Economic Instability and Corporate Failure of Pharmaceutical Firms in Nigeria

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Abstract
The study examined the effect of economic instability on corporate failure of pharmaceutical firms in Nigeria. The study adopted an ex-post facto research design, covering the period between 2013 and 2022. Secondary data were extracted from the CBN Statistical Bulletin and financial report and accounts of the sampled firms in Nigeria. Multiple regression technique was used for test of hypotheses. The findings revealed a nonsignificant negative effect of inflation rate and exchange rate on Altman zeta score of pharmaceutical firms in Nigeria. However, crude oil price shocks have a non-significant positive effect on Altman zeta score of pharmaceutical firms in Nigeria. The findings imply that economic instability is not the main determinant of corporate failure in Nigeria pharmaceutical sector. The study, therefore, recommended that pharmaceutical firms, should monitor inflation trends, especially concerning raw material costs, energy, and operational expenses. Proactive cost management strategies and sensitivity analyses to assess the financial impact of varying inflation scenarios are encouraged. Additionally, firms with foreign exchange exposure should remain vigilant about currency risk, considering hedging strategies, supplier diversification, and local sourcing. It is crucial to assess foreign exchange risk management practices thoroughly. Despite non-significant results, firms should stay attentive to the potential impact of oil price shocks, particularly concerning energy costs and economic stability. Developing a risk management strategy that considers potential oil price volatility and regularly monitoring global energy markets is advisable to enhance resilience.

Keywords: *Economic Instability, Corporate Failure, Nigeria, Pharmaceutical Industry, Altman Z-Score*

Background of the Study

Nigeria, with its vast reserves of natural resources, including oil, and a diverse and growing population, has the potential for robust economic growth. However, the nation's economy has been characterized by inherent challenges, including a heavy dependence on oil exports, political instability, and inadequate infrastructure. These factors, combined with global economic fluctuations, have made Nigeria susceptible to economic instability.

Economic instability is a multifaceted challenge that has significant implications for businesses operating in emerging markets, and Nigeria is no exception (Amoo, et al. 2017). This study seeks to explore and analyze the effect of economic instability on corporate failure in Nigeria. As one of the most populous and resource-rich countries in Africa, Nigeria's economic performance is pivotal to both the regional and global economies. However, the nation has experienced periods of economic volatility characterized by fluctuations in key macroeconomic indicators such as oil price, inflation, exchange rates, and GDP growth (Amoo, et al. 2017).

According to The World Bank in Nigeria (2023), between 2000 and 2014, Nigeria's economy experienced broad-based and sustained growth of over 7% annually on average, benefitting from favorable global conditions, and macroeconomic and first-stage structural reforms. From 2015-2022, however, growth rates decreased and GDP per capita flattened, driven by monetary and exchange rate policy distortions, increasing fiscal deficits due to lower oil production and a costly fuel subsidy program, increased trade protectionism, and external shocks such as the COVID-19 pandemic. Weakened economic fundamentals led the country's persistent inflation to reach a 17-year high of 25.8% in August 2023, which, in combination with sluggish growth, is leaving millions of Nigerians in poverty.

Also, Nigeria heavily relies on oil revenues, and fluctuations in global oil prices have a direct impact on government revenues, foreign exchange rates, and overall economic stability (Amoo, et al. 2017). Economic downturns associated with oil price changes can affect the pharmaceutical industry through reduced public health spending and the cost of imported raw materials for drug manufacturing. High inflation rates have eroded the purchasing power of Nigerians, influenced consumer behavior and affecting pricing strategies within the pharmaceutical industry. Rising costs of healthcare services and pharmaceutical products can impact the financial performance of pharmaceutical firms. Frequent fluctuations in exchange rates can influence the cost of importing essential pharmaceutical raw materials and finished products. This can pose operational challenges and lead to increased costs for pharmaceutical companies.

Corporate failure, in the context of this study, refers to the financial distress, insolvency, or underperformance of businesses operating in Nigeria, which can ultimately lead to closure or significant financial difficulties. Understanding the relationship between economic instability and corporate failure is crucial for policymakers, business leaders, and investors, as it can inform strategies for risk mitigation and economic resilience.

The pharmaceutical sector plays a critical role in promoting public health and well-being in Nigeria. However, like many industries, pharmaceutical firms in Nigeria face a unique set of challenges due to economic instability. This study aims to investigate the intricate relationship between economic instability and corporate failure in the pharmaceutical industry in Nigeria,

shedding light on the specific challenges and opportunities faced by these firms. The study specifically examined the relationship oil price volatility, high inflation rate, and foreign exchange rate fluctuations share with corporate failures in the pharmaceutical sector of Nigeria economy.

Economic Instability

In the business sphere, macroeconomic instability has been identified as the main constraint to firm growth in South Africa (Beaumont-Smith et al., 2003). In Nigeria, the 2016-2017 economic recession has highlighted the negative impact of macroeconomic instability, including spiralling inflation, unstable exchange rates, escalating debt levels and dwindling economic activities (Amoo, et al. 2017). These accentuate high unemployment, prevalent poverty and high social insecurity.

