

The Moderating Effect of Corporate Governance on the Association Between Earnings Quality and Cash Holding: Evidence from Egyptian-Listed Firms

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Abstract

This paper investigates the impact of earnings quality, corporate governance, and their interaction effect on cash holdings in Egyptian-listed firms, comprising the top-listed Egyptian firms on EGX100. The findings indicate that firms adhering to a corporate governance framework positively correlate with cash holdings, whereas earnings quality is negatively related to them. Furthermore, corporate governance moderates the relationship between earnings quality and cash reserves, with robust results across alternative measures of cash holdings. The paper contributes to the limited literature on corporate accounting in emerging markets by focusing on Egyptian firms, ensuring contextual relevance in the distinct Egyptian business environment characterized by economic and political stability, as well as cultural and institutional factors. Moreover, it addresses a gap in the literature by providing insights to regulators and corporations regarding the factors influencing the level of cash holdings in this specific setting.

Keywords

Cash holdings; corporate governance; earnings quality; information asymmetry; Egyptian Stock Exchange.

Article history

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1. Introduction

Recent studies emphasized the importance of cash holdings to mitigate cash inflow decline, especially during volatile times such as the current political crises in Ukraine and China-Taiwan regions and their economic implications (Qin et al., 2020; Sarker et al., 2023). The importance of corporate cash holdings emerged during the US financial crisis in 2008. The financial crisis was not limited to the United States; it spread globally to other countries. From an economic perspective, firms tend to hold cash as a source of financial independence to avoid liquidity shortages and continue operational processes. However, holding cash is associated with significant risks, such as diminished investment returns (Dittmar et al., 2003) and irrational cash spending (Jensen, 1986). Furthermore, large cash buffers can suggest agency conflicts and information asymmetry problems. In this context, holding high cash balances could reflect managerial discretion, permitting the conversion of cash into personal benefits at the expense of shareholder wealth.

Considering the aforementioned points, a growing research stream has examined the impact of corporate governance, enhanced monitoring, and legal structures on the management of cash holdings-related costs (Chen & Chuang, 2009; Dittmar et al., 2003; Harford et al., 2008; Masood & Shah, 2014; Roy, 2018). However, the results of these studies are neither comprehensive nor consistent. Consequently, an additional research trajectory has investigated the impact of earnings quality on cash holdings as a proxy for information asymmetry (Francis et al., 2005; Louis et al., 2012). Moreover, poor earnings quality exacerbates concerns among shareholders, investors, and other users regarding information asymmetry and the safety of financial positions. Given that information asymmetry has been recognized as one of the principal determinants of increased cash reserves, serving as a buffer against cash flow uncertainties (Ozkan & Ozkan, 2004), it can be argued that an association between earnings quality and cash holdings exists. Furthermore, earnings quality is as crucial as corporate governance in alleviating agency and information asymmetry conflicts. Nevertheless, the relationship between earnings quality and cash holdings remains unaddressed in the existing literature, and the results are inconsistent (e.g., García-Teruel *et al.*, 2009; Sun *et al.*, 2012; Liu et al., 2016; Mansali *et al.*, 2019).

Furthermore, few studies indicate the interrelationship between earnings quality, corporate governance, and cash holdings (e.g., El Diri et al., 2000; Lee et al., 2015). Earnings quality, which represents the reliability and relevance of reported financial information, is basically important to stakeholders for assessing the performance of a firm and thereby making useful decisions (Al-Haddad & Al-Ghoul, 2023). Corporate governance refers to the structure through which a company's affairs are directed and controlled; it, therefore, has a major impact on strategic decisions and financial practices. The integration of these factors with cash holdings, one of the most important determinants of a firm's liquidity and financial flexibility, gives comprehensive insight into the dynamics of corporate financial management. Furthermore, corporate governance mechanisms are designed to mitigate agency conflicts between shareholders and managers. Therefore, the interaction between

corporate governance and earnings quality can shed light on how effective governance practices may either complement or counterbalance the impact of earnings quality on cash holdings. As noted by Greiner (2017), Liu et al. (2016), and Sun et al. (2012), these interactions help clarify the importance of identifying and managing risks in cash management, as excessively high or low cash holdings can undermine a firm's financial stability.

However, there is still a considerable research gap in perceiving synergistic effects and possible conflicts among earnings quality, corporate governance, and the level of cash holdings. In fact, most prior studies have only separately investigated either the effect of corporate governance or that of earnings quality on cash holdings. It is, therefore, desirable that future studies investigate both determinants together. Bridging this gap is important because it would lead to a better understanding of the interlinking impacts on the liquidity and financial stability of a firm while helping devise better strategies toward cash holdings optimization. Moreover, integrating corporate governance with earnings quality can improve the strength and accuracy of models being used to predict cash management behavior (Salas-Malina, 2023).

Studies have yet to examine the combined impact of corporate governance and earnings quality on cash holdings in emerging economies. Egypt, as an emerging economy, often encounters unique challenges in corporate governance mechanisms and financial reporting practices; hence, investigating the joint impact of corporate governance and earnings quality can enhance the understanding of the effectiveness of governance structures and financial reporting quality in mitigating agency problems and ensuring efficient cash utilization in such contexts.

Most previous studies were not conducted during the economic downturn, when the effective management of cash holdings becomes crucial for firms to survive. Consequently, understanding how corporate governance practices interact with earnings quality strategies in impacting cash holdings can provide insights into whether strong governance practices serve as a safeguard against opportunistic financial reporting or if they inadvertently exacerbate cash retention challenges during crises.

Therefore, this study attempts to extend the existing literature on cash holdings by investigating the joint impact of corporate governance and earnings quality on the level of cash holdings. Specifically, it aims to provide a comprehensive analysis of the corporate governance structure in the top-listed Egyptian companies by including eleven different proxies from Egypt's corporate governance framework. Additionally, the study contributes to the limited literature regarding how earnings quality affects cash holdings in emerging markets. Furthermore, the study will examine the moderating role of corporate governance in the relationship between earnings quality and the level of cash holdings, addressing concerns related to agency and information asymmetry.

Data were collected from listed firms in Egypt. As an emerging Arab market that has recently experienced turbulent times due to political and economic reforms, the application of corporate governance in Egypt has witnessed several transformations and improvements. However, these challenging periods have influenced corporate

financial decisions and led to inflationary pressures. Therefore, the need for cash holdings can be especially prioritized in uncertain and challenging economic environments. In addition, investors may prefer high cash holdings to safeguard against unexpected events or to exploit future investment opportunities. Consequently, this could provide various insights into the mentioned relationships in the emerging Egyptian market.

The study's contribution lies in investigating the interaction of corporate governance, earning quality, and cash holdings, which would assist in developing more nuanced regulatory guidelines and best practices for cash management, ultimately fostering improved financial stability and resilience within corporations. Furthermore, the findings could help identify optimal corporate governance practices, discourage unethical earning management, and promote responsible cash management (Dissanayake et al., 2023).

2. Literature Review and Hypotheses Development

2.1. Corporate Governance and Cash Holdings

Corporate governance has been identified as a critical mechanism limiting managers' extensive expropriation (LaPorta et al., 2000). According to agency theory, cash holdings may exacerbate conflicts between managers and shareholders, as discussed earlier. Thus, internal controls are established to restrict managers from extracting private benefits and expropriating shareholders through the exercise of corporate governance mechanisms. Therefore, many studies have investigated the relationship between corporate governance and cash holdings. Although previous studies utilized data from different types of organizations, periods, and countries to examine this relationship, the results of these studies have often lacked consistency and cohesion.

Prior research examined the impact of corporate governance on the level and utilization of cash holdings, and its subsequent effect on a firm's value. Some studies revealed a positive impact of corporate governance on cash holdings, implying that a robust corporate governance structure is associated with maintaining appropriate cash balances to avoid overlooking growth opportunities or future investments (Ginglinger and Saddour, 2007; Chen, 2008; Harford et al., 2008; Manoel et al., 2018; Nguyen and Rahman, 2020). Conversely, a weak corporate governance structure is associated with rapid cash depletion and a decline in a firm's value (Dittmar et al., 2003; Pinkowitz et al., 2007; Lee and Lee, 2009; Masood and Shah, 2014; Roy, 2018; Aslam et al., 2019). However, some studies reported no significant relationship between corporate governance and cash holdings (Mikkelsen & Partch, 2003; Ozkan & Ozkan, 2004).

