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LIQUIDITY MANAGEMENT IN THE CONTEXT OF ZOMBIE FIRMS IN NIGERIA

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Keywords: *zombie firms, liquidity management*

Abstract: *The primary objective of this research is to analyse the complexities associated with liquidity management in the context of zombie firms. In order to achieve this aim, a subset of publicly traded non-finance companies in Nigeria has been chosen as the subject of inquiry. The temporal scope being examined encompasses the years 2012 to 2021, thereby enabling an exhaustive examination of trends and practises pertaining to liquidity within this particular framework. The research examines the correlation between liquidity management proxies—namely the current ratio, receivable days, and cash conversion cycle—and the dependent variable of ghost firm status. Furthermore, the control variables of firm size and market capitalization were included in the current study. The present inquiry makes use of an ex-post facto research design. The population being analysed comprises all non-finance companies that were publicly traded in Nigeria between 2012 and 2021. As of December 2021, the Nigerian Exchange Group (NGX) floor accommodated a cumulative count of 109 listed entities, as reported in the NGX Factbook of 2021. Filtering sampling was employed in this investigation, as it was considered suitable to incorporate companies into the sample according to particular selection criteria. The logistic regression statistical technique was employed to evaluate and assess the hypotheses that were developed specifically for this research endeavour. The findings of this study indicate that a marginal increase of 1% in the current ratio results in a comparatively insignificant increase of approximately 1% in the interest coverage ratio, as determined through empirical analysis. As a result, the marginal enhancement in the interest coverage ratio aids in the decline of undead firms' prevalence during the period under examination. A marginal increase of 1% in the number of days it takes a company to collect its receivables is associated with a statistically significant decrease of approximately 1% in the interest coverage*

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ratio, according to the study's findings. The observed reduction in the interest coverage ratio implies that the aforementioned companies face an increased likelihood of degenerating into "zombies" throughout the examined time period. In summary, the results of our study suggest that a slight 1% increase in the currency conversion cycle has an inconsequential effect of approximately 98% on the interest coverage ratio. As a result, this occurrence contributes to the increased susceptibility of organisations, resulting in a progression of their undead status during the examined timeframe. Diverse stakeholders may utilise the findings of this research to emphasise the criticality of liquidity management in monitoring and evaluating the zombie status of a company. It is recommended that organisations contemplate implementing early pay discounts when circumstances are favourable from an economic and business standpoint. By implementing this strategy, they can significantly decrease the duration for which their accounts payable remain unpaid. On the contrary, in periods of economic and business downturn, organisations ought to make every effort to synchronise their incoming sales with their outgoing payments. The objective of this strategic approach is to ensure financial stability and minimise potential difficulties that may emerge due to unfavourable market conditions.

1.1 Introduction

Zombie firms, as defined by Tan et al. (2016), refer to financially distressed companies that continue to function despite their insolvency. In recent times, they have garnered significant recognition due to the expansion of their population and their consequential influence on the economy. Zombie firms have the potential to disrupt market competition through the manipulation of product prices, the elevation of wages (Acharya et al., 2019), and the displacement of credit from productive firms (Ahearne and Shinada, 2005). Industries that are predominantly controlled by zombies also demonstrate reduced job creation and decreased productivity (Caballero et al., 2008; McGowan et al., 2018). According to Banerjee and Hofmann (2018), it has been observed that zombie firms have a detrimental impact on economic performance due to their ability to suppress productivity. This, in turn, can have negative consequences for other thriving firms in the market. Nevertheless, in spite of the potential negative repercussions on the economy, the global prevalence of zombie firms is steadily increasing (Banerjee and Hofmann, 2018). Based on the studies conducted by Urionabarrenetxea et al. (2017) and Blažková and Dvouletý (2019), it is observed that the presence of zombie firms is prevalent in developed nations like the United States, United Kingdom, and Japan, among others. However, the investigation into zombie firms is still progressing, and there is a scarcity of data from

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developing regions, thereby necessitating the requirement for empirical evaluation. According to Andrews and Petroulakis (2019), there is a lack of sufficient research on the topic of zombie firms, indicating that it is an area that has not received adequate attention from researchers. This suggests that there is significant untapped potential for scholars, particularly in developing nations like Nigeria, to explore this subject further. Luo, Li, and Zhang (2015) have highlighted the limited attention given by researchers in the field of international finance to the study of companies experiencing negative equities and the subsequent consequences they face (Retolaza, San-Jose, Urionabarrenetxea, & Garcia-Merino, 2016). The lack of research on zombie firms in general often highlights a significant gap in the field, stemming from limited development and observation.

