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Original Research Article

CASH FLOW DEFICIENCY AND CORPORATE FAILURE: EVIDENCE FROM NIGERIA

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Abstract

This study investigates the ability of cash flow deficiency to predict bankruptcy possibilities. The study utilised a sample of 50 quoted companies in Nigeria drawn from different sectors that have consistently published their audited annual financial report between 2012 and 2014. We adopt a pooled data regression analysis in analysing the data for the study. The results show that cash flow deficiency predicts bankruptcy possibilities. Firm age, leverage and profitability were also found to impact bankruptcy possibilities significantly. The result further reveals that investment redemption can be a survival strategy as positive cash flow from investing also predicts the chances of firm survival. The study recommends that companies must ensure positive and consistent cash flow that would be sufficient to support daily needs and also to consistently meet business expectations and survive in the long-run.

Keywords: *Cash flows, Deficiency, Bankruptcy Prediction, Corporate Failure.*
JEL Classification: *M41.*

1.0 INTRODUCTION

The vagaries of the economic and business world place the survival of many corporate entities into a quagmire of risk and uncertainty. Financial and business risks have always led to many businesses closing down, not just in Nigeria but the world over. The work of Morris (1997) on the effect of the economic cycle and business uncertainty in corporate failure revealed that companies are more vulnerable to failure during recessions and increased business uncertainties. Platt (1989) also supported this in their findings by observing that the more uncertain the business environment becomes, the more likely it is that companies would face severe risk and competition that would put their cash flow at risk. Wong (2010) went further to explain that the financial distress of an organisation can increase when such company fails to meet its financial obligation or has difficulty in making payment due to cash flow deficiency. It then means that cash flow inadequacy can put the survival of such a company in jeopardy. We capture this cash flow inadequacy as stipulated by Wong (2010) with the terminology 'cash flow deficiency' and test the ability of this deficiency to predict the probability of bankruptcy.

The issue of bankruptcy prediction is significant for investors and other stakeholders. It would always be an added advantage if stakeholders can tell the likelihood of a company going under. If one can predict the failure of a firm in advance, it should be possible for management to take steps to avert such an occurrence and other stakeholders would also take appropriate steps to reduce the loss of value in the face of such signals (Platt, 1989). The issue of corporate failure has been a focal area in Nigeria and the world at large given the rate of failure in the last few years where some 'corporate giants' which were assumed to be immune to failure collapsed, putting the world economic system in jeopardy and investors value at risk.

There is a dire need for prediction of business failures since the result of business failure is losses both financially and non-financially to all the stakeholders of the firm. Thus a model that could accurately predict business failure in time would be quite useful to managers, shareholders, the government, suppliers, customers, employees amongst other stakeholders. The prediction

of business failure is an important and challenging issue that is worthy of constant review. Global economies have become cautious of the risk involved in the corporate failure, especially after the collapse of giant organisations like WorldCom and Enron. In Nigeria, the financial sector has been worst hit with corporate failures witnessed by companies such as Savannah Bank of Nigeria, Societe General Bank of Nigeria, Trade Bank PLC, Lead Bank PLC, Metropolitan Bank Ltd to mention a few.

Prior studies (Baimwera & Muriuki, 2014; Khaliq, Altarturi, Thaker, Harun, & Nahar, 2014; Nyamboga, Omwario, Muriuki, & Gongera, 2014; Pindado & Rodrigues, 2005, Pranowo, Achsani, Manurung, & Nuryatono, 2010) have focused separately on the individual components of either cash flow deficiency or bankruptcy prediction in relation to other variables, but little has been done in the area of how cash flow deficiency can predict bankruptcy. This is one of the significant gaps that this work tries to fill; especially in the case of Nigeria, by looking at how cash flow deficiency can predict corporate failure. Therefore, this study seeks to make a methodological and empirical contribution to bankruptcy prediction in Nigeria by using the Altman Z-score as introduced by Altman (1984). Furthermore, this study investigates bankruptcy in non-financial institutions to determine the extent to which bankruptcy can be predicted in these companies and to come up with a warning signal model, using cash flow signals, which investors and other stakeholders can watch out for to save their investment from being wiped out.