Inflation Rate

Price inflation is defined as an increase in the price of a standardized commodity or service or a basket of goods or services over a certain time period (usually one year). When the price of goods and services rise, is referred to as inflation. When price increases are persistent and exceed the stated benchmark, this is referred to be inflation. For example, an increase in the money supply can quickly lead to a rise in the price level. There are several varieties of inflation described in the literature, including: Demand-pull inflation occurs when aggregate demand grows without a matching increase in supply; supply push or cost-push inflation occurs when supply falls due to an increase in the cost/price of the product supplied (Anochiwa & Maduka, 2015). It can also be structural inflation, which occurs as a result of monetary policy changes. This sort of inflation is commonly known as built-in inflation. Inflation can be hyper, extremely high, chronic, high, moderate, or low within these categories (Umaru & Zubairu, 2012).

Exchange Rate

McDonald (1990) defines exchange rate as "the price of foreign currency that clears the foreign exchange market." As a result, a currency's exchange rate is the relationship between local and international prices of products and services. Furthermore, Mordi (2006) defines exchange rate as the price of one currency in terms of another. The price at which one currency may be purchased with another currency or gold, according to Economics Dictionary (2019). According to the Investment Dictionary (2014), an exchange rate is the price of one nation's currency represented in the currency of another country. In other words, the exchange rate at which one currency may be converted into another. According to Fahrettin (2001), an exchange rate, defined as the price of one country's currency in terms of another's, is one of the most essential prices in an open economy. It has an impact on the movement of goods, services, and capital inside a nation, as well as the balance of payments, inflation, and other macroeconomic indicators.

Oil Price Shocks

The oil industry dominates the economy of Africa's oil-producing countries, with Nigeria at the forefront; the economies of these countries rely heavily on the extremely unpredictable oil

rent, rendering them vulnerable to oil market volatility (Omolade, 2019). Oil price shocks are a key cause of macroeconomic variations, with a spike having a contractionary effect on global demand and GDP in the short term. This is because growing energy prices boost the cost of production, depending on labor market flexibility and manufacturers' capacity to pass on rising costs to customers in the form of higher pricing- higher oil prices generate inflation (Akpan, 2009) & (Omolade, 2019). Other else being equal, a continuous rise in the price of oil has a large beneficial influence on the economies of oil-exporting countries while having a negative impact on the economies of oil-importing countries. In the event of a drop in oil prices, the reverse occurs.

Corporate failure

Corporate failure refers to a situation where firms are unable to meet their financial obligations within the designated timeframe. It is characterized by the violation of loan contracts, continuous losses, and failure to honor financial obligations promptly (Ray, 2011). Financially distressed firms face challenges related to leverage and cash flow, resulting in poor performance and a decline in market value (Chan & Chen, 1991). These firms often encounter issues such as cash shortages and overdue obligations (Wesa & Otinga, 2018).

Altman Zeta Score

Altman's Z-score model, developed by Edward Altman in 1968, is a well-known and widely used bankruptcy prediction model in finance (Moyer, 2005). This multivariate model incorporates accounting ratios and market-derived price data to assess a company's financial health and predict the likelihood of bankruptcy within a two-year period (Hayes et al., 2010). The model gained acceptance among auditors, management accountants, and finance experts in the mid-1980s and has since been applied beyond the manufacturing sector, with modifications for other industries such as healthcare (Al-Sulaiti & Almwajeh, 2007).

The Altman Z-score model evaluates a company's financial health by considering multiple financial ratios, including profitability, liquidity, solvency, and market value ratios. These ratios are weighted based on their significance in predicting business failure. The resulting Z-score provides an overall assessment of a company's financial health, with lower scores indicating a higher probability of bankruptcy or business failure. Altman himself made amendments to the model to expand its applicability in certain situations not covered in the initial sample set (Altman, 2006). The Altman Z-score model has become a popular tool for auditors, financial analysts, investors, and researchers across industries and regions due to its robustness and wide-ranging applicability.

Theoretical Review

This study was anchored on Resource-Based View (RBV) Theory and Institutional Theory.

Resource-Based View (RBV) Theory

The Resource-Based View (RBV) Theory, as propounded by Jay Barney, posits that a firm's competitive advantage and performance are primarily determined by the unique and valuable resources and capabilities it possesses. In the context of pharmaceutical firms in Nigeria, this theory offers valuable insights into how these firms leverage their resources to navigate the challenges posed by economic instability (Barney, 1991).

Pharmaceutical firms in Nigeria are endowed with a range of resources, including research and development facilities, manufacturing infrastructure, access to funding, and human capital. These resources are critical for their competitiveness and their ability to withstand economic instability. For instance, firms with well-equipped research and development facilities can develop high-quality, cost-effective drugs that remain in demand even during economic instability. Access to funding is essential for sustaining operations and investments in research and development, while a skilled workforce can drive innovation and efficient production processes.

Resource heterogeneity among pharmaceutical firms can be observed (Barney, 1991). Some firms may have better access to resources, unique capabilities, or a stronger focus on research and development to create a sustainable competitive advantage. This heterogeneity influences how firms respond to economic instability, as those with superior resources may be better equipped to adapt and thrive.

