

CAPITAL STRUCTURE DETERMINANTS OF ZOMBIE STATUS LISTED NON-FINANCE FIRMS IN NIGERIA

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ABSTRACT

This article explores capital structure determinants of Zombie firm status of the non-finance corporation registered with the Nigerian exchange group from 2013 - 2022. The capital structure proxies used for the study are Long term debt to asset and debt to equity ratios, while zombie status of the firm is captured as the regress. Also, the study captured profitability variables as the control variable. The study comprises as its population, all the non-finance corporations listed in the Nigerian exchange group from 2013 to 2022, 109 companies were listed according to the fact book of the Nigerian exchange group of 2022. The filtering method of sampling was utilized. This is justified on the strength that firms were added into the sample based on certain selection criteria. This study explored Logistic regression technique for hypotheses testing. The findings thus revealed that an increase of 1% in long term debt to asset ratio will result in about 1% insignificant increase in interest coverage ratio and thus resulting to decreasing zombie status of the firms during the period under consideration. The study therefor concludes that a 1% increase in debt-to-equity ratio will lead to about 1% significant decrease in interest coverage ratio and thus increasing zombie status of the firms during the period under investigation. The study thus suggests that should non-financial firms consider using debt in their capital structure, non-current debt should be given priority over short-term debt. This suggestion and recommendation is hinged on the strength of the finding that long term debt reduces the incidence of zombies among non-financial firms.

Keywords: Capital Structure, Zombie Firm Status.

INTRODUCTION

The health and vitality of companies is crucial for achieving the goal of maximizing shareholder wealth, especially when considering the macroeconomic challenges faced by global corporations today. A healthy company can be defined as one that is profitable, maintains an optimal level of

liquidity, and is able to meet its financial obligations in a timely manner. In other words, a healthy company generates consistent profits in the short and medium term, and does not default in interest payments or have trouble accessing capital. Businesses that fail to meet these criteria risk entering a 'zombie state', as described by

Binh, et, al. (2020). Firms that chronically underperform, with declining productivity and profitability, are often called 'zombie firms or companies. Such struggling companies have raised concerns among policymakers, scholars and stakeholders across the globe (Bloom et al., 2010; Camacho-Miñano, Segovia-Vargas & Pascual-Ezama, 2015; Muñoz-Izquierdo, Segovia-Vargas & Pascual-Ezama, 2018). In summary, maintaining corporate health and avoiding 'zombification' is paramount for accomplishing the goal of maximizing returns for shareholders, especially given current macroeconomic conditions.

Urionabarrenetxea et al. (2017) and Blažková and Dvoutěý (2019) note that zombie companies are widespread in advanced economies as in the case of United States, the United Kingdom, and Japan. However, research on zombie firms is still in its early stages, and there is limited empirical evidence available in developing regions of the world as more empirical studies are indeed needed to fully understand this phenomenon across different economic contexts. According to Andrews and Petroulakis (2019), there appears to be insufficient or shallow research on zombie firms, suggesting this to be a relatively unexplored area. Luo et, al (2015) stress that negative equity and subsequent spillover effects have received limited attention from international finance researchers on the study of zombie firms. Similarly, Retolaza, et, al (2016) identified this as a research gap. This study aims to address an important gap related to the emergence of zombie firms and observational perceptions.

The goal and objective of this work is to carefully analyze the impact of liquidity management on the classification of publicly

listed companies in Nigeria as zombie firms. Extensive research across different continents has presented mixed findings regarding the factors influencing zombie firm status. Prior studies have mostly focused on Asian countries, especially India, Malaysia, Indonesia, Jordan and Pakistan. Limited research has been conducted in Africa during the period reviewed, particularly in Ethiopia and Kenya. Egypt and Nigeria has been the subject of some academic research. This study aims to further analyze zombie firms in the context of Nigeria by assessing how liquidity management affects their classification. The existing literature on zombie firms is heavily concentrated in Asia, while the African context remains less explored. By focusing on Nigeria, this research contributes to knowledge on zombie firms in the African region.

