The Impact of Internal Corporate Governance Mechanisms on Cash Holdings- An Empirical Study on Egyptian Listed Companies

Extracted from a master thesis of accounting

By

Khalid Mohamed Nashi

Master of Science Student, Faculty of Management and Technology, Arab Academy for Science, Technology, and Maritime Transport

Khalidnashi21@gmail.com

***Dr.* Eman Mohamed Saad Eldeen**

Professor of Financial Accounting, Faculty of Commerce, Beni-Suef University

emaneldeen2005@hotmail.com

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The Impact of Internal Corporate Governance Mechanisms on Cash Holdings- An Empirical Study on Egyptian Listed Companies

Khalid Mohamed Nashi and Dr. Eman Mohamed Saad Eldeen

Abstract:

Purpose: The study examines the impact of internal corporate governance mechanisms on corporate cash holdings among the Egyptian stock market.

Designs and methodology: The research used secondary data obtained from company's disclosure reports and financial statements of 37 firms listed in the Egyptian stock market in the period from 2017 to 2022 with a total of 222 firm-year observations. The study excluded banks, insurance firms and financial institutions from the study as they have special nature that governs their institutions.

Findings and Recommendations: The results showed that board size and board independence have a significant negative impact on cash holdings, audit committee size has an insignificant impact on cash holdings, and managerial ownership has a significant positive impact on cash holdings. The study recommends enhancing and activating the role of audit committee, additionally giving more attention and oversight to firms with a high percentage of managerial ownership due to the risk of acting in an opportunistic way by managers. Moreover, it is recommended that firms maintain a large percentage of independent directors on their board as that board independence is one of the most effective governance mechanisms. Furthermore, the researcher suggests that keeping board sizes on the larger side may encourage improved supervision and governance.

Originality and value: This study contributes to the accounting literature through its contributions to examining the impact of internal corporate governance mechanisms on corporate cash holdings among the Egyptian stock market, which in turn may contribute to reducing the research gap and controversy.

Keywords: Board Size, Board Independence, Audit Committee Size, Managerial Ownership, Corporate Cash holding

1.1 Introduction

Cash holdings refer to the liquid assets that a company keep on hand to meet unexpected needs and short-term obligations. These include real cash, as well as cash equivalent that can be converted into cash quickly with minimal risk of loss. Cash holdings are one of the major current assets which are very important accounts for the financial manager, so they help company management to manage the operations of the business as well as the liquidity of the company and help them to maintain operations especially when there are economic crises and high uncertainty (Darma et al., 2021).

For a growing business cash holding is an important financial decision some corporations keep more cash. However, some corporations keep lower amounts of cash, this varies among companies because the amount of cash to hold in a company is a very difficult decision as it is important for all the activities of the business. Good management of cash is important for operating the business (Narwal and Jindal, 2017).

Managers of firms which hold large amounts of cash prefer to keep the cash as a reserve to keep their control over the firm's resources. Moreover, keeping these amounts of cash has advantages such as the ability to invest in positive net present value projects and to be ready for any unexpected events such as economic crises (Darma et al., 2021; Al- Dhamari and Ismail, 2015).

On the other hand, this can lead to an agency conflict between shareholders and the controlling management. It is argued that managers who control large amounts of cash in a company may invest in projects which will benefit them at the expense of the shareholder, and this could result in a decline in the firm's value as these projects are not in the best interests of the firm.

Previous studies on cash holdings revealed that firms with large amounts of cash reserve experience low value, especially when the company has a weak corporate governance system (Dhamari and Ismail, 2015). In addition, another disadvantage of holding large amounts of cash is the opportunity cost, which is the loss of investment opportunities. Moreover, the company will not get the discount on purchases (Basheer, 2014).

Corporate governance is broadly defined as the process of organizing, directing, and controlling corporate behavior. Corporate governance is a professional governing system for a corporation based on the principles of good corporate governance. Good corporate governance basic principles are transparency, responsibility, accountability, fairness, and independence. Members engaged in the management system of the company, such as shareholders and other stakeholders, have a great impact on corporate governance (Boshnak et al.,2023).

Mechanisms of corporate governance refer to alignment of interest through which the firms are directed and controlled by their shareholders, investors, creditors, employees, customers, suppliers, and the government, along with the public in general. Lacking effective corporate governance mechanisms may lead to agency problems, empowering the agent (management) to participate in opportunistic actions, against the shareholders and the owners of the corporation as well as the whole economy (Urban, 2019). Despite not having generally accepted corporate governance definitions, corporate governance refers to mechanisms, systems, structures, and process through which firms are governed and guided towards their objectives in meeting the demands of shareholders and other stakeholders (Tawfik et al.,2022).

Corporate governance is accountable for balancing issues, such as social, economic, and environmental issues. Structures of corporate governance such as the audit committee and the board of directors are created to govern and monitor the company’s activities and the decisions of the managers that encompasses society and community involvement for the purpose of bringing direct and indirect benefits to all stakeholders. A company’s board of directors is the main mechanism in corporate governance, is accountable for governing and supervising executives and guarantees that all the needs of shareholders are obtained. Furthermore, the sub-committee of the board or directors, which is the audit committee, is accountable for overseeing the financial and non-financial reporting information with the aim of minimizing the information asymmetry among companies, executives, and other stakeholders (Bamahros,2022).

According to that there are limited studies under the Egyptian context that examined the impact of internal governance mechanisms on the level of cash holdings. Therefore, this research aims to investigate and analyze the impact of internal corporate governance mechanisms on corporate cash holdings among the Egyptian stock market. In other words, the researcher examines how board size, board independence, audit committee size, and managerial ownership can influence the level of cash holdings among non-financial Egyptian listed companies for the period from 2017 to 2022.

The rest of this research is organized as follows:

Section 2 presents the literature review which demonstrates previous studies that examined the impact of board size, board independence, audit committee size, and managerial ownership on corporate cash holdings and developing the study hypotheses. Section 3 includes research design and methodology. Section 4 presents hypothesis testing and empirical results. Finally, Section 5 provides the study conclusion, limitations and future studies.

2. Literature Review and Hypotheses Development

2.1 Board size and Cash Holdings

The board size is represented as the total number of directors on the board which is composed of executive and non-executive directors (Gambo et al., 2018). Board size is one of the major mechanisms of corporate governance that help in reducing the opportunistic behavior of managers but there is still debate about whether small board size is more effective or large board size (Ahmed and Che Ahmed, 2016; Hajjar et al., 2021). and as the board size reduces the opportunistic behavior of managers which includes holding too much cash to use it for their own personal interest as discussed before. Therefore, the researcher aims to find if there is impact of board size on cash holdings. The previous studies that addressed the relationship between board size and cash holdings are presented below:

The study of Wirianata (2024) intended to examine the impact of corporate governance in manufacturing firms on cash holdings. The corporate governance was measured through board size, board independence, board meetings, audit committee size, audit committee meetings, institutional ownership, and managerial ownership. Data was collected from firms under the Indonesia stock exchange for the period from 2017 – 2021. The results of the study showed that as board size increases the firms are more likely to hold more cash. In other words, there is a positive impact of board size on cash holdings.

On the contrary, the study of Iyoha et al. (2024) investigated the influence of corporate governance mechanisms on the level of cash holdings. The study examined the impact of board size, board independence, CEO equity ownership, board gender diversity and institutional ownership on cash holdings among the non-financial firms. The data was collected from 2011 to 2020, the population was 133 non- financial firms under the Nigeria exchange, with a final sample 88 firm after excluding firms that do not disclose their annual report publicly. The results of the study showed that board size has an inverse significant impact on cash holdings.

However, the study of Al-Mubarak (2023) examined the impact of corporate governance characteristics on cash holdings. The study focused on the following mechanisms: board size, board meetings, board independence, CEO equity ownership, and executive’s ownership. The study focus was on the firms under the Saudi financial market, the study excluded financial firms and banks as they have special regulations and treatments, the final sample was 138 non-financial firm for the period from 2017 to 2019. The results showed that there is no significant relationship between board size and cash holdings.

While the study of Cambrea et al. (2022) attempted to analyze the impact of the characteristics of the board of directors on cash holdings before and during the financial crisis, the study focused on board size, independent director, and CEO duality. The data was collected from 187 Italian listed firms under the stock exchange in Milan during the period from 2003 – 2013 this was the final sample after excluding financial and insurance firms as well as firms with missing data on corporate governance. The result showed that many directors on the board could make the board inefficient, which would make managers hold more cash to use for their personal benefits this is under the normal conditions. However, in times of crisis the analysis found that as the board size increases the level of cash holdings reduces.