Nevertheless, firms may hold more cash for precautionary purposes and to mitigate uncertainty. Corporate governance under such circumstances may permit maintaining high cash buffers. Prior studies advocating a positive association between corporate governance and cash holdings justified this practice as a means to overcome uncertainties, liquidity shortages, and financial crises, and to attain more future

investments (Chen, 2008; Ginglinger & Saddour, 2007). Therefore, it can be plausible that corporate governance may facilitate high levels of cash holdings. As a result, we hypothesize that:

H₁: There is a significant positive association between corporate governance and cash holdings.

2.2. Earnings Quality and Cash Holdings

Earnings quality and the level of cash holdings are crucial indicators of the firm's financial performance. Earnings quality refers to the reliability of the firm's earnings in predicting its current and future financial performance (e.g., Al-Haddad and Al-Ghoul, 2023; Ezat, 2019), whereas cash holdings represent the amount of cash and cash equivalents that the organization maintains as a precautionary asset for current and future needs or investments (Sun et al., 2012). Therefore, both indicators are vital for the firm's management and stakeholders to evaluate its financial stability and survival.

Nevertheless, free cash flow theory and agency theory suggest a conflict of interest between the firm's management and shareholders, which impacts the level of cash holdings. Moreover, managers may manipulate earnings to reflect pseudo-financial stability. Previous studies showed that companies with earnings management practices can retain high cash levels to avoid financial distress (Nekhili et al., 2016). In addition, companies with low earnings quality may retain high levels of cash to reduce agency problems and reassure stakeholders (e.g., Al-Haddad and Al-Ghoul, 2023). The relationship between cash holdings and earnings quality has, therefore, gained interest in the accounting literature (e.g., Al-Haddad and Al-Ghoul, 2023; Shin et al., 2018; Mansali et al., 2019; Sun et al., 2012).

A number of studies argue that high quality of earnings reflects better managerial competence, reduced information asymmetry, and heightened significant stakeholders' confidence as well. Thus, a company that maintains high earnings quality will have optimal cash reserves for operational needs, be ready for investment opportunities, and converge with economic uncertainties (Naumoski et al., 2022; Houque et al., 2017; Islam et al., 2022).

Previous studies documented that low earnings quality proxied by high abnormal discretionary accruals are positively related to cash holdings. It thus implies that as earnings quality deteriorates, the adverse effects of information asymmetry increase and make firms maintain a higher cash holding to hedge against potential cash deficiencies (Mansali et al., 2019; Sun et al., 2012). Recent research also revealed that the higher the quality of accounting, the lower cash holdings are depicted (Chada and Varadharajan, 2023; Al-Haddad and Al-Ghoul, 2023). Furthermore, a limited number of studies discussed the negative and significant relation between earnings quality and cash holding for profitable firms, indicating that the quality of earnings is one of the crucial factors determining cash holding for profitable firms. On the other hand, it is not as significant in companies that register losses (Farinha et al., 2018; Darrrough and Ye, 2007).

Finally, it is essential to note that most prior studies focused on listed firms in developed countries. However, research in emerging markets has been limited (e.g., Shin et al., 2018; Al-Haddad and Al-Ghoul, 2023). Therefore, further research is required in developing countries like Egypt, particularly given the increasing interest rates and stagflation. This is because firms in these economies may need high case reserves to meet their liquidity needs (Arestis & Karagiannis, 2023). Accordingly, the relationship between earnings quality and the level of cash holdings should be investigated in less developed markets. As a result, it is hypothesized that:

H₂: There is a significant negative association between earnings quality and the level of cash holdings.

2.3. Corporate Governance, Earnings Quality, and Cash Holdings

A considerable part of the literature on free cash flow has focused on how corporate governance mitigates the relationship between earnings quality, quality reporting, and the level of cash holdings. The challenge posed by free cash flow is that it encourages managers to distribute cash or waste it on organizational inefficiencies rather than investing it in low-return projects (Jensen, 1986). To a significant extent, corporate governance practices serve as the means to ensure investors' and shareholders' interests by disciplining management practices (Bushman and Smith, 2001). Therefore, previous studies contend that the presence or absence of corporate governance may intensify or diminish the relationship between earnings quality, quality of financial reporting, and the level of cash holdings, as discussed below.

Francis et al. (2005) examined the impact of accruals quality as a proxy for earnings quality on the value of cash flows. They concluded that poor earnings quality empirically results in a high cost of debt and equity. In poor corporate governance environments, managers may resort to inefficient debt and equity financing and hoard large firms' liquid resources for inefficient uses. Accordingly, it can be argued that corporate governance and earnings quality are essential for determining the level of cash holdings required by firms and assessing their effectiveness.

Some studies imply that good corporate disclosure reduces information asymmetry, enhances earnings quality, and decreases cash holdings. Specifically, the negative association between corporate transparency and cash holdings remains significant after considering corporate governance measures (Liu et al., 2016). Moreover, Shin et al. (2018) indicated that firms with low earning quality have excess cash to mitigate information asymmetry leading to shareholders questioning the reasons behind such excess cash holdings. This indicates that corporate governance could solve this agency problem and align management and shareholders' interest. Furthermore, Koo et al. (2017) provided empirical evidence that firms with high financial reporting quality are associated with increased dividend payments. The authors confirmed that firms with high accounting reporting quality do not retain excessive cash under management's control while distributing cash as dividends, especially when highly monitored by institutional investors, who serve as a corporate

governance tool. In addition, Benjamin et al. (2020) found that waste disclosure significantly increases cash holdings only for firms with strong corporate governance quality.

Shu-Hui et al. (2009) identified poor earnings quality in family firms with high agency problems. Their findings demonstrated an association between earnings quality and corporate governance. Sun et al. (2012) examined the interaction between earnings quality and corporate governance regarding the value of cash holdings, rather than their level. Their results demonstrated that low earnings quality adversely affects the value of corporate cash holdings while simultaneously exerting a favorable influence on the level of cash reserves. Some studies suggest that corporate governance moderates the relationship between earnings quality and the level of cash holdings. However, empirical findings supporting this association in the cash-holding context remain limited. For instance, Greiner (2017) observed a positive association between real activities management (RAM) and cash holdings, which is more robust in weak corporate governance environments. The results indicate that managers with limited monitoring have more flexibility in accumulating cash balances that exceed what is required.

Thus far, the discussion highlights that corporate governance mitigates the relationship between earnings quality and the level of cash holdings; however, a limited number of studies have examined this relationship. Furthermore, these studies have focused on the value of cash holdings rather than their level. Accordingly, this study aims to address this gap and hypothesizes that:

H₃: Corporate governance moderates the relationship between earnings quality and the level of cash holding.

Figure 1 depicts the research hypotheses.

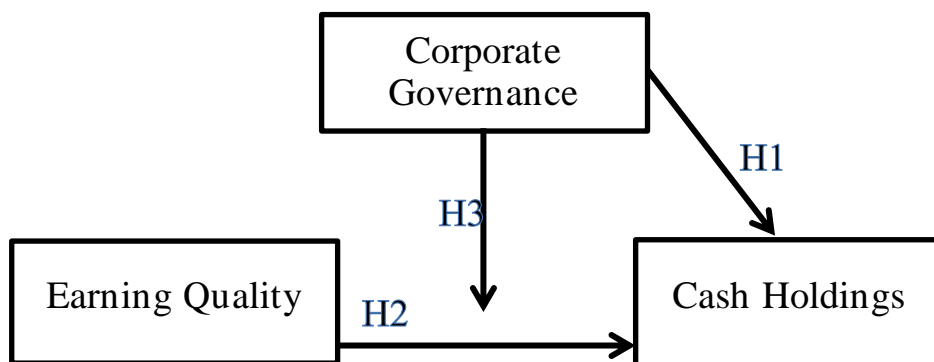


Figure 1: Research Framework

3. Research Context

Egypt is one of the largest and most active stock markets in the MENA region (Nasr & Ntim, 2018). The institutional environment of Egyptian firms has recently witnessed rapid economic and legal developments. Additionally, the adoption of

corporate governance rules in Egypt has evolved through several developmental phases, beginning with issuing the first corporate governance code in 2005, followed by two subsequent revisions in 2011 and 2016. This corporate governance code accentuates the "comply or justify" principle (Abdel-Meguid, 2021). The Financial Regulatory Authority (FRA) issued decision No.100 in 2020, which made the new corporate government framework obligatory for all firms. Therefore, the current corporate governance framework of the Egyptian market is transparent, comprehensive, and robust.