Previous research on African countries has mostly examined samples of manufacturing companies (Alayemi and Akintoye, 2015) and banks (Aregbeyen, 2012). Akpovbera, et, al (2014) focused on determinants of zombie firms outside the financial industry. However, these studies had small sample sizes, raising concerns about generalization. Additionally, the works of Mahdzan and Zainudin (2016) and Christopher (2014)., analyzed the factors contributing to financial distress. There are limited extant literatures specifically examining zombie firms under extreme financial distress. Therefore, this study fills a gap by timely assessing capital structure determinants of zombie status. This period saw active trading, regulation, recapitalization, mergers and recession in sub-Saharan Africa. Nigerian non-financial firms provide a unique opportunity with a larger firm sample, unlike previous studies focused on the financial sector. Capital

structure is measured by long-term debt and debt-to-equity ratio.

CONCEPTUAL CLARIFICATION

Zombie Firm Status

Zombie firms are known for their capacity to survive while persistently reporting negative equity. The idea of the zombie firm was presented by Kane (1980) during the savings and loan crisis in the US in the 1980s. This author characterizes a zombie firm as an organization that is in danger of liquidation by its loan bosses except if expedient mediation by public authorities utilizing bailout cash gave by financial specialists. As indicated by Kane (1980), an organization is considered as a zombie in the event that it consistently encounters monetary misfortunes that result in the actual worth of its assets being lower than the value of its obligations. Zombie firms are monetarily insolvent enterprises that can satisfy their monetary commitments through the convenient arrangement of credit support by the public authority. Organizations considered as zombie firms are described by their failure to meet their fixed interest installment commitments on schedule. Additionally, these organizations constantly suffer losses and continue to hold negative equity over successive years. (Mohrman and Stuerke, 2014; Blažková and Dvouletý, 2018). Zombie firms as characterized by Binh et al. (2020) have reliably low productivity, negative value capital, yet are described by their long endurance available. Zombie firms are frequently alluded to as 'strolling corpses' because of their capacity to keep exchanging regardless of progressing misfortunes, failure to pay interest expenses and negative value esteems.

Capital Structure

Researchers have offered various definitions of firms' capital structure over the years: Brealey and Myers (1991) defined capital structure as the combination of debt, equity and hybrid securities that firms use to finance their operations; VanHorn (1989) took a broader view of capital structure as the choice between internal and external sources of financing, while Pandey (2005) took a narrower view by defining capital structure as the ratio of debt to total working capital. Despite the differences in thinking, past definitions are united around the fact that a company's capital structure refers to how it obtains the funds it needs to start and grow its economic activities. Capital structure is a combination of different forms of equity and debt financing that businesses use to make investment decisions. The amount of debt and equity used by a company is referred to as leverage. Highly leveraged companies have more debt than equity in their capital structure. In sum, a company's capital structure is a particular combination of debt and equity financing (Brealey & Allen, 2007). The key distinction between the two is that debt requires repayment of principal and interest, while equity provides residual profits to owners.

Kania and Bacon (2005), avow that capital structure of a company refers to combination of equity and debt by a firm in order to finance the establishment and growth of business for a smooth operation. It consists of the various types of equity and debt financing that a company utilizes as a result of its funding choices. A company's financial leverage indicates the extent of its debt burden. The proportion of financial debt to assets is a common measure of leverage used in various studies, although there are

variations based on whether long-term or total debt is used and if book or market valuations are adopted. According to Megginson and Smart (2005), market value appeals to economists while business practitioners prefer book value since it is not subject to market volatility. Fernandez (2007) argues that firms should base capital structure on more realistic book values, while Rajan and Zingales (1995) and more recently, Jermias (2019) have identified flaws in measuring leverage overall. That is, leverage tends to be underestimated when financial liabilities are compared to assets containing non-financial liabilities (e.g. accounts payable, often used for trading).