Moreover, the study of Darma et al. (2021) tested the impact of corporate governance on cash holdings. The proxies used for corporate governance are 4 proxies: board size, percentage of board independence, family ownership, and institutional ownership. The study focused on firms listed on the Indonesian stock exchange, using data collected from 2015-2019, and the final sample was 77 firm. The results showed that board size does not have any effect on cash holdings.

However, the study of Mengyun et al. (2021) aimed to investigate the impact of corporate governance on cash holdings. The research focused on board independence and board size as indicators of corporate governance. The study population was all listed firms under the Pakistan stock exchange after excluding financial firms as they have special nature and regulations, as well as excluding the public corporations. The study focused on family enterprises. The final sample was 212 family listed firms for the period from 2010 to 2017. The study revealed that there is a positive relationship between board size and the level of cash holdings.

On the other hand, the study of Kwan and Lau (2020) examined how corporate governance mechanisms influence the cash holdings among hospital industries. One of the measures of corporate governance was board size. The data was collected from hospitality firms that are publicly listed in Malaysian and Singapore for the period from 2005 – 2013, the final sample for the study was 52 firms after excluding firms with missing data and negative book equity. The results revealed that board size has a significant negative impact on the cash holdings.

While the study of Magerakis et al. (2020) aimed to examine the determinants of the cash holdings and those determinants include corporate governance proxies which were board size, CEO duality, and managerial ownership. The data was collected from listed firms in the United Kingdom. The final sample was composed of 992 non-financial firms and non-utility firms for a period from 2010 to 2018. The results found no significant relationship between board size and the cash holdings.

On the other hand, the study of Ajanthan and Kumara (2017) test the impact of corporate governance practice on the cash holdings of the firms listed in Sri Lanka the corporate governance practices used was board size, board independence, board meetings, gender diversity, and CEO duality. The data was collected from 90 listed firms in Sir Lanka for the period from 2011/12- 2015/16. The results reveled that board size has a significant negative impact on cash holdings of firms in Sir Lanka.

According to the above discussion on previous studies that tested the impact of board size on cash holdings, the researcher can conclude that there is a significant relationship between the two variables in addition to the existence of different results regarding the direction of the relationship between them in previous studies. Therefore, the researcher intends to investigate the study in the Egyptian Stock Market by testing hypothesis number one:

H1: There is a significant impact of the board's size on cash holdings.

2.2 Board Independence and Cash Holdings

One of the major corporate governance mechanisms is board independence. When board members are independent this can enhance board effectiveness as well as improve supervision of management which will reduce conflicts of interest between managers and owners and one of the causes of this conflict is that managers seek to hold large amounts of cash as it is the most asset that could be controlled by manager and used for their own benefits (Drama et al., 2021; Fernandez-Gago et al., 2018). The findings of previous studies on the impact of board independence on cash holdings varies. The following part addresses some of those previous studies.

The study of Wirianata (2024) intended to examine the impact of corporate governance in manufacturing firms on cash holdings. The corporate governance was measured through board independence, board size, board meetings, audit committee size, audit committee meetings, institutional ownership, and managerial ownership. Data was collected from firms under the Indonesia stock exchange for the period from 2017 – 2021. The results of the study showed that as board independence increases the firms are more likely to hold more cash in other words there is a positive impact of board independence on cash holdings.

On the contrary, the study of Iyoha et al. (2024) investigated the influence of corporate governance mechanisms on the level of cash holdings. The study examined the impact of board independence, board size, CEO equity ownership, board gender diversity and institutional ownership on cash holdings among the non-financial firms. the data was collected from 2011 to 2020, the population was 133 non-financial firms under the Nigeria exchange, with a final sample 88 firm after excluding firms that do not disclose their annual report publicly. The results of the study showed that board independence has an inverse significant impact on cash holdings.

In the same context the study of Al-Mubarak (2023) examined the impact of corporate governance characteristics on cash holdings. The study focused on the following mechanisms: board independence, board meetings, board size, CEO equity ownership, and executive's ownership. The study focus was on the firms under the Saudi financial market, the study excluded financial firms and banks as they have special regulations and treatments, the final sample was 138 non-financial firm for the period from 2017 to 2019. The results showed that board independence has a significant negative relationship with cash holdings.

Also, the study of Kwan and Lau (2020) examined how corporate governance mechanisms influence the cash holdings among hospital industries. One of the measures of corporate governance was board independence. The data was collected from hospitality firms that are publicly listed in Malaysian and Singapore for the period from 2005 – 2013, the final sample for the study was 52 firms after excluding firms with missing data and negative book equity. The results revealed that board independence has a negative significant impact on the cash holdings. It was mentioned also that the results showed that the independence of the board of directors provides better protection for stockholders by decreasing the level of cash holdings.

While the study of Hassanein and Kokel (2019) investigated the influence of corporate governance mechanisms on the level of hoarding cash in the corporations the corporate governance mechanisms were measured through board independence, board meeting frequence, board size, CEO duality, family-controlled firms, and audit committee size. The study analyzed a sample from Turkish firms listed on Borsa Istanbul (BIST100). The final sample was 72 nonfinancial listed firm after excluding financial firms as they have higher motive to hoard cash as well as firms that lack the data for variables of corporate governance, the data was collected for the period from 2010 – 2014. The results showed that firms with a higher percentage of independent directors are going to hoard more cash.

Additionally, the study of Noman et al. (2019) aimed to examine the influence of corporate governance on the level of cash holdings in firms in Jordan. The corporate governance proxies were board independence, board size and CEO duality. The final sample was 26 manufacturing firms under the Amman stock exchange for the period from 2008 to 2012. The results showed that there is a positive significant relationship between board independence and cash holdings.

Moreover, the study of Ullah and Kamal (2017) tested the relationship between board characteristics and cash holdings. Board independence was one of the measures for board characteristics. The study sample was composed of 150 non-financial firms listed on the Pakistan stock exchange for the period from 2001 to 2014, this sample were further divided into sub samples based on the size of the firm whether it is small or large as well as dictator regime for the period from 2001 to 2007 and democratic regime for the period from 2008 to 2014. The results showed that for the full sample there is a significant positive impact of board independence on the cash holdings, however, in large sample firms if there is an increase in the percentage of board independence this reduces cash holdings, while in smaller firms it has the opposite impact. Board independence also has a significant positive impact on cash holdings under the democratic regime, while it has insignificant impact under the dictator regime.

However, the study of Kengatharan (2017) aimed to investigate the impact of practices of corporate governance on cash holdings of the manufacturing companies listed in Sir Lanka. The corporate governance was measured through board independence, CEO duality, board size, audit committee size, audit committee meetings. The data was collected from 26 manufacturing companies listed on the Colombo stock exchange for the period from 2011 to 2015. Fixed effect, random effect and pooled ordinary least square models were performed. The results of the study showed that the best model used was fixed effect model. According to the fixed effect model the board independence does not significantly impact cash holdings level under the manufacturing companies listed on the Colombo stock exchange.

Moreover, the purpose of the study of Al-Najjar and Clark (2017) was to examine the impact of internal governance practices and the external governance practices on cash holdings under the MENA countries. One of the measures of the internal governance practices was board independence. The data was collected from firms under the following countries: Saudi Arabia, Egypt, Kuwait, Jordan, Oman, UAE, Qatar, Bahrain, and Tunisia. The final sample was 430 non-financial firms after excluding financial and utility firms as they have special regulations, the data was collected for the period from 2000-2009. The results revealed that there is no significant impact of board independence and cash holdings.

Bearing on the above discussion on previous studies that tested the impact of board independence on cash holdings, the researcher can conclude that there is a significant relationship between the two variables in addition to the existence of different results regarding the direction of the relationship between them in previous studies. The researcher intends to investigate the study in the Egyptian Stock Market by testing hypothesis number two:

H2: There is a significant impact of board independence on cash holdings.