Egyptian companies use the Egyptian Accounting Standards EAS, an adoption of International Accounting Standards, for financial reporting. Nevertheless, financial and nonfinancial reporting still needs further efficiency and transparency. Moreover, issues regarding information asymmetry and disclosure have not been overcome yet (El-Deeb et al., 2023). Also, Egypt is an emerging market, unlike the developed economies where

most of the previous studies on free cash flow were done. Hence, this study will add new knowledge in a different setting that can support or extend the existing literature on free cash flow.

4. Research Method

4.1 Sample

The research population of this study is the EGX-100 index. The EGX100 gives data about the performance of the 100 most actively traded companies listed on the Egyptian Stock Exchange (EGX) (EGX, 2019). Banks and financial services firms are excluded from the final sample because such firms have different financial and legal structures compared to other firms. Furthermore, industries with fewer than five companies were excluded, as the Modified Jones model (1995) necessitates a minimum of five or twenty annual observations per industry to estimate discretionary accruals (Becker et al., 1998).

The final sample comprises 57 non-financial firms, resulting in 285 year-end observations spanning from 2014 to 2020. Financial and annual reports were sourced from the Thomson Reuters – Eikon Database and the Mubasher Corporation Database alongside the annual board of directors' reports (Form 40) to measure corporate governance-related proxies, obtained from the Official Egyptian Stock Exchange website. In cases where annual board reports were unavailable, data were collected manually from either the companies' websites or through Egypt for Information Dissemination Company (EGID).

4.2. Variables Measurements

Cash holdings are evaluated using four distinct measures. The primary metric is the ratio of cash, cash equivalents, and short-term investments to total assets, as outlined by Roy (2018). To ensure the robustness of the findings, three alternative

measures were also employed. The first alternative, proposed by Ozkan and Ozkan (2004), calculates the ratio of cash and marketable securities to total assets. The second measure, introduced by Opler et al. (1999), determines cash holdings as the ratio of cash and marketable securities to net assets, where net assets are defined as total assets minus cash; cash equivalents; and marketable securities. The latter represents the denominator in this measure. This approach ensures a more refined view of a firm's liquidity. The final measure, suggested by Hartford et al. (2008), is the ratio of cash, cash equivalents, and short-term investments to net assets.

Concerning corporate governance, eleven proxies of the corporate governance system in Egypt have been considered. The methodology employed by Dittmar and Mahrt-Smith (2007) and Gao and Jia (2016) has been applied to transform corporate governance measures into dummy variables, classifying high or low corporate governance based on median values. This approach addresses the potential inconsistencies that arise from relying on a single corporate governance measure, which may encompass numerous provisions (Melo, 2014). Furthermore, using a single criterion is inadequate, as it fails to account for the interactions and correlations between these different corporate governance measures, which may not be strongly correlated or may assess similar aspects of governance. Moreover, composite measures can provide a more comprehensive overview of a corporate governance structure.

A summary of the eleven corporate governance proxies and their classifications is presented in Appendix (I). Following prior studies, a corporate governance index has been developed for all related measures, assigning a value of one to all observations above the median value, and a value of zero otherwise (Dittmar & Mahrt-Smith, 2007; Gao & Jia, 2016). Modifications have been made to the audit committee (AC)-related measures, as the corporate governance code in Egypt mandates that firms conduct AC meetings quarterly, and all AC directors must be non-executive (Bouhamdan et al., 2023). Therefore, the variable for non-executive AC members is operationalized as a dummy variable that takes the value of one if firms have all AC members non-executives, and zero otherwise. The frequency of AC meetings is similarly calculated as a dummy variable taking a value of one if the meetings are four or more, and zero otherwise. Each of the eleven indices is aggregated to obtain a total score reflecting the degree of corporate governance compliance. Subsequently, the ratio representing the index for firm *i* at year *t* is calculated. This developed index does not aim to measure the quality of the corporate governance application in Egypt; rather, it seeks to encompass various proxies to determine the degree of corporate governance application in the top listed firms in Egypt and to analyze how these different proxies collectively influence cash holdings policies.

Earnings quality is assessed using the absolute value of abnormal accruals, which are calculated employing the modified Jones model (1995). The Jones model was initially proposed by Jones (1991) and later modified by Dechow, Sloan, and Sweeney (1995). Both the Jones (1991) and Dechow et al. (1995) models utilize discretionary accruals as a metric for evaluating and assessing earnings management. The rationale for excluding non-discretionary accruals lies in their representation of business

conditions, which are influenced by factors such as the firm's status and sales growth; elements that are beyond managerial control. The standard Jones (1991) model is widely employed in distinguishing discretionary accruals from non-discretionary ones (Islam et al. 2011). By adjusting changes in sales for alterations in receivables, the standard Jones model is transformed into the modified Jones model proposed by Dechow et al. (1995). This modified model aims to minimize the measurement errors associated with discretionary accruals when managerial discretion is exerted over sales. The study conducted by Dechow et al. (1995) suggests that the modified Jones model is the most effective tool for detecting earnings management, surpassing alternative models such as Healy's (1985), De Angelo's (1986), the standard Jones model, and other industry-specific models in this context.

Total accruals (TA) are defined as the sum of normal and abnormal accruals. The calculation of total accruals is represented in Equation (1), where ΔCA denotes the change in current assets between year t and $t-1$; ΔC signifies the change in cash and cash equivalents during the same period; ΔCL refers to the change in current liabilities between year t and $t-1$; ΔSTD indicates the change in short term debts over the same interval; and DEP and AMO represent depreciation and amortization for year t respectively.

$$TA_{i,t} = (\Delta CA_{i,t} - \Delta C_{i,t}) - (\Delta CL_{i,t} - \Delta STD_{i,t}) - (DEP_{i,t} + AMO_{i,t}) \quad (1)$$

To estimate abnormal discretionary accruals, cross-sectional regression is conducted for all firms i , within a given industry j to evaluate the parameters β_1 , β_2 , and β_3 , ensuring that each industry includes a minimum of five or six firms per year (Becker et al., 1998). The estimated industry parameters are subsequently used to calculate non-discretionary accruals. The residuals from Equation (2) indicate the discretionary abnormal accruals (DA); the higher the residuals, the higher the indicative of the accrual-based earnings management and a poor reflection of earnings quality (Dechow & Dichev, 2002; Fisher et al., 2019; Sun et al., 2012).

$$TA_{i,t} = (\beta_1 + \beta_2 (\Delta SR_{i,t} - \Delta REC_{i,t}) + \beta_3 (PPE_{i,t}) + \varepsilon_{i,t} \quad (2)$$

Where ΔSR denotes the change in sales revenue between year t and $t-1$, ΔREC signifies the change in receivables during the same period, and PPE refers to plant, property, and equipment for year t . All variables in Equation (2) are scaled by lagged total assets to mitigate heteroskedasticity. To indicate this inverse relationship, the absolute residuals obtained from Equation (2) are multiplied by -1 ; consequently, higher values of accrual-based earnings management correspond to lower values of earnings' quality values and vice versa.