Capital Structure and Zombie Firms: A Stylized Effect

Leverage refers to the portion of fixed costs that pose a risk to the company. The leverage ratio shows the extent to which liabilities finance the company's assets. Frank and Goyal (2019) Agency theory recognizes that the survival of a business depends on its agents. Leverage ratios are known to have a significant impact on the financial performance of firms, and a study on leverage by Baza and Rao (2017) shows that leverage has a negative and significant impact on zombie firms. According to the pecking order theory, the decline in firm value is due to this high debt ratio, (Eliu, 2014). The higher the debt ratio, the higher the potential risk of bankruptcy. Hussan (2016) examined the impact of leverage on firm risk and stated that leverage includes debt ratio and debt-equity ratio. The higher the leverage ratio, the higher the level of debt. If a firm goes bankrupt, all creditors and debt holders have a first claim on the firm's assets. If a highly leveraged company fails, shareholders may get nothing. Therefore, it can be concluded that leverage

has a positive effect on zombie firms, which is consistent with the pecking order theory.

On a second thought, one might think that financial institutions dealing with troubled borrowers would cease making new loans and hasten the demise of these firms, in contrast, Peek et al. (2005) show that Japanese banks, particularly those that were undercapitalized, mismanaged credit in the 1990's. as was occasioned by regulatory laxity leading to a perverse incentives which encouraged banks to extend extra loans to severely troubled borrowers in order to avoid being labeled 'problematic' while recording it in their balance sheets. This groundbreaking research in Japan provided insight into the proximate drivers of the zombie dominant in Europe. For example, using data on individual firms' lending to banks in Croatia, Broz et al., (2017) conclude that banks only lent to zombie firms when it was in their own interest to do so. Similarly, the work of Acharya et al., (2019) and Shivardi et al., (2022), evidently suggest that, during the crisis, undercapitalized banks in Portugal lent to zombie firms in order to avoid perceptions of loan default. Similarly, Andrews et al. (2017) find that zombie firms are more likely to be linked to weak banks, suggesting that the zombie problem partly originates from bank forbearance. However, in line with their aberrant lending to zombie companies, we also find that these banks re-located loans to borrowers who previously failed to report loan losses.

Theoretical Foundation

The concept of agency theory deals with the principal-agent problem and how to solve it (Jensen & Meckling, 1976; Ross, 1973). This issue has existed since the beginning of trade when people started looking out for their own

self-interest. The agency dilemma has been present since business began. In many ways, all companies have likely been impacted by this problem to some degree. Academic research increasingly shows that the agency problem has evolved over time. To fully grasp the agency problem, its many forms, and the numerous costs of resolving it, we must examine the literature on agency theory. Agency problems have frequently been observed across various fields. This includes economics across the globe (Jensen & Meckling, 1976; Ross, 1973; Spence & Zeckhauser, 1971), political science (Hammond & Knott, 1996; Weingast & Moran, 1983), sociology (Adams, 1996; Kiser & Tong 1992), and organizational behavior (Jensen & Meckling, 1976; Ross, (1973) Spence and Zeckhauser, (1971). (Fama, 1980); Fama and Jensen, (1983) Jensen, (1986). (Bergen, et.al (1992) Logan (2000). This theory has become important in finance and economics research this is because it is presence across difference organizations.

References to agency theory can be found in works dating back to the 1700s (Daily& Rajagopalan, 2003) Wasserman, (2006). This theory analyzes the potential issues that can arise when a company's manager is disconnected from the management of the company, and proposes solutions that are not in consonance with general objective of the shareholders. The theory provides guidance on adopting governance techniques to regulate the behavior of stakeholders in joint stock companies. According to Berle and Means (1932), modern American business has decentralized ownership structure, where ownership and control are separated. In a joint stock company, shareholders (principals) own shares and delegate

decision-making power to management (agents) (Jensen & Meckling, 1976; Ross, 1973). It is unclear whether managers act in the interests of owners or their own interests. Ross (1973) and Mitnick (1975) established agency theory in different publications using different methods. Although Ross views the agency problem as an incentive issue and Mitnick sees it as an institutional structure issue, their fundamental concepts are the same. Ross sees the principal-agent problem as a result of wage choices and argues that it is not just an issue for firms but permeates society in general.