2.3 Audit Committee Size and Cash Holdings

Audit committee size is the sum of the members working on the audit committee in the corporation most studies investigate the impact of audit committee size on firm performance and few studies investigated the impact of it on the cash holdings moreover audit committee size is one of the effective corporate governance mechanisms that can help in reducing the agency problem and therefore will reduce the opportunistic behavior of the managers which can lead to reducing cash holdings in the companies. but there is still debate regarding the size whether the small audit committee size is more effective or large audit committee size (Alghadi, 2019; Drama et al., 2021). Therefore, due to the limited studies that tested the impact of audit committee size on cash holdings, the researcher aims to examine this relationship to fill the research gap the studies that examined this relationship is presented below.

The study of Wirianata (2024) intended to examine the impact of corporate governance in manufacturing firms on cash holdings. The corporate governance was measured through audit committee size, audit committee meetings, board size, board independence, board meetings, institutional ownership, and managerial ownership. Data was collected from firms under the Indonesia stock exchange for the period from 2017 – 2021. The results of the study revealed that audit committee size didn’t influence the cash holdings in a significant way.

Moreover, the study of Alghadi (2019) aimed to examine the relationship between corporate governance mechanisms and cash holdings in Jordan. The governance mechanisms used were board characteristics, audit committee, ownership structure, and audit quality, the audit committee included the audit committee size. The data was collected from firms listed on Amman stock exchange for the period from 2011-2017. The final sample for the research was 87 firms after excluding firms with missing data. The results showed that the audit committee size has an insignificant positive impact on cash holdings.

On the other hand, the study of Hassanein and Kokel (2019) investigated the influence of corporate governance mechanisms on the level of hoarding cash in the corporations. The corporate governance mechanisms were measured through audit committee size, board size, board meeting frequence, board independence, CEO duality, and family-controlled firms. The study analyzed a sample from Turkish firms listed on Borsa Istanbul (BIST100). The final sample was 72 nonfinancial listed firm after excluding financial firms as they have higher motive to hoard cash as well as firms that lack the data for variables of corporate governance the data was collected for the period from 2010 – 2014. The results showed that firms with a higher number of audit committee members are going to hoard less cash in other words there is a significant negative impact of audit committee size on cash holdings.

While the study of Narwal and Jindal (2017) investigated the impact of corporate governance on firms’ cash holdings, where the measures of corporate governance were board meetings, board independence, board size, audit committee size, directors’ remuneration. The data was collected from Indian manufacturing sector which are listed under the national stock exchange for the period from 2005-2014, the final sample for the research was 96 manufacturing firms. The results showed that there is a significant positive impact of the audit committee size on cash holdings.

However, the study of Kengatharan (2017) aimed to investigate the impact of practices of corporate governance on cash holdings of the manufacturing companies listed in Sir Lanka. The corporate governance was measured through audit committee size, audit committee meetings, board independence, CEO duality, and board size. The data was collected from 26 manufacturing companies listed on the Colombo stock exchange for the period from 2011 to 2015. Fixed effect, random effect and pooled ordinary least square models were performed. The results of the study showed that the best model used was fixed effect model. According to the fixed effect model, the size of the audit committee does not significantly impact cash holdings level under the manufacturing companies listed on the Colombo stock exchange.

Moreover, the study of Gill and Biger (2013) aimed to test the impact of corporate governance on the efficiency of the working capital management. The corporate governance was measured through audit committee size, board size, CEO tenure, and CEO duality, moreover one of the measures for the efficiency of working capital management was the cash holdings. The data was collected from firms listed on the New York stock exchange for the period from 2009-2011, the final sample was 180 manufacturing firms. The results showed that the audit committee size does not significantly impact cash holdings.

According to the above discussion, the researcher found that in the limited studies that addressed the relationship between audit committee size and the cash holdings that the results is not consistent with each other, and based on that the audit committee size is one of the effective mechanisms of corporate governance therefore the researcher expects that there is an impact of audit committee size on cash holdings, and due to the inadequate evidence regarding this relationship the researcher intends to investigate the study in the Egyptian Stock Market by testing hypothesis number three:

H3: There is a significant impact of audit committee size on cash holdings.

2.4 Managerial Ownership and Cash Holdings

Managerial ownership can be defined as the percentage of ownership of CEO and top executives in the firm and according to this the directors are motivated to make decisions in the favor of the shareholders to maximize their wealth, which will reduce the agency cost (Alghadi, 2019). Moreover, when top executives and CEO hold large amount of shares in the firm, they tend to reduce the level of cash and cash equivalents hold by the firm, and they are more prone to use it by distributing dividends to shareholders (Khalil et al., 2016). The previous studies that addressed the impact of managerial ownership on cash holdings are presented below.

The study of Wirianata (2024) intended to examine the impact of corporate governance in manufacturing firms on cash holdings. The corporate governance was measured through managerial ownership, institutional ownership, board size, board independence, board meetings, audit committee size and audit committee meetings. Data was collected from firms under the Indonesia stock exchange for the period from 2017 – 2021. The results of the study showed that managerial ownership does not have a significant impact on the level of cash holdings.

While the study of Talbi and Menchaoui (2023) aimed to test the impact of managerial ownership and the attributes of the board on the cash holdings. The data was collected from listed firm on Saudi financial market for the period from 2006-2016, the final sample was 70 non-financial firms after excluding financial firms due to its special nature as well as firms with missing data. The results showed that managerial ownership has a significant positive impact on cash holdings.

Moreover, the study of Alghadi et al. (2021) investigated the influence of ownership structure on the cash holdings level in the emerging states. The ownership structure proxies were managerial ownership, family ownership, institutional ownership, and foreign ownership. The data was collected data from firms listed in Saudi stock exchange for the period from 2011-2019, the final sample for study was composed of 100 firms after excluding all financial firms because of their special nature and different rules govern them additionally firms with missing data was also excluded. The results showed that there is a significant positive impact of managerial ownership on cash holdings.

Unlike the study of Afifa et al. (2021) the purpose of the study was to test the direct and mediating relationship between ownership structure, cash holdings and the firm value. The proxies used for ownership were managerial ownership, concentrated ownership, foreign ownership and organizational ownership. The data was collected from insurance companies listed in Jordan for the period from 2009-2018, after excluding firms with missing data the final sample for the study was 20 insurance firms. The results showed that managerial ownership does not have a significant impact on cash holdings.

In the same context, the study of Qian (2021) examined the relationship between BOD design, managerial ownership and the cash holdings in Latin America's publicly traded firms in Peru, Mexico, Colombia, Chile, Brazil, and Argentine. The data was collected for the period from 2018-2019, the final sample for the study was 652 firm after excluding the financial institutions and public utilities due to the special nature and regulations that are related to them. The study founds that managerial ownership does not significantly impact cash holdings.

Moreover, the study of Sitorus et al. (2020) aimed to find out the determinants of cash holdings in manufacturing firms in Indonesia. The study tested the impact of a lot of variables on cash holdings including managerial ownership. The data was collected from 26 firm listed on Indonesia stock exchange for the period from 2016-2018. The results showed that managerial ownership does not significantly impact cash holdings.

On the other hand, the study of Alghadi (2019) attempt to examine the relationship between corporate governance mechanisms and cash holdings in Jordan. The governance mechanisms used were board characteristics, audit committee, ownership structure, and audit quality, the ownership structure included managerial ownership. The data was collected from firms listed on Amman stock exchange for the period from 2011-2017. The final sample for the research was 87 firms after excluding firms with missing data. The results showed that managerial ownership has a significant positive impact on cash holdings.

On contrary, the study of Abodoma (2018) aimed to analyze the determinants of cash holdings on firms listed on Egyptian stock market and one part of the study was the impact of corporate governance mechanisms on cash holdings, one of the mechanisms used was the managerial ownership. The data was collected from 157 firm listed on the Egyptian stock exchange for the period from 2008 to 2015.the results showed that managerial ownership has a significant negative impact on cash holdings it was mentioned also that this means that managerial ownership reduces agency problem as that when mangers hold higher percentage of the ownership in the company their interest is aligned with the interest of shareholders therefore hold lower levels of cash.

Moreover, the study of Alim and Khan (2016) examined the impact of corporate governance in the context of stand-alone companies and family-controlled companies in Pakistan. The measures for corporate governance included managerial ownership. The data was collected from non-financial listed firms in Pakistan. The study was conducted on 272 companies composed of 121 stand-alone companies and 151 family-controlled companies for the period from 2001-2014. The results showed that there is a significant negative impact of managerial ownership on cash holdings.