When a business firm receives a loan from a creditor, like a bank, the creditor will have a vested interest in the business firm's capacity to repay both the fixed interest charges and the borrowed principal amount. Creditors also hold a vested interest in the profitability of a business entity. The reason behind this is that the profitability of a company provides complete confidence to lenders that the company is in good financial health to grant credit facilities (loans) with the intention of repayment. The impact of interest charges and loan repayment defaults, potentially resulting from liquidity and profitability challenges, can disrupt the transfer of funds from surplus units to deficit units. This can impede the timely acquisition of capital for investment activities, production of goods, provision of services, and ultimately hinder economic growth. When banks participate in providing financial support to companies that are in a state of zombie status, they potentially contribute to the promotion of credit misallocation. This, in turn, can have adverse consequences for the financial sector within the respective economy (Ahearne & Shinada, 2022). Due to the absence of financial intermediation, zombie firms may experience limited investment and economic activities, consequently impacting the overall economy. Zombie firms often face challenges in meeting their financial obligations, such as the payment of salaries and wages to their employees, primarily due to their unfavorable profitability and equity situation. According to Ogbeide (2021), employees are unlikely to remain employed at a company that cannot consistently provide job security and timely salary payments. Zombie firms have a tendency to partake in downsizing, thereby making a contribution to the unemployment rate within an economy.

This study examines the effect of liquidity management on Zombie firm status of listed firms in Nigeria. A review from continents over the world showed different results of the determinants of zombie firm status. Most of the past studies were done in Asia especially in India (Surahbi Somya, & Madhuri Saripalle, 2021; Aggarwal, 2016), Malaysia (Rahim, Nor, Ramli, & Marzuki, 2021; Nor, Ramli, Marzuki, & Rahim,

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2020; Rahim, Nor, Ramli, & Marzuki, 2019; Rahim, 2017), Indonesia (Sunard, Pertiwi, & Supramono 2021; Listiani & Supramono, 2020; Nastiti, Atahau, & Supramono, 2019; Wahyuni & Dino, 2016), Jordan (Wasfit, Walid, & Hashem, 2021; and Al-Slehat & Altameemi, 2021) and Pakistan (Mubeen & Hanif, 2017) while in Africa the few studies were in Ethiopia (Solomon, Tadele, Shiferaw & Daniel, 2016), Kenya (Nanjala, Lucy, & Eddie, 2020; Mukherjee & Sen, 2019) Egypt (Hassan & Hart, 2016) and Nigeria (Alayemi & Akintoye, 2015; Akpovbera, Onodje & Farayibi, 2014; Aregbeyen, 2012).

Similarly, from the studies that used samples from African countries, we observed that the samples were among manufacturing firms (Alayemi & Akintoye, 2015) and Banks (Aregbeyen, 2012). Although we identify the works of Akpovbera, Onodje & Farayibi (2014) who conducted their study of zombie firm determinants in the non-finance sector, they only use few of the firms from the non-finance sector of which generalization could be vague. Furthermore, most studies examine determinants of financial distress (Sakinc & Gungor, 2015; Filsaraei & Zarei, 2017; Badu, 2013; Sardar 2015; Kania & Bacon, 2005; Mohammed 2016; Mohammed 2011; Pandey & Ashvini 2016; Mahdzan & Zainudin 2016; Christopher, 2014) and not on zombie firm which is a more extreme case, hence the timeliness of our study. This study is adjusted to fit its objectives of assessing liquidity management on the zombie status of listed non-finance firms in Nigeria between periods of 2012 to 2021. The period 2012 to 2021 represents the time period of highest activities in Sub-Saharan African business industry. This period in focus also witnessed a critical time of corporate regulations, recapitalization, mergers, and economic recession. Non-financial firms in Nigeria provide a unique opportunity for use in this study, thus meeting the need to capture a larger firm observation unlike previous studies since most firms in Nigeria are classified under the non-finance sectors.

2.0 Conceptual Clarification, Theoretical Exposition and Review of Literature

2.1 Conceptual Review

2.1.1 Zombie Firm Status

Zombie firms are companies that demonstrate remarkable resilience by continuing to operate despite consistently reporting unfavorable equity. The notion of a zombie firm was initially introduced by Kane (1980) during the emergence of the America Savings & Loan crisis in the 1980s. He defines a zombie firm as a company that is at risk of being overwhelmed by its creditors, but is saved from this fate by the timely intervention of the country's government through its monetary authority, utilizing funds for financial assistance. According to Kane (1980), it is stressed that a business transforms into a zombie entity when it consistently endures financial setbacks resulting in the actual worth of its assets being lower than its liabilities. A zombie firm refers to a financially distressed company that persists in its

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operations solely due to the timely financial support provided by the government, enabling it to fulfill its financial responsibilities. In essence, companies classified as zombies are those that exhibit unmistakable signs of being unable to meet their fixed interest payment obligations in a timely manner. Additionally, these companies consistently experience financial losses and maintain negative equity for a consecutive number of years, as supported by the research of Mohrman and Stuerke (2014) and Blažková and Dvouletý (2018). Zombie firms, as defined by Binh et al. (2020), are characterized by their prolonged existence in the market despite experiencing unfavorable profitability and maintaining a negative equity value. They are often referred to as "walking corpses" due to their ability to sustain business operations despite evident consecutive losses, failure to meet interest payments, and negative equity value.

