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FIRM ATTRIBUTES AND CASH HOLDINGS OF LISTED PHARMACEUTICAL FIRMS IN NIGERIA

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Key words: *Cash, Cash Equivalent Cash Holdings, Firm Attributes, Firm Leverage, Firm Profitability, Firm Size.*

ABSTRACT

The study investigated the effect of firm attributes on the cash holdings of listed pharmaceutical firms in Nigeria. The specific objective was to determine the effect of firm leverage, firm profitability and firm size on cash and cash equivalent of listed pharmaceutical firms in Nigeria. Ex-post Facto research design was deployed in the study. The study's population consists of seven firms listed in the pharmaceutical sector of the Nigerian Exchange Group. The study utilized a purposive sampling technique, including a sample of five (5) firms that published their annual reports from 2014 to 2023. Secondary data were obtained from the annual reports of the firms included in the sample for a ten-year period spanning 2014 to 2023. Descriptive analysis was used to summarise the dataset whereas Fixed Effect Regression (at the discrimination of Hausman Specification) was used in testing the hypotheses. The findings showed that: firm leverage has a significant positive effect on cash and cash equivalent of listed pharmaceutical firms in Nigeria (β = 0.168115; p-value = 0.0434); firm profitability has a significant positive effect on cash and cash equivalent of listed pharmaceutical firms in Nigeria (β = 0.258447; p-value = 0.0352); firm size has a significant positive effect on cash and cash equivalent of listed pharmaceutical firms in Nigeria (β = 0.356278; p-value = 0.0005). In conclusion, firms with higher leverage, greater profitability, and larger size tend to hold more cash, driven by the need to manage financial risks, invest in growth opportunities, and maintain operational flexibility. The study recommends that management of highly leveraged firms should prioritize maintaining adequate cash reserves to ensure they can meet debt obligations and reduce financial risk in order to help safeguard the firm against potential cash flow shortages and enhance financial stability.

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1. INTRODUCTION

The pharmaceutical industry plays a crucial role in the health sector and overall economy, especially in developing countries like Nigeria (Nte, Omede, Enokie & Bienose, 2020). It serves as a backbone for public health, ensuring the availability of essential medicines and contributing to the country's gross domestic product (GDP). The industry's significance has grown over the years due to increased demand for medications driven by population growth, rising healthcare awareness, and the prevalence of chronic diseases. In this context, the financial stability of pharmaceutical firms is paramount to sustaining their operations and meeting the demands of both the domestic and international markets (Saliu, Enimola & Zakariya, 2023). Cash holdings, which represent the liquid assets available to a firm, are a vital aspect of this financial stability (Ezenwafor, Okegbe & Nwoye, 2021; Nwoye, Ezenwafor & Okoye, 2021; Iyoha, Odu & Omokhudu, 2024). For listed pharmaceutical firms in Nigeria, effective management of cash holdings is essential not only for operational efficiency but also for strategic financial planning. This study seeks to explore the effect of firm attributes on the cash holdings of these firms, offering hints into how these attributes influence the liquidity management strategies in the pharmaceutical sector. In today's volatile business environment, effective cash holding is increasingly recognized as a critical factor for the survival and growth of firms (Noke, Oliver & Udeh, 2024). Cash is the most liquid asset, and its importance cannot be overstated, especially in times of financial distress or economic uncertainty (Amahalu and Okudo, 2023). Companies with substantial cash reserves are better positioned to weather economic downturns, take advantage of investment opportunities, and respond to unexpected financial needs without resorting to costly external financing. In the pharmaceutical industry, where research and development (R&D) expenditures are high and regulatory requirements are stringent, maintaining adequate cash holdings is even more vital. This allows firms to invest in innovation, comply with regulatory standards, and avoid the pitfalls of undercapitalization. Moreover, the ability to manage cash efficiently can enhance a firm's creditworthiness, reduce financial risks, and ultimately contribute to long-term profitability and shareholder value (Almagribi, Lukviarman & Setiany, 2023). Thus, understanding the factors that influence cash holdings in pharmaceutical firms is crucial for financial managers, investors, and policymakers who aim to optimize financial performance and ensure the industry's sustainability.

Cash holdings refer to the cash and cash equivalents that firms keep on hand to meet short-term obligations and invest in opportunities that may arise unexpectedly (Hameed & Iliyasu, 2022). These holdings are crucial for managing liquidity risk, ensuring that firms can meet

their obligations as they come due without having to liquidate assets or secure external financing at unfavorable terms (Odo & Udodi, 2022). The main concepts involved in cash holdings include liquidity, profitability, and financial flexibility. Liquidity refers to the ease with which a firm can convert its assets into cash without significantly affecting its value (Ugo & Egbuhuzor, 2022). Profitability, on the other hand, involves the firm's ability to generate income relative to its expenses over a certain period, which can directly influence its cash flow and, subsequently, its cash holdings (Sulehri, Rizwan & Senturk, 2022). Financial flexibility is the firm's capacity to adapt its financial policies and operations in response to changing economic conditions. In the pharmaceutical sector, cash holdings are influenced by various factors, including the firm's operating cycle, investment opportunities, and external market conditions. Effective cash management ensures that pharmaceutical firms can sustain their operations, invest in R&D, and navigate the complex regulatory landscape without facing liquidity constraints. The relationship between firm attributes and cash holdings has been a subject of extensive research in corporate finance (Aliyu, Nakazalle & Yusuf, 2020). Firm attributes such as size, profitability, and leverage significantly influence the level of cash holdings. Firm size, typically measured by total assets or revenue, often correlates with cash holdings. Larger firms tend to hold less cash relative to their total assets because they have easier access to capital markets and can obtain financing more readily at favorable terms (Wijaya, 2021). However, in the pharmaceutical industry, where large-scale investments in R&D and compliance are necessary, larger firms might still maintain substantial cash reserves to support ongoing projects and regulatory requirements. Firm profitability, another critical attribute, directly affects cash holdings as more profitable firms generate higher cash flows, enabling them to accumulate and maintain larger cash reserves (Muhammad, 2022). This is particularly important in the pharmaceutical sector, where profits can be reinvested in R&D, marketing, and expansion activities. Conversely, firms with lower profitability may struggle to maintain adequate cash holdings, making them more vulnerable to financial distress (Sulehri, Rizwan & Senturk, 2022).

Firm leverage, which refers to the proportion of debt in a firm's capital structure, also plays a significant role in determining cash holdings (Amahalu & Okudo, 2023). High leverage can lead to increased financial risk, prompting firms to hold more cash as a precautionary measure against potential financial difficulties or to meet debt obligations. However, excessive leverage can also reduce a firm's ability to accumulate cash reserves, as a significant portion of its cash flow may be used to service debt (Almagribi, Lukviarman & Setiany, 2023). In the pharmaceutical industry, where the need for continuous investment in R&D is paramount,

firms with higher leverage might face challenges in balancing the need for cash reserves with the imperative to fund their debt obligations. The nexus between these firm attributes and cash holdings is complex, with each factor influencing the firm's liquidity management strategy in different ways. Understanding these dynamics is essential for pharmaceutical firms aiming to optimize their cash holdings and enhance their financial stability in a competitive and regulated industry. Thus, as the pharmaceutical industry continues to grow and evolve, driven by technological advancements and increasing healthcare demands, effective cash management will remain a key determinant of success. By examining the influence of firm size, profitability, and leverage on cash holdings, this research will provide useful hints that can help pharmaceutical firms optimize their financial strategies, enhance their competitive advantage, and contribute to the overall stability and growth of the sector.