Additionally, the study of Khalil et al. (2016) aimed to test the impact of managerial ownership on the cash holdings level on the firms on the cement sector of Pakistan. The data was collected from 15 firms in the cement sector for the period from 2007-2015. The results showed that as managerial ownership increases the cash holdings level decreases and vice versa. Which shows that there is a significant negative impact of managerial ownership on cash holdings.

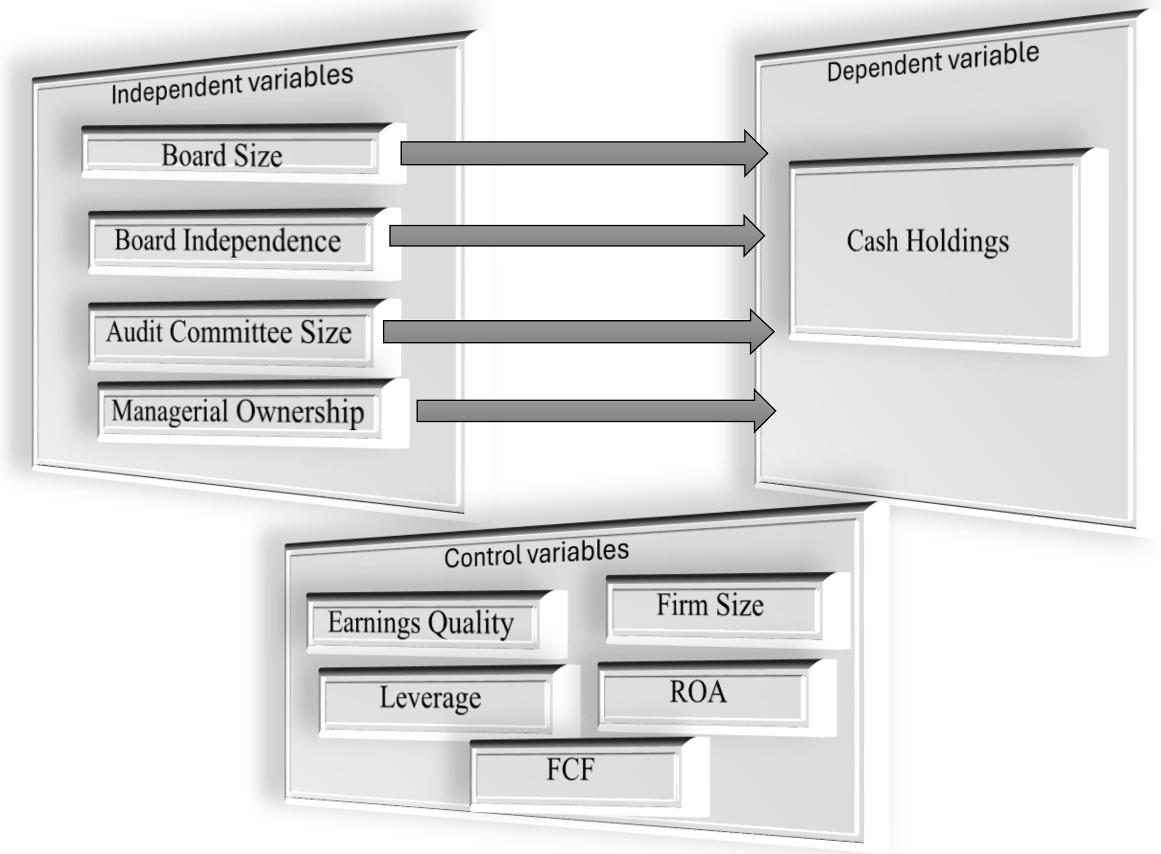
In the light of the above discussion, the researcher can conclude that there is a significant impact of managerial ownership on cash holdings in addition to the existence of different results regarding the direction of the impact between them in previous studies. Therefore, the researcher intends to investigate the study in the Egyptian Stock Market by testing hypothesis number four:

H4: There is a significant impact of managerial ownership on cash holding.

3. Research Design and Methodology

3.1 Research Conceptual Framework

The following figure (1) presents the research conceptual framework that shows the relation between independent and dependent variables:



Source: prepared by the researcher

3.2 Data Collection and Study Sample

The population is formed of all publicly listed firms in the Egyptian Stock Exchange (EGX) during the study period from 2017 to 2022 The reason for starting the period from 2017 is based on that the third release of Egyptian corporate governance code was issued on august 2016 therefore the researcher intended to collect data from the following year. The sample is considered a purposive sample because it excludes banks, insurance firms and financial institutions from the study as they have special nature that governs their institutions as well as there are some requirements and standards related to cash holdings level that should be implemented on these institutions. Additionally, firms with missing data have been excluded. Therefore, the final sample is comprised of 37 companies for 6 years with a total of 222 firm-year observations. In addition, the study sample involves 6 main sectors (Consumer Discretionary, Consumer Staples, HealthCare, Industrials, Materials, and Real Estate).

Furthermore, the research depends on the secondary data that are collected from the company's disclosure reports and financial statements over the period from 2017 to 2022, which are collected through Thomson Reuters, the Egyptian Stock Exchange website (www.egx.com.eg), and Mubasher info (www.mubasher.info).

3.3 Research Model

$$\begin{aligned} CH_{i,t} = \beta_0 + \beta_1\, BS_{i,t} + \beta_2\, BI_{i,t} + \beta_3\, ACS_{i,t} + \beta_4\, MO_{i,t} + \beta_5\, EQ_{i,t} \\ + \beta_6\, Size_{i,t} + \beta_7\, Lev_{i,t} + \beta_8\, ROA_{i,t} + \beta_9\, FCF_{i,t} \\ + \beta_{10}\, \text{Year Fixed Effect}_{i,t} + \varepsilon_{i,t} \end{aligned}$$

Where,

$CH_{i,t}$= Cash holdings for firm (i) at year (t).

β_0= the estimated constant term.

$BS_{i,t}$ = Board size for firm (i) at year (t).

$BI_{i,t}$ = Board independence for firm (i) at year (t).

$ACS_{i,t}$ = Audit committee size for firm (i) at year (t).

$MO_{i,t}$ = Managerial ownership for firm (i) at year (t).

$EQ_{i,t}$ = Earnings quality for firm (i) at year (t).

$Size_{i,t}$ = Firm size for firm (i) at year (t).

$Lev_{i,t}$ = Financial leverage for firm (i) at year (t).

$ROA_{i,t}$ = Return on assets for firm (i) at year (t).

$FCF_{i,t}$ = Free cash flows for firm (i) at year (t).

ε_{it}= The estimated random error of firm i at year t.

i = refers to the company.

t → refers to the year

3.4 Variables Measurement

Table1: shows the variables measurement and their abbreviation as follows:

Table (1): Summary for the research variables` measures

Variable (Abbreviation)	Measurement	Reference
Cash holdings (CH)	$\frac{\text{cash and cash equivalents}}{\text{Total assets}}$	Ali et al., 2024
Board size (BS)	The natural logarithm of the total number of directors on the board for firm i at year t	Gul et al., 2020
Board independence (BI)	The ratio of independent members on the board to the total size of BOD for firm i at year t	Gul et al., 2020
Audit committee size (ACS)	Total number of members on audit committee for firm i at year t	Hassanein & Kokel, 2019
Managerial ownership (MO)	$\frac{\text{Numbers of shares owned by Directors}}{\text{The outstanding shares during the financial year}}$	Magerakis et al., 2020
Earnings quality (EQ)	The absolute value of discretionary accruals which is calculated using modified Jones model (1995) multiplied by (-1) to directly reflect quality of earnings of firm i at year t.	Alzoubi, 2018; hung and ven, 2020
Size (Size)	The natural logarithm of the market value of Equity	Dang et al., 2018
Leverage (Lev)	$\frac{\text{Total Debt}}{\text{Total assets}}$	Gul et al., 2020
Return on assets (ROA)	$\frac{\text{Net income after tax}}{\text{Total assets}}$	Aminah, 2021
Fee cash flows (FCF)	$\frac{\text{Net cash from operating activities} - \text{capital expenditures}}{\text{Total assets}}$	Laurion & Shin, 2024

Source: prepared by the researcher

3.5 Methods of Data Analysis

The current study adopts a deductive research approach to test the impact of internal corporate governance mechanisms on cash holdings within the specific context of Egypt. This study employs quantitative methods to quantify the phenomena of interest. Furthermore, the research model is estimated using the Ordinary Least Squares (OLS) method and the Generalized Least Squares (GLS) method, which consider any potential issues that the OLS method may encounter. Moreover, STATA 17 software is used to conduct all the statistical analyses necessary to examine the research objectives and test hypotheses.