2.0 LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

Over the years, there have been several reviews on the prediction of corporate bankruptcy. Most of these studies have however become out-dated or too narrowly focused. Scott (1981), Zavgren (1983), Altman (1984) and Jones (1987) all focused exclusively on statistical models while others like Jones (1987) and Dimitras, Zanakis and Zopounidis (1996) do not give full coverage of failure causes in their models. While the likes of Zhang, Hu, Patuwo and Indro (1999) made more reasonable attempt in their works, they restrict their review to empirical applications of neutral network models while Crouhy, Galai, and Mark (2000) cover only

the essential theoretic credit risk models. None of the studies discussed above has been able to provide a complete comparison of the different approaches towards bankruptcy prediction especially in the area of cash flow effect on bankruptcy.

According to Altman (1984) and Zavgren (1983), the aforementioned methods create inconsistent signals since different variables could give a different forecast. This led to further improvement in prediction models through the development of the Altman's Z-score which has become a more acceptable model of failure prediction since its operationalisation in 1968. The Altman Z-score model has about five financial statement explanatory variables with different weights. The Z-score value is explaining the probability of the firm's default shortly (Laitinen, 2005). Studies carried out by Altman (1984) and Altman, Brooks, Andrea and Andrea (2003) used financial ratios to predict the occurrence of bankruptcy, and they were able to predict up to 94% correctly one year before bankruptcy occurred, and up to 72% two years before its actual occurrence. Significant ratios identified by Altman about bankruptcy prediction were working capital over total assets, retained earnings over total assets, earnings before interest and taxes over total assets, the market value of equity over book value of total liabilities and sales over total assets. In predicting the default of firms, the most used and most important information comes from the firms' historical data such as ratios from the financial statements and information of the firms' previous payment difficulties due to cash flow constraints. Adequate cash flow from operation is an adequate indicator that the business process of a firm is cash productive and that such a firm is self-sustaining, but when the business process does not produce cash flow, then there is both credit and bankruptcy risk in such a firm. Increases in productivity in the firm are perceived to be captured in increments in cash flows.

Bellone (2006) opines that the closer firms are to their failure year, the lower their productivity and in general, their cash flow from operations. Charitou and Trigeorgis (2003) suggested in their findings that when a company's ability to generate sustaining cash flow from its business reduces, the possibility of bankruptcy might be in sight. Farinas and Ruano (2005) also showed that firm's bankruptcy behaviour reacts initially to productivity and cash flow slack hence; higher productivity will increase a firm's cash flow

from operation and reduce the failure probability of such a firm. Blanchard, Huiban and Mathieu (2012) also supported these findings showing that productivity and cash flow from operations has a negative and significant impact on firm's failure probability. Aleksanyan and Huiban (2015) identified firm productivity, and cash flow sustainability as crucial determinants of a firm's probability of going bankrupt and the study revealed that cash flow from operation and productivity begins to deteriorate three years before failure. Patrick (2004) in his study reveals that cash flow deficiency is often the most critical reason for business failure. The problem arises when the money coming into the company from sales is not enough to cover the costs of production. In contrast, Ericson and Pakes (1995) show in their examination of the existing UK failure literature that operating cash flow variable has not been significant in predicting failure of UK insolvency models, despite the fact that there has been increasing interest in cash flow and its relevance in reporting in the UK and the world over. This finding and assertion lean on the models introduced by Jovanovich (1982) which implicitly assume that firms' cash flow situations have no impact on bankruptcy decisions.

