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Analysis Of Bonus On Share As A Determinant For Portfolio Selection Of Bank Shares [A Case Studies Of Three Most Viable Bank In Nigeria Namely Zenith Bank Plc, Guaranty Trust Bank Plc And First Bank Nigeria Plc.]

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Abstract : This research analysis of bonus on share as a determinant for portfolio selection of bank , one of the problems of investors is where to invest and how much to invest to maximize expected annual returns. Portfolio is a collection or an aggregation of investments tools such as stocks, shares, mutual funds, bonds, cash to mention a few. Data were collected from research work of Annual Report, Vetiva Research for the three banks, Zenith Bank, GTBank and First Bank share. The data was formulated as a quadratic programming problem and we create the lagrangean expression, LINDO software was used to analyse the data. Expected returns of Bonus on share capital for each bank are 35%, 28.64%, 25.84% for Zenith Bank, GTBank and First Bank respectively. The increment that yields the minimum variance with mixed investment opportunity is 30%. Hence the optimum solution to the model is b_1 = 30.15%, b_2 = 50.94% and b_3 = 18.91%Where b_1 represent Zenith bank expected investment of the share holder, b_2 represent GTBANK bank expected investment of the share holder and b_3 represent First bank expected investment of the share holder. Based on the analysis on Zenith bank, GTBANK, First bank, any interested investor can decide to invest 30.15% of available fund on Zenith bank share, 50.94% on GTBANK share and 18.91% on First bank share. This will guarantee 30% increase of bonus payment on share of the shareholder in the nearest future.

Keywords: Bonus, shares ,invest, funds, bank

I. INTRODUCTION

Portfolio management is simply a process of selecting a profitable investment policy for individuals out of available policies open to the investors. One of the problems of investors is where to invest and how much to invest to maximize expected annual returns. Portfolio is a collection or an aggregation of investments tools such as stocks, shares, mutual funds, bonds, cash to mention a few. This portfolio is solely a function of the investor's income, budget at a convenient time frame. The banking sector of the Nigeria Economy has been viewed as the most profitable place to invest in its share capital [8]. Most investors in the nation have their major investment in these banks[6]. This is an area which needs further study as Gupta's sample is too small to arrive at any definitive conclusions. In fact, we know too little about how companies decide on bonus issues; certainly, we know less about bonus policy than about dividend policy. There is considerably more work on the post bonus dividend performance. Academics have long argued that the real significance of bonus issues is that they signal management's perception of higher profits and dividends in future. [5] indicated that a third of the companies did not raise the dividend quantum and that significant number even reduced the dividend..

The range of increase was also large and in many cases, the old dividend percentage was maintained on the enlarged equity base. [2,7] also indicated that the bonus per shares has no effect on the share value and supported the view that bonus merely signals higher future profits and dividends. There is considerable evidence to suggest that the market assimilates information regarding bonus issues rapidly and efficiently. In an efficient market, the share starts rising in anticipation of the bonus announcement and completes its rise immediately after the announcement. [6] also concludes that there is no evidence to suggest that learning lags exist or that the assimilation of information is slow. Rights issues made below market prices are similar to bonus issues in some respects. In fact, a rights issue at a discount from the market price can be decomposed conceptually into a bonus issue and a rights issue at market prices. [3] analyses the value of rights shares and illustrates the advantage derived by the investor. [1] studied the efficiency of the market in assimilating the information content of rights issues and concluded that the market was by and large efficient. One unresolved issue in the field of rights and bonus issues is the price correction on the ex-bonus and ex-rights days. While these corrections are not equal to the theoretical corrections, the issue is complicated by tax arbitrage considerations and by liquidity effects. This unresolved anomaly deserves fuller study. [4,5] show that the beta coefficient of a security, when returns are measured using discrete time frame, vary with the length of the period used for computation for returns. The systematic risk of a security if such a method is used would therefore depend on the assumption about the holding period of investors.

