

# LONG-RUN INDUSTRY EFFECT ON STOCK RETURN: AN EMPIRICAL EVALUATION OF SELECTED NIGERIAN BANKS

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## Abstract

The study develops a fresh econometric equation to estimate the nature of the relationship between banking industry activities and stock market returns in Nigeria. The equation utilizes annual data sourced from the various volumes of Nigerian Stock Exchange (NSE) Fat books, NSE Daily Official List and annual reports of the selected banks for a period of 25 years ranging from 1984 to 2009. Our findings reveal that the activities of the banking industry and stock market return maintain a long-run relationship. Furthermore, we discover that an increase in earning produces a positive multiplier effect on stock market return; while retention of earning for acquisition of assets and high level of debt/leverage ratio is found to be detrimental to stock prices here in Nigeria.

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**Keywords:** Return, Bank activities, Cointegration, Nigeria

## 1.1 Introduction

The Nigerian ailing stock market is at this time being resuscitated, though in a gradual process, through the activities of its industries. Industrial or commercial dealings, such as production and sales of goods could give rise to an increase in investable income in stocks. Thus, evidence has shown that there is a contemporaneous relationship between industry activities and stock prices/returns (Chen, 1991).

The purpose of this study is to develop a multi-factor model for Nigerian firms operating in the banking industry. The model consists of three predetermined industry variables which seem intuitively to influence stock returns of the banking firms. The model is tested on six major participants in

the banking industry to examine if these variables have significant explanatory power in explaining the variability of the selected firms' returns.

Surprisingly, not much published research works are found concerning the testing of multi-factor models for the returns of the firms in the banking sector. Most of the previous empirical works on this topic have centered on firms in the utility industry. For instance, Melicher (1974) studied returns of 84 electronic utility firms for the period 1967-1971. Using factor analysis to determine the significance of 28 variables, he found that seven of these variables affected firm's stock returns. These seven variables were financial leverage, size, earnings trend and stability, operating efficiency, financial policy, return on investment, and market activity. Bower and Bower (1984) studied a multi-index model developed by Solomon Brothers, which was tested for daily stock returns of 93 electronic utilities from 1977 through 1981. The Nigerian banking industry is entirely based on development of product line for the mobilization and creation of credit facilities. This makes the structure of the banking firms to be apparently different from other industries such as the electronic utility. In a nutshell, this paper attempts to discover which of the industry variables that provides the stronger explanatory power in explaining the relationship between industry activities and stock market returns. In particular the following questions are examined: what is the nature of the relationship between industry activities and stock returns? And which of the industry variables is mostly significant in determining the changes in stock prices? In view of this, the paper is structured as follows: section (i) which is based in introduction had been discussed, section (ii) discusses the review of previous literature, section (iii) centers on Methodology and data description, Empirical results, Conclusive remark and recommendations are presented in sections iv, v and vi respectively.

## **2. Literature Review**

Sharpe (1963) developed a simplified single-index model to predict security returns. The major characteristic, and the primary shortcoming, of the single index model is that the only factor influencing a security's return is its sensitivity to changes in the market portfolio return (Martin & Klemkosky, 1976). King (1966) published the first important study proving that stock prices for firms in the same industry exhibit a common movement that goes beyond the market effect. Employing monthly closing stock prices for 63 firms in six industries during the June 1927 to December 1960 period, his study documents that while 50% of stock price movements could be explained by movements in the market index, 20% of the residual variance was accounted for by industry affiliation.

Meyers (1973) and Livingston (1977) in similar studies confirmed King's findings. The Meyers' study involved 60 of the same companies used

by King and 60 additional companies and concluded that although there were strong industries effects; King may have overstated the percent of residual variance explained by industry association. Livingston used 50 companies in 10 industry groups and studied monthly returns from January 1966 through June 1970. He also found strong co movement among stocks in the same industry, and concluded that 18% of residual variance was accounted for by industry effects. The recognition that factors other than movement in the market index affect security returns led to the development of multi-index models.