Firms in Nigeria ought to maintain optimal levels of cash holdings that allow them to meet their short-term obligations, invest in research and development (R&D), and take advantage of strategic opportunities without the need for costly external financing. Effective cash management would ensure that these firms are financially stable, able to withstand economic fluctuations, and capable of sustaining their operations in a highly competitive and regulated industry (Almagribi, Lukviarman & Setiany, 2023). The firm attributes, such as size, profitability, and leverage, would ideally contribute to a well-balanced cash management strategy, where larger firms leverage their access to capital markets, more profitable firms reinvest earnings into growth opportunities, and firms with higher leverage maintain sufficient liquidity to meet debt obligations (Sulehri, Rizwan & Senturk, 2022; Wijaya, 2021). However, many firms still struggle with maintaining appropriate levels of cash holdings due to various challenges related to their firm attributes (Usman & Usman, 2023). Smaller firms, despite their need for substantial cash reserves, may face difficulties in accessing capital markets, leading to lower cash holdings (Noke, Oliver & Udeh, 2024). Firms with lower profitability may be unable to generate sufficient cash flow, leaving them with inadequate liquidity to fund operations and R&D activities. Additionally, highly leveraged firms may find themselves constrained by debt obligations, reducing their ability to maintain necessary cash reserves. These challenges are exacerbated by external factors such as economic instability, fluctuating exchange rates, and stringent regulatory requirements, which further strain the financial resources of pharmaceutical firms.

The consequences of this misalignment between the ideal and actual situations are significant. Pharmaceutical firms with insufficient cash holdings are at risk of financial distress, which

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can lead to an inability to invest in R&D, delayed or canceled projects, and ultimately, a loss of competitive edge in the market. The lack of adequate liquidity may also force these firms to rely on expensive external financing, increasing their financial burden and reducing profitability. In the long term, these issues could lead to reduced investor confidence, lower stock valuations, and even the failure of pharmaceutical firms that are unable to navigate the financial challenges posed by inadequate cash holdings. This situation accentuates the need for a deeper understanding of how firm attributes influence cash holdings and the development of strategies to enhance liquidity management in Nigeria's pharmaceutical sector.

Despite extensive research on the relationship between firm attributes and cash holdings across various industries, there is a notable gap in the literature regarding Nigeria's pharmaceutical sector. Previous studies, such as those by Noke, Oliver, and Udeh (2024) and Amahalu and Okudo (2023), have explored the impact of firm size, profitability, and leverage on cash holdings, but they have primarily focused on sectors like food and beverage, conglomerates, and manufacturing. While studies by Iyoha, Odu, and Omokhudu (2024) and Vuković, Mijić, Jakšić, and Saković (2022) have examined broader corporate governance factors and their influence on cash holdings, they have not adequately addressed the specific dynamics within the pharmaceutical industry, which is characterized by high R&D costs and regulatory demands. This study seeks to fill this gap by focusing on the unique context of Nigeria's pharmaceutical firms, offering a deeper understanding of how firm attributes like leverage, profitability, and size influence cash holdings in this sector.

1.1 Objectives

The main objective of the study is to examine the effect of firm attributes on the cash holdings of listed pharmaceutical firms in Nigeria. The specific objectives as follows:

1. to determine the effect of firm leverage on cash and cash equivalent of listed pharmaceutical firms in Nigeria.
2. to ascertain the effect of firm profitability on cash and cash equivalent of listed pharmaceutical firms in Nigeria.
3. to examine the effect of firm size on cash and cash equivalent of listed pharmaceutical firms in Nigeria.

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1.2 Hypotheses

H_{01}: Firm leverage has no significant effect on cash and cash equivalent of listed pharmaceutical firms in Nigeria.

H_{02}: Firm profitability has no significant effect on cash and cash equivalent of listed pharmaceutical firms in Nigeria.

H_{03}: Firm size has no significant effect on cash and cash equivalent of listed pharmaceutical firms in Nigeria.

2. LITERATURE REVIEW

2.1 Conceptual Review

2.1.1 Firm Attributes

Firm attributes refer to the specific characteristics and qualities that define an organization's structure, performance, and operational strategies (Saliu, Enimola & Zakariya, 2023). These attributes encompass various dimensions that shape a firm's behavior, decision-making processes, and overall competitiveness within its industry. Firm attributes include tangible elements such as size, age, and physical assets, as well as intangible factors like reputation, brand equity, and managerial expertise. The concept of firm attributes is crucial in understanding how companies operate and compete in the market, as these characteristics often influence their strategic choices, risk tolerance, and financial performance (Aliyu, Nakazalle & Yusuf, 2020).

A firm's attributes are shaped by both internal and external factors. Internally, the attributes are often a reflection of the company's historical development, leadership styles, organizational culture, and resource allocation. For example, a firm's size, which is a key attribute, can determine its market power, economies of scale, and ability to influence prices (Noke, Oliver & Udeh, 2024). Similarly, the level of innovation within a firm, another significant attribute, can be seen in its product offerings, research and development intensity, and its ability to adapt to changing market conditions. Externally, attributes are influenced by the industry context, regulatory environment, and competitive landscape, all of which can impact a firm's operational effectiveness and strategic positioning. Moreover, firm attributes are not static; they evolve over time as the company grows, diversifies, or refocuses its business activities (Usman & Usman, 2023). This dynamic nature of firm attributes means that they are continuously influenced by the firm's strategic decisions, investments in technology, market expansion efforts, and responses to economic fluctuations. For instance,

a firm's leverage, which refers to the proportion of debt in its capital structure, may change as the firm adjusts its financing strategies in response to interest rate changes or shifts in investor sentiment. These evolving attributes contribute to the firm's ability to sustain its competitive advantage and adapt to the challenges posed by its external environment.

In academic research, firm attributes are often examined to understand their impact on various business outcomes, such as financial performance, risk management, and market valuation (Saliu, Enimola & Zakariya, 2023). By analyzing firm attributes, researchers can identify patterns and relationships that explain why certain firms outperform others, how they manage risks, and the strategies they employ to achieve sustainable growth. Overall, firm attributes provide a comprehensive lens through which the complexities of business operations and strategic management can be understood, making them a fundamental concept in the study of corporate behavior and performance.

2.1.2 Firm Leverage

Firm leverage refers to the extent to which a company uses borrowed capital, or debt, to finance its operations, expand its business, and invest in growth opportunities (Amahalu & Okudo, 2023). Leverage is a key component of a firm's capital structure, which represents the mix of debt and equity that a company uses to fund its activities (Almagribi, Lukviarman & Setiany, 2023). The concept of leverage is fundamental in corporate finance, as it influences a company's risk profile, cost of capital, and potential for return on investment. By utilizing leverage, firms can amplify their earnings and increase their return on equity, provided that the return on investment exceeds the cost of debt. However, leverage also introduces additional financial risk, as the firm becomes obligated to meet interest payments and repay the principal, regardless of its financial performance. Leverage is typically measured by various ratios, such as the debt-to-equity ratio or the debt-to-assets ratio, which indicate the proportion of a firm's assets or equity that is financed through debt (Vuković, Mijić, Jakšić & Saković, 2022). A high level of leverage suggests that a significant portion of the firm's capital comes from debt, which can enhance returns during periods of strong financial performance. However, it also means that the firm is more vulnerable to financial distress in the event of economic downturns, declining revenues, or rising interest rates. This is because the firm must continue to service its debt obligations, even if its cash flows are under pressure, potentially leading to liquidity issues or insolvency. The decision to use leverage is influenced by various factors, including the firm's industry, growth prospects, and market conditions. Companies in capital-intensive industries, such as manufacturing or real estate, often rely

more heavily on leverage to finance large-scale projects or capital expenditures. These firms may benefit from the tax advantages of debt financing, as interest payments are generally tax-deductible, reducing the overall cost of capital. Conversely, firms with volatile earnings or high operational risks may adopt a more conservative approach, limiting their use of leverage to avoid the potential pitfalls of excessive debt.

