

# Evaluation Of Model In Predicting Financial Distress In Manufacturing Companies: A Focus On South-Western Region Of Nigeria

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## Abstract

The study assesses whether Altman's z-score model is capable of predicting business failure in western states of Nigeria. The population of the study consists of all the manufacturing companies that registered with corporate affair commission and enlisted with stock exchange market at one time or the other. Twenty firms are selected for the study: 10 firms that are still in existent and 10 firms that were no longer in existent or that are at least delisted from corporate affair commission. The data for the study is obtained from the financial reports of the firms selected. This research study reveals that Altman's scores financial distress prediction model is found to be applicable in 7 out of the 10 failed firms that were analyzed which indicate a 70% successful prediction of the model. On the 10 non-failed firms analyzed; 9 of them proved the Altman's financial distress prediction model was successful indicating a 90% validating of the model while 10% of the non-failed firms are within the Grey Zone that registered immediate attention in order to bring them back to their right footing. To this end, Altman's Z-score can be used as a "barometer" for measuring companies' performance in Nigeria while Ratios Analysis serves as its "barometric liquid".

**Keywords:** Altman's z-score model, Financial Distress, Manufacturing Organization

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## I. Introduction

The panacea for solving problems of economic growth in developing countries often reside in the development of industries; be it at micro and macro level. The establishment and sustainability of the existing one play a prominent role in the development and growth of many countries such as India, Malaysia, Pakistan, China, and United State of America to mention just a few. It is expected that gains to be derived from the establishment and sustainability of industries will be translated into wealth creation and generation of employment at a low investment cost in South West and in Nigeria as a whole Adewumi (1992). In recognition of the above, industrialization is generally accepted by policy makers, economic planners, researchers and professionals as one of the most desirable way of improving the quality of life of the populace.

The specific impact of such an improvement in the quality of life would involve:

- i. Raising people standard of living by way of increase in income, consumption levels of food, medical services, education, utilities and social services.
- ii. Creating job opportunity for the youth thereby reduces the menace that usually accompanies joblessness.
- iii. It encourages good combination of suitable technology, good combination resources to move the economy from the traditional management of techniques low level of production to a more automated and efficient system of production of goods and services. However, in-spite of the advantages that can be derived from industrialization the rate of business failures has call for the need to put a drastic measure in place to check the menace.

Many research studies on company failure predictions have taken place in developed countries such as those carried out by; Beaver (1968), Altman (2003), Ohlson (1980) in the United State of America; Taffler (2001), wood and Piesse (1987) in United kingdom; Kuma (2001) and Cybinski (2000) Australia, and also Low, Fauzias and Ariffin (2001) in Malaysia. All these countries have a long history of commercial success which might due to enforcement of more stringent legal and accounting rules and regulation coupled with ability to predict whether companies in their domain are sick or healthy so as to apply appropriate corrective measures.

In Nigeria, however, literature is very scanty on research in this area of study when compared with the numbers of corporate failure. One of the few read by the researcher was the one presented by Charles Onyewu, this prompted this researcher to embark on this study; and to know the applicability or non- applicability of

Multiple Discriminant Analysis models in, predicting correctly corporate failure in South West Nigeria. To be able to accomplish this, the following specific objectives were considered:

- i. To assess the recent trend of business failure and identify common causes of corporate failure.
- ii. To identify the key variables determining the solvency of corporate organization in Nigeria.

### **Related Empirical Studies**

Early warning of financial distress is vital for bankruptcy prediction. A firm is called bankrupt when it fails to meet its financial obligations when they fall due. As (Aharony, P.Jones & Swary 1980), states "Corporate failure is an indication of resource misallocation which is undesirable from a social point of view." So the ability to predict corporate bankruptcy has been an important issue for economic researchers since the last five decades and various statistical methods mostly based on financial ratios have been established for bankruptcy. In this section we focus on the emergence of the predicting study of bankruptcy and go through different studies and statistical models on predicting bankruptcy. Prior to the development of quantitative methods of measuring of company's performance, the traditional ratio analysis was performed by agencies to assess the creditworthiness of a business (Altman 2005).

Smith and Winakor (1935) in Saeiddeh Aliakbari (2004) showed that the ratio measurements of failing companies are significantly different from those of continuing entities. Another study examined the financial ratios for large asset size companies which had financial difficulties to make their fixed debt payments. In this study bond quality related to some ratios such as margin of safety (ratio of net income to gross income of the companies offering the bonds), ratio of income before fixed charges to charges, the size of issue and the asset size of obligor Hyndman (2002). Beaver (1996) compared a list of financial ratios individually for failed and a matched sample of non-failed companies and concluded that financial ratios of five years prior to bankruptcy can be indicators of bankruptcy. The studies mentioned above determined a definite potential of financial ratios as indicators of bankruptcy while the profitability, solvency and liquidity ratios are recognized as the most important ones Altman (1977). Altman (1977) objected the univariate financial ratio analysis as susceptible approach to defective interpretation and established the first multiple discriminant analysis by combining a set of financial ratios in a linear multivariate framework and calculated Z-score as a measure of bankruptcy.