Seven control variables are incorporated into the research model, following previous studies, to mitigate potential bias from omitted variables. First, the dummy variable for dividends ($DIV_{i,t}$) is included. Firms that maintain their dividend payout policies tend to retain more cash to support these policies and distribute dividends to shareholders. The inability to pay dividends may lead to decreased stock prices and adverse market reactions (Ozkan & Ozkan, 2004). A value of one is assigned when distributing cash dividends, and zero otherwise (e.g., Chen and Chuang, 2009; Sun *et*

al., 2012; Habib *et al.*, 2017; Mansali *et al.*, 2019). Second, Leverage ($LEV_{i,t}$) is a critical determinant in the analysis of cash holdings. High leverage may increase the likelihood of financial distress, necessitating the retention of higher cash balances (Maheshwari & Rao, 2017; Opler *et al.*, 1999). $LEV_{i,t}$ is defined as the ratio of total liabilities to total assets for firm *i* at year *t* (Shehata *et al.*, 2014). Third, short-term debt financing ($STD_{i,t}$) is examined, as short-term debts may act as a substitute for cash holdings. $STD_{i,t}$ is defined as the ratio of short-term debts and the current portion of long-term obligations to total assets. Fourth, cash flow from operations ($CFO_{i,t}$) is included, as robust cash flows can protect against the shortness of liquid assets. This finding aligns with the pecking order theory (Chen and Chuang, 2009; Masood and Shah, 2014; Habib *et al.*, 2017; Maheshwari and Rao, 2017; Orlova *et al.*, 2018; Mansali *et al.*, 2019). $CFO_{i,t}$ is measured as the ratio of cash flow from operations to total assets (Habib *et al.*, 2017; Mansali *et al.*, 2019). Fifth, measuring a firm's profitability ($ROA_{i,t}$) is essential, as a study deployed in the MENA region by (Al-Najjar & Clark, 2017) found a positive association between ROA and cash holdings. Accordingly, the net income to total assets ratio quantifies $ROA_{i,t}$ (Masood and Shah, 2014; Al-Najjar and Clark, 2017; Roy, 2018), following the methodology of Gao *et al.* (2013), Lin *et al.* (2016), and Shin *et al.* (2018). Sixth, growth opportunities ($GRW_{i,t}$) are considered, since firms limited investment opportunities may lead managers to stockpile cash for personal benefits (Fernandes *et al.*, 2017). Growth opportunities are measured by the ratio of the change in sales from year *t* minus sales in year *t*-1 scaled by sales in year *t*-1 by (Kalcheva and Lins, 2007; Manoel *et al.*, 2018; Tran, 2020).

Finally, the probability of default ($Z\text{-score}_{i,t}$) is included as a control variable, as firms facing potential financial distress often maintain higher cash reserves to safeguard against default risks (Fernandes *et al.*, 2017; Hall *et al.*, 2014; Ozkan & Ozkan, 2004). The model developed by Agarwal and Taffler (2007) is employed to compute firm-specific z-scores. It is important to note that the weights attached to this measure were originally calibrated for the US market. Applying the same weighting in the Egyptian context may limit the generalizability and accuracy of the findings. According to this measure, an increase in the Z-score signifies a lower probability of default, indicating a financially healthy firm. Conversely, a lower Z-score is associated with a higher probability of default, suggesting financial distress. The Z-Score is calculated as follows:

$$Z\text{-Score}_{i,t} = 3.20 + 12.18 \frac{\text{Profit before Taxes}}{\text{Current Liabilities}} + 2.50 \frac{\text{Current Assets}}{\text{Total Liabilities}} - 10.68 \frac{\text{Current Liabilities}}{\text{Total Assets}} + \{0.029 \left(\frac{\text{Quick Assets} - \text{Current liabilities}}{\text{Sales} - \text{Profit before Taxes} - \text{Depreciation, Amortization}} \div 365 \right)\}$$

4.3. Model Specification

To test the hypotheses, the research model is constructed to examine the impact of corporate governance, earnings quality, and the interaction between corporate governance and earnings quality on cash holdings. The model is specified as follows:

$$CH_{i,t} = \beta_0 + \beta_1 CG_{i,t} + \beta_2 EQ_{i,t} + \beta_3 CG*EQ_{i,t} + \beta_4 DIV_{i,t} + \beta_5 LEV_{i,t} + \beta_6 STD_{i,t} + \beta_7 CFO_{i,t} + \beta_8 ROA_{i,t} + \beta_9 GRW_{i,t} + \beta_{10} Z\text{-score}_{i,t} + \beta_{11} INDDUM_{i,t} + \beta_{12} YEARDUM_{i,t} + \varepsilon_{i,t}$$

In this equation, $CH_{i,t}$ represents the cash holdings of firm i in year t ; $CG_{i,t}$ denotes the corporate Governance index for firm i at year t ; and $EQ_{i,t}$ refers to the earnings' quality of firm i in year t . The interaction between corporate governance and earnings quality is represented as $CG*EQ_{i,t}$ for firm i in year t , while $DIV_{i,t}$ captures dividends paid by firm i in year t ; $LEV_{i,t}$ represents the leverage for firm i in year t , $STD_{i,t}$ refers to the short-term debt for firm i at year t ; and $CFO_{i,t}$ captures the cash flow from operations for firm i in year t . The return on assets is denoted by $ROA_{i,t}$ for firm i in year t ; growth opportunities are represented by $GRW_{i,t}$ for firm i in year t ; $Z\text{-score}_{i,t}$ refers to the Z-score for firm i in year t , and $\varepsilon_{i,t}$ is the error term.

To address outlier issues, all data are winsorized at the top and bottom 10%. In addition, the model also accounts for industry and year-fixed effects. This study employs Panel-Corrected Standard Errors PCSE using the Prais-Winsten regression to address the problems of heteroskedasticity, cross-sectional dependence, and serial correlation. This method adjusts for autocorrelation, cross-sectional dependence, and heteroscedasticity by utilizing the covariance matrix of standard errors. PCSE is considered a suitable alternative to Feasible Generalized Least Squares (FGLS) when errors are assumed heteroskedastic and contemporaneously correlated across panels.

5. Findings and Discussion

5.1 Descriptive Results

The summary statistics in Table 1 provide an overview of the firm-specific variables used in regression models for the entire sample. For cash holdings, the first measure, $CH_{a,i,t}$ shows a mean 0.1183 and a median of 0.0775, with values ranging from 0.0007 to 0.3620, indicating that cash balances and short-term investments account for approximately 12% of total assets. The second measure, $CH_{b,i,t}$ reports a mean of 0.0989 and a median of 0.0582, respectively, with cash holdings comprising almost 30% of total assets. In this case, cash and short-term investments exceed 36% of total assets, suggesting that investments form around 6% of total assets, highlighting their significance. The third measure shows an average of 8% of net assets in cash balances, with a maximum reaching 26%. For the final measure, $CH_{di,t}$, the mean, and the median are 0.1351 and 0.0827, respectively, revealing that cash and short-term investments account for 13% of net assets, with a peak of 42% of net assets. This indicates that firms, on average, hold between 10% to 14% of their total assets in cash and short-term investments, with some firms holding up to 30% to 36% of total assets and 26% to 42% of net assets, suggesting significant cash accumulations. In addition, the average corporate governance index averages 49%. At the same time, the earnings' quality- $EQ_{i,t}$ has a mean of -0.1985 and a median of -0.1452, reflecting that earnings' quality among these firms is approximately 20% on average.

Table 2 presents the correlation matrix, confirming no multicollinearity issues, as the variance inflation factor (VIF) between pairs of independent variables is no higher than 2.12.