II. METHOD OF DATA COLLECTION

To achieve the aims and objectives data were collected from research work of ***Annual Report, Vetiva Research.*** This undoubtly a secondary data with possible error. Problem of researcher in Nigeria is getting reliable data to work with, although data of this nature is not possible to collect primarily, we definitely depend on transcribing from available records.

The table below shows the **Percentage of Bonus on Share held** on Zenith Bank, GTBank and First Bank share (Data in percentage of Bonus payment per share holding).

Table: 1

				YEAR	
BANK	**2008**	**2009**	**2010**	**2011**	**2012**
ZENITH	25	50	75	25	0
GTBANK	34.09	25	25	34.09	25
FIRST BANK	41.67	29.17	29.17	12.50	16.67

Source: STOCKWATCH WEEKLY from PEACE OF MIND ARCHIVE

III. DATA ANALYSIS

An investor has fixed sum of money say **K**, to invest in share capital of three identified most viable bank in Nigeria namely Zenith Bank plc, Guarantee Trust Bank plc and First Bank Nigeria plc.

The portfolio problem is to determine how much money the investor should allocate to each Bank share so that total expected return is greater than or equal to some lowest acceptable amount say **T**, and so that the total variance of future payment is minimized.

Let $\mathbf{b_1, b_2, b_3}$ designate the amount of money to be allocated to Zenith Bank plc, Guarantee Trust Bank plc and First Bank Nigeria plc share respectively and let $\mathbf{b_{is}}$ denote the return per Naira invested from investment **í (í = 1, 2, 3)** during the **S** period of time in the past **(S =1, 2, 3,.. 5)**. If the past history of payments is indicative of future performance, the expected future return per Naira from investment **1, 2, 3** is

$E_{í} = \frac{\sum_{S=1}^{5} bís}{5}$ ---------- (1)

And the expected return from three investments combined is

$E = E_1b_1 + E_2b_2 + E_3b_2$ ---------- (2)

The portfolio problem modeled as quadratic programming is

Minimize $R = A^TCA$

Subject to: $b_1 + b_2 + b_3 = K$

$E_{b1}b_1 + E_{b2}b_2 + E_{b2}b_3 \geq T$

$b_1 \geq 0, b_2 \geq 0, b_3 \geq 0$, where **C** is the covariance Matrix which is positive semi - definite

Matrix C = $\begin{bmatrix} \sigma_{11}^2 & \sigma_{12}^2 & \sigma_{13}^2 \\ \sigma_{21}^2 & \sigma_{22}^2 & \sigma_{23}^2 \\ \sigma_{31}^2 & \sigma_{32}^2 & \sigma_{33}^2 \end{bmatrix}$

E is the mathematical expectation

Column Matrix A = $\begin{bmatrix} b_1 \\ b_2 \\ b_3 \end{bmatrix}$

This can be translated as follows

Minimize $R = (b_1\ b_2\ b_3) \begin{bmatrix} \sigma_{11}^2 & \sigma_{12}^2 & \sigma_{13}^2 \\ \sigma_{21}^2 & \sigma_{22}^2 & \sigma_{23}^2 \\ \sigma_{31}^2 & \sigma_{32}^2 & \sigma_{33}^2 \end{bmatrix} (b_1, b_2, b_3)^T$

Subject to: $b_1 + b_2 + b_3 = K$

$E_{b1}b_1 + E_{b2}b_2 + E_{b2}b_3 \geq 0$

$b_1 \geq 0, b_2 \geq 0, b_3 \geq 0$

Hence we have

Minimize $R = b_1^2\sigma_{11}^2 + b_2^2\sigma_{22}^2 + b_3^2\sigma_{33}^2 + b_1b_2\ (\sigma_{21}^2 + \sigma_{12}^2) + b_1b_3\ (\sigma_{31}^2 + \sigma_{13}^2) + b_2b_3\ (\sigma_{32}^2 + \sigma_{23}^2)$

S.T.