The conclusion was that by this approach the ratios will take on greater statistical significant than the sequential ratio comparisons. Ohlson (1980) studied a similar approach to Santomero & Vinso (1977) and Mertin (1977), and applied the Logistic regression methodology (Logit) as developed linear rating methodology. Ohlson (1980) used the data for 105 bankrupt and 2058 non-bankrupt firms in the period 1970 and 1976 and compared the result with three corporate failure research studies using the same period data and quite different methodologies and objectives, i.e. Altman & McGough (1974), Moyer and Altman, Haldeman and Narayanan (2003). He found (i) the size of the company; (ii) a measure(s) of the financial structure; (iii) a measure(s) of performance; (iv) a measure(s) of current liquidity, significantly contribute in predicting bankruptcy one year prior to bankruptcy.

The prediction error-rate for the data used in Ohlson's study is larger than the one reported in Altman and much lower than those reported by Altman & McGoug (1974) and Moyer. This issue is related to the timing of the releasing the financial reports and the filing for bankruptcy which is not explicitly considered in the other three studies. And also Ohlson (1980) states that the predictive power of the model could be improved of by incorporating market transactions (price) data of the Firms. The Logit model has also been found more attractive by Lacerda & Moro (2008), because its score indicates probability of default whereas in discriminant analysis as well as the majority of other methods, the score has to be recalculated into probability of default by using historical observations. Seaman, M.Young & N.Baldwin (1990) in N.Hyndman (2002) compare the predictive power of three discriminant models: linear, quadratic and logistic. They obtained the best results by the of variable selected and the quadratic discriminant approach by which 78% of firms were classified accurately and that is the highest accurate rate among the three applied approaches. The authors find the differences in variances and correlations for the predictor variables between the groups of bankrupt and non-bankrupt firms, which is an important source of information for quadratic technique in classification of companies, as the for the better performance of this approach in comparison with the other models.

## **II. Data And Methods**

The research design adopted in this study is the ex-post-facto research design. This design was employed because data collected for the study were not subjected to any direct manipulation by the researcher, for the independent variables had their influence on the dependent variable prior to the commencement of the study. The populations for this study consist of all profit oriented corporate organisations that registered with Corporate Affairs Commission between the year

1990 to 2013 and that are located in the South Western States of Nigeria (i.e Ekiti, Ondo, Osun, Oyo, Lagos, and Ogun State) between the period under review. Two sampling techniques were employed to select 20

companies from the total population. A stratified sampling method was first employed in which the population was just grouped into two categories that is failed companies and non-failed companies. After which a purposive sampling method was adopted to select 10 samples from each group to give a total of 20 samples. A purposive sampling technique was adopted because of the difficulties faced by the researcher in getting across to the financial statement of the companies involved.

Data was collected from secondary source mainly from the financial reports of the selected companies, which were registered with Corporate Affairs Commission. Data for the study was drawn from audited accounts (i.e. income statement and balance sheet) of the concerned companies, therefore, this data may be considered reliable for the purpose of this study. As to the validity of the instrument, necessary checking and cross checking were done while scanning information and data from the secondary source. All these efforts were made in order to generate a valid data for the study. Hence, the researcher satisfied the content validity criterion.

### III. Result And Discussion

The data so collected from the secondary source that is from the financial reports of the selected companies were subjected to multiple discriminant analysis using special package for social sciences (SPSS). The Model as predicted by Altman (1968) is  $Z = 0.717 T_1 + 0.847T_2 + 3.107T_3 + 0.420T_4 + 0.998T_5$

Where:

$T_1$  = Working capital/Total assets,

$T_2$  = Retained earnings/Total assets,

$T_3$  = EBIT/Total assets,

$T_4$  = Market value of equity/Book value of total debt, and

$T_5$  = Sales/Total assets.

Z = Overall Index

Using the result of Z-scores Altman classified companies into three major zones. All the companies which had a Z score below 1.23 were classified as companies in a distress zone; companies which had a Z score of between 1.23 and 2.9 were classified as companies in a grey zone while those companies which had a Z score above 2.9 were classified as companies in a safe zone. In a distress zone there is high probability of bankruptcy for a firm, in a grey zone there is uncertainty whether the firm be bankrupt or not, while in a safe zone there is low probability of firm becoming bankrupt.