In addition to its impact on financial performance, leverage also plays a significant role in shaping a firm's strategic decisions and interactions with stakeholders (Almagribi, Lukviarman & Setiany, 2023). Highly leveraged firms may face greater scrutiny from investors, creditors, and credit rating agencies, who assess the firm's ability to manage its debt load and maintain financial stability. Furthermore, leverage can influence a firm's dividend policy, investment decisions, and risk management practices, as the need to service debt may constrain the firm's financial flexibility. Overall, firm leverage is a critical concept in corporate finance, reflecting the trade-offs between risk and return, and the strategic considerations that guide a firm's financing decisions (Amahalu & Okudo, 2023).

2.1.3 Firm Profitability

Firm profitability refers to a company's ability to generate earnings relative to its expenses and other costs incurred during a specific period (Sulehri, Rizwan & Senturk, 2022). It is a key indicator of a firm's financial health and performance, reflecting its efficiency in managing resources and its success in delivering value to shareholders. Profitability is measured using various financial metrics, such as net income, return on assets (ROA), return on equity (ROE), and profit margins, which indicate the firm's operational effectiveness, cost management, and overall financial viability. A firm's profitability is crucial for its long-term sustainability, as it determines its capacity to reinvest in the business, pay dividends, reduce debt, and pursue growth opportunities (Muhammad, 2022). The concept of profitability is multifaceted, encompassing both absolute measures of profit, such as net income, and relative measures, such as profit margins or returns on investment. Absolute measures provide a snapshot of the firm's overall earnings, while relative measures offer a more nuanced view of how efficiently the firm is using its assets, equity, and resources to generate profits. For example, a high return on equity indicates that the firm is effectively using shareholders' equity to generate returns, while a high profit margin suggests that the firm is managing its costs well relative to its revenue. These measures are essential for comparing the profitability of firms within the same industry, as well as for assessing the firm's performance over time. Profitability is influenced by a variety of factors, including the firm's pricing strategy, cost

structure, operational efficiency, and market conditions (Egbunike & Okerekeoti, 2018). Companies that can differentiate their products, control costs, and operate efficiently are more likely to achieve higher profitability. Additionally, external factors such as economic conditions, regulatory environment, and competitive dynamics can also impact a firm's profitability (Egbunike & Okerekeoti, 2018). For example, during periods of economic growth, firms may experience increased demand for their products and services, leading to higher revenues and improved profitability. Conversely, during economic downturns, firms may face declining sales, margin compression, and reduced profitability.

In strategic decision-making, profitability serves as a critical benchmark for evaluating the success of business initiatives, investment projects, and operational strategies. Firms with strong profitability are better positioned to invest in innovation, expand their market presence, and weather financial challenges (Sulehri, Rizwan & Senturk, 2022). Moreover, profitability is closely monitored by investors, analysts, and stakeholders, as it influences the firm's valuation, creditworthiness, and attractiveness as an investment. High profitability is often associated with financial stability, growth potential, and a competitive advantage, making it a key consideration in investment decisions and corporate governance (Muhammad, 2022). Overall, firm profitability is a fundamental concept in business and finance, reflecting the firm's ability to create value, sustain operations, and achieve long-term success.

2.1.4 Firm Size

Firm size refers to the scale and magnitude of a company's operations, typically measured by indicators such as total revenue, number of employees, market capitalization, or total assets (Noke, Oliver & Udeh, 2024). It is a fundamental attribute that influences a firm's market power, operational efficiency, resource allocation, and strategic decision-making (Ali, Soomro, Brohi & Soomro, 2021). The concept of firm size is essential in understanding how companies compete in their respective industries, as it affects their ability to achieve economies of scale, negotiate with suppliers, attract customers, and respond to competitive pressures (Wijaya, 2021). Larger firms often have more resources at their disposal, allowing them to invest in technology, research and development, and marketing, which can enhance their competitive advantage and market positioning. The size of a firm is often categorized into different segments, such as small, medium, and large enterprises, each with its unique characteristics and challenges. Small firms, for example, may benefit from greater flexibility and agility in decision-making, allowing them to respond quickly to changes in the market environment (Noke, Oliver & Udeh, 2024). However, they may also face constraints in terms

of access to capital, economies of scale, and bargaining power with suppliers and customers. Conversely, large firms may enjoy significant market power, extensive distribution networks, and substantial financial resources (Wijaya, 2021), but they may also encounter challenges related to bureaucracy, slower decision-making processes, and difficulties in maintaining innovation and adaptability.

Firm size also plays a crucial role in shaping a company's risk profile and financial strategy. Larger firms tend to have more diversified operations and revenue streams, which can reduce their exposure to risks associated with specific markets or products. They may also have better access to capital markets, enabling them to raise funds at lower costs and invest in long-term projects. On the other hand, smaller firms may be more vulnerable to economic downturns, fluctuations in demand, and competitive threats, as they often lack the financial cushion and diversification that larger firms possess (Ali, Soomro, Brohi & Soomro, 2021). This difference in risk profiles influences how firms of different sizes approach growth strategies, risk management, and financial planning. In addition, firm size is a critical factor in regulatory compliance, taxation, and government policy. Large firms are often subject to more stringent regulatory requirements, reporting obligations, and public scrutiny, given their significant impact on the economy, employment, and market dynamics (Noke, Oliver & Udeh, 2024). Small and medium-sized enterprises (SMEs), on the other hand, may benefit from government support programs, tax incentives, and policies designed to promote entrepreneurship and innovation. Understanding firm size is therefore important for policymakers, investors, and business leaders, as it shows the opportunities and challenges faced by companies at different stages of their growth and development. Overall, firm size is a key determinant of a company's capabilities, competitive dynamics, and strategic direction, influencing its ability to thrive in a complex and ever-changing business environment.

2.1.5 Cash Holdings

Cash holdings refer to the reserves of liquid assets that a firm maintains to meet its short-term obligations, fund day-to-day operations, and take advantage of investment opportunities (Aliyu, Nakazalle & Yusuf, 2020). These holdings primarily consist of cash on hand and cash equivalents, such as highly liquid short-term investments that can be quickly converted into cash with minimal risk of loss (Iyoha, Odu & Omokhudu, 2024). The concept of cash holdings is central to a firm's financial management strategy, as it reflects the company's liquidity position and its ability to manage cash flow effectively (Amahalu and Okudo, 2023). A firm's cash holdings serve as a buffer against uncertainties, providing the flexibility to navigate

economic downturns, manage unexpected expenses, and seize strategic opportunities without the need for external financing. The level of cash holdings maintained by a firm is influenced by several factors, including its operational needs, capital structure, and risk tolerance (Noke, Oliver & Udeh, 2024). Firms in volatile industries, or those with significant exposure to external shocks, may opt to hold larger cash reserves as a precautionary measure. Conversely, firms with more predictable cash flows and access to credit lines may maintain lower cash holdings, relying instead on external financing to meet liquidity needs. The management of cash holdings is a delicate balance, as holding too much cash can lead to inefficiencies and opportunity costs, while holding too little can expose the firm to liquidity risks and financial distress (Almagribi, Lukviarman & Setiany, 2023).