Table 1
Descriptive Statistics of Variables

Variable	N	Mean	Median	Std. Dev.	Min	Max
CH _a _{i,t}	285	0.1183	0.0775	0.1108	0.0007	0.3620
CH _b _{i,t}	285	0.0989	0.0582	0.0937	0.0007	0.3072
CH _c _{i,t}	285	0.0863	0.0551	0.0774	0.0007	0.2654
CH _d _{i,t}	285	0.1351	0.0827	0.1318	0.0007	0.4208
CG _{i,t}	285	0.4916	0.4546	0.1783	0.0909	1.0000
EQ _{i,t}	285	-0.1985	-0.1452	0.1694	-0.7768	-0.0004
LEV _{i,t}	285	0.5476	0.5280	0.2640	0.0015	1.2630
STD _{i,t}	285	0.1206	0.0792	0.1271	0.0000	0.4198
CFO _{i,t}	285	0.0443	0.0431	0.0960	-0.1507	0.2343
ROA _{i,t}	285	0.0457	0.0351	0.0808	-0.1192	0.2110
GRW _{i,t}	285	0.1957	0.1478	0.3477	-0.5823	0.9389
Z-score _{i,t}	285	4.9001	3.6144	7.5770	-12.560	22.109

Table 2
Pearson Correlation Matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
(1) CH _a _{i,t}	1.000													
(2) CH _A	0.836*** (0.000)	1.000												
(3) CH	0.840*** (0.000)	0.998*** (0.000)	1.000											
(4) CH ₄ out	0.997*** (0.000)	0.864*** (0.000)	0.865*** (0.000)	1.000										
(5) CG _{i,t}	0.155*** (0.009)	0.147** (0.013)	0.151** (0.011)	0.156*** (0.008)	1.000									
(6) EQ _{i,t}	-0.253* (0.000)	-0.147** (0.013)	-0.144** (0.015)	-0.249*** (0.000)	0.143** (0.016)	1.000								
(7) CG*EQ _{i,t}	-0.291*** (0.000)	-0.22*** (0.000)	-0.22*** (0.000)	-0.292*** (0.000)	-0.308*** (0.000)	0.83*** (0.000)	1.000							
(8) DIV _{i,t}	0.164*** (0.006)	0.199*** (0.001)	0.199*** (0.001)	0.172*** (0.004)	0.161*** (0.007)	0.138** (0.020)	0.012 (0.840)	1.000						
(9) LEV _{i,t}	-0.24*** (0.000)	-0.117** (0.048)	-0.112 (0.060)	-0.246*** (0.000)	-0.017 (0.777)	0.061 (0.306)	0.085 (0.150)	-0.196*** (0.001)	1.000					
(10) STD _{i,t}	-0.367*** (0.000)	-0.28*** (0.000)	-0.28*** (0.000)	-0.365*** (0.000)	0.032 (0.594)	0.15*** (0.009)	0.122** (0.039)	-0.072 (0.224)	0.388*** (0.000)	1.000				
(11) CFO _{i,t}	0.405*** (0.000)	0.360*** (0.000)	0.356*** (0.000)	0.412*** (0.000)	0.261*** (0.000)	0.036 (0.544)	-0.116 (0.050)	0.350*** (0.000)	-0.405*** (0.000)	-0.278*** (0.000)	1.000			
(12) GRW _{i,t}	-0.012 (0.840)	-0.013 (0.821)	-0.007 (0.912)	-0.021 (0.729)	-0.045 (0.450)	-0.106 (0.075)	-0.048 (0.417)	0.049 (0.410)	0.036 (0.541)	-0.016 (0.791)	0.002 (0.978)	1.000		
(13) ROA _{i,t}	0.392*** (0.000)	0.331*** (0.000)	0.327*** (0.000)	0.399*** (0.000)	0.270*** (0.000)	-0.079 (0.186)	-0.265*** (0.000)	0.450*** (0.000)	-0.478*** (0.000)	-0.223*** (0.000)	0.637*** (0.000)	0.195*** (0.001)	1.000	
(14) Z-score _{i,t}	0.458*** (0.000)	0.344*** (0.000)	0.342*** (0.000)	0.458*** (0.000)	0.149** (0.012)	-0.147** (0.013)	-0.251*** (0.000)	0.346*** (0.000)	-0.788*** (0.000)	-0.425*** (0.000)	0.537*** (0.000)	0.128** (0.031)	0.782*** (0.000)	1.000

*, **, *** denote significance at 10, 5, and 1%, respectively.

CH_a is the ratio of cash, cash equivalents, and short-term investments to total assets. CH_b is the ratio of cash and cash equivalents to total assets. CH_c is the ratio of cash and cash equivalents to net assets. CH_d is the ratio of cash, cash equivalents, and short-term investments to net assets. CG is the index for corporate governance. EQ is earnings quality using the modified Jones model. CG*EQ is the interaction term between corporate governance and earnings quality. DIV is a dummy variable for dividend distribution. LEV is leverage; STD is short-term debts; CFO is cash flow from operations; ROA is the return on assets; GRW is growth opportunities, and Z-score is the z score reflecting the probability of default.

5.2. Regression Results

Table 3 presents the regression results, demonstrating that the first hypothesis is supported across all four models. A positive association is observed between corporate governance and cash holdings, with coefficients of 0.099, 0.057, 0.051, and 0.122, respectively. Consequently, H1 is accepted. These findings align with prior research, including studies by Ginglinger and Saddour (2007), Chen (2008), Harford et al. (2008), Ameer (2012), Caprio et al. (2013), Hsu et al. (2015), Habib et al. (2017), Asante-Darko et al. (2018), and Manoel et al. (2018).

The relatively high cash holding observed in the research setting may be attributed to economic challenges faced in recent years. Firms likely maintained large cash reserves to safeguard against liquidity issues. Furthermore, investment opportunities were geographically dispersed, promoting an environment conducive to economic expansion while mitigating financial risks, which could otherwise lead to elevated debt levels in both rates domestically and internationally (El-Deeb et al., 2023). Empirical evidence suggests that firms with substantial investment opportunities are inclined to maintain higher cash reserves to prevent the forfeiture of potential investments. Thus, firms with strong corporate governance structures and effective management benefit from high cash reserves, leveraging them for investment opportunities and economic growth. In addition, effective corporate governance reassures shareholders that managers will not misuse or expropriate the company's cash in such cases.

The second hypothesis, positing a negative association between earnings quality and cash holdings, is supported by the results, which indicate that an increase in earnings quality correlates with a decrease in cash holdings by coefficients of -0.213, -0.206, -0.202, and -0.269, respectively. Thus, H2 is accepted. These findings align with prior research (Derouiche et al., 2019; García-Teruel et al., 2009; Mansali et al., 2019; Sun et al., 2012; Shin et al., 2018), suggesting that poor earnings quality exacerbates information asymmetry and intensifies agency issues. This underscores the significance of high earnings quality in mitigating unproductive cash reserves on balance sheets and, consequently, enhancing corporate cash management practices.

The results of the four research models further indicate acceptance of the third hypothesis, as the interaction between corporate governance and earnings quality demonstrates a positive association with cash holdings, with coefficients of 0.261, 0.168, 0.254, and 0.347 in the respective variables CH_a, CH_b, CH_c, and CH_d. These findings suggest that corporate governance exerts a moderating role in the relationship between earnings quality and cash holdings, leading to the acceptance of H3. This is consistent with the assertions made by Greiner (2017) and Shin et al. (2018), which indicates that effective corporate governance mitigates information asymmetry, enhances reported earnings, and consequently, supports elevated cash levels.

Furthermore, control variables such as dividends have a positive relation with cash holdings across four models, which also coincides with the finding of Ozkan and Ozkan, 2004; Chen and Chuang, 2009; Habib et al., 2017; Mansali et al. 2019. The results also indicate that, across all models, leverage is positively and significantly

related to cash holdings, supporting the notion by Opler et al. (1999) and Maheshwari and Rao (2017) that high leverage might increase the risk of financial distress.

Also, a significant negative association is observed between short-term debts and cash holdings, suggesting that short-term debts act as substitutes for cash (Farinha et al., 2018; Manoel et al., 2018). The cash flow from operations is positive, relating to cash holdings in all models, which supports the findings of Chen and Chuang (2009), Masood and Shah (2014), Habib et al. (2017), Maheshwari and Rao (2017), Orlova and Rao (2018), and Mansali et al. (2019).

Concerning return on assets, the outcome indicates a significant negative relation with cash holdings. This outcome verifies earlier findings seen in studies conducted in the MENA region by Al-Najjar and Clark (2017), which suggested that in subsamples from Egypt, Bahrain, Saudi Arabia, Oman, the United Arab Emirates, and Tunisia, the relationship between ROA and cash holdings is mostly negative. This indicates the trend whereby profitable companies may not rely on cash to satisfy their liquidity needs.