4. Empirical analysis and results discussion

4.1 Descriptive Analysis

The crucial role of descriptive statistics arises from the ease of articulating the key statistical characteristics of a large amount of data. The selection of statistical approaches for data analysis is based on the fundamental attributes of the data in the research sample. Table (4.1) presents the summary statistics for all continuous variables used in the regression model for the full sample. According to this section, descriptive statistics aim to describe the fundamental characteristics of the data, including the mean, standard deviation, minimum and maximum values for each variable.

Table (4.1): Descriptive Statistics

Variable		Mean	Std. dev.	Min	Max	Observations
CH	overall	0.100381	0.092367	0.000795	0.557577	N = 222
	between		0.079267	0.006933	0.402552	n = 37
	within		0.048895	-0.08051	0.276077	T = 6
BS	overall	2.099144	0.278259	1.39	2.83	N = 222
	between		0.253573	1.53	2.748333	n = 37
	within		0.120761	1.607477	2.379144	T = 6
BI	overall	0.196577	0.169032	0	0.78	N = 222
	between		0.142937	0	0.511667	n = 37
	within		0.092754	-0.07009	0.728243	T = 6
ACS	overall	3.36036	0.821573	0	6	N = 222
	between		0.725966	2	5.666667	n = 37
	within		0.399849	1.36036	4.36036	T = 6
MO	overall	0.12509	0.224315	0	0.89	N = 222
	between		0.212189	0	0.76	n = 37
	within		0.079448	-0.41491	0.643423	T = 6
EQ	overall	-0.05114	0.044847	-0.17698	-0.00113	N = 222
	between		0.028525	-0.1301	-0.00334	n = 37
	within		0.034871	-0.15481	0.056167	T = 6
Size	overall	21.21078	2.184782	13.81457	25.4182	N = 222
	between		2.187513	14.23095	25.11087	n = 37
	within		0.310361	20.47203	22.0201	T = 6
Lev	overall	0.137258	0.131073	0	0.459642	N = 222
	between		0.116756	0	0.33977	n = 37
	within		0.062101	-0.07466	0.380896	T = 6
ROA	overall	0.092177	0.073718	-0.00316	0.404694	N = 222
	between		0.064482	0.011614	0.334324	n = 37
	within		0.037019	-0.03353	0.267157	T = 6
FCF	overall	0.040127	0.110491	-0.37051	0.437117	N = 222
	between		0.066156	-0.03845	0.263346	n = 37
	within		0.089054	-0.35649	0.445447	T = 6

Source: Prepared by the researcher from Stata 17 software output

The previous table presents the results of descriptive statistics for the whole sample, which do not consider differences between firms or differences within each firm over time. It also shows descriptive statistics at the between and within levels, which consider differences between firms and variations within each firm over time, respectively. Based on the overall, between, and within levels, Table (4.1) shows the following:

In terms of the main dependent variable (i.e., **cash holdings**), it has a mean of (0.100), indicating that the average firms listed in the Egyptian stock exchange hold on average about 10% cash and cash-equivalents balances. However, some sampled firms suffer from around zero cash and cash-equivalents balances as shown by the minimum value of (0.001), which reflects the failure of some sampled firms to buffer against unanticipated operating cash flow shortfalls. On the other hand, the maximum value (0.558) reveals the ability of other firms to effectively handle contingencies and unanticipated operating cash flow shortfalls. However, the maximum value is greater than half of total assets which expose firms to the risk of idle capital. The large overall standard deviation of (0.092) aligns with the wide range, both suggesting the large variations among the sampled firms concerning the cash holding ratio. The variations in cash holding among firms (0.079) are more intense than the variations in cash holding in each single firm through the sample period (0.049).

Concerning **board size (BS)** as an internal corporate governance mechanism, it has a mean value of (8.159), which means that the average number of directors in Egyptian boards is 9 directors. There is a relative overall homogeneity in board size, and a relative homogeneity across the sampled firms and within each firm over time. Because all levels of standard deviation (overall, between, and within) are small compared to the mean. The minimum value of (4.000) reveals that the lowest number of directors in the Egyptian boards is 4 directors. On the other hand, the maximum value of (17.000) reveals that the highest number of directors in the Egyptian boards is 17 directors.

Regarding **board independence (BI)** as an internal corporate governance mechanism, it shows large variations among the sampled Egyptian firms due to the large values of the overall (0.169) and between (0.143) levels of standard deviation. Such a large variation is supported by the wide range between the minimum value (0.000) and the maximum value (0.78). Meaning that some boards in the Egyptian environment lacks independence because they have no independent directors as evidenced by the minimum value of (zero).

With regards to the **audit committee size (ACS)**, it has a mean value of (3.36), which means that the average number of members in Egyptian audit committees is 4 members. However, some of the firms on the sample have no audit committee as evidenced by the minimum value of (zero). On the other hand, the maximum value of (6.000) reveals that other firms in the sample have audit committees with up to 6 members. There is a relative overall homogeneity in audit committee size, and a relative homogeneity across the sampled firms and within each firm over time. Because all levels of standard deviation (overall, between, and within) are small compared to the mean.

Continuing with internal corporate governance mechanisms, **managerial ownership (MO)** shows a relatively large difference among the sampled firms, as its overall standard deviation is relatively large (0.224) compared to the mean (0.125). The overall dispersion is mainly derived from a wide-ranging dispersion among panels as reflected by the between level of standard deviation (0.212). It is noteworthy that the minimum value for this ownership pattern is (zero), indicating that some sampled firms have no managerial ownership in their ownership structure. On the contrary, the maximum value reaches (0.890) for managerial ownership. Implying that other listed firms in the Egyptian Stock Exchange have 89% of their stocks owned by firms` managers.

With respect to the first control variable (i.e., **earnings quality**), it reveals diversity among the sampled Egyptian firms in terms of their earnings quality. For instance, EQ shows a relatively high overall standard deviation **(**0.045**)** compared to the mean **(**-0.051**)**, along with a wide range between its minimum value **(**-0.177**)** and its maximum value **(**-0.001**)**. This suggests that some firms in the Egyptian capital market suffer from low EQ, due to exploiting the discretionary loopholes in accruals to manipulate accounting reports. While other sampled firms can sustain a high level of earnings quality.

In terms of the firm-specific characteristics, **firm size** shows a standard deviation of **(**2.185), which is very small relative to the mean (21.211) due to applying the natural logarithm on market value of Equity, which caused smoothing in firm size among the sampled Egyptian firms.

With respect to **firm leverage** (Lev), it has a mean value of (0.137) which means that on average the Egyptian sampled firms depend on a leverage ratio of 13.7%. The minimum value (0.000) indicates the self-financing of some Egyptian sampled firms. While the maximum value (0.460) reflects that other firms try to balance between debt and equity in their capital structure. The high overall standard deviation (0.131) supports the heterogeneity among the sampled firms in terms of their preference for debt over equity for financing assets and operations. The overall dispersion is mainly derived from a wide-ranging dispersion among panels as reflected by the between level of standard deviation (0.117).

In terms of **profitability**, the average of the **return on assets (ROA)** is (0.092), which means that on average the Egyptian sampled firms achieve returns on their assets of around 9.2%, indicating that every Egyptian pound the firms invest in their assets achieves on average 0.092 pounds. The minimum value is negative (-0.0032), indicating that some firms in the Egyptian environment suffer from a negative rate of return on their assets due to their inefficient utilization of their assets and resources. Conversely, the maximum value (0.405) indicates that other firms achieve a positive rate of return on their assets, reaching up to 40.5%, as they optimally exploit their resources to maximize profitability. Consistent with the wide range, the overall and between levels of standard deviation show a large dispersion around the mean.