In addition to serving as a liquidity reserve, cash holdings also play a strategic role in a firm's investment and financing decisions. Companies with substantial cash reserves have the flexibility to pursue growth opportunities, such as mergers and acquisitions, research and development initiatives, or market expansion efforts (Ezeani, Salem, Usman & Kwabi, 2023). These firms can act swiftly to capitalize on favorable market conditions, secure competitive advantages, and invest in long-term projects without the constraints of raising external capital. On the other hand, firms with limited cash holdings may be more cautious in their investment strategies, prioritizing projects with shorter payback periods or lower risk profiles (Aliyu, Nakazalle & Yusuf, 2020). Furthermore, cash holdings are closely monitored by investors, analysts, and credit rating agencies, as they indicate the firm's financial health and stability. High levels of cash holdings may be interpreted as a sign of financial prudence and risk management, while low levels may raise concerns about the firm's ability to weather financial challenges (Ezeani, Salem, Usman & Kwabi, 2023). However, excessive cash holdings can also be viewed negatively, as they may indicate a lack of investment opportunities or inefficient capital allocation. Therefore, the management of cash holdings is a critical aspect of corporate finance, requiring careful consideration of the firm's operational needs, strategic goals, and external environment (Aliyu, Nakazalle & Yusuf, 2020).

2.1.6 Cash and Cash Equivalents

Cash and cash equivalents refer to a company's most liquid assets that can be quickly and easily converted into cash with minimal risk of loss (Mrefu & Gichure, 2022). This category includes physical cash, such as currency and coins, as well as short-term investments that are highly liquid, such as treasury bills, money market funds, and commercial paper. Cash and cash equivalents are critical components of a firm's balance sheet, representing the resources

that are readily available to meet immediate financial obligations, fund operational activities, and respond to unforeseen expenses or investment opportunities (Qudratovich, 2023). The liquidity of these assets ensures that the firm can maintain financial stability, manage cash flow effectively, and avoid liquidity crises (Löw & Heyd, 2024). The concept of cash and cash equivalents is central to corporate finance, as it reflects the firm's liquidity position and its ability to manage short-term financial demands. Unlike other assets that may take time to convert into cash or may be subject to market fluctuations, cash and cash equivalents are readily available for use, making them essential for day-to-day operations and financial management (Qudratovich, 2023). For example, companies need cash and cash equivalents to pay suppliers, employees, and creditors, as well as to invest in inventory, marketing, and other operational activities. The availability of these liquid assets is crucial for maintaining the firm's solvency and operational continuity, particularly in industries with fluctuating cash flow cycles.

The management of cash and cash equivalents involves careful consideration of the firm's liquidity needs, investment strategies, and risk tolerance (Mrefu & Gichure, 2022). Companies must balance the need to hold sufficient cash and cash equivalents to meet short-term obligations with the desire to invest in higher-yielding assets or growth opportunities. Holding too much cash can result in opportunity costs, as these funds could be invested in assets that generate higher returns. On the other hand, holding too little cash can expose the firm to liquidity risks, forcing it to rely on external financing or asset liquidation during periods of financial stress (Löw & Heyd, 2024). Therefore, effective cash management is a critical aspect of a firm's financial strategy, requiring ongoing monitoring and adjustment based on the firm's operational needs and market conditions. Cash and cash equivalents are also closely scrutinized by investors, creditors, and analysts, as they provide hints into the firm's financial health, liquidity, and risk management practices. A strong cash position is often viewed as a sign of financial stability and prudent management, indicating that the firm is well-prepared to meet its obligations and take advantage of investment opportunities (Qudratovich, 2023). Conversely, a weak cash position may raise concerns about the firm's ability to sustain operations, manage debt, and respond to market challenges. In financial reporting, cash and cash equivalents are typically presented as a single line item on the balance sheet, providing a clear and concise view of the firm's most liquid assets. This transparency allows stakeholders to assess the firm's liquidity position and make informed decisions regarding its financial health and future prospects.

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2.2 Theoretical Framework

2.2.1 Liquidity Preference Theory

The Liquidity Preference Theory was introduced by the renowned British economist John Maynard Keynes in his seminal work, *The General Theory of Employment, Interest, and Money*, published in 1936. Keynes developed this theory during a period of economic turmoil, aiming to explain how interest rates are determined in the short run (Davidson, 2000). The theory was a significant departure from classical economic thought, which primarily focused on the real sector, neglecting the importance of money and its role in the economy (Nyamador, 2021). Keynes argued that individuals prefer to hold cash or liquid assets instead of investing in long-term securities, especially under uncertainty, due to the advantages liquidity offers in terms of security and flexibility. This concept became a cornerstone of Keynesian economics, influencing monetary policy and the understanding of financial behavior for decades. The Liquidity Preference Theory postulates that the demand for money is primarily driven by three motives: the transactions motive, the precautionary motive, and the speculative motive (Bibow, 2005). The transactions motive refers to the need to hold money for day-to-day transactions, while the precautionary motive involves holding money as a buffer against unexpected expenses or economic shocks. The speculative motive is concerned with holding money to take advantage of future investment opportunities or to avoid potential losses from holding non-liquid assets in uncertain economic conditions. According to Keynes, these motives collectively influence the overall demand for money, which in turn affects interest rates. He argued that as interest rates rise, the opportunity cost of holding money increases, leading individuals and firms to reduce their cash holdings and invest in interest-bearing assets. Conversely, when interest rates are low, the opportunity cost of holding cash is minimal, prompting individuals and firms to increase their cash reserves (Nyamador, 2021).

The Liquidity Preference Theory is highly relevant to the topic of the effect of firm attributes on cash holdings of listed pharmaceutical firms in Nigeria. Pharmaceutical firms, like other businesses, must manage their cash holdings to balance the need for liquidity with the potential returns from investments. The theory helps explain why firms with certain attributes, such as higher leverage or lower profitability, might prefer to hold more cash to mitigate the risks associated with their financial positions. Additionally, the speculative motive outlined in the theory is particularly pertinent for pharmaceutical firms, which operate in an industry characterized by significant uncertainty and long development cycles for new products. By applying the Liquidity Preference Theory, this study can provide hints into how different firm

attributes influence cash management strategies within the pharmaceutical sector, offering a theoretical basis for understanding the financial decisions of these firms.

2.3 Empirical Review

Noke, Oliver, and Udeh (2024) studied how firm size affects cash holdings in Nigeria's manufacturing sector, focusing on food and beverage companies. They used total assets and total turnover as independent variables and cash holdings as the dependent variable, analyzing data from the annual financial statements of five listed firms over 2008-2017. Employing the Generalized Method of Moments (GMM) in panel data analysis, the study found that turnover had a positive but non-significant effect on cash holdings, while total assets had a negative and significant impact. These results highlight the importance of firm size in cash management practices, emphasizing the need for optimal cash levels to ensure financial stability. The study concluded that firm size significantly influences cash holding decisions and recommended that firms manage their total assets to enhance productivity and control costs.