Several subsequent studies attempted to determine factors other than the market index which affect security prices. Sharpe (1982) studied monthly returns for stocks of 2,197 firms from 1931 through 1979. His findings showed that the  $R^2$  for a regression model was significantly improved using dividend yield, company size and bond beta in addition to a market index. Pari and Chen (1984) conducted a test of an Arbitrage Pricing Theory (APT) model for 2,090 firms for the period 1975 to 1980. Using this model, they found that factors such as the general market index, price volatility of energy, and interest rate risk, influence stock price. Chen, Roll, and Ross (1986) tested an APT model for significance of several factors in explaining security returns. Using monthly data for the period 1953-1983, their results indicate that the following factors are significant in explaining the variability of a security return: spread between long and short interest rates, expected and unexpected inflation, industrial production, and the spread between returns on high- and low-grade bonds.

Chen (1991) provided improved framework for analyzing stock returns and macroeconomic factors. He showed that using the test period 1954-1986, state variables, such as the lagged production growth rate, the default risk premium, the term premium, the short-term interest rates and the market dividend-price ratio, are important indicators of current economic growth, which is in turn negatively correlated with the market excess return. Chan (1991) examined the cross-sectional differences in Japanese stock returns and found a significant relationship between expected returns in the Japanese stock market and four variables including earnings yield, size, book to market ratio, and cash flow yield, of which the last two variables have the most significant positive effect on expected stock returns. In some early studies of industry effects on stock returns show that up to 20% of a stock's residual variance, or 10% of total variance, is due to industry association. These early studies mainly documented that stocks in the same industry do tend to move together. Beginning in the early 1980's, researchers began applying multi-index CAPMs to identify which factors influenced stock returns. Chen, Novy-Marx and Zhang (2010) developed the Investment-based models and predicted that firms that invest a lot should have lower

expected returns. Dimitrov and Jain (2008) reported a negative relationship between the yearly change in leverage and the current-year and next-year stock returns. Also, they discovered an inverse relationship between the leverage change and future earnings and posited that a firm increases its borrowing when the underlying performance is expected to deteriorate. They finally concluded that the leverage change contains value-relevant information about future stock returns. Eckbo, Masulis, and Norli (2007) reviewed the literature on exchange offers and found out that leverage decreasing or increasing activities generally associate with lower or higher announcement returns; this is likely due to asymmetric information. Penman, Richardson and Tuna (2007) investigated the book-to-price effect in expected stock returns and its relation to leverage. They split the book to price value into an enterprise and a leverage component to represent the operational risk and financial risk respectively and found that the leverage component is negatively related with expected stock returns. Therefore, our study tends to sample out four banks that have lived for more than 30 years in Nigeria, and then relates their peculiar activities with the return of overall stock markets.

### 3. Methodology And Data

#### 3.1. The Model

Our model is close to Melicher’s (1974) multi-factor model for electronic utility firms, which can be stated in a compacted form as:

$$R_t = \lambda + \beta_s x_{st} + \mu_{st} \dots \dots \dots (1)$$

Where:  $R_t$  is defined as the market return;  $\lambda$  is the intercept;  $\beta_s$  takes value from  $\beta_{s1}, \beta_{s2}, \beta_{s3} \dots \dots \dots \beta_{sn}$  for the set of regression coefficients related to the selected industry, financial/monetary factors;  $x_{s,t}$  takes value from  $x_{s,1,t}, x_{s,2,t}, x_{s,3,t} \dots \dots \dots x_{s,n,t}$  for the selected industry, financial/monetary variables and  $\mu_{s,t}$  is the stochastic error term which is assumed to be independent and identically distributed I.e.  $\mu_{s,t} \sim N(0, \delta_t^2)$

Since our study is empirically based on the specific factors in the banking industry which influence stock return, we therefore limit our model to consist of three banking industry forces in Nigeria which is in tandem with the alternative three factors model of (Chen, Norvy-Marx and Zhang, 2010). Also, the variables are expressed in a way to give expected directions of influence in a multivariate regression context. These variables are leverage or debt ratio, operating earnings and size and they capture the major attributes of industry performance. However, the explained variable is taken to be the returns on the overall market. This makes the model to be somehow distinct, insightful and fresh specification linking industry specific factors to aggregate market return. Thus, our multi-indexed model takes the form:

$$Rm_t = \lambda_0 + \lambda_1 Lev_t + \lambda_2 LogEn_t + \lambda_3 Size_t + \epsilon_t \dots \dots \dots (2)$$

Where:  $Rm_t$  is return on the overall stock market at period t.