Jensen (1986) suggests that managers have an incentive to hoard cash to increase the number of assets under their control and to gain discretionary power over the firm investment decision and sustain its ultimate survival. Opler (1999) examined the determinants and effects of cash holdings amongst publicly traded US firms in the 1971–1994 period. The result indicates that firms with substantial growth opportunities, higher business risk, and smaller size hold more cash than other firms as failure to do so endangers their survival. Similar results are found using a sample of US small firms (Faulkender, 2002) and a sample of UK firms (Ozkan & Ozkan, 2004). However, Pinkowitz, Stulz, and Williamson (2006) are of the opinion that the absence of good corporate governance could lead to abuse of such excess cash by management and could put the financial health of the corporation into jeopardy. They went further to opine that colossal cash holding can only generate a positive effect on firm survival if there is a good internal control system for checking corporate behaviour. Almeida, Haldeman and Narayanan (2002) propose a theory of corporate liquidity demand that is based on the assumption that liquidity

choices will depend on firms' access to capital markets and the importance of future survival to the firm. The model predicts that financially constrained firms which are suspecting cash difficulty will save a positive fraction of incremental cash flows, while unconstrained firms will not.

Investment in other businesses or securities always provides another source of income aside from the core operating cash flow of a firm. The sufficient cash flow from this investment represents business progress and helps to boost the end profit of a company. Aleksanyan and Huiban (2015) observed that healthy companies tend to comparatively stable association amongst the three components of cash flow: operating, investing and financing activities. Also, the author noted that unhealthy companies were characterised by depreciating cash flows from operating, investing and financing cash flows about one or two years before they filed for bankruptcy. Arlov, Rankov, and Kotlica (2013) used Altman Z-score discriminant analysis for bankruptcy prediction to assess companies showing signs of failure. The findings of the work show that cash flow from investing has a significant inverse relationship with bankruptcy possibility. Moyer (2006) and Sipika and Smith (2002) also supported the tenet of a significant relationship between corporate failure and cash flow from investing.

3.0 METHODOLOGY

The study hinges on the life cycle theory which stipulates that organisations go through different phases in its existence. These phases include but are not limited to introduction, growth, maturity and decline. The decline stage is the stage wherein signals of failure begin to manifest. Dickinson (2011) asserted that age was not the only peculiar determinant of a firm's life cycle, but the nature of a firm's cash flow, leverage and profitability patterns can be used to deduce the stage of a firm's life cycle. The study, therefore, tests this assertion by utilising three regression models to capture the effect of several variants of cash flow deficiency on the decline stage in the firm's life cycle. The first regression model focuses on cash flow from operation and bankruptcy prediction; the second investigates how cash flow from investing can predict bankruptcy while the third focuses on cash holding and bankruptcy. The models are given as follows:

$$ZSCORE = \alpha_0 + \beta_1 CFO_{it} + \beta_2 AGE_{it} + \beta_3 PROF_{it} + \beta_4 LEV_{it} + \mu_{it} \quad - \quad - \quad - \quad - \quad - \quad (1)$$

$$ZSCORE = \alpha_0 + \beta_1 CHT_{it} + \beta_2 AGE_{it} + \beta_3 PROF_{it} + \beta_4 LEV_{it} + \mu_{it} \quad - \quad - \quad - \quad - \quad - \quad (2)$$

$$ZSCORE = \alpha_0 + \beta_1 CFI_{it} + \beta_2 AGE_{it} + \beta_3 PROF_{it} + \beta_4 LEV_{it} + \mu_{it} \quad - \quad - \quad - \quad - \quad - \quad (3)$$

The Z-score stands for Altman failure prediction score which is calculated thus:

Z-score= 6.56T1+3.26T2+6.72T3+1.05T4

T1= Working Capital/Total Assets

T2= Retained Earnings/Total Assets

T3= Earnings before Interest and Taxes/Total Assets

T4= Book Value of Equity/ Total liabilities

ZSCORE = Z score: Z>2.6 is a safe zone
Z score: 1.1<Z<2.6 is a gray zone
Z score: Z<1.1 is a distress zone