The resource-based competitive advantage of pharmaceutical firms can be explored (Barney, 1991). Do these firms effectively leverage their resources to remain competitive? Are they able to adapt their product portfolios and production processes to cope with fluctuations in costs and demand caused by economic instability? Moreover, the study can delve into how resource management during times of economic instability impacts these firms. Do they allocate their resources efficiently to navigate challenges such as supply chain disruptions and increased costs? Inefficient resource allocation or mismanagement during economic instability can pose significant risks to corporate failure.

Institutional Theory

Institutional Theory, with foundations from scholars such as John W. Meyer and Brian Rowan, focuses on how the external environment, including regulatory and institutional factors, influences organizational behavior. In the context of pharmaceutical firms in Nigeria, this theory offers a lens through which to examine the impact of institutional norms and government regulations on these firms during economic instability (Meyer & Rowan, 1977).

The pharmaceutical industry in Nigeria operates within a regulatory framework. Government policies, healthcare regulations, and industry standards shape the behavior of pharmaceutical firms. These regulations can significantly influence the pharmaceutical sector's ability to adapt to economic instability. Also, pharmaceutical firms in Nigeria are subject to institutional pressures, which can manifest as pressures to conform to specific norms or standards (Meyer & Rowan, 1977). Investigating the extent to which these firms adhere to industry standards and government policies is crucial. Non-compliance with these regulations may have significant consequences and can influence corporate performance during economic instability.

Institutional isomorphism, another key aspect of Institutional Theory, explores whether organizations adopt similar structures and practices due to institutional pressures (Meyer & Rowan, 1977). Pharmaceutical firms may respond to economic instability by implementing similar strategies or policies because they are pressured by industry norms or government regulations. Institutional change, in the context of pharmaceutical firms, refers to alterations in healthcare policies or shifts in regulatory practices. Investigating how pharmaceutical firms adapt to these changes during periods of economic instability and how they navigate the uncertainty created by shifting institutional norms is essential.

Corporate failure can result from a misalignment between a pharmaceutical firm's practices and the institutional environment. Non-compliance with regulatory changes during economic instability can lead to business disruptions or other issues that contribute to corporate failure, highlighting the importance of understanding the interplay between institutional factors and economic instability.

Empirical Review

Ononugbo (2018) used ARCH-GARCH and ARDL-ECM methodologies to analyze the influence of oil price volatility on GDP, inflation, currency rate, and interest rate in Nigeria, using monthly time series data from 2000 to 2015. According to the findings of their analysis, oil price volatility has a beneficial influence on real GDP but has a considerable negative impact on exchange rates, as a spike in oil price volatility causes the value of the Naira to depreciate by more than a comparable amount. According to the study, the impact of oil price variations on the economy is mediated via the exchange rate channel.

Maku, Adegboyega, and Oyelade (2018) investigated the dynamic influence of oil price shocks, inflation, and the exchange rate on Nigerian economic development from 1980 to 2016. To investigate the data features, many tests were done, including descriptive statistics, the autoregressive conditional heteroskedasticity (ARCH) test, the unit-root test, and co-integration. The GARCH model's variance equation was used to reflect the oil price shock and the volatility of the exchange rate. The study reveal that a rise in currency volatility will result in a relatively tiny boost in GDP. Thus, stability in the oil price and exchange rate in Nigeria might lead to a rise in the country's GDP.

Abubakar (2019) analyzed the characteristics of the link between the oil price and the Nigerian currency rate using monthly data from January 1986 to June 2018. For the investigation, the threshold autoregressive (TAR), momentum threshold autoregressive (MTAR), and structural vector autoregressive (SVAR) models were used. The results of the TAR and MTAR models indicate the absence of asymmetric cointegration, leading to the conclusion that there are no asymmetries in the connection between oil price and exchange rate in Nigeria. The SVAR model results reveal that the naira gradually appreciates (although with a temporal lag) in response to positive shocks to the oil price.

Abrokwah (2019) used a vector autoregressive (VAR) model to investigate the impacts of oil price shocks on Nigeria's interest rate, real GDP, and real effective exchange rate. The impulse response function results indicate that positive oil price shocks have no influence on interest rates (monetary policy), real exchange rate, or real GDP. This finding implies that Nigerian monetary policy does not respond to oil price shocks. Both the impulse response functions and the variance decomposition analysis indicated, to a considerable extent, that oil price shocks can only explain a tiny part of the prediction error variation of the variables under study.

Agbo (2020) used a nonlinear autoregressive distributed lag framework to investigate the influence of oil price variations on Nigeria's monthly inflation rate. The ex-post facto research design was used. The data set included a Brent spot series and monthly inflation rates from January 1997 through August 2020. The findings indicate that both positive and negative changes in oil prices have a negative and non-significant influence on Nigeria's inflation rate, as well as the absence of asymmetric effects between variables. The research advocates

counter-cyclical fiscal measures and effectively binding budgetary regulations to help the monetary authority reach its lower inflation objective.

Bawa, et al. (2020) investigated the influence of oil price shocks on Nigerian inflation. On quarterly data covering 1999Q1 to 2018Q4, a Non-Linear Autoregressive Distributed Lag (NARDL) technique was used. The findings revealed that rising oil prices caused a rise in Nigeria's headline, core, and food inflation indices. However, a drop in the price of oil led in a drop in the marginal cost of production, which resulted in a moderation of domestic inflation. Furthermore, when the exchange rate was removed from the models, negative oil price shocks resulted in higher inflation in Nigeria.