Finally, the **free cash flows ratio (FCF)** has a wide range extending from (-0.371) to (0.437). The negative sign of the minimum value (-0.371) reflects the failure of some sampled firms to generate sufficient positive cash flows to cover their cash outflows associated with operating processes and capital expenditure, which results in a deficit in FCF. While the maximum value (0.437) accounts for around 43.7% of total assets, which reveals that other firms in the sample are seriously exposed to managers` discretionary activities as managers have control over hoarded cash of around four-tenths of assets. Such existence of higher levels of free cash flow may lead to expropriation by opportunistic managers for their own benefits and empire building. The large standard deviation (0.110) aligns with the large range, both suggesting the large variations among the sampled firms. However, firms with a marginally positive free cash flow to limit expropriation of excess cash appear to dominate the sample as evidenced by the minimal positive value of the average FCF ratio of 4%. This mean value signifies that the sampled firms, on average, hoard a modest surplus of cash after funding their operating expenses and capital expenditures, which hinders managerial expropriation behavior.

4.2 Diagnostic Statistics

The current study utilizes many diagnostic tests (e.g. normality test, stationarity test…etc.) to assess validity of the panel data in this study, and to select the appropriate regression technique based on the results of those tests to improve the accuracy of the findings.

4.2.1 Normality Test

The normal distribution of the **main** dependent variable, i.e. **cash holdings,** is investigated using the Shapiro-Wilk normality test. The null hypothesis proposed that the data has a normal distribution, contrary to the alternative hypothesis, which claimed that the data are not normally distributed. The acceptance of the null hypothesis occurs when the p-value is higher than 5%. When the p-value is less than 5%, the alternative hypothesis is, however, accepted.

Table (4.2): Shapiro-Wilk W test for normal data

Variable	Obs.	W	V	Z	Prob>z
CH	222	0.83654	26.712	7.598	0.00000

Source: Prepared by the researcher from Stata 17 software output

Table (4.2) shows that the alternative hypothesis is supported, and the null hypothesis is rejected since the p-value of the Shapiro-Wilk normality test is less than 5%. According to the central limit theorem which stated that when the data are not normally distributed, the parametric procedures can still be applied on the non-normally distributed data, just on the large sample size. The sample size of the current study is large, n>30 (n=37, N= 222), thus the parametric approaches may still be used (Elliott and Woodward, 2007).

4.2.2 Optimal Lag Selection Test

The purpose of the optimum lag selection test is to assess if the cash holdings phenomenon is static or dynamic. This is done by examining whether previous levels of cash holdings affect the current level of cash holdings. The variable under investigation is assessed using three criteria to determine whether it is dynamic or static. The three information criteria used are “the Akaike Information Criterion (AIC), Hannan-Quinn Information Criterion (HQIC), and Schwarz Information Criterion (SBIC)”.

Table (4.3): Optimal Lag Selection for Cash Holdings

Lag	LL	LR	Df	p	FPE	AIC	HQIC	SBIC
0	208.986				0.008686	-1.90813	-1.90185	-1.8926
1	276.235	134.5	1	0	0.00473	-2.51592	-2.50338	-2.48487
2	279.857	7.2441*	1	0.007	.004618*	**-2.53998***	**-2.52116***	**-2.4934***
3	279.991	0.26647	1	0.606	0.004655	-2.53202	-2.50694	-2.46992
4	281.109	2.2374	1	0.135	0.00465	-2.53311	-2.50176	-2.45549

Source: Prepared by the researcher from Stata 17 software output

Table (4.3) demonstrates that there is a decline in the values of the AIC, HQIC and SBIC at the second level. This implies that cash holdings is a dynamic phenomenon. Meaning that the current level of cash holdings is impacted by the previous levels of cash holdings that are adopted during the prior periods.

4.2.3 Stationarity Test

The study uses a stationarity test to examine the time series of each variable included in investigating the impact of internal corporate governance mechanisms on cash holdings. A variable is said to have a stationary time series if its statistical features, such as mean and variance, stay constant across time. An instance of mean reversion may be seen in the time series of stationary variables. As time goes on, the impact of sudden changes gradually decreases since the overall pattern ultimately reverts back to its average and variability. Meanwhile, the variable is deemed as having a non-stationary time series if its statistical properties exhibit time-varying features, which are defined as variations that take place with time. As a result, the series exhibit a unit root. Consequently, it is impractical to draw the conclusions of models that include non-stationary variables to different time periods.

A Harris-Tzavalis unit-root test is conducted to determine if the time series of each variable in the balanced panel data is stationary or reveals a unit root. The null hypothesis states that the series supports the existence of a unit root. Conversely, the alternative hypothesis argued that the series exhibits stationarity. The null hypothesis becomes valid when the p-value is above the threshold of 5%. However, the alternative hypothesis is considered true when the p-value is less than 5%.

Table (4.4): Harris-Tzavalis unit-root test		
Variable	**Statistic**	**p-value**
CH	0.1586	0.0000***
BS	0.3913	0.0047***
BI	0.4140	0.0000***
ACS	0.3846	0.0035***
MO	**0.6430**	**0.8490**
EQ	-0.3092	0.0000***
Size	0.3307	0.0003***
Lev	0.3412	0.0005***
ROA	0.1889	0.0000***
FCF	-0.2526	0.0000***
*, **, and *** show the rejection of the null hypothesis of a unit root at 10%, 5%, and 1%		

Source: Prepared by the researcher from Stata 17 software output

Because the associated p-value for managerial ownership is more than 5%, Table (4.4) demonstrates that this variable has a unit root at its initial level. However, the corresponding p-values for the remaining variables are less than 5%, thus the variables have a static time series at their initial levels. However, by calculating the first difference, the managerial ownership becomes stationary at the first difference, as shown in table (4.5).

Table (4.5) The First Differencing Transformation		
Variables	**Statistic**	**P-Value**
D.MO	-0.0063	0.0000***
*, **, and *** show the rejection of the null hypothesis of a unit root at 10%, 5%, and 1%		

Source: Prepared by the researcher from Stata 17 software output

Table (4.5) reveals that the first differencing transformation is taken for managerial ownership. Hence, the stationarity of managerial ownership is achieved after taking the first differencing transformation. Taking table (4.4) and table (4.5) together, the p- values reveal that there is no unit root, and all the study variables are stationary.

4.2.4 Pearson's Correlation Test

The correlation matrix is used to examine the strength and direction of the relationship between the dependent and independent variables, and between the independent variables and each other. Correlation coefficients are also used for detecting any potential multicollinearity problem, which is the existence of high linear relationship between the explanatory variables that are included in the same regression model. Table 4.6 displays the Pearson's correlation matrix.

Table (4.6): Correlation Matrix

Variables	CH	BS	BI	ACS	MO	EQ	Size	Lev	ROA	FCF
CH	1.000									
BS	-0.129*	1.000								
	(0.055)									
BI	-0.160**	0.035	1.000							
	(0.017)	(0.602)								
ACS	0.137**	0.082	-0.156**	1.000						
	(0.041)	(0.226)	(0.020)							
MO	0.115*	0.216***	0.031	0.091	1.000					
	(0.087)	(0.001)	(0.643)	(0.176)						
EQ	-0.152**	-0.020	0.041	-0.081	-0.017	1.000				
	(0.024)	(0.763)	(0.539)	(0.230)	(0.797)					
Size	0.138**	0.271***	0.039	0.065	-0.204***	0.158**	1.000			
	(0.039)	(0.000)	(0.568)	(0.332)	(0.002)	(0.018)				
Lev	-0.234***	0.160**	0.208***	-0.099	0.221***	-0.046	0.045	1.000		
	(0.000)	(0.017)	(0.002)	(0.142)	(0.001)	(0.495)	(0.502)			
ROA	0.329***	0.149**	-0.198***	0.228***	-0.144**	-0.191***	0.183***	-0.311***	1.000	
	(0.000)	(0.026)	(0.003)	(0.001)	(0.031)	(0.004)	(0.006)	(0.000)		
FCF	0.282***	0.075	-0.059	0.165**	-0.169**	-0.134**	0.175***	-0.416***	0.478***	1.000
	(0.000)	(0.263)	(0.380)	(0.014)	(0.012)	(0.045)	(0.009)	(0.000)	(0.000)	

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Source: Prepared by the researcher from Stata 17 software output

Table (4.6), illustrates the results of Pearson's correlation matrix as follows:

- Regarding the internal corporate governance mechanisms, all mechanisms show a significant association with cash holdings. Board size (BS) and independence (BI) have a significant negative correlation with cash holdings. On the other hand, audit committee size (ACS) and managerial ownership (MO) have a significant positive correlation with cash holdings.