2.1.2 Liquidity Management

Liquidity is a term used to describe the current state or condition of a business organization, which ultimately determines its capacity to fulfill or meet its impending obligations (Olabode, 2011). These responsibilities consist of existing obligations and debts that extend over a long period of time. The liquidity ratio is a metric that assesses the proportionate quantity of assets held in cash or those that can be swiftly converted into cash, without experiencing any depreciation in value. This metric gauges the capacity of a company to fulfill its short-term obligations and meet all impending financial commitments without jeopardizing its overall financial stability. It assists a company in evading a circumstance wherein it would be compelled to liquidate, thereby encountering the associated challenges of selling assets at reduced prices and incurring additional expenses for legal representation, bankruptcy trustees, and liquidation agents. The concept of liquidity encompasses two aspects: the duration required to transform an asset into cash and the level of assurance regarding the conversion rate or the price obtained for the assets (Olagunju, Adeyanju & Olabode, 2011). According to Olabode (2011), it can be inferred that an increase in liquidity has the effect of decreasing the likelihood of the firm becoming insolvent. Liquidity management, conversely, refers to the regular practice of overseeing a company's allocation of resources in current assets, current liabilities, short-term borrowings, and short-term investments of excess funds, all of which impact the firm's financial performance. According to Pandey (2010), the efficient handling of both current assets and current liabilities is equivalent to the proficient management of working capital.

2.1.3 Liquidity Management and Zombie Firm Status: A Stylized Effect

Liquidity management holds significant importance in various areas of finance, as highlighted by Ohara (2004). Cash, savings accounts, and checking accounts are classified as liquid assets due to their high convertibility into cash. A company is deemed to possess liquidity

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when it possesses an ample amount of liquid assets to fulfill all of its financial commitments. According to the theory of agency, one way in which a company fulfills its obligation to its shareholders (principal) is by providing information on its liquidity ratio. Based on this hypothesis, there is a consensus between shareholders and management. In their study, Chiaramonte and Casu (2017) analyze the correlation between capital and liquidity ratios and the occurrence of financial distress. According to data from the European banking industry, it is observed that capital and liquidity ratios play a complementary role in safeguarding the stability of banks. However, this observation is applicable solely to the most prominent banking groups. The topic of the cash conversion cycle was initially brought up in 1976 following an examination conducted by Hager. Kamath (1989) conducted an empirical examination to test the hypothesis regarding the presence of conflicting signals between the analysis of current and quick ratios, as well as the analysis of currency conversion cycles.

Furthermore, the researcher explored the potential associations among the three previously mentioned liquidity indicators and factors influencing profitability. Additionally, an investigation was conducted to assess the reliability of the net trade cycle as a valid approximation of the cash conversion cycle. The profitability of a company is directly influenced by the positive correlation between the current and quick ratios. Additionally, our findings indicate that the net trade cycle and cash conversion cycle yield comparable results, and both cycles exhibit an inverse relationship with factors that determine profitability. The author reaches the conclusion that every metric has the potential to offer valuable insights and unclear indications about the company's liquidity status. They suggest utilizing all three methods to gain comprehensive understanding and enhance efficiency in managing working capital. In a study conducted by Mary, John, and Laurie (2010), the impact of inventory on the financial performance of companies was analyzed in the aftermath of two major supply chain disruptions: the September 11, 2001 terrorist attacks and Hurricane Katrina. The primary objective was to investigate whether there is any indication of inventory being utilized as a strategy to enhance supply chain resilience and assess the stability of this association. Applying univariate analysis, the researchers examined the impact of the disruptions on the profitability of manufacturers, wholesalers, and retailers, as well as selected growth measures and inventory levels. This analysis was conducted using distinct three-year periods surrounding the disruptions.

2.2 Theoretical Review

The Resource Based View (RBV) is a framework that assesses and interprets internal organizational resources, aiding organizations in understanding how to sustain a competitive advantage in the long run. The Resource-Based View (RBV) places emphasis on the idea that the unique attributes of a company are the primary

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factors contributing to its achievements (Barney, 1986; Hamel & Prahalad, 1996). If the achievement of a corporation relies on assets that are not easily transferable or obtainable, such as those requiring extensive knowledge acquisition or a significant transformation in the company's surroundings and ethos, it becomes more arduous for competitors to replicate that triumph. According to Conner (1991), the productivity of a company is determined by its resources and abilities. The Resource-Based View (RBV) provides a definition of resources that encompasses a wide range of elements. These include assets, organizational processes, firm qualities, information, and knowledge. These resources can be effectively utilized in the development and implementation of a company's strategy. This perspective has been supported by various scholars such as Learned, Christensen, Andrews, and Guth (1969), Daft (1983), Barney (1991), and Mata, Fuerst, and Barney (1995).