Khan (2021) investigated the impact of inflation, nominal exchange rate, foreign direct investment, and unexpected event shock on the economic growth of Bangladesh by using the time series data from 1990 through 2020. The Ordinary Least Squares method is applied to determine the relationship between the dependent variable and independent variables. The results revealed that the exchange rate and foreign direct investment have significantly affected the country's economic growth. Inflation, FDI, and exchange rate have positive impacts, whereas unexpected events like Covid-19, natural disasters, etc., negatively affect the economic development of Bangladesh.

Abdelkreem and Sisay (2021) assessed the dynamics of inflation and its impacts on economic growth in Ethiopia, Kenya, and Sudan using time-series macroeconomic data collected from the African Development Bank. The research used the Autoregressive Distributed Lag (ARDL) econometrics model and investigated the presence of cointegration and long-term relationships between macroeconomic factors. The result indicates that the exchange rate and the supply of the long-run economic growth rate influence Ethiopia's money supply. Inflation rates and foreign direct investments have impacted economic growth rates in Kenya and Sudan.

Magaji and Singla (2021) investigated the impact of Oil Price shocks on Exchange rate and Economic growth in Nigeria using annual time series data from 1981-2019. The study establishes two equations, the GDP equation, and Exchange Rate equation, and applies Bounds test co-integration analysis and ARDL model to determine the existence of the long run and the short-run relationship between variables of each equation. The results from the Bounds test shows no evidence of long-run relationship was found between Oil Price, Exchange Rate, and the rest of the variables included in the Exchange Rate equation. Results from the ARDL model for the GDP equation depict a significant positive relationship between oil price and GDP both in the short run and long run.

Ayunku and Dickson (2021) investigated the impact of inflation rate, exchange rate and remittances inflows on the economic performance of Nigeria using time series data from 1960 to 2018. The study employed econometric techniques such as the Augmented Dickey Fuller (ADF) unit root test, correlation statistics, granger causality testand the ordinary least squares multivariate regression methods to analyze the data. The study finding showed that remittances inflows are a major driver of economic activities and growth in the Nigeria clime. Exchange rate exerted a positive impact on gross domestic product per capita growth in Nigeria. Both remittances inflows and exchange rate maintained a bi-directional causality with the performance of economy of Nigeria.

Agu and Nyatanga (2022) investigated the impact of predicted oil prices on inflation rates in order to better understand the behavior of inflation in Nigeria as a result of shocks to expected

crude oil prices. The study used an Autoregressive Distributed lag (ARDL) and Bound testing cointegration technique to assess the variables' short-run and long-run impacts. The estimation result reveals that the predicted oil price has a considerable and favorable influence on inflation in Nigeria, both in the long and short run. Surprisingly, interest rates have a positive and large long-run influence on inflation rates as compared to apriori estimates.

Purwaningsih and Safitri (2022) aimed to identify the factors that influence financial distress conditions in retail trading sub-sector companies listed on the Indonesia Stock Exchange from 2015 to 2019. The study used a causal comparative research design and selected a sample of 10 companies using purposive sampling. Multiple regression analysis was used to test the hypotheses. The results showed that cash flow ratio had a negative effect, and firm size had no effect on financial distress.

Ramadani and Ratmono (2023) tested financial ratios in predicting financial distress moderated by firm size using a sample of 128 manufacturing companies listed on the Indonesia Stock Exchange from 2018 to 2020. The study employed the Structural Equation Model based on Partial Least Square (SEM-PLS) analysis with SmartPLS 3.0. The results indicated that operating cash flow had the opposite effect.

METHODOLOGY

The study adopted Ex-post facto research design. The study adopted an ex-post-facto design because it relied on secondary data which was collected from CBN statistical bulletin for data analysis. Ex-post-facto allows for verification of data and results of a study because ex-post-facto is based on historical data. The research was conducted in Nigeria, in the public sector of the Nigerian economy.

Initially, the study aimed to include all seven listed firms mentioned in the population. However, Ekocorp Plc was unable to provide complete data for the specified period of coverage. As a result, Ekocorp was excluded from the sample, and the study proceeded with the following healthcare firms: Glaxo Smithkline Nigeria Plc, Fidson Healthcare Plc, May and Baker Nigeria Plc, Pharma-Deko Nigeria Plc, Neimeth International Healthcares Plc, and Morison Industries Plc. These companies were selected because they were able to provide comprehensive and verifiable data for the entire period of coverage. The study made use of generalized autoregressive conditional heteroskedasticity (GARCH) process to ascertain if there's shocks in the data, while ordinary least squares (OLS) is used for the main and specific objectives of the study.

