 2 > 0$) and negative for REM (H4: $\beta 2 < 0$).

4. Results

4.1. Descriptive statistics

Table 2 presents descriptive statistics for the study variables. The firms' FWB shows a mean of -2.179% (range: -7.409% to 8.29%), indicating diverse financial health. The cash holding ratio (CashHolding) and optimal cash balance ratio (Cash^holding) exhibit significant variability, with means of 10.4% and 11.6%, respectively, and range up to 57.5% and 28% respectively. The absolute cash holding excess (absCashExcess) averages 7.9%.

AEM has a positive mean of 3.9%, REM has a negative mean of -7.9%, firm size averages 13.40, and the debt ratio varies widely, with a mean of 10.3%. The ROA averages 1.4%, and 17.6% of firms reported losses.

Table 2

Table 3 Panel A shows the Pearson correlation matrix. FWB has significant negative correlations with cash holding (r = -0.307), absolute cash excess (r = -0.347), and ROA (r = -0.377), while positively correlating with MTB (r = 0.192) and firm size (r = 0.081). These findings suggest that liquidity, EM, and firm size significantly influence FWB.

In Panel B of Table 3, the mean of the VIF for the independent variables used in Equations (8 and 9) is less than 1.50, suggesting no multicollinearity issues (Kutner et al., 2004; O'Brien, 2007).

Table 3

4.2. Multivariate analysis

4.2.1 Accrual earnings management and efficiency of cash management

Table (4) presents the regression results on the relation between AEM and ECM. The findings reveal that the AEM has a significant positive relationship with both optimal cash holding level (p-value = 0.034, t-value = 2.12) and cash holding excess (p-value = 0.011, t-value = 2.55). These findings *support the Agency Theory's adverse selection hypothesis (H1)*, which suggests that AEM is more pronounced at higher levels of cash reserves and excess cash holdings. This reveals that firms engaging in higher levels of AEM tend to maintain greater cash reserves as a precautionary strategy, serving as a buffer against future uncertainties or financial distress, thereby ensuring liquidity and financial flexibility. These results are consistent with Sun et al. (2012) reveal that firms engaging in AEM are more likely to hold cash reserves to hedge against the potential negative effects of AEM.

Furthermore, Farinha et al. (2018) findings reveal that cash balances are positively associated with more information asymmetry arising from poor earnings quality or higher AEM. In contrast, our findings are inconsistent with the findings of García-Teruel and Martínez-Solano (2009) and Mansali et al. (2019) that firms with higher AEM tend to maintain lower levels of cash holdings.

Table 4

4.2.2 Real earnings management and efficiency of cash management

Table (5) shows a significant negative relationship between REM and cash excess (p-value = 0.011, t-value = -2.55), as well as a similar pattern for optimal cash holding (p-value = 0.034, t-value = -2.12). These results *support the Agency Theory's moral hazard hypothesis (H2)*, which suggests that cash holdings and excess cash decrease when firms engage in REM activities, such as sales manipulation and overproduction, to inflate reported earnings. These findings align with prior research, which indicates that REM activities can deplete a firm's

cash resources as managers strive to meet earnings targets (Roychowdhury, 2006; Zang, 2012). Similarly, Guney et al. (2007) points out that firms with higher REM are likely to hold less cash, as these firms use cash to manipulate operational activities. Additionally, Kim et al. (1998) implies that firms with a higher tendency on EM to meet earnings targets exhibit lower liquidity levels.

Furthermore, Chang et al. (2018) findings reveal that REM is negatively associated with the value of cash holdings, particularly in firms with potential agency problems or those facing financial constraints. In contrast, our findings are inconsistent with Greiner's (2017) finding that REM is associated with higher cash holdings.

Table 5

4.2.3 Earnings management, cash holding excess, and firm's financial well-being:

The question to be answered now is whether a firm's FWB is positively or negatively contingent upon the relationship between cash-holding excess and EM. The reported results in Table 6 shows the AEM has a significant positive relationship with FWB (p-value = 0.056, t-value = 1.91). This finding suggests that firms engaging in higher levels of AEM to smooth earnings might present a more stable perceived favourably by investors (Dechow and Dichev, 2002) and exhibit better financial health. The absolute cash excess (abs_CashEx) shows a significant negative relationship with FWB (p-value = 0.000, t-value = -15.87). This result implies that excessive cash holdings could indicate inefficient management practices and poor resource allocation negatively impact FWB.

In Table 6, The interaction term (AEMD*CashExcess*)* is positively and statistically significant (p-value = 0.075, t-value = 1.78). This result *supports H3* on the adverse selection hypothesis and is consistent with Positive Accounting Theory and Agency Theory. The findings indicate that firms highly engaged in

AEM mitigate the negative impact of excess cash and have a notable positive impact on FWB.