- The significant negative correlation between board size (BS) and cash holdings, implies an inverse relationship between board size and cash holdings for Egyptian listed firms.
- The significant negative correlation between board independence and cash holdings implies that a higher proportion of independent directors on the board is associated with lower levels of cash holdings. independent directors may lean towards holding lower cash as they may prefer to avoid excessive cash reserves in favor of other investment opportunities or shareholder returns.
- The significant positive correlation between the audit committee size and cash holdings indicates that there is a pattern where larger audit committees are associated with higher levels of cash reserves within the firm.
- The significant positive correlation between managerial ownership and cash holdings implies that managers with a significant ownership stake in a firm may prioritize their own interests over those of shareholders. This self-serving behavior can manifest in decisions that prioritize personal wealth accumulation and the expansion of their own influence within the firm, rather than focusing on maximizing shareholder value. As a result, this can lead to a less responsible approach to cash management within the firm. Managers may be inclined to hoard cash reserves or allocate funds inefficiently in ways that do not benefit the firm or its shareholders optimally.
- Concerning control variables, earnings quality shows a significant negative correlation with cash holdings. As higher earnings quality indicates more reliable and transparent financial reporting practices, which may reduce the need for firms to hold excess cash as a precaution.
- Additionally, there is a significant positive correlation between firm size and cash holdings. As, larger firms tend to have more resources at their disposal due to their large scale of operations. As a result, they often maintain higher levels of cash reserves compared to smaller firms. This can be because larger firms have more diversified operations, larger cash flows, and potentially face higher risks that require greater liquidity cushions.
- In terms of the financial leverage (Lev), it has a significant negative association with cash holdings. As, high levels of debt often come

with interest payments and principal repayments that need to be met. This can put pressure on the firm's cash flow, as a portion of cash needs to be allocated to service debt obligations. As a result, firms with high financial leverage may have lower cash reserves available for other purposes.

- Continuing with control variables, there is a significant positive correlation between profitability and cash holdings. As, firms with higher profitability may have more cash available from their operations. This profitability stems from efficient asset utilization, which translates into higher profits and, consequently, more cash that can be retained by the firm
- Finally, there is a significant positive relationship between free cash flows and the amount of cash that firms hold. As when firms generate higher free cash flows, they have more cash available after meeting their operational and capital expenditure requirements. This excess cash can be held as a buffer for future investments or expansions.
- In terms of multicollinearity, the correlation coefficients reveal that there is no multicollinearity problem because the highest correlation coefficient is (0.478), which is below the threshold value of 70% (Anh et al., 2018).

4.3 Testing Hypotheses

Initially, an initial pooled OLS (Ordinary Least Squares) regression is carried out to test the validity of the developed research hypotheses concerning the impact of internal corporate governance mechanisms on cash holdings. Following this, some goodness of fit tests is carried out to determine whether the model best fits the sample data or whether there are some statistical issues that need to be resolved before the model validity and reliability can be ensured. Because of this, the findings of the initial model cannot be deemed valid until the goodness of fit of the model has been verified. During the process of estimating the final regression model, it is important to take into consideration any potential econometric problem, such as multicollinearity, heteroskedasticity, omitted variables, and autocorrelation.

4.3.1. Testing Research Model

Before accepting the **research model** as a reliable model, there are some goodness of fit tests that should be conducted to confirm that the statistical techniques applied in the current study best fit the sampled data. These tests are the multicollinearity, heteroskedasticity, omitted variables, and autocorrelation.

Table (4.7): the Goodness of Fit Tests for Research Model

		VIF
Multicollinearity Test	FCF	1.525
	ROA	1.501
	Lev	1.423
	Size	1.281
	BS	1.233
	MO	1.222
	EQ	1.124
	ACS	1.102
	BI	1.096
	Mean VIF	1.279
Heteroskedasticity	**Prob > chi2**	**0.0000**
Omitted Variables test	**Prob > F**	**0.0020**
Autocorrelation	**Prob > F**	**0.0000**

Source: Prepared by the researcher from Stata 17 software output

The goodness of fit tests used to evaluate the validity of the research model are displayed in table (4.7). The regressors in research model of "the impact of internal corporate governance mechanisms on cash holdings" do not exhibit multicollinearity. Multicollinearity is present when the variance inflation factor (VIF) of any independent variable is greater than 10 (Landau and Everitt, 2004; Field, 2005). Because each explanatory variable in research model has a VIF coefficient less than 10, so there is no multicollinearity among the regressors of research model.

Furthermore, table (4.7) shows the existence of a heteroskedasticity issue, i.e., the error variances for research model are not constant. Because the p-value is less than 5%, the null hypothesis is thus rejected. The alternative hypothesis is supported, meaning that the variances of errors are not constant across data of research model.

According to Gujarati & Porter (2009), mistakes in model specification may result from leaving out important explanatory factors, adding unnecessary explanatory variables, or using the wrong functional form for independent and dependent variables. The omitted variables test has a p-value of less than 5%, as demonstrated in table (4.7). As a result, the null hypothesis—which claimed that the functional form is accurate and contains no missing variables—is rejected. The alternative hypothesis is supported, which means that research model is mis-specified.

In addition, there is an issue of autocorrelation, which means that the residuals of research model are serially correlated because the p-value is less than 5%.

Eventually, the researcher employs the generalized least squares (GLS) method to consider the econometric problems of heteroscedasticity, mis-specification and autocorrelation in research model. Also, to address autocorrelation, the researcher adds a year fixed effect in the regression analysis.

Table (4.8): The Fitted GLS Regression Results of research Model

CH	Coef.	p-value	Sig
BS	-.087	0	***
BI	-.042	.059	*
ACS	.002	.747	
MO	.126	0	***
EQ	-.318	.023	**
Size	.012	0	***
Lev	-.096	.03	**
ROA	.288	.004	***
FCF	.088	.163	
Year Fixed Effect	Yes		
Number of obs	222		
Prob > F	0.000		
R-squared	0.677		
Adjusted R-squared	0.655		
*** *p<.01*, ** *p<.05*, * *p<.1*			

Source: Prepared by the researcher from Stata 17 software output

Discussion of GLS Regression Results of Research Model:

- The overall model can be accepted as a reliable model because the Prob > F is less than 5%.
- In addition, internal corporate governance mechanisms along with control variables can explain 67.7% of the variation in cash holdings for Egyptian listed firms by using GLS.
- Concerning board size (BS), there is a significant negative impact of board size as an internal corporate governance mechanism on cash holdings within the context of the Egyptian listed firms. This suggests that larger boards may be associated with reduced levels of cash holdings.
- Regarding board independence (BI), there is a significant negative impact of board independence as an internal corporate governance mechanism on cash holdings within the context of the Egyptian listed firms. This implies that a higher proportion of independent directors on the board is associated with lower levels of cash holdings. Independent directors may lean towards holding lower cash as they may prefer to avoid excessive cash reserves in favor of other investment opportunities or shareholder returns.
- In terms of audit committee size (ACS), there is not a significant impact of audit committee size on cash holdings within the context of the Egyptian listed firms.
- With regards to managerial ownership (MO), there is a significant positive impact of managerial ownership as an internal corporate governance mechanism on cash holdings within the context of the Egyptian listed firms. When managers have a significant ownership stake in a firm, they may prioritize their own interests over those of shareholders. This self-serving behavior can manifest in decisions that prioritize personal wealth accumulation and the expansion of their own influence within the firm, rather than focusing on maximizing shareholder value. As a result, this can lead to a less responsible approach to cash management within the firm. Managers may be inclined to hoard cash reserves or allocate funds inefficiently in ways that do not benefit the firm or its shareholders optimally.
- In relation to the control variables earnings quality (EQ), there is a significant negative impact of earnings quality on cash holdings

within the context of the Egyptian listed firms. As, higher earnings quality indicates more reliable and transparent financial reporting practices, which may reduce the need for firms to hold excess cash as a precaution.

- Additionally, there is a significant positive impact of firm size on cash holdings within the context of the Egyptian listed firms. As, larger firms tend to have more resources at their disposal due to their large scale of operations. As a result, they often maintain higher levels of cash reserves compared to smaller firms. This can be because larger firms have more diversified operations, larger cash flows, and potentially face higher risks that require greater liquidity cushions.
- In terms of the financial leverage (Lev), there is a significant negative impact of financial leverage on cash holdings within the context of the Egyptian listed firms. As, high levels of debt often come with interest payments and principal repayments that need to be met. This can put pressure on the firm's cash flow, as a portion of cash needs to be allocated to service debt obligations. As a result, firms with high financial leverage may have lower cash reserves available for other purposes.
- Moreover, there is a significant positive impact of return on assets as a proxy for profitability on cash holdings within the context of the Egyptian listed firms. As, firms with higher profitability may have more cash available from their operations. This profitability stems from efficient asset utilization, which translates into higher profits and, consequently, more cash that can be retained by the firm.
- Finally, there is not a significant impact of free cash flows on cash holdings within the context of the Egyptian listed firms.