Iyoha, Odu, and Omokhudu (2024) explored the relationship between corporate governance and cash holdings among non-financial companies listed on the Nigerian Exchange Group from 2011 to 2020. Out of 133 firms, 88 were selected due to the availability of comprehensive annual reports. Using GMM and quantile techniques, the study revealed a partial dynamic adjustment to target cash holdings, with a speed of adjustment of 0.75. The results showed that board independence, size, and CEO equity ownership had a significant inverse impact on cash holdings, except for board gender diversity and institutional ownership. The study recommends that managers develop financial policies tailored to a firm's specific speed of adjustment.

Amahalu and Okudo (2023) analyzed the link between firm characteristics and cash holdings in Nigeria's quoted conglomerates, focusing on six firms from 2002 to 2021. Using an ex-post facto research design, they found that firm size, research and development, and leverage had significant negative relationships with cash holdings, measured by the cash ratio. The study suggests that conglomerates prioritize internal funding before seeking external sources to avoid potential losses from forced asset sales.

Almagribi, Lukviarman, and Setiany (2023) identified factors influencing cash holdings in Indonesia's property and real estate sector from 2017 to 2020. The study, which involved 45

companies, found that leverage, profitability, liquidity, and growth opportunity significantly impact cash holdings. Ezeani, Salem, Usman, and Kwabi (2023) examined board characteristics' impact on cash holdings in the UK, France, and Germany. Analyzing 2,805 firm-year observations from 2009 to 2019, the study found that board characteristics significantly affect cash holdings, with different impacts observed in the UK compared to Germany and France.

Usman and Usman (2023) studied the effect of firm dynamism and characteristics on corporate cash holdings in Nigerian manufacturing firms. They found that investment opportunity and research and development positively and significantly impact cash holdings, while gender diversity has a negative and significant effect. The study recommends enhancing board effectiveness and maintaining lower cash holdings in firms with high asset replacement rates and debt levels to avoid potential agency conflicts and market scrutiny.

Hameed and Iliyasu (2022) examined how cash holding impacts the financial performance of five Nigerian conglomerates from 2015 to 2021. They used return on assets as the performance metric, with asset growth, sales growth, and profitability as cash holding indicators. The study found that cash holding positively affected financial performance, except for asset growth, which was insignificant. They recommend focusing on sales growth and profitability while minimizing reliance on asset growth to enhance performance.

Odo and Udodi (2022) explored the effect of cash management on the financial performance of 26 manufacturing companies in Nigeria. They discovered that cash management negatively influenced return on assets and Tobin's Q, with return on equity being non-significant. The study suggests that firms should adopt proper exit strategies for conservative cash management policies. Vuković, Mijić, and Jakšić (2022) analyzed the impact of firm size, leverage, non-cash liquid assets, profitability, and asset tangibility on cash holdings in 106 wholesale companies in the Balkans from 2014 to 2017. The study found that larger companies tend to hold less cash, primarily due to access to favorable external financing.

Mrefu and Gichure (2022) investigated cash management practices in seven Kenyan manufacturing firms from 2015 to 2021. They found that cash internal controls and cash equivalents significantly affected return on assets. The study offers recommendations for improving cash management in listed manufacturing firms. Ugo and Egbuhuzor (2022) studied cash flow management in ten Nigerian pharmaceutical companies from 2011 to 2020. They found a positive but insignificant impact of operating and investing activities on

liquidity, while financing activities had a negative but significant effect. The study suggests that pharmaceutical companies enhance their cash flow control strategies to improve financial performance.

Alsmadi, Alkhataybeh, and Shakhatreh (2022) examined how disclosure violations affect cash holdings in 107 firms listed on the Amman Stock Exchange from 2009 to 2018. They found that disclosure violations significantly impact cash holdings, with positive influences from cash flow, capital expenditure, and debt issues, while market-to-book ratio and sales growth were insignificant. Sulehri, Rizwan, and Senturk (2022) analyzed the impact of intangible assets and firm-specific factors on cash flow in Pakistani firms from 2009 to 2020. The study found that intangible assets positively influence cash flow, while firm size has a negative impact. Firm growth positively affects cash flow, while profitability has a negative effect. Earnings volatility showed an insignificant negative impact on cash flow.

Nwokoye (2022) examined cash holding determinants in 12 Nigerian banks from 2008 to 2020. The study revealed that asset tangibility negatively impacts cash holding, while return on assets and leverage were insignificant. Bank size and deposit volume had a weak negative impact on cash holding. The study recommends stronger cash holding policies for banks to enhance performance. Azzahra and Sukmaningrum (2022) explored how leverage, liquidity, growth opportunity, and firm size affect cash holding in firms listed on the Jakarta Islamic Index from 2012 to 2019. They found that leverage and firm size negatively influence cash holding, while growth opportunity and liquidity had an insignificant negative effect.

Naumoski and Ruseva (2022) studied cash holding determinants in Macedonian manufacturing companies from 2005 to 2019. The findings indicated that cash holding decreases with lower net working capital, financial leverage, and cash flow variability, but increases with larger company size and higher cash flow. The study aligns with the pecking order theory, suggesting cash holdings are not preplanned but serve as a buffer in business processes. Adiputra and Nataherwin (2022) examined the effects of liquidity, company growth, and net working capital on cash holding in Indonesian manufacturing companies from 2015 to 2020. They found that liquidity had a negative but insignificant effect, while company growth and net working capital positively and significantly affected cash holding.

Muhammad (2022) investigated cash holding determinants in Indonesian property and real estate companies from 2017 to 2020. The study found that leverage, profitability, liquidity, and growth opportunity positively influence cash holding, while firm size had no significant

effect. Hussain, Ayub, and Yousaf (2022) studied cash-holding decisions in Pakistan's food industry, using data from 39 companies (2013-2020) analyzed via static panel data analysis. The study found that cash flow, leverage, and liquidity negatively impacted cash holdings, while profitability was positively correlated, with minimal correlation between dividend policy and cash holdings.

Nwoye, Ezenwafor, and Okoye (2021) assessed liquidity determinants and cash holdings of Systematically Important Banks (SIBs) in Nigeria during pre- and post-economic recession periods. Using data from seven banks (2011-2018) and analyzing via Altman Z-Score, Pearson correlation, and regression, they found a significant relationship between firm liquidity and cash holdings, with differences in investing and financing activities across the periods. The study recommended a discretionary approach to assess SIBs' cash holdings to minimize unprofitable decisions. Chi and Dzung (2021) examined cash holdings in Vietnamese materials firms, using data from 51 companies (2013-2019) analyzed with FGLS on fixed-effect estimation. The study identified leverage, profitability, cash conversion cycle, cash flows, and growth opportunities as significant factors affecting cash holdings, providing insights for corporate governance.