In relation to growth opportunities, the analysis reveals a negative association with cash holdings, supporting the free cash flow theory (Fernandes et al., 2017). However, it is noteworthy that this relationship is insignificant in certain cash holdings models, a phenomenon observed in previous studies as well (García-Teruel et al., 2015). Finally, the financial distress-related factors, since measured by Z-score, reveal an important positive relationship with cash and cash equivalents holdings (García-Teruel et al., 2009; Farinha et al., 2018; Tran, 2020). The rationale for such a relationship is that firms hold more cash due to increased opportunities for investments.

Moreover, during the years covered by the sample, the decision to devalue the Egyptian currency may have posed serious problems in terms of adequate cash reserves, thereby increasing the risk of default, even for firms in healthy financial condition.

Table 3
Results of Regression Analysis

	CH _{a, it}		CH _{b, it}		CH _{c, it}		CH _{d, it}	
	Coef.	P> z	Coef.	P> z	Coef.	P> z	Coef.	P> z
CG _{it}	0.099	0.004***	0.057	0.016**	0.051	0.008***	0.122	0.004***
EQ _{it}	-0.213	0.008***	-0.206	0.006***	-0.202	0.054**	-0.269	0.004***
CG*EQ _{it}	0.261	0.061*	0.168	0.023**	0.254	0.018**	0.347	0.032**
DIV _{it}	0.007	0.418	0.006	0.494	0.005	0.490	0.008	0.388
LEV _{it}	0.088	0.001***	0.090	0.013**	0.075	0.01**	0.11	0.000***
STD _{it}	-0.153	0.000***	-0.089	0.003***	-0.076	0.002***	-0.179	0.000***
CFO _{it}	0.247	0.000***	0.198	0.000***	0.163	0.000***	0.311	0.000***
ROA _{it}	-0.023	0.016**	-0.009	0.322	-0.006	0.393	-0.03	0.013**
GRW _{it}	-0.19	0.009***	-0.243	0.012**	-0.209	0.008***	-0.219	0.021**
Z-score _{it}	0.006	0.000***	0.005	0.001***	0.005	0.000***	0.008	0.000***
INDDUM _{it}	√	√	√	√	√	√	√	√
YEARDUM _{it}	√	√	√	√	√	√	√	√
_cons	-0.016	0.601	0.003	0.995	0.001	0.953	-0.031	0.371
R-Squared	0.582		0.456		0.488		0.575	
Wald chi2(9)	156.87		203.731		211.907		190.086	
Prob > chi2	0.000		0.000		0.000		0.000	
Final Wooldridge Test	0.6889		0.3190		0.2554		0.4468	
Pesaran CD Test (Average absolute value)	0.467		0.455		0.457		0.463	
Modified Wald test	0.000		0.000		0.000		0.000	

Notes: *, **, *** denote significance at 10, 5, and 1%, respectively.

CH_a is the ratio of cash, cash equivalents, and short-term investments to total assets. CH_b is the ratio of cash and cash equivalents to total assets. CH_c is the ratio of cash and cash equivalents to net assets. CH_d is the ratio of cash, cash equivalents, and short-term investments to net assets. CG is the index for corporate governance. EQ is earnings quality using the modified Jones model. CG*EQ is the interaction term between corporate governance and earnings quality. DIV is a dummy variable for dividend distribution. LEV is leverage; STD is short-term debts; CFO is cash flow from operations; ROA is the return on assets; GRW is growth opportunities, and Z-score is the z score reflecting the probability of default. INDDUM_{it}, and YEARDUM_{it} are dummy variables included (√) to control for the industry and year-fixed effects.

6. Conclusion and Implications

This study aimed to examine the combined effect of corporate governance and earning quality on the level of cash holdings among the top 100 listed firms in Egypt. Utilizing a sample of 57 non-financial firms over the period from 2014 to 2020, the findings reveal that corporate governance is positively associated with cash holdings. Conversely, earnings quality is found to be inversely related to cash holdings, and corporate governance serves as a moderator in the relationship between earning quality and cash holdings. Given that a limited number of studies have incorporated both corporate governance and earnings quality in the analysis of cash holdings, this research contributes important insights regarding their interactive effects in an emerging market context, such as Egypt.

The findings suggest that, amid the turbulent economic environment in which Egyptian firms operate, even with robust corporate governance, firms tend to maintain relatively higher cash reserves to facilitate future investments and mitigate liquidity shortages (Abdelfattah & Aboud, 2020). Furthermore, effective corporate governance mechanisms encourage firms to uphold quality financial reporting, thereby assisting in maintaining appropriate cash reserve levels.

While corporate governance was assessed based on the number of applicable rules, this measure does not necessarily reflect the quality of governance implementation. Numerous studies have indicated that firms in emerging markets often do not apply governance practices as effectively as their counterparts in developed economies. This deficiency in governance quality may contribute to the observed positive relationship between corporate governance and cash holdings. The negative association between earnings quality and cash holdings, moderated by corporate governance, indicates that effective governance practices correlate with higher earnings quality and greater cash reserves.

The implications of this study are manifold. The association between corporate governance and the level of cash holdings indicates that enhanced governance can bolster a firm's reputation and creditworthiness, facilitating access to capital markets during challenging periods. Furthermore, the inverse relationship between earnings quality and cash holdings highlights the importance for firms to prioritize transparent financial reporting and avoid aggressive accounting practices to improve earnings quality. Firms with elevated earnings quality may maintain lower cash levels as their financial performance is perceived as more stable and reliable. Moreover, firms with high earnings quality and strong governance practices may be more prudent in their cash management decisions, potentially holding optimal cash levels. Recognizing this interaction can enable firms to balance cash reserves and efficient capital allocation to maximize shareholder value. Additionally, these findings can assist regulators in formulating policies aimed at protecting shareholders and achieving market stability.

This research is not without its limitations. The analysis is restricted to firms listed on the EGX100, and the study developed an index to gauge the application of corporate governance rules among these top-listed firms.

Future research is encouraged to evaluate the effectiveness and impact of corporate governance practices on cash holdings. Given the acute global crisis stemming from the COVID pandemic, political turbulence, and stagflation, which have disrupted supply chains; the need for financial flexibility and liquid resources is likely to be heightened. Consequently, further investigation is warranted to reexamine corporate governance, earnings quality, and cash holdings during the pandemic (Fahlenbrach et al., 2020). Future studies could also compare cash management practices before and after crisis events. To enhance the robustness of results, it is recommended that future research employ multiple proxies for earnings quality, rather than relying on the single measure utilized in this study.

References

- Abdelfattah, T. and Aboud, A. (2020). Tax Avoidance, Corporate Governance, And Corporate Social Responsibility: The Case Of The Egyptian Capital Market. *Journal of International Accounting, Auditing and Taxation*, 38, p. 100304.
- Abdel-Meguid, A. (2021). Corporate governance in Egypt: The landscape, the research, and future directions. *Corporate Ownership & Control*, 18, 296-306.
- Agarwal, V. and Taffler, R. J. (2007). Twenty-five Years Of The Taffler Z-score Model: Does It Have Predictive Ability? *Accounting and Business Research*, 37(4), pp. 285–300.
- Al-Haddad, L. and Al-Ghoul, S. (2023), "The impact of earnings quality on corporate cash holdings: evidence from an emerging economy", *Journal of Financial Reporting and Accounting*, ahead-of-print, <https://doi.org/10.1108/JFRA-09-2022-0321>
- Al-Najjar, B. and Clark, E. (2017). Corporate Governance and Cash Holdings in MENA: Evidence From Internal and External Governance Practices. *Research in International Business and Finance*, 39, pp. 1–12
- Ameer, R. (2012). Impact of Cash Holdings and Ownership Concentration On Firm Valuation. *Review of Accounting and Finance*, 11(4), pp. 448–467.
- Arestis, P., & Karagiannis, N. (2023). The Recent Global Crises and Economic Policies for Future Durable Recovery. In *Prospects and Policies for Global Sustainable Recovery: Promoting Environmental and Economic Sustainability* (pp. 1-39). Cham: Springer International Publishing.
- Asante-Darko, D., Adu-Bonsu, B., Famiyeh, S., Kwarteng, A., and Goka, Y. (2018). Governance Structures, Cash Holdings, And Firm Value on the Ghana Stock Exchange. *Corporate Governance: The International Journal of Business in Society*, 18(4), pp. 671–685.
- Aslam, E., Kalim, R. and Fizza, S. (2019). Do Cash Holding and Corporate Governance Structure Matter For The Performance of Firms? Evidence from KMI 30- And KSE 100-Indexed Firms in Pakistan. *Global Business Review*, 20(2), pp. 313–330.
- Becker, C., Defond, M., Jiambalvo, J., and Subramanyam, K. (1998). The Effect of Audit Quality on Earnings Management. *Contemporary Accounting Research*, 15(1), pp. 1–24.
- Benjamin, S. J., Regasa, D. G., Wellalage, N. H. & Marathamuthu, M.S. (2020): Waste disclosure and corporate cash holdings, *Applied Economics*, DOI: 10.1080/00036846.2020.1764480.
- Bouhamdan, R. F., Mostapha, N., & Hegazy, W. (2023). Corporate Governance and Anti-Corruption Disclosure: Evidence from MENA Region. *European Journal of Science, Innovation and Technology*, 3(2), 122-136.
- Bushman, R. M. and Smith, A. J. (2001). Financial Accounting Information and Corporate Governance. *Journal of Accounting and Economics*, 32(1–3), pp. 237– 333.
- Caprio, L., Faccio, M. and McConnell, J. J. (2013). Sheltering Corporate Assets from Political Extraction. *Journal of Law, Economics, and Organization*, 29(2), pp. 332–354.