First, the study ascertained if there are shocks in crude oil prices using this model specification is given below;

$$H_t = \beta_0 + \beta_1 U^2_{t-1} + \beta_2 U^2_{t-2}$$

Where H_t = variance of the error term

$\beta_1 U^2_{t-1}$ = Mean Equation

$\beta_2 U^2_{t-2}$ = Variance Equation measuring the existence of volatility in the model

The underlying assumptions here are;

$$\beta_1 > 0,\ 1 < \beta_2 > 0$$

To achieve the main objective of the study which is to ascertain the effect of economic instability on corporate failures of pharmaceutical firms in Nigeria, the study specified the following model:

$Z\text{-}SCORE_t = \beta_0 + \beta_1 INFRATE_t + \beta_2 EXRATE_t + \beta_3 OPS_t + \varepsilon_t$ - [Equation (1)]

Where;

Z-SCORE	Altman's Zeta Score
INFRATE	Inflation Rate
EXRATE	Exchange Rate
OPS	Oil Price Shocks
ε	Stochastic Disturbance (Error) Term
β_o	Coefficient (constant) to be estimated
$\beta_i - \beta_3$	Parameters of the independent variables to be estimated
t	Current period

DATA ANALYSIS AND DISCUSSIONS

Shock Analysis (GACHE Method)

The GARCH model is employed to test for the presence of shocks in the price of oil in Nigeria. However, in order to carry this out, the presence of ARCH effects need to be determined. The ARCH heteroskedasticity test is used for this purpose. This was used to determine if we can go on to estimate the ARCH model. It tells us if the time series data exhibits some levels of volatility.

Table 4.2.1: Heteroskedasticity Test: ARCH

F-statistics	45.09850	**Prob. F (1,196)**	0.0000
Obs*R-Squared	37.03674	**Prob. Chi-Square (1)**	0.0000

Source: E-views 10.0 Software, 2023

Ho: There is no arch effect
Decision Rule: Reject Ho if p-value of Chi-square is less than 0.05. Do not reject if otherwise. Since the p-value of chi-square is 0.0015 which is less than 0.05, we therefore conclude that there is ARCH effect in the variable. As a result, we now go on to estimate the GARCH model.

Table 4.2.2: Results of GARCH Model

Mean Equation				
Variable	**Co-efficient**	**Std. Error**	**z-Statistic**	**Prob.**
C	2.983532	1.463827	2.038173	0.0415
Oil Price (-1)	0.970511	0.017725	54.75267	0.0000
Variance Equation				
C	11.72060	4.352117	2.693080	0.0071
RESID (-1)^2	0.489765	0.130419	3.755326	0.0002
GARCH (-1)	0.337697	0.124980	2.702013	0.0069

Source: E-views 10.0 Software, 2023

The GARCH (1, 1) model was used here to check for the existence oil price shock in Nigeria.

Ho: There is no presence of shocks in the oil price of Nigeria.

Decision Rule: Reject Ho if the p-value of z statistics is less than 0.05 level of significance.

Decision: Since the p-value of the z-statistics is 0.0000 which is less than the 0.05 level of significance, it indicates that there is volatility or shocks in the oil price of Nigeria.

Table 4.2.3: Multiple Regression Result (Dependent Variable: Z-SCORE)

Variable	Coefficient	Standard Error	t-Stat	p-Value
LOG(INFRATE)	-0.077894	0.868952	-0.089642	**0.9290**
LOG(EXRATE)	-0.149997	0.355734	-0.421653	**0.6753**
LOG(OPS)	0.032279	0.087172	0.370293	**0.7129**
C	2.296511	3.769876	0.609174	**0.5455**
R^2 = 0.589, Adjusted R^2 = 0.516, F-Stat = 8.067482, Prob(F-stat) = 0.000001, D.W. Stat. = 1.34				

Source: Author's Computation, 2023 (Eviews 10.0 Statistical Software)

The multiple regression results presented in Table 4.2.3, which analyzes the relationship between the dependent variable, Z-SCORE, and three independent variables: LOG(INFRATE) (the natural logarithm of Inflation Rate), LOG(EXRATE) (the natural logarithm of Exchange Rate), LOG(OPS) (the natural logarithm of Oil Price Shocks), and the constant term C. Here's a detailed interpretation of the results:

LOG(INFRATE) (Natural Logarithm of Inflation Rate):
The coefficient for LOG(INFRATE) represents the change in Z-SCORE associated with a one-unit change in the natural logarithm of Inflation Rate. In this case, the negative coefficient suggests that an increase in the natural logarithm of inflation rate is associated with a decrease in Z-SCORE, although the relationship is not statistically significant ($p > 0.05$). This implies that changes in inflation rate, when expressed in logarithmic form, do not significantly affect Z-SCORE.

LOG(EXRATE) (Natural Logarithm of Exchange Rate):
The coefficient for LOG(EXRATE) represents the impact of changes in the natural logarithm of Exchange Rate on Z-SCORE. The negative coefficient suggests that an increase in the natural logarithm of exchange rate is associated with a decrease in Z-SCORE, although this relationship is not statistically significant ($p > 0.05$). This indicates that changes in exchange rate, when expressed in logarithmic form, do not significantly affect Z-SCORE.

LOG(OPS) (Natural Logarithm of Oil Price Shocks):
The coefficient for LOG(OPS) represents the effect of changes in the natural logarithm of Oil Price Shocks on Z-SCORE. The positive coefficient suggests that an increase in the natural logarithm of oil price shocks is associated with an increase in Z-SCORE, but like the other variables, this relationship is not statistically significant ($p > 0.05$). This implies that changes in oil price shocks, when expressed in logarithmic form, do not significantly affect Z-SCORE.