There are commonly two methods to demonstrate the value of a particular resource. The cost-saving potential of a resource is indicative of its value to an organization, particularly when considering low-cost resources. One possible criterion for determining the value of something is its ability to enhance a company's financial performance, commonly referred to as differentiated resources. This allows for the allocation of funds that can be used to develop innovative strategies that enhance productivity and performance (Barney, 1991), customer contentment (Bogner & Thomas, 1994; Verdin & Williamson, 1996), or cost (compared to competitors) (Barney, 1986; Peteraf, 1993). The primary determinant of a resource's value lies in its ability to enhance a company's competitive edge. If the resource meets these criteria, a subsequent investigation will be undertaken. However, in the event that the organization fails to implement this measure and exhausts the resource, it could potentially face a competitive disadvantage. Our subsequent inquiry into the allocation of resources focuses on the accessibility of a highly prized asset. If the resource is readily available to all businesses, the company can attain competitive parity, wherein it possesses equal access to the same resources as its competitors.

2.3 Empirical Review

Elazhari, Tampubolon, Siregar, Parinduri, and Prayoga (2023) examine the phenomenon of "zombie" corporations within the framework of state-owned enterprises in Indonesia. The researchers specifically analyze the aspects that contribute to the transformation of companies into "zombie" entities. Furthermore, they analyze the repercussions of their presence on the economy. Based on an analysis conducted on a sample of 159 Indonesian state-owned companies spanning the period from 2010 to 2020, it has been observed that these companies exhibit characteristics commonly associated with zombie firms. The existence of individuals is predominantly influenced by internal variables as opposed to external causes. The simultaneous

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testing of internal and exterior elements reveals the significance of dominant external forces. Furthermore, it has been seen that their very existence exerts a substantial adverse influence on both economic growth and national productivity. Hence, it is anticipated that the government, in addition to exerting control over the corporation, possesses the capacity to promptly address their presence, either through implementing corporate restructuring or, if feasible, pursuing liquidation. The presence of these entities not only poses a detriment to their own well-being, but also has negative effects on other enterprises, and potentially even undermines the overall stability and growth of the domestic economy.

In their study, Omoruyi and Osariemen (2022) employed a specific criterion to identify zombie enterprises within the Nigerian Insurance sector from 2005 to 2015. They defined a zombie firm as an established company that has been in operation for at least ten years and has incurred losses for three consecutive years. This study aims to investigate the twenty-four (24) insurance firms listed on the Nigerian stock exchange as of December 31, 2015. The objective is to determine the presence of zombie firms within the insurance sub-sector. The results indicate that a total of seven insurance firms, namely African Alliance Insurance, Goldlink Insurance, Guinea Insurance, Linkage Assurance, Niger Insurance, SUNU Assurance Nigeria, and Wapic Insurance, of the twenty-four listed on the Nigerian stock market, might be classified as zombie firms. The study has determined that a significant proportion of insurance firms listed on the Nigerian stock market, specifically 29.2%, can be classified as zombie firms between the years 2005 and 2015. Following their transition into the Zombie state, Linkage Assurance, Niger Insurance, and Wapic Insurance have successfully regained profitability. However, African Alliance Insurance, Goldlink Insurance, Guinea Insurance, and SUNU Assurance Nigeria have exhibited inconsistent patterns in their efforts to restore profitability. Consequently, the study proposes that early restructuring efforts be implemented with the objective of mitigating the expenditure of zombie enterprises. Furthermore, it is imperative for Zombie enterprises to use contemporary technologies in order to attain a competitive edge, while simultaneously demonstrating innovation in their product design.

In this study, Evers (2021) examines the factors that contribute to the likelihood of a zombie firm either recovering or exiting the market. The analysis is based on annual data from global public firms spanning the years 2002 to 2021. The findings indicate a notable rise in the proportion of zombie enterprises over the past two decades. Specifically, the percentage of such organizations climbed from approximately 8% of the total number of firms in 2002 to 12% in 2021. Notably, the peak occurred during the global financial crisis, reaching 16%. The proliferation of zombie enterprises contributes to a greater allocation of capital and labor resources towards

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financially distressed entities, so impeding the potential value creation that could be achieved if these resources were utilized by solvent firms. Consequently, this phenomenon hampers the pace of economic progress. The regression analysis reveals that the use of employee downsizing and debt restructuring strategies significantly enhances the likelihood of recovery for zombie enterprises, while also leading to increased sales and investment in the firm's assets. The probability of zombie firms exiting the market exhibits a notable decrease subsequent to the global financial crisis compared to the period during the crisis.

In this study, Lee and Manual (2019) investigate the impact of capital structure on the occurrence of financial distress among non-financial firms listed in the Kuala Lumpur Stock Exchange (KLSE). In order to reflect capital structure, various independent variables were considered, including financial leverage, debt maturity, equity structure, and asset structure. The measurement of financial distress was determined using the Altman Z-score. This study utilized quantitative data, as well as secondary data, which was obtained from the financial statements of 74 non-financial firms listed on the Kuala Lumpur Stock Exchange (KLSE) between the years 2013 and 2017. The utilization of ordinary least squares (OLS) linear regression has been employed as a methodology to address the research hypotheses. The study revealed that there exists a negative and statistically significant association between financial distress and financial leverage, external equity, and assets tangibility. Additionally, the study found a positive and statistically significant relationship between financial distress and internal equity. Nevertheless, the association between debt maturity and financial difficulty is favorable, albeit statistically negligible.