Table 6

Table 7 shows a negative relationship between REM, cash holding excess (CashExcess), and FWB. The findings imply that firms engaging in REM exhibit a statistically significant decline in FWB (p-value = 0.056, t-value = -1.91). This suggests that manipulating reported earnings to meet short-term goals can harm a company's long-term financial health (Roychowdhury, 2006; Zang, 2012). Additionally, the results show a negative association between higher absolute cash excess (abs_CashEx) and FWB (p-value = 0.000, t-value = -15.87). This result indicates that excessive cash holdings can show inefficient resource allocation, suggesting that firms might not invest sufficiently in growth opportunities or return value to shareholders (Opler et al., 1999; Bates et al., 2009). This result, therefore, provides preliminary empirical evidence that excessive cash holdings and REM adversely impact the firm's FWB.

Furthermore, the interaction term (REMD*CashExcess) is negatively and statistically significant (p = 0.072, t = -1.80). This result *supports H4* on the moral hazard hypothesis and aligning with Positive Accounting Theory and Agency Theory. This finding indicates that the negative impact of excessive cash holdings on FWB is more pronounced in firms engaging in REM. Managers in such firms exacerbate information asymmetry, enabling them to prioritize their own interests over those of shareholders (Jensen, 1986; Chen, 2008). This behaviour leads to ineffective cash management decisions, further deteriorating the firm's FWB.

Table 7

4.3 Robustness tests

4.3.1. Alternative measurement of accrual earnings management

To ensure that alternative measurements of the AEM do not alter the paper results, I conduct a robustness check using the Modified Jones model developed by Kothari et al. (2005). The results presented in Table 8 and 9, remain consistent with the main findings.

Table 8
Table 9

4.3.2. Alternative measurement of real earnings management

Alternative measurements of the REM variable were used to conduct a robustness check, employing abnormal cash flow from operating activities (AbCFO) and abnormal production costs (AbPROD) to measure REM separately rather than as an aggregated measure. The results in Tables 10 and 11 consistently exhibit that firms' ECM is negatively associated with REM and the firm's FWB. However, the interaction term between abnormal production costs and cash holding excess on FWB is negative but not statistically significant.

Table 10
Table 11

4.3.3. Endogeneity Problem

As a robustness check, this study addressee endogeneity issues using the Generalized Method of Moments (GMM) and the approach postulated by Arellano and Bond (1991). The consistency of the findings with the main findings confirmed the robustness of these models. Therefore, the results of robustness checks are not reported here.

5. Conclusion

This study examines the association between EM and ECM among firms listed on the Egyptian stock market, using quarterly and yearly data from 178 non-financial firms between 2005 and 2019. The findings, robust to statistical

issues like endogeneity, support the adverse selection hypothesis, showing that higher levels of AEM are linked to increased cash reserves as a precautionary measure against information asymmetry. Conversely, the results support the moral hazard hypothesis, indicating that REM activities, are negatively associated with cash holdings due to liquidity being directed toward suboptimal investments, thereby increasing agency costs and harming future performance. Notably, the findings provide new evidence that AEM based on the flexibility of GAAP, when interplayed with cash management, positively impacts the firm's financial health.

The findings of our study provide several research implications. This paper contributes to the existing literature in two keyways: first, it fills the research gap by exploring the impact of REM on cash holdings. Additionally, it addresses the underexplored consequences of AEM, REM, and cash holding excess on a firm's financial health.

This study has several limitations. First, it focuses on Egyptian data, excluding years before 2005 and after 2019, due to data unavailability and the impact of COVID-19 on liquidity. Second, the analysis focuses on operating REM without considering investing and financing activities that could influence cash management. Third, the study does not fully address factors beyond earnings, such as working capital policies, that affect ECM, which may not be adequately captured in a single model. As a result, some models' R-squared and Adjusted R-squared values were low (Deloof, 2003; García-Teruel and Martínez-Solano, 2007; Baños-Caballero et al., 2014).

The findings of this paper suggest several avenues for future research, including exploring the effect of corporate governance on the relationship between EM and ECM, examining the impact of loan covenants on this relationship, and investigating the moderating role of female directorship in this context.

Appendix A. Empirical research examining the relation between earnings management and cash holding

Study	Sample/Data/Period	EM method	Cash holding	Findings/results
García-Teruel and Martínez-Solano (2009)	Panel data / Spanish stock exchange / 1995 to 2001.	Accounting Quality: Accruals Quality based on Dechow and Dichev (2002).	The ratio of cash and marketable securities to (Total) Net assets.	Firms with higher values of accounting quality (poorer accruals quality) tend to maintain higher levels of cash holdings.
Farinha et al. (2018)	Panel data / UK Main and AIM-Alternative Investment Markets/ 1998–2015.	Earnings Quality based on Dechow and Dichev (2002).	Cash and cash equivalents to total assets.	Cash balances are positively with the presence of greater information asymmetries arising from poor earnings quality
Sun et al. (2012)	Panel data / US / 1980 to 2005	Accounting quality: accrual quality based on Dechow and Dichev (2002), discretionary Accruals Quality, absolute abnormal accruals, and earning variability	Excess cash based on Opler et al. (1999).	Poor earnings quality associate with higher levels of cash and lower level of value
Mansali et al. (2019)	Panel data / Euronext Paris / 2000 to 2015.	Earnings quality: Jones model performance-matched discretionary accruals developed by Kothari et al. (2005).	The ratio of cash and short-term investments to total book assets (Opler et al., 1999).	Firms with higher accruals quality or low reporting quality (higher under financial constraints) hold less cash and have higher under financial constraints.
Greiner (2017)	Panel data / US / 2004 to 2014	REM based on the normal levels of cutting discretionary expenses.	Cash holdings (Opler et al., 1999).	REM is associated with higher cash holdings.
Chang et al. (2018)	Panel data / US / 1989 to 2014.	REM based on the normal levels of cutting discretionary expenses, accretive stock repurchases, and selectively timed asset sales	Value of cash holdings as the change in cash and short-term investments; to the market value of equity.	REM is negatively associated with the value of cash holdings, mainly in firms with potential agency problems or those facing financial constraints.