CFO = Cash flow from Operations

CFI = Cash flow from Investing

CHT = Cash Holding to Total asset

PROF = Corporate Profitability (Measured using PAT margin)

LVG = Company Leverage (Measured as total liabilities/ total assets)

AGE = Firm Age

Model 1 investigates the ability of cash flow from operation to predict bankruptcy. Model 2 investigates the ability of cash flow from investing activities to predict bankruptcy, while model 3 investigates the ability of cash holding to predict bankruptcy. The models assume that the dependent variable is a linear function of the independent variables with consideration to the heterogeneity in the pooled companies. This means that pooled regression model assumes that there is no difference in the pooled companies.

The dataset for the study consists of 50 non-financial firms quoted on the Nigerian Stock Exchange. These companies were selected using the convenience sampling method based on the availability of sufficient information for the period under review. The data gathered were analysed using the pooled data econometric technique. The estimation results were evaluated based on

individual statistical significance test (t-test) and overall statistical significance test (F-test). The goodness of fit of the model was tested using the coefficient of determination (R-squared).

4.0 ESTIMATION RESULTS AND DISCUSSION OF FINDINGS

The analysis begins with the descriptive statistics which aims to reveal some hidden qualities of the data utilised and aid proper understanding of the significance of the results.

Table 1: Descriptive Statistics

DESCRIPTIVE STATISTICS							
	Z-SCORE	CFO	CHT	CFI	AGE	PROF	LVG
Mean	2.14	130164	0.09	-97571	26.76	0.03	0.59
Median	2.13	598864	0.06	-362942	28.5	0.05	0.56
Maximum	6.30	2.82E+08	0.48	646454	49.00	0.52	1.51
Minimum	-2.46	-1.2E+07	0.00	-1.92E+08	2.00	-0.75	0.14
Std. Dev.	1.47	421696	0.10	305637	11.33	0.19	0.25
Jarque-Bera	8.79	2369.41	57.15	2305.66	6.90	160.80	73.00
Probability	0.01	0.00	0.00	0.00	0.03	0.00	0.00
Observations	149	149	149	149	149	149	149

Source: Researcher's Computation (E-Views)

Table 1 shows the mean (average) for each of the variables, their maximum values, minimum values, standard deviation and Jarque-Bera (JB) statistics (a test for variable normality). The table reveals that the average Z-score in our sample size is 2.14, it went further to reveal that while some firms are considered very strong, some are at the brink of collapse with a Z-score of -2.46. This raises serious concern of stability of some companies in our sample.

Cash flow from operation produces the highest amount of deviation in our sample followed by cash flow from investing, meaning that these variables produce the highest level of volatility among all the variables of our study. The average cash holding in our sample is 0.09 with a maximum of 0.48 and a minimum of 0. While some of our sampled companies keep as much as 48% in cash, some keep no form of cash in their business. Also, the statistics of cash flow from investing suggests that the average investment in our

sample is ₦97,571,000 (-ve). This entails that most companies are recording negative cash flows on their investments. This could be as a result of aggressive current investments on the part of the corporations with the view of reaping massive returns in the future.

The oldest company in our sample is 27years old while the youngest is 2 years old. This variation shows that our sample considered both small and large companies. Our data also shows that some of the companies in our sample can convert 52% of their revenue to profit in the face of a sample average of 3%. This could mean that many companies are applying right cost-cutting measures to keep their profits high and guarantee the survival of their business. However, a minimum of -0.75 indicates a high level of losses recorded by some companies about turnover. The result of leverage also confirms the indications of the Z-score as some firms are leveraged up to 151%. These companies might be on the brink of collapse if urgent measures are ignored in improving their cash flow condition by reducing leverage. Lastly, the Jarque-Bera (JB) which tests for normality or the existence of outliers or extreme values among the variables shows that all the variables are normally distributed. This also implies that a least square estimation can be used to estimate the pooled regression models.