3.0 Methodology and Data

The present study used an ex-post facto research design. This is due to the utilization of data obtained from a secondary source, which inherently lacks the researcher's ability to change it. The ex-post facto study design facilitates the retrieval of necessary data from the annual reports of non-financial enterprises spanning the years 2012 to 2021. This study focuses on the analysis of liquidity management and the classification of listed non-financial enterprises in Nigeria as "Zombie firms." Therefore, the study's population encompasses all non-finance enterprises listed in Nigeria between the years 2012 and 2021. According to the NGX Factbook of 2021, the floor of the Nigerian Exchange Group (NGX) accommodated a total of 109 listed enterprises as of December 2021. The population for this study is selected from 10 distinct non-finance industries listed on the NGX website. These sectors include agribusiness (5 companies), conglomerate (5 companies), consumer goods (22 companies), construction and real estate (9 companies), healthcare (10 companies), ICT (9 companies), oil and gas (9 companies), industrial goods (17 companies), natural resources (5 companies), and services

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(24 companies). Therefore, the population of this study consists of a total of 109 non-finance enterprises from the categories stated above. The sampling technique utilized in this study is the filtering sampling technique, wherein firms were selected for inclusion in the sample based on specific criteria. The criteria encompass the requirement that the companies under consideration are officially listed on the Nigerian Exchange Group market during the timeframe spanning from 2012 to 2021. Additionally, it is necessary that their annual financial reports for this period are readily accessible. Furthermore, it is important to exclude firms that operate subsidiaries in Nigeria but are not listed in the Nigerian Exchange Group Market. In addition, the analysis does not include recently listed companies. Inclusion in the sample was limited to non-finance enterprises that possessed all pertinent data throughout the whole duration of the investigation. The final sample size comprises 73 non-finance enterprises listed in Nigeria. The secondary data source of data collection was utilized in this study, as the data were obtained from the stock market Fact books and annual financial reports of relevant firms for the specified time periods. In this study we employ secondary data source which has been justified by recent studies of Jayeola, Agbatogun and Akinrinlola (2017).

3.1 Model Specification

Based on the theoretical literature and earlier empirical studies on the determinants of zombie firm status, we will specify our model to capture the determinants of zombie firm status of listed firms in Nigeria. Thus, the study adapted the first model specified by Evers (2021). Particularly, the Evers (2021) model was stated as $ZOB_{it} = \alpha_0 + \alpha_1 ROA_{it} + \alpha_2 AGE_{it} + \alpha_3 LVRG_{it} + e_{it}$. Where ZOB represented Zombie firm, ROA represented return on asset, AGE represented firm age, and LVRG represented Leverage. Specifically, we modified their model for the purpose of establishing the relationship between the dependent variables and the linear combinations of several determining variables captured in the study. Succinctly, the functional form of our model is expressed as follows:

$$In\left(\frac{ZOBS}{1-ZOBS}\right)_{it} = \beta_0 + \beta_1 CURR_{it} + \beta_2 RECD_{it} + \beta_3 CACC_{it} + \beta_4 FSIZ_{it} + \beta_5 MCAP_{it} + \mu_{it}$$

Where:

ZOBS	=	Zombie Firm Status
CURR	=	Current Ratio
RECD	=	Receivable Days
CACC	=	Cash Conversion Cycle
FSIZ	=	Firm Size
MCAP	=	Market Capitalization
β_o	=	Constant
β_1- β_5	=	Slope Coefficient
μ	=	Stochastic disturbance
i	=	ith firm
t	=	time period

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3.2 Data and Measurement

The study investigates liquidity management and Zombie firm status by drawing samples from listed non-finance firms in Nigeria from 2012 to 2021. Current ratio, receivable days, and cash conversion cycle are the liquidity management proxies employed in this study while the dependent variable of the study is zombie firm status. Furthermore, the study employed the variables of firm size and market capitalization as the control variables. The table below shows how each variable are measured

Table 3.1: Variable Measurement

S/N	Variables	Definition	Measurements	Sources	Apriori Sign
Dependent Variable					
1	Zombie Firm Status	Zombie firms are companies which are unable to pay back their borrowed funds for a defined period, maybe in a three to ten years consecutive period, and continue operating.	Zombie firm status is measured in dummy as "1" where the interest coverage ratio is less than 1 and "0" for otherwise.	Wijaya and Atahau (2021)	
Independent Variables					
2	Current ratio	The current ratio is a liquidity ratio that measures a company's ability to pay short-term obligations or those due within one year.	Current ratio is computed as the ratio of current asset to current liabilities	Teng, Aslam, Onder and Ludo (2012)	
3	Receivable days	The accounts receivable collection period is the average number of days it takes a business to collect payments owed by its clients in terms of	Receivable Days in days is computed as Trade receivable or trade debtors divided by revenue or sales multiply by 1/365	Wijaya and Atahau (2021)	