5.1 Conclusion

This research shows the impact of internal corporate governance mechanisms on the level of cash holdings. The researcher attempted to provide evidence from the Egyptian listed companies on the stock exchange. The study was carried out on a sample comprised of 37 companies for 6 years with a total of 222 firm-year observations during the period from 2017-2022, The reason for starting the period from 2017 is based on that the third release of Egyptian corporate governance code was issued on august 2016 therefore the researcher intended to collect data from the following year. In addition, the study sample was extracted from 6 main sectors (Consumer Discretionary, Consumer Staples, HealthCare, Industrials, Materials, and Real Estate).

Moreover, the researcher excludes banks, insurance firms and financial institutions from the study as they have special nature that governs their institutions as well as there are some requirements and standards related to cash holdings level that should be implemented on these institutions. The empirical findings indicated that board size and board independence have a significant negative impact on the level of cash holdings, while audit committee size does not have a significant impact on the level of cash holdings, Moreover the managerial ownership has a significant negative impact on the level of cash holdings.

Regarding the result of board size, it is consistent with the results of the studies by Iyoha et al. (2024), Kwan and Lau (2020) and Ajanthan and Kumara (2017) which found a significant negative impact of board size and cash holdings, while the result of this research contradicted with the following studies by Wirianata (2024) and Mengyun et al. (2021) which found that board size has a significant positive impact on cash holdings. However, the findings of studies by Al-Mubarak (2023), Darma et al. (2021) and Magerakis et al. (2020) also contradicted the result of this research as they found an insignificant relationship between board size and cash holdings.

Additionally, the study of Cambrea et al. (2022) showed that under normal conditions board size will have a positive impact on cash holdings which is contradicted with the research result while under the crisis the analysis found that as the board size increases the level of cash holdings reduces this is consistent with the research result.

Continuing with the research results, the board independence result are consistent with findings from studies by Iyoha et al. (2024), Al-Mubarak (2023) and Kwan and Lau (2020) which found a significant negative impact of board independence and cash holdings, while the research result contradicted with the studies by Wirianata (2024), Hassanein and Kokel (2019) and Noman et al. (2019) which found that board independence has a significant positive impact on cash holdings. However, the following studies by Kengatharan (2017) and Al-Najjar and Clark (2017) also contradicted with the research result as they found an insignificant relationship between board independence and cash holdings.

Additionally, the study of Ullah and Kmal (2017) showed that board independence has a significant positive impact on cash holdings which contradict with the research result while tested on the full sample, while in large sample firms there is a negative impact on cash holdings which is consistent with the empirical result, but in small firms it has opposite impact which contradict with the research result additionally this study showed that Board independence also has a significant positive impact on cash holdings under the democratic regime which contradict with the research result while it has insignificant impact under the dictator regime also contradict with the research result.

Moreover, the result of audit committee size is consistent with the studies by Wirianata (2024), Alghadi (2019), Kengatharan (2017) and Gill and Biger (2013) which found that audit committee size has insignificant impact on cash holdings. While the result contradicted with the following studies Narwal and Jindal (2017) which showed that audit committee size has a significant positive impact on cash holdings, while the study of Hassanein and Kokel (2019) found that audit committee size has a significant negative impact on cash holdings.

Finally, the result of managerial ownership are consistent with the studies by Talbi and Menchaoui (2023), Alghadi et al. (2021) and Alghadi (2019) which showed that managerial ownership has a significant positive impact on cash holdings. While the studies by Abodoma (2018), Alim and Khan (2016) and Khalil et al. (2016) found that there is significant negative impact of managerial ownership on cash holdings which contradict with the research result, also the studies by Wirianata (2024), Afifa et al. (2021), Qian (2021) and Sitorus et al. (2020) showed that managerial ownership has an insignificant impact on cash holdings which contradict with the research result.

The researcher recommends that shareholders and regulatory organizations, such as the Financial Regulatory Authority, may give more attention to the presence and role of audit committees, urging them to be more active and effective. It is also critical to increase oversight on firms with high managerial ownership, as this can lead to managers acting in opportunistic ways that prioritize their own interests above those of shareholders.

Moreover, the findings demonstrate that board independence is one of the most effective governance mechanisms, boards with a higher number of independent directors operate more effectively. As a result, it is important to maintain or even increase the independent directors on board wherever possible. Similarly, the findings show that larger board sizes are related to better performance, suggesting that keeping board sizes on the larger side may encourage improved supervision and governance.

5.2 Study Limitations and Future studies

5.2.1 The research has several limitations that could be presented as follows:

- The research is limited to a sample of companies listed on the Egyptian Stock Exchange during the period from 2017 to 2022.
- The study was conducted on Egyptian non-financial firms only and excluded banks, insurance firms and financial institutions from the study.
- The study focused on the impact of internal corporate governance Mechanisms on cash holdings and didn't address any external mechanisms as well as didn't address any other determinant of cash holdings.
- The study focused only on four corporate governance mechanisms and their impact on cash holdings

5.2.2 Future Studies

Considering the limitations and results of the current study, the researcher recommends a group of future studies that can be conducted as an extension of the current study:

- The overall impact of the internal corporate governance mechanisms on cash holdings.
- The impact of external and internal corporate governance mechanisms on cash holdings of financial firms.
- The impact of corporate governance mechanisms on cash holdings under small firms and large firms.
- The determinants of cash holdings under the Egyptian corporations.

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تأثير آليات الحوكمة الداخلية للشركات على الاحتفاظ بالنقدية - دراسة تطبيقية على الشركات المصرية المدرجة

ملخص البحث :

الهدف: ناقشت الدراسة تأثير آليات الحوكمة الداخلية للشركات على احتفاظ الشركات بالنقدية في سوق الأوراق المالية المصرية.

التصميم والمنهجية: استخدم البحث البيانات الثانوية التي تم الحصول عليها من تقارير الإفصاح والقوائم المالية للشركات المدرجة في سوق الأوراق المالية المصرية في الفترة من ٢٠١٧ إلى ٢٠٢٢ بإجمالي ٢٢٢ ملاحظة سنوية للشركة. استبعدت الدراسة البنوك وشركات التأمين والمؤسسات المالية من الدراسة لطبيعة خاصة تحكم مؤسساتها.

النتائج والتوصيات: أظهرت النتائج أن حجم مجلس الإدارة واستقلاليته لهما تأثير سلبي معنوي على الاحتفاظ بالنقدية، علاوة على ذلك، فإن حجم لجنة المراجعة ليس له تأثير معنوي على حجم النقدية المحتفظ بها، الملكية الإدارية لها تأثير إيجابي معنوي على حجم النقدية المحتفظ بها. توصي الدراسة ضرورة تعزيز وتفعيل دور لجنة المراجعة، بالإضافة إلى إيلاء المزيد من الاهتمام والرقابة للشركات ذات النسبة العالية من الملكية الإدارية نظرًا لخطر التصرف بطريقة انتهازية من قبل المديرين. علاوة على ذلك، يوصى بأن تحافظ الشركات على نسبة كبيرة من الأعضاء المستقلين في مجلس الإدارة، نظرًا لأن استقلالية المجلس تُعد من أكثر آليات الحوكمة فاعلية. علاوة على ذلك، يقترح الباحث أن الحفاظ على حجم كبير نسبيًا لمجلس الإدارة قد يُساهم في تعزيز الإشراف وتحسين فعالية الحوكمة.

الأصالة والاضافة: تساهم هذه الدراسة في الادب المحاسبي من خلال مساهمتها في دراسة أثر آليات حوكمة الشركات الداخلية على احتفاظ الشركات بالنقدية في سوق الأوراق المالية المصرية، مما قد يساهم في تقليص الفجوة البحثية والجدل.

الكلمات المفتاحية: حجم مجلس الإدارة، استقلال مجلس الإدارة، حجم لجنة المراجعة، الملكية الإدارية، احتفاظ الشركات بالنقدية.