Lev represents leverage which is the ratio of debt to equity

LogEn is the log of earnings

Size is the log of total assets.

$\lambda_0, \lambda_1, \lambda_2, \lambda_3$  are the regression parameters and  $\varepsilon$  is the error term.

On the a-priori:  $\delta Rm_t / \delta Lev_t < 0$ ;  $\delta Rm_t / \delta LogEn_t > 0$  and  $\delta Rm_t / \delta Size_t > 0$

The model above presents linear relationship between market return and banking industry factors. This intuitive linearity is drifted from other attractive multi-factor modes like those of (Ross, 1976), Kraus & Litzeberger, (1976) and (Lai & Lang, 1978).

### 3.2. Data Description and sources

The four banking industry firms randomly selected for this study are First Bank of Nigeria, United Bank of Africa, Wema Bank and Union Bank. This choice is purported by the fact that they are the only banking firms in Nigeria that have lived for more than twenty-five years and as such data based on them will produce robust empirical results to reflect the long-run position of the industry. The data relating to leverage, earning and size for each of the firms are collected from their annual reports, while returns on overall market is sourced from the Daily Officer List of the Nigerian stock Exchange (NSE). Our sampling period is twenty-five years as this is sufficient to cover the major changes in the activities of the industry ranging from the deregulation to recent consolidation policies in Nigeria.

### 4.1 Empirical Results

The first econometric test conducted in this study is the unit root tests which ascertain if the time series data for the four banks are stationary or not. The study particularly employs the Augmented Dickey Fuller Unit root manipulations to examine the level of stationarity of the variable series. The results obtained from this test are reported on table 4.1 in appendix.

Table 4.1 shows that for each series examined, the presence of unit root is not found. This makes us not to reject the alternate hypothesis that the variables series under-investigation are stationary at first difference based on mackinnon critical values of 1%, 5% and 10%. This explicitly implies that all the series are integrated of order one I (1) and can therefore be tested for long-run equilibrium relationship using the Johansen and Juselius Cointegration technique.

Since the variables are satisfied to be I(1), the next test procedure is to examine whether there is long-run relationship existing between banking industry factor and return. Here in this study, the industry effect is capture by the financial activities of the banking industry ranging from, leverage ratio, asset acquisition, and earnings. This is tandem with the study of (Melicher, 1974). However, the test first examines the null hypothesis of no cointegration, at-most- one-cointegrating vector and at-most-two-cointegrating vectors. Two, the nature and magnitude of the relationship are

examined. The results of the long-run test are presented on table 4.2 in the appendix.

From table 4.2, the trace statistic shows that the null hypothesis that there is no cointegration is rejected for the alternate hypothesis of all the banks except First Bank. This same evidence is found with the maximum Eigen statistic. Thus, our findings indicate that financial activities and decision of banking industry produce long-run effect on the performance of stocks in Nigerian stock market.

The results reported in table 4.3 in the appendix show that all the variables selected as Proxies for industry effect are maintaining significant relationship with stock market return but the nature of the relationship is however differed across respective variables and firms. For instance, leverage ratio and size base on total assets are negatively relating with stock market return, while earning per share maintains positive relationship. This means that acquisition of more debt and ploughing of earning for the purchases of assets reduce the total earnings that are supposed to be distributed to shareholders and this detrimental to the prices of stocks. Obviously, when the wealth of shareholders are reduced, then their disposable and investable funds are consequently reduced and it will have a negate demand for stocks prices because the aggregate demand for stocks will fall drastically. The study also reveals that an increase in the earning per share has multiplier effect on the prices of stocks. When a firm increases the earnings/wealth of its shareholders; the investable funds of those shareholders are simultaneously increased and all things being equal, the demand for stock increases likewise prices. We further provide test for weak endogeneity of the three specified explanatory variables in this study. The results are reported on table 4.4 in the appendix. However, from the table, it is discovered that leverage, earnings and size factors are significant at 5% level for the four banks implying that the three variables are weakly endogenously determined in the Nigerian banking industry over the study period coinciding with the regimes of deregulation and consolidation.