Empirical Review

Nieto-Carrillo, et.al (2022) study the impact of Portugal's reforms to its insolvency system, which were intended to make the framework more efficient. Their analysis finds that these reforms have lowered barriers to the reallocation of resources. The reforms seem to have been more successful at rescuing zombie firms than at forcing their exit from the market. Firm size is an important factor to consider in order to prevent zombies from emerging in the first place. By reducing barriers, the reforms have made the selection process across the economy less distorted. The new system appears better than strictly forcing all zombie firms to shut down regardless of other considerations.

Using data on publicly listed non-financial companies in 14 developed economies, Banerjee and Hofmann (2022) found that the proportion of zombie firms, captured as unprofitable companies with low stock market value, rose from 4% in the late 1980s to 15% in 2017. These zombie firms tend to be smaller, less productive, more highly leveraged, invest less in tangible and

intangible assets, and have declining assets, liabilities and employment. Their performance starts to deteriorate several years before they become zombies, and they continue to perform much worse than non-zombie firms. Over time, about 25% of zombie firms exit the market and 60% lose their zombie status. However, zombie firms that recover still perform less well and are more likely to return to zombie status than firms that never became zombies in the first place.

On the other hand, Cuong (2014) examined the relationship between long-term liabilities to total assets (LTA) and ROE (Return on Average Earnings) of Seafoods-producing enterprises listed on the Vietnam Stock Exchange. The study included 552 observations of a sample of 92 enterprises over the years 2005-2010. The study used long-term LTA as an indicator of long-term borrowing and ROE as an indicator of profitability. The panel threshold regression model (PTM) was used to test for a relationship between LTA and ROE. The PTM revealed that long term LTA had a multiple threshold effect.

San et.al (2021) aim to empirically examine the impact of corporate governance on the zombie firm theory. Zombie firms, defined as companies with negative equity, affect over 10% of all firms, representing around €1 billion in the European Union. Thus, the authors analyze a sample of Spanish companies that had negative equity from 2013-2017. They focus on identifying how elements of corporate governance, like board size, board participation, ownership concentration, ownership structure, and CEO gender, influence the severity of extreme zombie firms as measured by the quantity and duration dimensions of the EZ Index. The

findings confirm that internal factors like corporate governance significantly impact zombie firm performance. The study recommends multi-member boards, non-exclusive CEO roles, decentralized ownership, and female CEOs to mitigate zombie firm issues.

De Martiis et,al (2021) use a large dataset of publicly listed European and American companies to analyze the characteristics of zombie firms in the US and Europe. They find that although US and European zombie firms exhibit similar patterns, European zombies have more firm and industry-specific factors. Using decision tree analysis, they show that metrics related to revenue and leverage are key predictors of zombie status in both regions. However, shareholder interests are more relevant for identifying US zombies. Prior research has often incorrectly categorized zombies as other unsustainable firms. To demonstrate this, the authors compare zombies to distressed firms. They conclude that zombies and distressed firms represent different stages of financial problems, not interchangeable types. Additionally, they find that zombification is mainly a European trend, while distressed firms are more common in the US.

METHODOLOGY

The methodology that was used was the ex-post facto research design, this is because the data comes from secondary sources and it is difficult to modify it to temper the researcher's expectations. The ex-post facto research design enabled the researcher to obtain the required secondary information (secondary data) from the annual reports of non-financial companies from 2013 to 2022. The population includes all companies listed on the Nigerian Exchange Group (NGX) from 2013 to 2022: As of December 2022,

there are 109 companies listed on the NSE in sectors such as agriculture (5), consolidated companies (5), consumer goods (22), construction/real estate (9), health (10), information and communication technology (ICT) (9), oil/gas (9), industrial products (Agriculture (17), natural resources (5) and services (24). Thus, the total population was 109 non-financial companies across those sectors. Filtered sampling was used, where companies were selected based on certain criteria and were also listed on Nigeria Exchange Group between 2013-2022, having audited annual reports for that period under consideration. Newly listed companies were also excluded based on their inadequate years of operation. Ultimately, only non-financial firms continuously existing over the study period with full published financial data were sampled. The final sample was 73 non-financial firms listed on the floor of the Nigerian exchange group. Secondary data from the companies' fact books and reports provided the data. Using secondary sources was justified by a recent study by Jayeola et.al (2017).