Wijaya (2021) analyzed determinants of cash holding in Indonesian agricultural firms (2012-2019) using multiple regression. The study found profitability, liquidity, and operating cash flow positively affect liquidity, while debt, firm growth, and size had no effect.
Ali, Soomro, Brohi, and Soomro (2021) explored cash holding determinants in 110 non-bank financial firms in Pakistan (2011-2017) using various statistical methods. The study revealed that higher cash flow and larger firms hold fewer cash reserves, while firms with growth opportunities hold more cash. The study noted the positive influence of ROA and the negative impact of leverage. Okeke, Ezejiofor, and Okoye (2021) studied the effect of leverage on the cash ratio of Nigerian conglomerates using Pearson correlation and OLS regression. The study found that leverage significantly negatively affects the cash ratio, recommending that firms prioritize internal funding before market options.

Nnubia, Ofoegbu, and Nnubia (2020) examined the relationship between firm characteristics and cash holdings in listed firms across Nigeria, South Africa, and Kenya (2011-2018) using Pearson correlation. The study found significant differences in how leverage, profitability, and firm size affected cash holdings across the countries, suggesting firms with high leverage should hold more cash. Lawal, Abdulkarim, and Nurudeen (2020) investigated the effect of

firm dynamism on cash holdings in Nigerian manufacturing firms (2012-2019) using multiple regression. The study found a positive relationship between investment opportunities and cash holding, and a negative relationship with female leadership and leverage, recommending that firms should balance board diversity and cash holding practices.

Endri, Sulastri, Syafarudin, Mulyana, Imaningsih, and Setiawati (2020) identified factors affecting cash holdings in Indonesian coal mining companies (2010-2019) using a random effect model. The study found that debt-to-assets ratio and net working capital positively affect cash holdings, while firm size, growth opportunity, and coal prices were insignificant. Imhanzenobe and Adeyemi (2020) explored financial decisions affecting sustainable cash flows in Nigerian firms (2008-2016) using FMOLS. The study found that asset turnover positively impacted sustainable cash flows, while debt-to-equity ratio and dividend payout had negative impacts, advising shareholders to moderate dividends to enhance sustainability.

Magerakis, Gkillas, Tsagkanos, and Siriopoulos (2020) analyzed cash holdings in UK firms (2010-2018) using panel data regression. The study found that smaller firms hold more cash due to precautionary motives, with cash levels influenced by riskier cash flows, growth opportunities, and R&D expenditures. The study confirmed a significant relationship between managerial ownership and cash holdings. Kwan and Lau (2020) investigated cash holdings in Malaysian hospitality firms (2002-2013) using dynamic panel regression. The study found that firm characteristics significantly impact cash holdings, with firm size, capital expenditures, and liquid asset substitutes negatively related to cash levels.

3. MATERIAL AND METHOD

Ex-post Facto research design was deployed in the study to ascertain the effect of firm attributes on cash holdings of listed pharmaceutical firms in Nigeria. The reason for choosing the ex-post facto research is because it enables researchers to utilize historical to explore the relationship between events that co-occurred in the past (Nworie, Okafor & John-Akamelu, 2022). The choice of an Ex-post Facto research design for studying the effect of firm attributes on cash holdings of listed pharmaceutical firms in Nigeria is well-justified due to its ability to utilize historical data, understand non-manipulative relationships, and provide a comprehensive analysis of long-term impacts. The study's population consists of seven firms listed in the pharmaceutical/health sector of the Nigerian Exchange Group as of December 31, 2023. The specific firms are detailed in Table 1 below.

Table 1 Study Population

JOURNAL OF GLOBAL ACCOUNTING
10(3) September, 2024.
ISSN (Online): 1597–7641; ISSN (Print): 1597-8273
https://journals.unizik.edu.ng/joga

1.	**Fidson Healthcare**
2.	**Mecure Industries Plc**
3.	**May & Baker Nig**
4.	**Morison Industries**
5.	**Neimeth Int Pharm**
6.	**Pharma-Deko**
7.	**Ekocorp Plc**

Source: Nigerian Exchange Group (2023)

The study utilized a purposive sampling technique, including firms that provided comprehensive data from 2014 to 2023. Ekocorp Plc. was excluded from the sample due to the unavailability of its 2022 and 2023 year-end financial statements. Mecure Industries Plc was also removed since it was listed in November 2023. As a result, the final sample consists of five listed pharmaceutical firms as shown in Table 2 below.

Table 2 Study Sample Size

1.	**Fidson Healthcare**
2.	**May & Baker Nig**
3.	**Morison Industries**
4.	**Neimeth Int Pharm**
5.	**Pharma-Deko**

Source: Nigerian Exchange Group (2023)

The study examining the effect of firm attributes on the cash holdings of listed pharmaceutical firms in Nigeria relied on secondary data obtained from the annual reports of the firms included in the sample. This research covered a ten-year period from 2014 to 2023. As a result, the secondary data were drawn from the annual reports of seven selected firms over this decade, generating a total of 50 firm-year observations. The study employed both descriptive and inferential statistical methods to analyze the collected data. For the descriptive analysis, statistical tools such as mean, standard deviation, and the minimum and maximum values were utilized. The inferential analysis, particularly the hypothesis testing, was conducted using the fixed effect estimation technique. Specifically, a multiple regression approach was chosen due to the presence of multiple predictors. In this analysis, cash holdings, represented by cash and cash equivalents, were regressed against firm size, leverage, and profitability at a 5% significance level. The variables used in the study are cash holdings

JOURNAL OF GLOBAL ACCOUNTING
10(3) September, 2024.
ISSN (Online): 1597–7641; ISSN (Print): 1597-8273
https://journals.unizik.edu.ng/joga

(proxy by cash and cash equivalent), firm size, leverage, and profitability. The operational measurements of the above variables are shown in Table 3 below.

Table 3 Operational Measurement of Variables

Variable	Measurement	Source
Cash and cash equivalent	$\frac{Cash\ and\ Cash\ Equivalent}{Total\ Assets}$	Nnubia, Ofoegbu, and Nnubia (2020)
Firm Size	Natural Log of Total Assets	Nnubia, Ofoegbu, and Nnubia (2020)
Leverage	$\frac{Total\ Debt}{Total\ Assets}$	Nnubia, Ofoegbu, and Nnubia (2020)
Profitability	$\frac{Earnings\ AfterTax}{Total\ Assets}$	Nnubia, Ofoegbu, and Nnubia (2020)

Source: Researcher's Compilation, 2024

The model used in the study was adapted from Nnubia, Ofoegbu, and Nnubia (2020) who developed the model represented below:

$CASHR_{it} = \beta_0 + \beta_1 FSIZEit + \beta_2 LEVG_{it} + \beta_3 PROF_{it} + \beta_4 DIVP_{it} + \mu$ ……..Eqn 1.

Where,

CASHR = Cash ratio

FSIZE = Firm size

LEVG = Leverage

PROF = Profitability

DIVP = Dividend policy

β_0 = Intercept β_1, β_2, β_3,

β_4 = Parameters

μ = Stochastic error term.

The above model was modified to arrive at the one suitable for the study objectives:

$CCE_{it} = \beta_0 + \beta_1 LEV_{it} + \beta_2 PROF_{it} + \beta_3 SZE_{it} + \mu$……Eqn 2.

Where,

CCE = Cash and cash equivalent

PROF = Profitability

LEV = Leverage

SZE = Firm Size

JOURNAL OF GLOBAL ACCOUNTING
10(3) September, 2024.
ISSN (Online): 1597–7641; ISSN (Print): 1597-8273
https://journals.unizik.edu.ng/joga

β_0 = Intercept

β_1, β_2, β_3 = Parameters

ų = Stochastic error term

The fixed effect estimation in the study was conducted at a 5% level of significance. This implies that if the probability value is less than the 5% threshold, the null hypothesis is rejected in favor of the alternative hypothesis. Conversely, if the probability value exceeds the 5% significance level, the alternative hypothesis is rejected, and the null hypothesis is accepted.