Appendix B. Definition of variables and source of data

Variable	Definition and	Source of data
$FWB_{i,t}$	Firm's financial well-being measured as the reverse of Altman's Z score	Based on equitation (1).
$Ln(CashHolding_{i,t})$	Cash holding ratio measured as the natural logarithm of the ratio of cash and short-term investment to total assets .	Bloomberg
$MB_{i,t}$	Growth opportunities measured as the market-to-book ratio.	Bloomberg
$Ln(A_{i,t})$	The firm size measured as the natural logarithm of the book value of total assets.	Bloomberg
$OCF_{i,t}/A_{i,t}$	Operating cash flows scaled to total assets.	Bloomberg
$NWC_{i,t}/A_{i,t}$	Net working capital compared to total assets.	Bloomberg
$Debt_{i,t}/A_{i,t}$	The ratio of total liabilities to total assets.	Bloomberg
$R\&D_{i,t}/Revenue_{i,t}$	Investment opportunities measured as the total of R&D and capital expenditures scaled to revenue.	Refinitiv
IndustrySigma	Industrial volatility of cash flow.	Bloomberg
$DummyDividend_{i,t}$	Dividend payouts dummy variable equal to 1 if the firm i paid a dividend in the time t and zero otherwise.	Refinitiv
$DummyRegulation_{i,t}$	Industry regulation indicator variable which is equal to 1 if the firm regulated by the government for public services.	Bloomberg
$Cash\hat{}holding_{i,t}$	Optimal cash holding balance.	Based on equitation (3)
$absCashExcess_{i,t}$	The absolute value of the difference between the firm- year-quarter cash balance-holding ratio and the optimal cash balance.	Based on equitation (3)
$TA_{i,t}$	Is the total accrual in year-quarter t for firm i. Which is calculated based on the below equation: $TA_{it} = \Delta CA_{it} - \Delta Cash_{it} - \Delta CL_{it} + \Delta STD_{it} - DAE_{it}$	Bloomberg
$\Delta CA_{i,t}$	Is the change in current assets from year-quarter t - 1 to year t for firm i.	Bloomberg
$\Delta Cash_{i,t}$	Is the change in cash from year t_{-1} to year-quarter t for firm i.	Bloomberg
ΔCL_{it}	Is the change in current liabilities from year-quarter t - 1 to year t for firm i.	Bloomberg
$ASTD_{i,t}$	Is the change in debt included in current from year-quarter t - 1 to year t for firm i.	Bloomberg
$DAE_{i,t}$	Is the depreciation and amortization expense in year-quarter t for firm i.	Bloomberg
PPE_{it}/A_{it-1}	The gross property, plant, and equipment scaled by the beginning-of- year-quarter total assets.	Bloomberg
$AEM_{i,t}$	The absolute accrual value of modified Jones model, as developed by Pae (2005).	Based on equation (4)
$PROD_{it}/A_{t-1}$	Is the sum of the COGS in year t and the change in inventory scaled by the beginning-of- year-quarter t_{-1} for firm i total assets.	Bloomberg

$REM_{i,t}$	$REM1i,t = -DISOCF_{i,t} + DISPROD_{i,t}$ The summation of abnormal production costs DISPROD and abnormal levels of operating cash flow DISOCF. DISOCF are multiplied by −1 to show higher income-increasing REM.	Based on equations (5 and 6)
$AEMD_{i,t}$	Dummy variable is assigned a value of 1 for firms with higher AEM than the industry median of AEM, and 0 otherwise.	Based on equitation (4)
$REMD_{i,t}$	Dummy variable is assigned a value of 1 for firms with higher REM than the industry median of REM, and 0 otherwise.	Based on equations (5,6,and 7)
$ROA_{i,t}$	The return on assets. the ratio of the net income before extraordinary items to the total assets.	Refinitiv
$Loss_{i,t}$	Dummy variable equal 1 indictee the year-quarter t for firm i result was net loss and zero otherwise.	Refinitiv
Size	Is the natural logarithm of the book value of total assets.	Bloomberg
Debt	Is the percentage of total debt to total assets.	Bloomberg
RevGrowth	The revenue change or $\Delta Revenue_{i,t}/A_{t-1}$.	Bloomberg

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