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		accounts receivable (AR)			
4	Cash conversion cycle	The cash conversion cycle (CCC) is a metric that expresses the time (measured in days) that it takes for a company to convert its investments in inventory and other resources into cash flows from sales.	Cash conversion cycle in days is computed as inventory Days + Trade receivable Days - Trade Payable Days	Teng, Aslam, Onder and Ludo (2012)	
5	Firm Size	Firm size is a measure of the scale or capacity of a business unit	Firm Size is measured as the log of total asset	Teng, Aslam, Onder and Ludo (2012)	
6	Market Capitalization	Market capitalization is equal to the market price per common share multiplied by the number of common shares outstanding.	Market capitalization is the log of the product of share price and market capitalization.	Teng, Aslam, Onder and Ludo (2012)	

Source: ***Author's Compilation (2023)***

4.0 Empirical Results and Discussion

This section shows the descriptive statistics, correlation analysis, regression analysis, and the discussion of findings. We conducted a binary logistics regression in addition to correlation analysis. However, we also perform preliminary pre-regression analysis such as descriptive statistics, correlation matrix.

4.1 Descriptive Statistics

In this section, an examination of the descriptive statistics is conducted for both the explanatory and dependent variables of interest. The examination of each variable involves an analysis of its mean, standard deviation, maximum value, and minimum value. The descriptive statistics for the study are presented in Table 1.

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Table 4.1: Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
zoms	730	.763	.426	0	1
curr	730	1.545	2.636	-6.59	38.7
recd	725	116.907	189.067	-7.08	2084.58
cccc	730	72863.378	1437251	-70052.398	37117580
fsiz	730	7.095	.845	5.03	9.38
mcap	730	6.722	1.008	3.95	9.64

Source: Author (2023)

The outcome of the descriptive statistics has been documented and is displayed in Table 4.1. The analysis reveals that the average value of the dependent variable, namely zombie status (ZOMS), is estimated to be 0.763, accompanied by a standard deviation of 0.426. The findings suggest that, on average, approximately 76% of the companies included in our sample exhibited characteristics commonly associated with zombie firms. Regarding the independent variables, our findings indicate that the current ratio (CURR) exhibits a mean value of 1.545, accompanied by a standard deviation of 2.636. The findings suggest that, on average, the current ratio observed was 1:5, which falls below the established benchmark of 2:1. Additionally, our research findings reveal that the average receivable days (RECD) observed in our study was 116.907, with a standard deviation of 189.067. This suggests that, on average, it took approximately 117 days for debtors to settle their accounts with the firms included in our analysis. Additionally, the findings of our study indicate that the cash conversion cycle (CCC) exhibited a mean value of 72,863.37 days, with a standard deviation of 1,437,251. This suggests that, on average, firms required approximately 72,863 days to convert their non-cash assets into cash. The findings derived from the analysis of descriptive statistics reveal that the average value of the control variable representing firm size (FSIZ) was determined to be 7.09, accompanied by a standard deviation of 0.85. The control variable of market capitalization (MCAP) exhibits a mean value of 6.72, accompanied by a standard deviation of 1.09.

4.2 Correlation Analysis

The utilization of the Spearman rank correlation is warranted in this study due to the non-normal distribution of the employed data. The obtained result from the Spearman correlation analysis is presented.

British International Journal of Applied Economics, Finance and Accounting
B. J. Int. J. A. Econ. Fin. & Acc.
Volume: 7; Issue: 6
November-December, 2023
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Table 4.2: Spearman's Rank Correlation

Variables	(1)	(2)	(3)	(4)	(5)	(6)
(1) zoms	1.000					
(2) curr	0.279	1.000				
(3) recd	0.015	0.426	1.000			
(4) cccc	0.012	0.472	0.553	1.000		
(5) fsiz	0.172	-0.148	-0.134	-0.139	1.000	
(6) mcap	0.274	-0.037	-0.165	-0.106	0.832	1.000

Source: Authors (2023)

The Spearman rank correlation analysis conducted in this study reveals a positive association (correlation coefficient = 0.279) between the current ratio and the dependent variable of zombie firm status. The data presented in the table indicates a notable correlation between the variable of receivable days (0.015) and the dependent variable of zombie firm status throughout the duration of the study. Moreover, our analysis reveals a significant positive correlation (r = 0.012) between cash conversion and the dependent variable of zombie firm status throughout the duration of our study. In relation to the control variables, our analysis reveals that firm size (0.172) and market capitalization (0.274) exhibit a positive correlation with the dependent variable, namely the status of being a zombie firm, throughout the duration of our study. The observed associations between the variables are found to be relatively weak, indicating that there is no strong evidence to suggest the presence of multicollinearity among the explanatory variables.

4.3 Binary Logit Regression

In order to investigate the causal relationships between the dependent and independent variables in our study, we have chosen to utilise binary logit regression. This particular regression method is suitable for our analysis as the dependent variable is characterised by a dichotomous nature. The obtained result is presented in the following section.