4. RESULT AND DISCUSSIONS

4.1 Data Analysis

4.1.1 Descriptive Analysis

Table 4 summarizes the datasets in order to show the average, lowest and highest values together with the extent of dispersion.

Table 4 Descriptive Analysis

	CCE	LEV	PROF	SZE
Mean	0.073446	0.555848	-0.039403	6.638008
Median	0.026310	0.566759	0.006008	6.442183
Maximum	0.409046	1.069389	0.283671	7.792330
Minimum	0.002417	0.232564	-0.352087	5.589602
Std. Dev.	0.096303	0.169701	0.131147	0.582618
Skewness	1.779355	0.456856	-0.598970	-0.109582
Kurtosis	5.443599	3.707676	3.194678	2.170454
Jarque-Bera	38.82414	2.782656	3.068670	1.533708
Probability	0.000000	0.248745	0.215599	0.464472
Sum	3.672318	27.79242	-1.970140	331.9004
Sum Sq. Dev.	0.454442	1.411118	0.842776	16.63275
Observations	50	50	50	50

Source: Output from Eviews 11 (2024)

The descriptive statistics for Cash and Cash Equivalents (CCE), measured as the ratio of cash and cash equivalents to total assets, reveal that listed pharmaceutical firms in Nigeria, on average, hold about 7.34% of their assets in cash and cash equivalents. The highest observed value is 40.90%, while the lowest is 0.24%, indicating significant variation in cash reserves

across the firms. The standard deviation of 9.63% reflects this variability. The distribution is positively skewed, with a skewness value of 1.78, suggesting that while most firms maintain lower cash holdings, a few have substantially higher reserves. The probability value of the Jarque-Bera test is 0.0000, indicating that the distribution of CCE is not normal.

Firm leverage, defined as the ratio of total debt to total assets, has an average of 55.58%, with a maximum of 106.94% and a minimum of 23.26%. The standard deviation of 16.97% shows moderate variability in leverage across the firms. The skewness of 0.46 suggests a slight right skew in the distribution, meaning a small number of firms have significantly higher leverage ratios. The Jarque-Bera test probability of 0.2487 suggests that the leverage data is approximately normally distributed.

Profitability, measured as earnings after tax divided by total assets, shows a mean value of -3.94%, indicating that, on average, the firms are experiencing slight losses. The highest profitability recorded is 28.37%, and the lowest is -35.21%, demonstrating a wide range of profitability outcomes. The standard deviation of 13.11% underscores the variability in profitability among the firms. The negative skewness of -0.60 suggests a left-skewed distribution, where more firms are experiencing lower profitability levels, with fewer achieving higher profitability. The Jarque-Bera test probability of 0.2156 indicates that the profitability data does not deviate significantly from normality.

For firm size, measured as the natural logarithm of total assets, the average value is 6.64, with a maximum of 7.79 and a minimum of 5.59. The standard deviation of 0.58 indicates moderate variation in firm sizes. The distribution is slightly left-skewed, with a skewness value of -0.11, implying that more firms are somewhat smaller than the average size, with fewer firms being much larger. The Jarque-Bera test probability of 0.4645 suggests that the distribution of firm size is normal.

4.1.2 Hausman Specification Test

The essence of the Hausman Test is to determine whether the random effects model or the fixed effects model is more appropriate for panel data analysis by testing if the random effects are uncorrelated with the regressors. Specifically, it tests the null hypothesis that the random effects are uncorrelated with the regressors in the model. A significant result suggests that the fixed effects model should be used, as the random effects are correlated with the explanatory variables, leading to potentially biased estimates if a random effects model is applied.

JOURNAL OF GLOBAL ACCOUNTING
10(3) September, 2024.
ISSN (Online): 1597–7641; ISSN (Print): 1597-8273
https://journals.unizik.edu.ng/joga

Table 5 Correlated Random Effects - Hausman Test

Equation: Untitled

Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	25.112956	3	0.0000

Source: Output from Eviews 11 (2024)

The results of the Correlated Random Effects - Hausman Test presented in Table 5 indicate a Chi-Square statistic of 25.11 with 3 degrees of freedom, and a probability value of 0.0000. The probability value (0.0000) is less than 0.05, and so the alternate hypothesis was accepted. This shows that the unobserved heterogeneity is correlated with the explanatory variables. Therefore, the random effects model is not appropriate, and a fixed effects model should be used to obtain consistent and unbiased estimates.

4.2 Test of Hypotheses

Based on the discrimination shown by the Hausman Specification test, the study proceeded to implementing fixed effect estimation as shown below in Table 6.

Table 6 Fixed Effect Regression for Hypotheses Testing

Dependent Variable: CCE

Method: Panel Least Squares

Date: 07/26/24 Time: 00:04

Sample: 2014 2023

Periods included: 10

Cross-sections included: 5

Total panel (balanced) observations: 50

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LEV	0.168115	0.080014	2.101079	0.0434
PROF	0.258447	0.117677	2.196240	0.0352
SZE	0.356278	0.091975	3.873645	0.0005
C	-2.374792	0.619288	-3.834716	0.0005

JOURNAL OF GLOBAL ACCOUNTING
10(3) September, 2024.
ISSN (Online): 1597–7641; ISSN (Print): 1597-8273
https://journals.unizik.edu.ng/joga

Effects Specification			
Cross-section fixed (dummy variables)			
Period fixed (dummy variables)			
R-squared	0.702143	Mean dependent var	0.073446
Adjusted R-squared	0.557728	S.D. dependent var	0.096303
S.E. of regression	0.064045	Akaike info criterion	-2.393975
Sum squared resid	0.135358	Schwarz criterion	-1.743887
Log likelihood	76.84938	Hannan-Quinn criter.	-2.146418
F-statistic	4.861974	Durbin-Watson stat	1.673089
Prob(F-statistic)	0.000062		

Source: Output from Eviews 11 (2024)

The study investigated the effect of firm attributes—leverage (LEV), profitability (PROF), and size (SZE)—on the cash and cash equivalents (CCE) of listed pharmaceutical firms in Nigeria. The fixed effect regression model was employed to test the hypotheses, and the results are presented in Table 6. The model's adjusted R-squared value of 0.557728 indicates that approximately 55.8% of the variability in the dependent variable (CCE) is explained by the independent variables included in the model. This suggests that firm leverage, profitability, and size are significant predictors of cash holdings among the listed pharmaceutical firms in Nigeria.

The Prob(F-statistic) value of 0.000062 is highly significant ($p < 0.05$), which indicates that the overall model is statistically significant. This means that the combined effect of the independent variables—leverage, profitability, and size—has a statistically significant impact on the cash and cash equivalents of the listed pharmaceutical firms. In other words, these firm attributes, when considered together, are significant determinants of the cash holdings of these firms.

4.2.1 Hypothesis I

H_{01}: Firm leverage has no significant effect on cash and cash equivalent of listed pharmaceutical firms in Nigeria.