- Chada, S., & Varadharajan, G. (2023). Earnings quality, institutional investors, and corporate cash holdings: evidence from India. *International Journal of Managerial Finance*.
- Chen, Y. R. (2008). Corporate Governance and Cash Holdings: Listed New Economy Versus Old Economy Firms. *Corporate Governance*, 16(5), pp. 430–442.
- Chen, Y. R. and Chuang, W. T. (2009). Alignment Or Entrenchment? Corporate Governance and Cash Holdings in Growing Firms. *Journal of Business Research*, 62(11), pp. 1200–1206.
- Darrough, M. N. and Ye, J. (2007). Valuation Of Loss Firms in A Knowledge-Based Economy. *Review of Accounting Studies*, 12(1), pp. 61–93.
- DeAngelo, L., (1986) "Accounting Numbers as Market Valuation Substitutes: A Study of Management Buyouts of Public Stockholders", *The Accounting Review*, 61(3), pp. 400 – 420.
- Dechow, P. M. and Dichev, I. D. (2002). The Quality of Accruals and Earnings: The Role Of Accrual Estimation Errors. *The Accounting Review*, 77, pp. 35–59.
- Dechow, P. M., Sloan, R. G., & Sweeney, A. P. (1995). Detecting earnings management. *The Accounting review*, 70(2), pp.193-225.
- Derouiche, I., Jemai, K. and Mansali, H. (2019). Accruals Quality, Financial Constraints and Corporate Cash Holdings. *Managerial Finance*, 45(8), pp.1129-1145.
- Dissanayake, S., Ajward, R., & Dissanayake, D. (2023). Whether corporate social responsibility is used to suppress earnings management practices, and could corporate governance mechanisms prevent them? An empirical study. *Asian Journal of Accounting Research*, 8(4), pp. 373-386.
- Dittmar, A. and Mahrt-Smith, J. (2007). Corporate Governance and The Value of Cash Holdings. *Journal of Financial Economics*, 83(3), pp. 599–634.
- Dittmar, A., Mahrt-Smith, J. and Servaes, H. (2003). International Corporate Governance and Corporate Cash Holdings. *Journal of Financial and Quantitative analysis*, 38(1), pp. 111–133.
- EGX (2019) EGX100, Retrieved at https://www.egx.com.eg/getdoc/9a176cf8-c9b9-4c90-8968-b8ac821511a4/EGX-100-Methodology_en-03-02-2019.aspx
- El Diri, M., Lambrinoudakis, C., & Alhadab, M. (2020). Corporate governance and earnings management in concentrated markets. *Journal of Business Research*, 108, pp.291-306.
- El-Deeb, M. S., Ismail, T. H., & El Banna, A. A. (2023). Does audit quality moderate the impact of environmental, social and governance disclosure on firm value? Further evidence from Egypt. *Journal of Humanities and Applied Social Sciences*, 5(4), 293-322.
- Ezat, A.N. (2019), "The impact of earnings quality on the association between readability and cost of capital: Evidence from Egypt," *Journal of Accounting in Emerging Economies*, 9(3), pp. 366-385. <https://doi.org/10.1108/JAEE-12-2018-0136>
- Fahlenbrach, R., Raged, K., & Stulz, R. M. (2021). How valuable is financial flexibility when revenue stops? Evidence from the COVID-19 crisis. *The Review of Financial Studies*, 34(11), pp. 5474-5521.
- Farinha, J., Mateus, C. and Soares, N. (2018). Cash Holdings And Earnings Quality: Evidence From The Main And Alternative UK Markets. *International Review of Financial Analysis*, 56, pp. 238–252.
- Fernandes, F., Coelho, L. and Peixinho, R. (2017). Determinants Of Corporate Cash Holdings: Evidence From Portuguese Publicly Traded Firms. *Dos Algarves: A Multidisciplinary e-Journal*, 29, pp. 102–118.
- Fisher, T. C. G., Gavius, I. and Martel, J. (2019). Earnings Management In Chapter 11 Bankruptcy. *Abacus*, 55(2), pp. 273–305.
- Francis, J., Lafond, R., Olsson, P., and Schipper, K. (2005). The Market Pricing Of Accruals Quality. *Journal of Accounting and Economics*, 39(2), pp. 295–32
- Gao, X. and Jia, Y. (2016). Internal Control Over Financial Reporting And The Safeguarding Of Corporate Resources: Evidence From The Value Of Cash Holdings. *Contemporary Accounting Research*, 33(2), pp. 783–814.
- García-Teruel, P. J., Martínez-Solano, P. and Sánchez-Ballesta, J. P. (2009). Accruals Quality and Corporate Cash Holdings. *Accounting and Finance*, 49(1), pp. 95– 115.