British International Journal of Applied Economics, Finance and Accounting
B. J. Int. J. A. Econ. Fin. & Acc.
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Table 4.3: Binary Logistic Regression Result

	ZOMS Model (Logistic Regression)	ZOMS Model (Marginal Effect)
CONS.	-2.082	
	{0.017} **	
CURR	0.052	0.008
	{0.216}	{0.215}
RECD	-0.001	-0.001
	{0.019} **	{0.018} **
CCC	-1.280	-2.090
	{0.982}	{0.982}
FSIZ	-0.698	-0.114
	{0.001} **	{0.001} **
MCAP	1.253	0.205
	{0.000} ***	{0.000} ***
LR (Prob>chi2)	72.16 (0.0000) ***	
Pseudo R- Squared	0.5908	
Goodness of Fit Test	687.82 {0.7930}	
Sensitivity	97.29%	
Specificity	5.81%	
Classification	75.59%	

Source: Author (2023)

*Note: (1) bracket {} are p-values; (2) **, ***, implies statistical significance at 5% and 1% levels respectively*

In the aforementioned table, our analysis of the Logistic regression model for the zombie firm status reveals a Pseudo R-squared value of 0.5908. This value indicates that approximately 59% of the systematic variations observed in the zombie status of the pooled non-finance firms during the specified period can be collectively attributed to the independent and control variables incorporated within the model. The unexplained aspect of the phenomenon known as zombie status can be ascribed to the omission of additional independent variables that have the potential to influence said status, yet were not accounted for and instead were subsumed within the error term. The logistic regression model's LR Statistics, with a value of 72.16 and a p-value

British International Journal of Applied Economics, Finance and Accounting
B. J. Int. J. A. Econ. Fin. & Acc.
Volume: 7; Issue: 6
November-December, 2023
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Impact Factor: 5.23
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of 0.0000, indicates that the model is statistically significant at the 1% level. This finding suggests that the logistic regression model is valid and can be utilised for conducting statistical inference. Additionally, the LR Statistics outcome is substantiated by the Pearson goodness of fit test [687.82 {0.7930}], suggesting that the model, as a whole, is deemed suitable. Based on the preceding information, the model is subjected to additional diagnostic testing in order to verify the accuracy and dependability of the estimates.

4.3.1 Sensitivity and Specificity Test

Sensitivity, also known as the true positive rate, quantifies the ability to accurately detect positive instances by correctly identifying them. It serves as a counterpart to the false negative rate, which represents the proportion of actual positives that are mistakenly classified as negatives. On the other hand, specificity, also referred to as the true negative rate, gauges the ability to correctly identify negative instances as such. It complements the false positive rate, which denotes the proportion of actual negatives that are erroneously classified as positives. The analysis of the classification table reveals that among the 700 cases categorised as zombie status samples, a total of 538 cases were accurately predicted, resulting in a sensitivity accuracy of 97.29%. On the other hand, within the group of not-zombie status samples consisting of 25 cases, only 10 cases were correctly predicted, yielding a specificity accuracy of 5.81%. The results of our analysis indicate that the overall accuracy rate of the model is approximately 75.59%. This finding suggests that the model does not exhibit any substantial bias, thus making it suitable for interpretation and policy recommendation purposes.

4.4 Discussion of Results

The examination of the binary logistic regression in table 4.4 demonstrates that the current ratio, functioning as an independent variable, exhibits a coefficient of 0.008 with a positive direction. Nevertheless, the obtained p-value of 0.215 suggests that the aforementioned coefficient lacks statistical significance in its ability to determine the zombie status. The results indicate that a slight increase of 1% in the current ratio is associated with a minimal rise of approximately 1% in the interest coverage ratio. As a result, a decline in the occurrence of companies categorized as "zombies" is evident throughout the analyzed timeframe. The results provide additional backing for the acceptance of the null hypotheses, indicating that the current ratio does not exert a significant influence on the zombie status of non-finance companies listed in Nigeria during the examined timeframe. The validity of Tesfamariam's (2014) findings, which propose a negative correlation between a high current ratio and the probability of corporate insolvency, is being challenged. The current examination contests the conclusions made by Ong'era et al. (2017) by contradicting the idea that liquidity significantly enhances the condition of Zombie firms. Furthermore, our examination uncovers

British International Journal of Applied Economics, Finance and Accounting
B. J. Int. J. A. Econ. Fin. & Acc.
Volume: 7; Issue: 6
November-December, 2023
ISSN 2234-2418
Impact Factor: 5.23
Advance Scholars Publication
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https://aspjournals.org/Journals/index.php/bijaefa