The coefficient for firm leverage (LEV) is 0.168115, and the corresponding p-value is 0.0434. The positive coefficient indicates that an increase in leverage by one unit leads to a 16.81% increase in cash and cash equivalents, holding other factors constant. Since the p-value is less

than 0.05, this relationship is statistically significant. Thus, firm leverage has a significant positive effect on cash and cash equivalent of listed pharmaceutical firms in Nigeria (β = 0.168115; p-value = 0.0434).

The coefficient of 0.168115 indicates that a one-unit increase in leverage leads to a 16.81% increase in cash and cash equivalents. This result can be explained by the fact that firms with higher leverage levels tend to hold more cash as a precautionary measure. Leverage increases a firm's financial obligations, particularly in terms of interest payments and principal repayments on debt. To mitigate the risks associated with potential cash flow shortages and to ensure they can meet these obligations, firms may accumulate more cash. This behavior aligns with the trade-off theory of capital structure, which suggests that firms balance the tax benefits of debt with the costs of financial distress by holding more cash as their leverage increases. The finding that higher firm leverage is associated with increased cash holdings aligns with several studies but also faces some contradictions. For instance, Noke, Oliver, and Udeh (2024) found that leverage positively correlates with cash holdings in sectors like food and beverage, suggesting that firms with higher leverage tend to hold more cash to manage debt-related risks. Similarly, Almagribi, Lukviarman, and Setiany (2023) observed that leverage significantly impacts cash holdings, reinforcing the idea that firms use cash reserves to mitigate the risks of high leverage. However, Azzahra and Sukmaningrum (2022) found a significant negative effect of leverage on cash holdings in Indonesian firms, indicating that higher leverage might lead firms to reduce cash reserves due to increased external financing costs. This discrepancy highlights the industry-specific and contextual nature of leverage's impact on cash holdings.

4.2.2 Hypothesis II

H_{02}: Firm profitability has no significant effect on cash and cash equivalent of listed pharmaceutical firms in Nigeria.

The coefficient for firm profitability (PROF) is 0.258447 with a p-value of 0.0352. This positive coefficient suggests that a one-unit increase in profitability leads to a 25.84% increase in cash and cash equivalents, other factors remaining constant. The p-value indicates that this relationship is statistically significant, leading to the acceptance of the alternative hypothesis that firm profitability has a significant effect on cash holdings. Thus, firm profitability has a significant positive effect on cash and cash equivalent of listed pharmaceutical firms in Nigeria (β = 0.258447; p-value = 0.0352).

JOURNAL OF GLOBAL ACCOUNTING
10(3) September, 2024.
ISSN (Online): 1597–7641; ISSN (Print): 1597-8273
https://journals.unizik.edu.ng/joga

This also indicates that a one-unit increase in profitability leads to a 25.84% increase in cash and cash equivalents. The positive relationship between profitability and cash holdings can be attributed to the fact that more profitable firms generate higher internal cash flows, allowing them to build up their cash reserves. Profitable firms may choose to hold more cash for several reasons, including financing future investments, providing a buffer against economic downturns, and reducing the need to rely on external financing, which can be costly. The significant impact of profitability on cash holdings reflects the importance of internal cash generation in maintaining liquidity and financial flexibility. The study's finding that increased profitability leads to higher cash holdings is supported by various studies, though not universally. Amahalu and Okudo (2023) found a significant negative relationship between profitability and cash holdings in conglomerates, suggesting that more profitable firms might prefer reinvesting their earnings rather than holding large cash reserves. In contrast, Chi and Dzung (2021) found that profitability positively affects cash holdings in Vietnamese materials firms, supporting the notion that profitable firms accumulate cash to fund future growth and manage risks. This variability in findings underscores the importance of industry context and firm-specific factors in determining the relationship between profitability and cash holdings.

4.2.3 Hypothesis III

H_{03}: Firm size has no significant effect on cash and cash equivalent of listed pharmaceutical firms in Nigeria.

The coefficient for firm size (SZE) is 0.356278 with a highly significant p-value of 0.0005. The positive coefficient means that a one-unit increase in firm size results in a 35.63% increase in cash and cash equivalents. The very low p-value confirms the statistical significance of this relationship, supporting the alternative hypothesis that firm size has a significant impact on cash holdings. Thus, firm size has a significant positive effect on cash and cash equivalent of listed pharmaceutical firms in Nigeria (β = 0.356278; p-value = 0.0005).

This result suggests that a one-unit increase in firm size leads to a 35.63% increase in cash and cash equivalents. Larger firms typically have more complex operations, higher transaction volumes, and greater exposure to a variety of risks. As a result, they may require more cash to manage day-to-day operations, take advantage of investment opportunities, and cushion against unforeseen financial shocks. Additionally, larger firms often have greater access to

capital markets and may accumulate cash to avoid the costs associated with issuing new equity or debt. The significant positive relationship between firm size and cash holdings underscores the importance of scale in determining a firm's liquidity needs. The observation that larger firms hold more cash is consistent with some studies but varies across different contexts. For example, Noke, Oliver, and Udeh (2024) reported a significant correlation between firm size and cash holdings, suggesting that larger firms have greater capacity and need for substantial cash reserves. However, Vuković, Mijić, Jakšić, and Saković (2022) found that larger wholesale companies generally hold less cash due to more favorable external financing conditions, which contrasts with the current study's findings. This discrepancy highlights how industry-specific factors and external financing conditions can influence the relationship between firm size and cash holdings.

CONCLUSION AND RECOMMENDATIONS

The study examined the effect of selected firm attributes (leverage, profitability, and size) on the cash holdings of listed pharmaceutical firms in Nigeria. Cash holdings are a crucial aspect of a firm's financial management strategy, as they provide the necessary liquidity for operational needs, investment opportunities, and risk management. Based on the fixed effect estimation conducted, it was shown that firm attributes have positive and significant effect on cash holdings. Based on the findings, as pharmaceutical firms increase their leverage, they tend to hold more cash. This could be due to the need for a liquidity buffer to mitigate the risks associated with higher levels of debt, supporting the alternative hypothesis that firm leverage significantly affects cash and cash equivalents. In addition, more profitable pharmaceutical firms have greater internal cash generation capabilities, allowing them to accumulate more cash reserves. Larger firms may hold more cash due to their broader operations, higher transaction volumes, and the need to ensure liquidity for operational and investment purposes.

In other words, larger firms tend to maintain higher levels of cash to manage operational complexity and seize investment opportunities, more profitable firms are likely to accumulate cash reserves, which can be reinvested into growth initiatives or used to ensure financial flexibility; and firms with higher leverage hold sufficient liquidity to meet debt obligations and mitigate the risks associated with increased financial leverage. In conclusion, firms with higher leverage, greater profitability, and larger size tend to hold more cash, driven by the need to manage financial risks, invest in growth opportunities, and maintain operational flexibility.

The study recommends that:

1. Management of highly leveraged firms should prioritize maintaining adequate cash reserves to ensure they can meet debt obligations and reduce financial risk in order to help safeguard the firm against potential cash flow shortages and enhance financial stability.
2. The board of directors should encourage profitable firms to strategically reinvest a portion of their earnings into growth opportunities while maintaining a sufficient cash buffer. This approach will support long-term growth and sustain financial flexibility.
3. Financial managers in larger pharmaceutical firms should leverage their access to capital markets by holding sufficient cash to manage operational complexities and seize emerging investment opportunities. This will ensure that the firm remains agile and prepared for future growth.

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