Specification of the model

From the extant work comprising empirical studies and theoretical works, the factors that determine whether a firm is a zombie company or not, requires a model constructed to capture the determinants of zombie status among Nigerian listed firms. This study adopts the first model outlined by Evers (2021). Specifically, Evers' (2021) model defines zombie status (ZOB) as a function of return on assets (ROA), firm age (AGE), leverage (LVRG), and an error term. We modify this model to examine the connectivity between zombie status by using the regressors considered in the study.

summarily, this model is expressed in functional form as follows:

$$\ln\left(\frac{ZOBS}{1 - ZOBS}\right)_{it} = \beta_0 + \beta_1 LTDA_{it} + \beta_2 DE TE_{it} + \beta_3 RETA_{it} + \mu_{it}$$

Where:

ZOBS	=	Zombie Firm Status
LTDA	=	Long term debt to asset
DE TE	=	Debt to Equity
RE TA	=	Return on Asset
β_0	=	Constant
$\beta_1 - \beta_3$	=	Slope Coefficient
μ	=	Stochastic disturbance
i	=	i th firm
t	=	time period

This study investigates the factors that determine zombie firms' capital structure by analyzing a sample of Nigeria's non-financial firms registered on the exchange group of Nigeria over the period 2013-2022. LTDA and DE TE ratios are the capital structure near measurement variables used in the course of the study while the dependent variable of the study is zombie firm status. Furthermore, the study employed the variables of profitability as the control variable.

RESULTS AND DISCUSSION

This part shows descriptive statistics, correlation analysis, regression analysis and discussion of findings. Besides the correlation analysis, a binary logistic regression was carried out. Also, preliminary pre-regression analysis such as descriptive statistics and correlation matrix were also

conducted. This section describes the descriptive statistics of the relevant explanatory and dependent variables. Each variable is categorized according to mean,

standard deviation, highest and lowest values. The descriptive statistics for this study are presented in Table 1 below.

Table 1: Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
zoms	730	.763	.426	0	1
ltlda	730	17.957	25.5	-113.2	205.65
dete	730	2.447	20.645	-343.17	207.53
reta	730	1.279	17.278	-179.92	176.27

Source: Author (2024)

The result of the descriptive statistics is presented in table 1. The result shows that the mean of the dependent variable of zombie status (ZOMS) is 0.763 with a standard deviation of 0.426. The result implies that, on average, about 76% of the firms in our sample were zombies. In the case of the independent variables, our results show that the mean of long-term debt to asset ratio (LTDA) is 17.96 with a standard deviation of 25.50. The result implies that on average, the ratio of long-term debt to asset ratio was about 18% during the period under study. We also find that the mean of debt-to-equity ratio (DETE) was 2.47 with a standard deviation of 20.65. This indicates that on average, the

ratio of debt to equity was about 2% during the period under study. In the case of the control variable, the result indicates that the mean of return on asset (RETA) was 1.28 with a standard deviation of 17.28 indicating that on average, for every 1 unit of asset utilized in the firms under study, it returned a profit of N1.28K during the period under study.

Correlation Analyses

Since the data used in this study is not from a standard distribution, we use Spearman rank correlations. The results obtained from Spearman correlations are shown below.

Table 2: Spearman's Rank Correlation

Variables	(1)	(2)	(3)	(4)
(1) zoms	1.000			
(2) ltlda	-0.055	1.000		
(3) dete	-0.267	0.375	1.000	
(4) reta	0.655	-0.092	-0.213	1.000

Source: Author 2024

In the case of the correlation between the variables, the results obtained from the Spearman rank correlation above shows that there exist a negative association between

long term debt to asset (-0.055) and the dependent variable of zombie firm status during the period of study. The table also shows that there exists a negative association

between debt to equity (-0.267) and the dependent variable of zombie firm status during the period of study. In the case of the control variables, we find that return on asset (0.655) has positive association with the dependent variable of zombie firm status during the period of study. All associations are seen to be weak and thus we cannot suspect the presence of multicollinearity among the explanatory variables

Binary Logit Regression

In particular, since the dependent variable is binary, the causality between dependent and independent variables was examined using binary logit regression. The result depicts thus below.