## **5. Conclusion**

This paper employed the Johansen and Juselius cointegration procedure to investigate the nature of the relationship between stock market return and industry financial activities that is termed industry effect. The study is particularly based on the banking firms only four of them are selected for the analysis because they are the only ones that have lived consistently for more than 30 years. Our findings show that the financial activities/ decisions of Wema Bank, Union Bank and United Bank have long-run relationship with stock prices/returns; while First Bank's activities of acquiring more assets, debt and retaining or distribution of earning maintain short-run relationship with stock return. Furthermore, in relation to existing empirical studies, we

find that an increase in earnings per share increases investable funds and the demand for stocks which simultaneously lead to a rise in stock prices conversely, ploughing back of earning for expansion or acquisition of additional assets coupled with a high leverage ratio, shrink total earnings; and vis-à-vis investable funds

## **6. Recommendations**

This study recommends that an optimum dividend policy is inevitable if Nigerian stock market will develop faster and measure up with international standard or even resolve the long-standing problems of infrequent trading.

It also recommends that investors should hold long-term investments with Wema Bank, United Bank and Union Bank, since the long-run relationship is evident in the operations of these banks and stock market returns, while investors with short-term agenda should diversify their holdings to the First Bank with the notion of hedging against uncertainty in the medium or long-term horizon.

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**Appendix:**

Table 4.1 Augmented Dickey-Fuller (ADF) Unit Root Test Results

Bank	ADF Statistics				Mackinnon Critical Values		
	Rmt	Lev	Eps	Size	1%	5%	10%
Wema Bank	-5.80	-7.010	-4.14	-6.68	-4.62	-3.71	-3.30
Union Bank	-5.89	-5.37	-4.67	-4.79	-4.39	-3.61	-3.24
United Bank	-5.81	-8.12	-3.41	-4.19	-4.39	-3.61	-3.24
First Bank	-5.43	-6.03	-6.03	-6.17	-4.39	-3.61	-3.24

Source: Extracted by the Authors from E-view 3 Program Window

Table 4.2 The Results of the Johansen Cointegration Tests

Bank	Trance statistic			Max- Eigen Statistic		5% critical value
	None	At most one	5% critical value	None	At most one	
Wema Bank	53.38	20.97	47.86	32.42	10.91	27.58
Union Bank	46.15	16.56	47.86	29.59	9.58	27.58
United Bank	71.81	24.84	47.85	46.97	16.65	27.58
First Bank	44.10	21.96	47.86	22.14	13.32	27.58

Source: Extracted by the Authors from E-view 3 Program Window

Table 4.3: Results of the Nature and Magnitude of the Relationships between Stock Market Return and Industry Effect

Bank	Coefficient of variable			Summary Statistics	
	Eps	Lev	Size	R2	F-Statistics
Wema Bank	-0.32 (0.07) (-4.74)**	0.07 (0.007) (9.62)**	0.24 (0.02) (9.62)**	0.39	3.32
Union Bank	0.14 (0.05) (2.59)**	-0.42 (0.12) (-3.41)**	-0.42 (0.12) (-3.41)**	0.18	2.01
United Bank	0.24 (0.04) (5.67)**	-0.02 (0.002) (5.67)**	-0.33 (0.04) (-8.12)**	0.56	3.54
First Bank	-0.51 (0.19) (-3.01)**	0.57 (0.07) (7.98)**	-0.43 (0.08) (-6.44)**	0.91	15.83

Source: Extracted by the Authors from E-view 3 Program Window

Note: the figures in parenthesis are the standard error and t-statistics; while \* and



\*\*implies significant at 5% and1% respectively

**Table 4.4: The Results of the Test of Weak Endogeneity**

Variable	Weak Endogeneity			
	Wema Bank	Union Bank	United Bank	First Bank
Lev (-1)	-0.32 (-4.74)	0.14 (2.59)**	0.24 (5.67)**	-0.51 (3.01)**
LogEn (-1)	0.07 (9.62)**	-0.42 (-3.41)**	-0.02 (5.67)**	0.57 (7.98)**
Size (-1)	0.24 (9.62)**	-0.42 (-3.41)**	-0.33 (-8.12)**	-0.43 (-6.44)**

Source: Extracted by the Authors from E-view 3 Program Window

Note: the figures in parenthesis are the standard error and t-statistics; while \* and \*\*implies significant at 5% and1% respectively