In examining the association among the variables, we employ the Pearson correlation coefficient (correlation matrix), and the results are presented in Table 2.

Table 2: Pearson Correlation Matrix

	Z-SCORE	CFO	CHT	CFI	AGE	PROF	LEV
Z-SCORE	1	0.04	0.52	0.04	0.09	0.63	-0.64
CFO		1	0.11	-0.7	0.11	0.5	-0.06
CHT			1	0	0.01	0.38	-0.37
CFI				1	0.08	-0.44	0.07
AGE					1	0.03	0.07
PROF						1	-0.6
LEV							1

Source: Researcher's Computation (E-Views)

Table 2 reveals the association between all variables in the study. From the table, it can be observed that there is a positive association between the dependent variable and the independent variables with the exception of leverage. This suggests that decrease

in leverage improves Z-score. A close look at the correlation matrix also revealed that no two explanatory variables were highly correlated. This suggests the absence of multicolinearity problem in the model which could result in wrong signs or implausible magnitudes in the estimated model coefficients, and bias of the standard errors of the coefficients.

To examine the cause-effect relationships between the regressors and regressed, a pooled regression analysis was used since the data had both time series (2012-2014) and cross-sectional properties (50 quoted companies). The pooled data regression results obtained in the model and the results are presented in table 3.

Table 3: Regression Result

	Expected Sign	FIRST MODEL (POOLED)	SECOND MODEL (POOLED)	THIRD MODEL (POOLED)
C		3.02 (7.20) [0.00]*	3.08 (7.33) [0.00]*	2.56 (6.59) [0.00]*
CFO	+	E (-2.99) [0.00]*	- - -	- - -
CHT	+	- - -	- - -	4.86 (5.62) [0.00]*
CFI	-	- - -	E (2.84) [0.00]*	- - -
AGE	+	0.01 (2.08) [0.03]**	0.01 (1.87) [0.00]*	0.01 (2.52) [0.01]*
PROF	+	3.89 (4.65) [0.00]*	3.78 (4.54) [0.00]*	2.11 (3.23) [0.00]*
LVG	-	-2.37 (-4.26) [0.00]*	-2.40 (-4.30) [0.00]*	-2.53 (-5.72) [0.00]*
R-Squared Adj-R-Squared F-Statistic N		0.65 0.63 40.46(0.00)* 149	0.65 0.63 39.88(0.00)* 149	0.72 0.70 55.33(0.00)* 149

Source: Researcher's Computation (E-Views)

Note: (1) Parentheses ( ) are t-statistic while bracket [ ] are p-values
(2) * is significance at the 1% level
(3) ** is significance at the 5% level

In testing the cause-effect relationship between the dependent and independent variables, pooled regression was estimated. Table 3 presents the results of the three models of our study. The first model considers cash flow from operation; the second looks at cash holding while the third looks at cash flow from investing. All these models are aided by other related variables which can significantly explain the chances of failure or survival.

The R-squared values were (0.65) and (0.65) and (0.72) for the first, second and third models respectively. This indicates that all the independent variables jointly explain about 65%, 65% and 72% of the systematic variations in the Z-score of the respective

models. The error terms explain the remaining 35%, 35% and 28% in our model. The F-statistics (40.46) (39.88) (55.33) with p-values of (0.00) (0.00) (0.00) respectively shows that the model is significant and well specified at 1% level of significance.

On the average, observed that cash flow deficiency significantly influences the chances of failure. Our first model shows that cash flow from operation is positively related to bankruptcy chances at 1% level of significance means that a unit fall in cash flow from operations deteriorates the Z-score significantly. This entails that as cash flow from operations become deficient, the risk of bankruptcy for the firm increases. This is in tandem with the assumptions of the life cycle theory based on the work of Dickinson (2011) which stipulates that negative cash flow from operations (except start-up years) are a significant indication of the firm's decline stage. This finding also resonates with those of other studies such as Aleksanya and Huiban (2015), Bellone (2006), Blanchard, Huiban and Mathieu (2012), Charitou and Trigeorgis (2003), Farinas and Ruano (2005) and Patrick (2004).