$b_1 + b_2 + b_3 = K$

$E_{b1}b_1 + E_{b2}b_2 + E_{b3}b_3 \geq T$

$b_1 \geq 0, b_2 \geq 0, b_3 \geq 0$

WE CALCULATE VARIANCE-COVARIANCE MATRIX from GBSTAT

MATRIX C = $\begin{bmatrix} 812.5 & -45.45 & 119.8 \\ -45.45 & 24.7884 & 5.6767 \\ 119.8 & 5.6767 & 133.7028 \end{bmatrix}$

Expected returns of Bonus on share capital for each bank are 35%, 28.64%, 25.84% respectively. The budget constraint investment portfolio optimization problem has three candidate assets $\mathbf{(b_1, b_2, b_3)}$ for our portfolio.

IV. THE MODEL

We shall determine what fraction should be devoted (or of the share should be purchased) to each Bank share (asset), so an expected return of at least 27% (equivalently, a growth factor 1.27) is obtained while minimizing the variance in return and not exceeding a budget constraint.

We also impose a restriction that any given asset can constitute at most 70% of the portfolio. The variance of the entire portfolio is;

$R = 812.5b_1^2 + 24.79b_2^2 + 133.70b_3^2 - 90.90b_1b_2 + 239.6b_1b_3 + 11.35b_2b_3$

Since variance is a measure of risk, we need to minimize. Hence

Minimize $R= 812.5b_1^2 + 24.79b_2^2 + 133.70b_3^2 - 90.90b_1b_2 + 239.6b_1b_3 + 11.35b_2b_3$

Subject to:

! We start with **N**1.00

$b_1 + b_2 + b_3 = 1$

! We want to end with at least **N**1.27

$1.35b_1 + 1.286b_2 + 1.258b_3 \geq 1.27$

! No asset may constitute more than 70% of the portfolio

$b_1 < 0.70$

$b_2 < 0.70$

$b_3 < 0.70$

The research employs LINDO software. We create the lagrangean expression. The impute procedure for LINDO requires the model be converted to true linear form by writing the first order conditions. To do this we introduce lagrangean multiplier for each constraint. There are five (5) constraints, we shall use five (5) dual variables devoted respectively as UNITY, RETURN, b_1 FRAC, b_2 FRAC and b_3 FRAC.

The lagrangean expression corresponding to this model is now

MIN $R (b_1, b_2, b_3) = 812.5b_1^2 + 24.79b_2^2 + 133.70b_3^2 - 90.90b_1b_2 + 239.6b_1b_3 + 11.35b_2b_3$

$+ (b_1 + b_2 + b_3 - 1)$ UNITY $+ [1.27 - (1.35b_1 + 1.286b_2 + 1.258b_3)]$ RETURN

$+ (b_1 - 0.70)\ b_1$ FRAC $+ (b_2 - 0.70)\ b_2$ FRAC $+ (b_3 - 0.70)\ b_3$ FRAC

Next we compute the first order conditions

$\frac{\partial R}{\partial b_1} = 1625b_1 - 90.90b_2 + 239.6b_3 +$ UNITY $- 1.35$RETURN $+ b_1$ FRAC > 0

$\frac{\partial R}{\partial b_2} = 49.58b_2 - 90.90b_1 + 11.35b_3 +$ UNITY $- 1.286$RETURN $+ b_2$ FRAC > 0

$\frac{\partial R}{\partial b_3} = 267.4b_3 + 239.6b_1 + 11.35b_2 +$ UNITY $- 1.258$RETURN $+ b_3$ FRAC > 0