- Ginglinger, E. and Saddour, K. (2007) 'Cash holdings, corporate governance, and financial constraints.' Available at: <https://hal.archives-ouvertes.fr/halshs-00162404/document> (Accessed: 27 March 2020).
- Greiner, A. J. (2017). An Examination Of Real Activities Management And Corporate Cash Holdings. *Advances in Accounting*, 39(February), pp. 79–90.
- Habib, A., Hasan, M. and Al-Hadi, A. (2017). Financial Statement Comparability and Corporate Cash Holdings. *Journal of Contemporary Accounting & Economics*, 13(3), pp. 304–321.
- Hall, T., Mateus, C. and Mateus, I. B. (2014). What Determines Cash Holdings At Privately Held And Publicly Traded Firms? Evidence From 20 Emerging Markets. *International Review of Financial Analysis*, 33, pp. 104–116.
- Harford, J., Mansi, S. A. and Maxwell, W. F. (2008). Corporate Governance And Firm Cash Holdings In The US. *Journal of Financial Economics*, 87(3), pp. 535–555.
- Healy P., (1985) "The Effects of Bonus Schemes on Accounting Decisions" *Journal of Accounting and Economics*, 7 (1), 32 - 39.
- Houqe, M. N., Ahmed, K., & Van Zijl, T. (2017). Audit quality, earnings management, and cost of equity capital: evidence from India. *International Journal of Auditing*, 21(2), 177-189.
- Hsu, W. Y., Huang, Y. R. and Lai, G. (2015). Corporate Governance And Cash Holdings: Evidence From The U.S. Property-Liability Insurance Industry. *Journal of Risk and Insurance*, 82(3), pp. 715–748.
- Islam, M. A., Ali, R., & Ahmad, Z. (2011). Is modified Jones model effective in detecting earnings management? Evidence from a developing economy. *International Journal of Economics and Finance*, 3(2), 116-125.
- Islam, R., Haque, Z., & Moutushi, R. H. (2022). Earnings quality and financial flexibility: A moderating role of corporate governance. *Cogent Business & Management*, 9(1), 2097620.
- Jensen, M. C. (1986). Agency Costs Of Free Cash Flow, Corporate Finance, And Takeovers. *American Economic Review*, 76(2), pp. 323–329.
- Jones, J. J. (1991). Earnings management during import relief investigations. *Journal of accounting research*, 29(2), 193-228.
- Kalcheva, I. and Lins, K. V. (2007). International Evidence On Cash Holdings And Expected Managerial Agency Problems. *Review of Financial Studies*, 20(4), pp. 1087–1112.
- Koo, D. S., Ramalingegowda, S. and Yu, Y. (2017). The Effect Of Financial Reporting Quality On Corporate Dividend Policy. *Review of Accounting Studies*, 22(2), pp. 753–790.
- LaPorta, R. L., Lopez-de-silanes, F., Shleifer, A., and Vishny, R. (2000). Investor Protection and Corporate Governance. *Journal of Financial Economics*, 58, pp. 3–27.
- Lee, K. and Lee, C. (2009). Cash Holdings, Corporate Governance Structure. *Review of Pacific Basin Financial Markets and Policies*, 12(3), pp. 475–508.
- Lee, Y. H., Kang, S. A., & Cho, S. M. (2015). The effect of voluntary IFRS adoption by unlisted firms on earnings quality and the cost of debt: empirical evidence from Korea. *Journal of Business Economics and Management*, 16(5), 931-948.
- Lin, Z., Liu, M. and Noronha, C. (2016). The impact of corporate governance on informative earnings management in the chinese market. *Abacus*, 52(3), pp. 568–609.
- Liu, Y., Valenti, A., & Chen, Y. J. (2016). Corporate governance and information transparency in Taiwan's public firms: The moderating effect of family ownership. *Journal of Management & Organization*, 22(5), 662-679.
- Louis, H., Sun, A. X. and Urcan, O. (2012). Value Of Cash Holdings and Accounting Conservatism. *Contemporary Accounting Research*, 29(4), pp. 1249–1271.
- Maheshwari, Y. and Rao, K. T. V. (2017). Determinants Of Corporate Cash Holdings. *Global Business Review*, 18(2), pp. 416–427.
- Manoel, A. A. S., Moraes, M. B. C., Nagano, M. S., & Sobreiro, V. A. (2018). Cash holdings and corporate governance: The effects of premium listing in Brazil. *Review of development finance*, 8(2), 106-115.

- Mansali, H., Derouiche, I. and Jemai, K. (2019). Accruals Quality, Financial Constraints, And Corporate Cash Holdings. *Managerial Finance*, 45(8), pp. 1129– 1145.
- Masood, A. and Shah, A. (2014). Corporate Governance and Cash Holdings in Listed Non-Financial Firms In Pakistan. *Business Review*, 9(2), pp. 48–73.
- Meloa, T. (2014). *The association between firm-level corporate governance and corporate cash holdings: Evidence from some emerging markets* (Doctoral dissertation, University of Pretoria).
- Mikkelsen, W. H. and Partch, M. M. (2003). Do Persistent Large Cash Reserves Hinder Performance? *The Journal of Financial and Quantitative Analysis*, 38(2), pp. 275–294.
- Nasr, M. A., & Ntim, C. G. (2018). Corporate governance mechanisms and accounting conservatism: evidence from Egypt. *Corporate Governance: The International Journal of Business in Society*, 18(3), 386-407.
- Naumoski, A., Arsov, S., & Cvetkoska, V. (2022). Asymmetric information and agency cost of financial leverage and corporate investments: Evidence from emerging South-East European countries. *Scientific Annals of Economics and Business*, 69(2), 317-342.
- Nekhili, M., Hussainey, K., Cheffi, W., Chtioui, T., & Tchakoute-Tchuigoua, H. (2016). R&D narrative disclosure, corporate governance and market value: Evidence from France. *Journal of Applied Business Research*, 32(1), pp.111-128.
- Nguyen, P., & Rahman, N. (2020). Institutional ownership, cross-shareholdings and corporate cash reserves in Japan. *Accounting & Finance*, 60, pp.1175-1207.
- Opler, T., Pinkowitz, L., Stulz, R. M., and Williamson, Rohan. (1999). The Determinants and Implications Of Corporate Cash Holdings. *Journal of Financial Economics*, 52(1), pp. 3–46.
- Orlova, S. V. and Rao, R. P. (2018). Cash Holdings Speed Of Adjustment. *International Review of Economics and Finance*, 54, pp. 1–14.
- Ozkan, A. and Ozkan, N. (2004). Corporate Cash Holdings: An Empirical Investigation Of UK Companies. *Journal of Banking and Finance*, 28(9), pp. 2103–2134.
- Pinkowitz, L., Williamson, R. and Stulz, R. M. (2007). Cash Holdings, Dividend Policy, And Corporate Governance: A Cross-Country Analysis. *Journal of Applied Corporate Finance*, 19(1), pp. 81–87.
- Qin, X., Huang, G., Shen, H., and Fu, M. (2020). COVID-19 Pandemic And Firm- Level Cash Holding—Moderating Effect Of Goodwill And Goodwill Impairment. *Emerging Markets Finance and Trade*, 56(10), pp. 2243–2258.
- Roy, A. (2018). Corporate Governance and Cash Holdings in Indian Firms. *In Governance and Regulations' Contemporary Issues*, 99, pp. 93-119.
- Salas-Molina, F., Rodríguez-Aguilar, J. A., & Guillen, M. (2023). A multidimensional review of the cash management problem. *Financial Innovation*, 9(1), 67.
- Sarker, M. S. R., Mazumder, S., & Amin, M. R. (2023). Oil price uncertainty, workplace misconduct, and cash holding. *International Review of Financial Analysis*, 102757.
- Shehata, N., Dahawy, K. and Ismail, T. (2014). The Relationship Between Firm Characteristics and Mandatory Disclosure Level: When Egyptian Accounting Standards Were First Adopted. *Mustang Journal of Accounting and Finance*, 5(4), pp. 85-103.
- Shin, M., Kim, S., Shin, J., and Lee, J. (2018). Earnings Quality Effect On Corporate Excess Cash Holdings And Their Marginal Value. *Emerging Markets Finance and Trade*, 54(4), pp. 901–920.
- Shu-Hui, S., Chien-Ju, L., & Chen-Lung, C. (2009). The association between family firms and earnings quality: Ownership, management, and control. *Tai Da Guan Li Lun Cong*, 19(S2), 35.
- Sun, Q., Yung, K. and Rahman, H. (2012). Earnings Quality and Corporate Cash Holdings. *Accounting & Finance*, 52(2), pp. 543–571.
- Tran, Q. T. (2020). Monetary loosening and cash holdings: Evidence from an emerging market. *Finance Research Letters*, 36(C), p.101312.

Appendix (I) Corporate Governance Proxies

Type	Measurement	Description
Board related Measures	Board Size	Total number of Board of Directors (BOD) on the board for firm <i>i</i> at year <i>t</i>
	Board Independence	The ratio of non-executive members on the board to the total size of BOD for firm <i>i</i> at year <i>t</i>
	CEO Duality	In the dummy variable, the value of one is assigned where the roles of CEO and chairman of the board are separated and the value of zero otherwise.
	BOD Meetings	Total number of meetings held by BOD for firm <i>i</i> at year <i>t</i>
Audit Committee Effectiveness-Related Measures	AC Size	Total number of directors on Audit Committee (AC) for firm <i>i</i> at year <i>t</i>
	AC Independence	AC non-executives is the proportion of non-executive directors on the audit committee for firm <i>i</i> at year <i>t</i>
	AC Meeting	Total number of meetings held by the audit committee for firm <i>i</i> at year <i>t</i>
	Big (4)	As a dummy variable, the value of one is assigned if the firm is audited by big(4) audit firms and zero otherwise.
Ownership Structure Measures	Managerial Ownership	The proportion of outstanding shares held by managers/directors for firm <i>i</i> at year <i>t</i>
	Institutional Ownership	The proportion of outstanding shares held by institutions for firm <i>i</i> at year <i>t</i>
	Blockholders	The ratio of outstanding shares held by blockholders for firm <i>i</i> at year <i>t</i>