Summary of the Model:

- The R-squared (R2) value is 0.589, suggesting that approximately 58.9% of the variability in Z-SCORE is explained by the model. The adjusted R-squared (0.516) takes into account the number of predictors in the model.
- The F-Stat (8.067482) is used to test the overall significance of the model. The low p-value (Prob(F-stat) = 0.000001) indicates that the model as a whole is statistically significant.
- The Durbin-Watson (D.W.) statistic (1.34) is used to test for autocorrelation in the residuals. A value below 2 suggests potential positive autocorrelation.

Based on this regression analysis, none of the independent variables, when expressed in logarithmic form, appears to have a statistically significant effect on the Z-SCORE. The constant term is also not statistically significant. While the model as a whole is statistically significant, the specific variables do not significantly explain the variation in Z-SCORE. Additional analysis or the inclusion of different variables may be necessary to better understand the factors influencing Z-SCORE in this context.

Test of Hypotheses

The hypotheses were tested using the following decision rule:

Statement of Decision Criteria

According to Gujarati and Porter (2009), the decision rule for hypothesis testing involves considering multiple criteria. In order to accept the alternate hypothesis (H1), the following conditions need to be satisfied:

i. The sign of the coefficient should be either positive or negative, indicating a clear direction of the relationship between the variables.
ii. The p-value associated with the t-statistic should be less than 0.05. A p-value below 0.05 indicates that the observed results are statistically significant and unlikely to occur by chance.

If any of these conditions are not met, the null hypothesis (H0) is accepted, and the alternate hypothesis (H1) is rejected. These criteria provide a framework for evaluating the statistical significance of the coefficients and determining the validity of the alternative hypothesis in hypothesis testing.

Hypothesis One

Step 1: Restatement of the Hypothesis in Null and Alternate Forms

H_0: Inflation rate has a non-significant effect on Altman z-score of pharmaceutical firms in Nigeria.
H_1: Inflation rate has a significant effect on Altman z-score of pharmaceutical firms in Nigeria.

Step 2: Presentation of Test Results

Table 4.2.3: Multiple Regression Result is used to test the above-stated hypothesis.

Step 3: Decision

Based on the multiple regression analysis in Table 4.2.3, the coefficient for LOG(INFRATE) (the natural logarithm of Inflation Rate) is -0.077894, with a high p-value of 0.9290. This

means that the effect of Inflation Rate on Altman Z-score is not statistically significant. Therefore, we fail to reject the null hypothesis (H0).

Hypothesis Two

Step 1: Restatement of the Hypothesis in Null and Alternate Forms

H_0: Exchange rate has a non-significant effect on Altman z-score of pharmaceutical firms in Nigeria.
H_1: Exchange rate has a significant effect on Altman z-score of pharmaceutical firms in Nigeria.

Step 2: Presentation of Test Results
Table 4.2.3: Multiple Regression Result is used to test the above-stated hypothesis.

Step 3: Decision
According to the multiple regression results in Table 4.2.3, the coefficient for LOG(EXRATE) (the natural logarithm of Exchange Rate) is -0.149997, with a p-value of 0.6753. This p-value is relatively high, indicating that the effect of Exchange Rate on Altman Z-score is not statistically significant. Consequently, we fail to reject the null hypothesis (H0).

Hypothesis Three

Step 1: Restatement of the Hypothesis in Null and Alternate Forms

H_0: Oil price shock has a non-significant effect on Altman z-score of pharmaceutical firms in Nigeria.
H_1: Oil price shock has a significant effect on Altman z-score of pharmaceutical firms in Nigeria.

Step 2: Presentation of Test Results
Table 4.2.3: Multiple Regression Result is used to test the above-stated hypothesis.

Step 3: Decision
Analyzing the multiple regression results in Table 4.2.3, the coefficient for LOG(OPS) (the natural logarithm of Oil Price Shocks) is 0.032279, with a p-value of 0.7129. The p-value is relatively high, suggesting that the effect of Oil Price Shocks on Altman Z-score is not statistically significant. Therefore, we fail to reject the null hypothesis (H0).

Discussion of Findings

Inflation Rate and Corporate Failure
The lack of a statistically significant relationship between Inflation Rate and Altman Z-score can be attributed to several factors. Inflation rates, in general, have the potential to affect various aspects of the business environment, including operating costs and consumer behavior. However, in the specific context of pharmaceutical firms in Nigeria, it appears that Inflation Rate may not be the predominant driver of corporate financial health. Several underlying reasons can elucidate this observation.

Firstly, it's essential to recognize that pharmaceutical firms operate within a multifaceted environment, and their financial well-being is likely influenced by a multitude of interrelated factors. While inflation rates can contribute to increasing operational costs, such as the prices of raw materials or energy, these firms may have established mechanisms to mitigate the impact of inflation. They could employ strategies like cost control, efficient resource management, or pricing adjustments to adapt to changing economic conditions. Consequently, the direct influence of inflation on Altman Z-scores may be less pronounced when viewed in isolation.

Secondly, the non-significant relationship could also be indicative of the presence of unmeasured or unaccounted variables within the model. The financial health of pharmaceutical companies is not solely determined by inflation rates but rather by a complex interplay of elements. Factors like market demand for pharmaceutical products, the level of competition, government healthcare policies, access to international markets, and overall economic stability could be contributing significantly to Altman Z-scores. If these influential variables are not included in the model, it can obscure the true impact of Inflation Rate.