Cash holding with a coefficient of 4.86 and a P-value of 0.00 reveals that a unit fall in cash holding decreases the Z-score hence increasing bankruptcy chances significantly at 1% level of significance. This finding agrees with the findings of Faulkender (2002), Opler (1999), Ozkan and Ozkan (2004) and it signifies that increasing the quantity of cash held could help to jeopardise the probability of bankruptcy, as this cash could be disbursed when an urgent need arises. Pinkowitz, Stulz and Williamson (2006) despite also arriving at similar results advised that cash holdings should only be significantly increased in the presence of good corporate governance, as the absence of the latter would only lead to an abuse of the excess cash, hence, endangering the sustainability of the firm.

Our third model shows that cash flow from investing with P-value of 0.00 shows that Z-score improves when the sampled companies sell their assets or reduce their investments. This is surprising as it is expected that investing improves chances of survival but also it makes sense to believe that overinvestment and carrying large idle asset is a problem that can cause failure. This result then suggests that as the sampled companies de-invest or sell their idle assets, cash is generated which is used to drive the business

and ensure its continued existence. This finding is in tandem with the works of Aleksanyan and Huiban (2015), Arlov, Rankov and Kotlica (2013), Moyer (2006) and Sipika and Smith (2002).

Firm age and firm profitability are found to be significantly related to improving Z-score. The older a firm gets, the better its chance of surviving. This finding, however, does not adequately portray the tenets of the life cycle theory, as the theory segments this older part of the firm existence into two phases (maturity and decline). The maturity phase is the stage where the firm has a better probability of surviving. In the decline phase, the probability of survival decreases, and the firm has to resort to drastic measures to keep itself afloat. Increase in profitability also improves the chances of firm survival. Firm leverage, on the other hand, indicates an inverse relationship, i.e. as the leverage level of companies reduces their chance of survival improves at 1% level of significance. As sampled companies de-leverage themselves, they tend to keep more of their profits and use such to drive their chances of survival.

5. CONCLUSION AND RECOMMENDATIONS

The study sought to establish the relationship between cash flow deficiency and corporate failure. The results show that cash flow from operation and cash holding are significant in predicting the chances of survival or failure of companies. The results further indicate that de-investment by companies can improve their chances of survival since the proceeds from the sale of such assets can be injected into the business to produce positive cash flow and profitability which helps sustainability and survival. The result followed *apriori* expectation in the area of firm age; profitability and leverage as it reveals that maturity and profitability improve the chances of firm survival, while increased leverage could jeopardise the survival of the firm in the long run.

This research work examined the ability of cash flow deficiency to predict the chances of firm survival in Nigeria. The variables used in this study include survival prediction score (Altman Z-score) which predicts the chances of survival utilised as the dependent variable. The farther the score is from two (2), the higher or lesser the chances of survival. Cash flow from operations, cash holdings and cash flow from investing were the independent

variables utilised with firm age, profitability and firm leverage serving as the control variables.

From the study, it can be inferred that increases in cash flow from operations, cash holdings and reduction in non-current assets can help to improve the chances of firm survival. This means that cash flow deficiency deteriorates the Z-score of companies and exposes them to the chances of failure. The study further concludes that over-investment in a non-current asset can result in operational inefficiency which significantly enhances the chances of failure. This is because as more cash flows are tied up in idle assets, funds that could have been utilised for more productive alternatives become unavailable placing an automatic financial squeeze on the company. This inadvertently places the substantial risk on the long-run sustainability of the company. The study, therefore, recommends that companies must ensure positive and consistent cash flow that would be sufficient to support daily needs and also to consistently meet business expectations and survive in the long-run.

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