Table 4.3: Binary Logistic Regression Result

	ZOMS Model (Logistic Regression)	ZOMS Model (Marginal Effect)
CONS.	1.225 {0.0000} ***	
LTDA	0.005 {0.163}	0.007 {0.162}
DETE	-0.028 {0.032} **	-0.004 {0.031} **
RETA	0.103 {0.000} ***	0.014 {0.000} ***
LR (Prob>chi2)	163.89 (0.0000) ***	
Pseudo R- Squared	0.2050	
Goodness of Fit Test	789.59 {0.5123}	
Sensitivity	96.23%	
Specificity	35.26%	
Classification	81.78%	

Source: Author (2024)

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

We observed from the Logistic regression result of the zombie firm status model that R-squared amounts to 0.2050 which signifies that about 21% systematic discrepancies in zombie status of the collective non-finance firms for the period under consideration was explained jointly by the repressor in the model. The unexplained section of zombie status can be accredited to omission of other explanatory variables that has the capacity to

influence zombie status but were captured in the error term. The LR Statistics of the logistic regression [163.89 {0.0000}] demonstrates the model statistically significant at 1% level, meaning that the Logistic regression model is significant and worthy for statistical inference. Adding to this, is the fact that LR Statistics result value of [787.59 {0.5123}] shows Pearson goodness of fit test, indicating the overall

goodness of the model, to further buttress this fact, this model was subjected to diagnostic test just to ascertain the validity and the reliability of the estimates.

Analysis of Sensitivity Test

Sensitivity (also called the true positive rate) measures the proportion of actual positives which are correctly identified as such and is complementary to the false negative rate while Specificity (also called the true negative rate) measures the proportion of negatives which are correctly identified as such and is complementary to the false positive rate. Particularly, the classification table shows that out of 648 cases that fell into the group of zombie status samples, 536 cases were predicted correctly with 96.23% sensitivity accuracy while 61 of 82 cases that fell into the group of not-zombie status samples were predicted correctly and with 35.26% specificity accuracy. However, we find that the overall accuracy rate is seen to be roughly 81.78% which suggests that the model is free from any significant bias hence can be employed for interpretation and policy recommendation.

Discussions

The marginal effect of binary logistic regression shown in Table 4.4 shows that independent variable of long term debt is positive and insignificant for zombie status {Coeff.0, p-value:0.162}. Therefore, increasing long term debt to assets by 1% will result in insignificant increase of interest coverage ratio and decrease zombie status for the firms during the investigation period. Therefore, we should accept the null hypothesis that long term debt is not significant for zombie status of the listed non-

financial firms in Nigeria in the investigation period.

Contrary to the findings of Kapopoulos (2007), the study showed that severe industry competition results in a decrease in sales turnover and therefore reduced profitability for the firms affected. The author avows that if the situation persists, the firm will experience liquidity shortages that will eventually lead to financial distress and zombie status.

CONCLUSION AND RECOMMENDATIONS

Having examined the factors that influence zombie firm status by examining capital structure determinants. From a sample from the list of non-financial firms in Nigeria for the period 2012-2021. This study concludes that a 1% rise in long term debt-to-asset ratio will result in a about 1% insignificant rise in interest coverage ratio, resulting in an increase in zombie status for the firms over the period. This is suggestive of that fact that an increase of 1% in debt to equity ratio will result in an increase of interest coverage ratio of about 1% over the period. Leading to a significant decline in interest coverage ratio over the period.

The findings of this study may be used by various stakeholders to highlight the significance of capital structure for monitoring and assessing a company's Zombie status. For example, the study suggests that non-financial firms that need to consider the use of debt in their capital structure should focus on non-current debt rather than short-term debt. Long-term debt reduces the zombie prevalence of non-financial firms in comparison to financial

firms. The study also suggests that when configuring non-financial firms equity structure, financing managers should emphasize the use of internally generated capital (i.e., earnings and reserves) over externally issued equity. For future quantitative research into the determinants of zombie firm status, it is important to consider the curvilinear correlation between corporate zombie status determinants across different economic cycles.

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