In essence, the non-significant relationship between Inflation Rate and Altman Z-score for pharmaceutical firms in Nigeria should be interpreted in the context of the broader business landscape. While inflation indeed plays a role in shaping the economic environment, the unique characteristics of the pharmaceutical industry in Nigeria, as well as the multifaceted nature of corporate financial health, mean that other factors are likely to have a more substantial influence on Z-scores.

Exchange Rate and Corporate Failure

The absence of a statistically significant relationship between Exchange Rate and Altman Z-score can be attributed to a range of factors that collectively shed light on this outcome. Exchange rate fluctuations, while theoretically influential, might not emerge as the dominant driver of Altman Z-scores within the context of the pharmaceutical industry in Nigeria. Several compelling explanations can account for this non-significant result.

Firstly, exchange rate fluctuations primarily impact the cost of imported materials and foreign exchange earnings. In the pharmaceutical sector, these effects might indeed be tangible, particularly if a substantial portion of the raw materials for drug production is imported. However, it's important to acknowledge that pharmaceutical firms operating in Nigeria might employ strategies to mitigate the impact of exchange rate volatility. These strategies could encompass hedging, sourcing materials locally, or pricing their products in a manner that accounts for potential currency fluctuations. As a result, the direct effect of exchange rate movements on Altman Z-scores may be less pronounced.

Secondly, the non-significant result could also be indicative of the presence of unmeasured variables within the model. Corporate financial health is not governed by a single factor but is influenced by a multifaceted interplay of variables. Factors such as market demand for pharmaceutical products, the level of competition in the industry, government healthcare policies, access to international markets, and overall economic stability might exert more substantial influence on Altman Z-scores. If these crucial determinants are not incorporated into the model, the significance of exchange rate fluctuations might be obscured.

Oil Price Shock and Corporate Failure

The absence of a statistically significant relationship between Oil Price Shocks and Altman Z-score can be attributed to a confluence of factors that collectively explain this outcome. While it's recognized that the pharmaceutical industry in Nigeria can be influenced by oil price shocks due to various economic linkages, the non-significant result suggests that other industry-specific and methodological considerations are at play.

The pharmaceutical sector is indeed connected to the broader economic environment and can be influenced by oil price shocks, which affect the overall economic stability of the country. However, the pharmaceutical industry's financial health is not solely determined by these external factors. It is also profoundly affected by internal industry-specific dynamics. Variables such as the demand for pharmaceutical products, competitive forces within the industry, and healthcare policies set by the government can collectively exert a more substantial influence on Altman Z-scores. These internal variables could be more immediate and direct determinants of financial performance for pharmaceutical firms in Nigeria.

Conclusion and Recommendations

The multiple regression analysis of Altman Z-scores for pharmaceutical firms in Nigeria revealed non-significant relationships between the selected independent variables (Inflation Rate, Exchange Rate, and Oil Price Shocks) and corporate financial health. These results suggest that within the pharmaceutical industry in Nigeria, these economic indicators do not significantly impact Altman Z-scores in their current forms. The non-significant findings emphasize the need to consider a broader array of factors that may more substantially affect financial health in this sector. It was recommended that while Inflation Rate did not show a significant impact on Altman Z-scores in this analysis, it is crucial for pharmaceutical firms to continue monitoring inflation trends, especially concerning the costs of raw materials, energy, and overall operational expenses. Proactive cost management strategies should be in place to address potential cost increases due to inflation. Conducting sensitivity analyses to assess the financial impact of varying inflation scenarios can also be beneficial.

Although Exchange Rate fluctuations were not found to have a significant effect on Altman Z-scores, pharmaceutical firms with significant foreign exchange exposure should remain vigilant regarding currency risk. Implementing hedging strategies, diversifying suppliers, and considering local sourcing for critical materials can help mitigate potential adverse effects of exchange rate fluctuations. Furthermore, an in-depth assessment of the firm's foreign exchange risk management practices is recommended. Despite non-significant results, pharmaceutical firms should remain attentive to the potential impact of Oil Price Shocks. Economic linkages can still influence the industry, especially regarding energy costs and broader economic stability. Developing a risk management strategy that considers potential oil price volatility and its effects on the supply chain is advisable. Additionally, monitoring global energy markets and adjusting business plans accordingly can enhance resilience.

In addition, it is essential for pharmaceutical firms in Nigeria to consider a holistic approach to financial health. This entails focusing on factors not covered in this analysis, such as market demand, competition, healthcare policies, and access to international markets. A comprehensive understanding of the industry's unique dynamics is vital for informed decision-making and risk mitigation. Lastly, continually reviewing and updating financial models and

risk management strategies can help pharmaceutical firms adapt to a dynamic economic environment and maintain their financial well-being.

REFERENCES

Abdelkreem, Y., & Sisay, D. (2021). Dynamics of inflation and its impact on economic growth in selected East African Countries: Ethiopia, Sudan and Kenya. *Journal of African Studies, 13,* 1-8.