that the factor of receivable days, when considered as an autonomous variable, exerts a statistically noteworthy adverse influence on the probability of being categorized as a zombie corporation (coefficient: -0.001; p-value: 0.018). The results indicate that a slight rise of 1% in the duration it takes for a firm to gather its outstanding payments is linked to a statistically noteworthy decline of approximately 1% in the interest coverage ratio. During the specified time frame, the enterprises under examination may face an increased likelihood of financial distress, which is often referred to as "zombie status." This can be attributed to the decrease observed in the interest coverage ratio. The results obtained from this investigation offer supplementary proof that supports the dismissal of the null hypotheses stating that the number of days it takes to receive payments does not have a significant impact on the zombie status of non-financial companies listed in Nigeria within the examined timeframe. Organizations that demonstrate superior proficiency in effectively managing the number of days it takes to collect receivables showcase a greater ability to generate internal funds and face fewer obstacles when seeking external financing. As a result, these companies encounter a reduction in their vulnerability to transforming into "zombies" (Quayyum, 2011). However, our discoveries are in accordance with the investigation carried out by Anand and Gupta (2022), which proposes that while companies aim to preserve liquidity in their daily activities to meet immediate responsibilities, there is a discrepancy between assets and liabilities. The incongruity between these factors, which may enhance immediate financial gains, also presents a potential vulnerability of falling into a dormant condition. According to Takon and Atseye (2015), it is suggested that businesses should strategically assess and determine the most advantageous levels of accounts receivable, cash, and inventories, taking into consideration their respective sales and cost values. This particular strategy empowers companies to efficiently oversee their position as zombie firms. To summarize, our examination reveals that the cash conversion cycle, when considered as a separate factor, displays an unimportant and non-significant correlation with zombie status (coefficient: -2.090; p-value: 0.982). The results indicate that a slight increase of 1% in the cash conversion cycle is linked to a statistically insignificant decrease of approximately 98% in the interest coverage ratio. As a result, it is possible that there could be an increase in the occurrence of zombie firms during the specified period under investigation. The results of this investigation offer further evidence in favor of embracing the null hypotheses, which suggest that the cash conversion cycle does not exert a significant influence on the zombie status of non-finance companies listed in Nigeria during the examined timeframe. The main goal of working capital management is to efficiently handle the short-term assets and obligations, guaranteeing a suitable equilibrium between them. The

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efficient handling of vital elements of operational capital, such as inventory, cash, and receivables, holds immense importance. This is mainly due to a significant portion of working capital becoming entangled in these assets (Paramasivan & Subramanian, 2009). The findings of the study present a contrasting viewpoint to the claims put forth by Mukhopadhyay (2004), who posited that proficient handling of working capital within organizations can play a role in upholding liquidity, solvency, longevity, and profitability in business activities.

5.0 Conclusion and Recommendation

For more than thirty years, there have been numerous instances of bankruptcy and liquidation among prominent companies, including Enron in the United States, WorldCom, Parmalat in Italy, Nortel in Canada, Onetel in Australia, as well as Lehman Brother, Merrill Lynch, American International Group (AIG), Oceanic, and Intercontinental banks in Nigeria. These cases have captured the attention of economics and finance scholars who are now directing their research towards analyzing these "zombie" firms and the factors that contribute to their existence. Due to the absence of financial intermediation, zombie firms may experience limited investment and economic activities, consequently impacting the overall economy. Zombie firms often face challenges in meeting their financial obligations, such as the payment of salaries and wages to their employees, primarily due to their unfavorable profitability and equity situation. On the basis of this, we investigate liquidity management and Zombie firm status by drawing samples from listed non-finance firms in Nigeria from 2012 to 2021. Based on the findings of the study, we conclude that a 1% increase in the current ratio will lead to about 1% insignificant increase in interest coverage ratio and thus decreasing zombie status of the firms during the period under investigation. The study also concludes that a 1% increase in the receivable days will lead to about 1% significant decrease in interest coverage ratio and thus increasing zombie status of the firms during the period under investigation. Finally, we conclude that a 1% increase in the cash conversion cycle will lead to about 98% insignificant decrease in interest coverage ratio and thus increasing zombie status of the firms during the period under investigation.

The potential impact of this research can be utilized by various parties to underscore the significance of effectively managing liquidity when assessing and appraising the Zombie state of the organization. It is advisable for companies to consider availing early payment discounts during favorable business and economic circumstances, resulting in a reduction in the number of days for accounts payable. Conversely, during periods of deteriorating business and economic conditions, companies should strive to align incoming sales with outgoing payments. In addition, the research suggests that it would be beneficial for company executives to effectively handle each specific aspect of liquidity management in isolation, in order to reduce the

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likelihood of being classified as a zombie company. This is because there might be a counterbalancing impact associated with the cash conversion cycle. It is highly advised that managers should strive to maintain minimal levels of accounts receivable, accounts payable, and inventory days in order to enhance the sustainable growth rate and mitigate the risk of being classified as a zombie firm. In order to maintain a low number of days for accounts receivable, it is advisable for companies to enforce stringent customer credit policies during periods of economic prosperity, with the aim of expediting the collection of funds. Conversely, during challenging economic circumstances faced by customers, it is recommended to adopt more lenient credit policies. Future quantitative research should take into account the possibility of varying curvilinear associations between the status of zombie firms and their determinants in different economic cycles. Furthermore, it is imperative for forthcoming quantitative investigations to explore the necessity of incorporating short-term borrowings within the cash conversion cycle. Incorporating the inclusion of short-term borrowing within the cash conversion cycle may offer further understanding regarding the potential curvilinear connections between firms utilizing accounts payable and banking lines of credit, and their association with Zombie firm status. Additionally, it raises the question of whether adjustments are necessary for the current measurement of the cash conversion cycle.

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Volume: 7; Issue: 6
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