#### Summary of Key Findings (Average score for five years) on Failed Firms

| Firms                       | Average score | State    |
|-----------------------------|---------------|----------|
| Pulp and Paper Mill Plc.    | 0.24          | Distress |
| Nig. Romanian Wood Industry | 0.79          | Distress |
| Ire Burnt Block Industry    | 1.63          | Distress |
| Nig. Romaco Plc.            | 1.10          | Distress |
| Okitipupa Oilpalm Plc.      | 1.67          | Grey     |
| Afprin Nig. Plc.            | 0.83          | Distress |
| Oluwa Glass Plc.            | 0.25          | Distress |
| Odua textile Plc.           | 1.07          | Distress |
| Oasis Plastic Plc.          | 1.44          | Grey     |
| Apex Paint Ltd.             | 2.15          | Grey     |

The analysis shows that the seven companies out of the ten failed companies represent 70% are in total distress zone while remaining three companies which represent 30% are in grey zone position.

#### Summary of Key Findings (Average score for five years) on Non-Failed Firms

| Firms                   | Average score | State |
|-------------------------|---------------|-------|
| Vitafoam                | 2.84          | Grey  |
| NASCON                  | 3.11          | Safe  |
| DN-Tyre & Rubber Plc.   | 55.27         | Safe  |
| Nestle Nig. Plc.        | 3.34          | Safe  |
| Academic Press Plc.     | 4.31          | Safe  |
| SMURFIT Cases Nig. Plc. | 7.04          | Safe  |
| Nigerian Brewery Plc.   | 4.08          | Safe  |
| Lafarge Cement Plc.     | 4.34          | Safe  |
| Unilever Nig. Plc.      | 4.90          | Safe  |
| WAMCO Nig. Plc.         | 4.95          | Safe  |

The above table shows the analysis of the result for non-failed group from the table; nine companies out of ten non-failed companies which represent 90% of the non-failed group are in safe zone while the remaining one which represents 10% is in the grey zone and therefore need surgical operation to bring it back to its right footing.

### **Limitations of this study**

Finally, the role of regulatory agencies in forecasting incidences of corporate failures caused by improper financial records and reporting cannot be overemphasized. It must be noted that the attainment of transparent and reliable financial reporting is a collective responsibility of all stakeholders, shareholders inclusive. Hence, all must put hands together to ensure that people with criminal tendencies are not allowed to man the affairs of public companies. To further empower regulatory authorities in the financial market, there is the need to review some of the existing laws to bring them in tune with current reality and peculiarity of the market. The commission should come up to exploit all available Means at its disposal in ensuring that investors' confidence is not eroded in the capital market. To this end, the routine onsite and off-site inspections of the commission should be beefed up to ensure that irregularities are spotted out and addressed quickly. The commission should investigate any reported case of financial company's management, professional bodies, and ensure that appropriate measures are taken.

This study has several limitations which may affect the accuracy of MDA these include:

- i. Only data on a relatively small sample of failed companies and non-failed companies were available. Hence, there is some risk that the results have been affected by sample size.
- ii. The companies were not selected at random.
- iii. The data analyzed in this study was obtained from public financial statements which may be subject to creative accounting. Companies facing failure may distort their published accounts and this will skew the results of the model.
- iv. Some corporate financial statements did not disclose figures on cash flow or operating expenses. This study was restricted to balance sheet and income statements.
- v. The MDA methodology violates the assumptions of normality for independent variables.

## **IV. Conclusions And Recommendations**

Edward Altman's distress prediction model is found to be accurately predicting firms quoted at Nigerian Stock Exchange as 7 out of 10 failed firms were correctly classified this represents 70% validity for the model. Similarly, 9 out of the 10 non-failed firms were correctly classified this represents a 90% validity of the model.

### **Recommendations**

In the light of the above, following strategies should be adopted by the commission to reduce the incidences of inaccurate corporate financial reporting:

- Organizations should file quarterly, interim financial statements and annual reports in accordance with accounting standards.
- Segmental reporting in financial statement of quoted companies that operate in different lines of business or in different jurisdictions multinational corporation or group of companies should be adopted in line with global best practices. The commission regards this as essential to full disclosure of companies' activities because a group when viewed from one segment may appear profitable, whereas in actual fact it is doing poorly on aggregate thereby concealing the inherent risk factor in the business from investors.
- The chief executive officer, director and the chief financial officer must be made to swear in to an oath of correctness of information contained in the audited accounts. This is to confirm that due care has been taken in the preparation of account and such officers would be held liable if any falsehood are later discovered in the account.
- External Auditor should be changed every five (5) years in order not to get too friendly or compromise their position with the company being audited.
- There should be an action plan for compliance with the code of corporate governance by the commission, in terms of supervision and enforcement activities so as to reinforce the provisions of the code of corporate governance.

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