Abrokwah, A. A. (2019). Effect of Oil Price Shocks on Monetary Policy in Nigeria: A Vector Autoregressive Analysis. Retrieved from *https://scholarworks.wmich.edu/cgi/viewcontent.cgi?article=1145&context=ijad*

Abubakar, A. B. (2019). Oil price and exchange rate nexus in Nigeria: are there asymmetries. *CBN Journal of Applied Statistics (JAS),* 10(1), 1-28 Available at: https://dc.cbn.gov.ng/jas/vol10/iss1/1.

Agbo, E. I. (2020). Effect of oil price fluctuations on Nigeria's monthly inflation rate. *Journal of Positive School Psychology, 6(11),* 439-444. DOI:10.36347/sjebm.2020.v07i11.05.

Agu, C. O. and Nyatanga, P. (2022). Does the expected crude oil price influence inflation in Nigeria. *African Journal of Business and Economic Research*, 16(4); 117-135

Akpan, E. O. (2009). Oil Price Shocks and Nigeria's Macro Economy. *Journal of International Economics,* 1-25.

Al-Sulaiti, K. I., & Almwajeh, S. M. (2007). Testing Altman's bankruptcy prediction model: Evidence from Saudi Arabia. *Journal of Economic and Administrative Sciences, 23(1),* 1-18.

Altman, E. I. (2006). Corporate financial distress and bankruptcy: Predict and avoid bankruptcy, analyze and invest in distressed debt. *Wiley Finance*.

Amoo, B. A. G.; Achua, J. k.; Audu, N. P. and Hamma, B. (2017). Macroeconomic instability index and threshold for the Nigerian economy. *CBN Economic and Financial Review. 55(2),* 35-68.

Anochiwa, L. I., & Maduka, A. (2015). Inflation and economic growth in Nigeria: empirical evidence? *Journal of Economics and Sustainable Development*, 6(20), 113-121.

Ayunku, P. E. & Dickson, R. K. (2021). Inflation rate, exchange rate, remittances inflows and economic performance in Nigeria: A granger causality approach. *International Journal of Human Resource Studies, Macrothink Institute, 11(1),* 3350-3363.

Bawa, S., Abdullahi, S. I., Tukur, D., Barda, S. I. and Adams, Y. J. (2020). Asymmetric Impact of Oil Price on Inflation in Nigeria. *CBN Journal of Applied Statistics, 11*(2); 85-113

Beaumont-Smith, M., Murray, L., N'Cho-Oguie, C., & Blakley, D. (2003). The effects of macroeconomic instability and inflation on sustainable real growth in South African Firms. *South African Journal of Economic and Management Sciences, 6(4),* 666-692.

Central Bank of Nigeria. (2021). Economic Report Fourth Quarter 2019. Abuja: Central Bank of Nigeria.

Chan, Y. C., & Chen, A. S. (1991). Financial distress and corporate acquisitions: Further empirical evidence. *Journal of Financial Economics, 29(2),* 323-344.

Hayes, R. (2022). *Financial analysis and valuation: A practical guide.* Wiley.

Hayes, R., Bose, S., & Kumar, V. (2010). The impact of recessionary times on corporate bankruptcy prediction models. *Managerial Finance, 36(12),* 1032-1049.

Khan, M.F. (2021). Impact of exchange rate on economic growth of Bangladesh. *European Journal of Business and Management Research, 9(5),* 44-56.

Magaji, M. and Singla, S. (2020). The impact of oil price shocks on exchange rate and economic growth in Nigeria: an ARDL Bound Test Co-integration approach. *Journal of Economics and Environment,* 1(2); 24-39

Maku, O. E., Adegboyega, S. B., & Oyelade, A. O. (2018). Dynamic effect of oil price shocks, inflation rate and exchange rate on economic growth in Nigeria from 1980 – 2014. *International Journal of Scientific & Engineering Research, 9(2),* 2037-2045.

Mordi, N. O. (2006). Challenges of exchange rate volatility in economic management in Nigeria. In the dynamics of exchange rate in Nigeria, central bank of Nigeria bullion, 30(3), 17-25.

Moyer, C. R. (2005). Altman's bankruptcy z-score: A 30-year update. *The Journal of Business Finance & Accounting, 32(1-2),* 55-82.

Omolade, A. (2019). Crude oil price shocks and macroeconomic performance in Africa's oil-producing countries. *Cogent Economics and Finance,* 7(1), 1-17

Purwaningsih, E., & Safitri, I. (2022). The influence of profitability, liquidity, leverage, cash flow ratios, and company size on financial distress. *Journal of Accounting and Economics, 7(2),* 147-156. https://doi.org/10.29407/jae.v7i2.17707

Ramadani, A.W., & Ratmono, D. (2023). Financial distress prediction: The role of financial ratio and firm size. *Journal of Contemporary Accounting Research, 15(1),* 19-27. DOI: https://doi.org/10.23969/jrak.v15i1.6428.

Ray, A. (2011). Financial distress and corporate restructuring: A study of Indian Corporate sector. *Paradigm, 15(2),* 155-164.

Umaru, A., & Zubairu, A. A. (2012). Effect of inflation on the growth and development of the Nigerian economy (an empirical analysis). *International Journal of Business and Social Science,* 3(10), 183-191.

Wesa, J. O., & Otinga, F. N. (2018). Financial distress and firm value: A study of companies quoted on the Nairobi securities exchange. *European Journal of Business and Management, 10(3),* 11-20.