Adding the real constraints

$b_1 + b_2 + b_3 = 1$

$1.35b_1 + 1.286b_2 + 1.258b_3 > 1.27$

$b_1 < 0.70$

$b_2 < 0.70$

$b_3 < 0.70$

The final model is thus

MIN $b_1 + b_2 + b_3$ + UNITY + RETURN + b_1 FRAC + b_2 FRAC + b_3 FRAC
S.T.
! First order condition for b_1:
$1625b_1 - 90.90b_2 + 239.6b_3$ + UNITY – 1.35RETURN + b_1 FRAC > 0
! First order condition for b_2 :
$-90.90b_1 + 49.58b_2 + 11.35b_3$ + UNITY – 1.286RETURN + b_2 FRAC > 0
! First order condition for b_3 :
$239.6b_1 + 11.35b_2 + 267.4b_3$ + UNITY – 1.258RETURN + b_3 FRAC > 0
! ---------- Start of "Real" constraints ----------
! Budget constraint multiplier is UNITY:
$b_1 + b_2 + b_3 = 1$
! Growth constraint multiplier is RETURN:
$1.35b_1 + 1.286b_2 + 1.258b_3 > 1.27$
! Max fraction of b_1 multiplier is b_1 FRAC:
$b_1 < 0.70$
! Max fraction of b_2 multiplier is b_2 FRAC:
$b_2 < 0.70$
! Max fraction of b_3 multipliers is b_3 FRAC:
$b_3 < 0.70$
END
QCP

V. THE SOLUTION OF THE MODEL FROM LINDO SOFTWARE

LP OPTIMUM FOUND AT STEP 1 FOR T = 1. 25 TO 1. 27
OBJECTIVE FUNCTION VALUE
1) 1.000000

VARIABLE	VALUE	REDUCED COST
B1	0.162436	0.000000
B2	0.137564	0.000000
B3	0.700000	0.000000
UNITY	0.000000	1.000000
RETURN	0.000000	1.000000
B1FRAC	0.000000	1.000000
B2FRAC	0.000000	1.000000
B3FRAC	0.000000	1.000000

NO. ITERATIONS= 1
LP OPTIMUM FOUND AT STEP 1 FOR T = 1.28
OBJECTIVE FUNCTION VALUE
1) 1.000000

VARIABLE	VALUE	REDUCED COST
B1	0.181635	0.000000
B2	0.188914	0.000000
B3	0.629452	0.000000
UNITY	0.000000	1.000000
RETURN	0.000000	1.000000
B1FRAC	0.000000	1.000000
B2FRAC	0.000000	1.000000
B3FRAC	0.000000	1.000000

NO. ITERATIONS= 1
LP OPTIMUM FOUND AT STEP 0 FOR T 1.29
OBJECTIVE FUNCTION VALUE
1) 1.000000

VARIABLE	VALUE	REDUCED COST
B1	0.241555	0.000000
B2	0.349176	0.000000
B3	0.409269	0.000000
UNITY	0.000000	1.000000
RETURN	0.000000	1.000000
B1FRAC	0.000000	1.000000
B2FRAC	0.000000	1.000000
B3FRAC	0.000000	1.000000

NO. ITERATIONS= 0
LP OPTIMUM FOUND AT STEP 0 FOR T = 1.30
OBJECTIVE FUNCTION VALUE
1) 1.000000

VARIABLE	VALUE	REDUCED COST
B1	0.301475	0.000000
B2	0.509438	0.000000
B3	0.189086	0.000000
UNITY	0.000000	1.000000
RETURN	0.000000	1.000000
B1FRAC	0.000000	1.000000
B2FRAC	0.000000	1.000000
B3FRAC	0.000000	1.000000

NO. ITERATIONS= 0
LP OPTIMUM FOUND AT STEP 1 FOR T = 1.31
OBJECTIVE FUNCTION VALUE
1) 4.099982

VARIABLE	VALUE	REDUCED COST
B1	0.375000	0.000000
B2	0.625000	0.000000
B3	0.000000	99.690002
UNITY	3.099982	0.000000
RETURN	0.000000	2.268000
B1FRAC	0.000000	1.000000
B2FRAC	0.000000	0.000000
B3FRAC	0.000000	1.000000

NO. ITERATIONS= 1

VI. DISCUSSION

The summary of the results yields the table below for purpose of comparison and decisions

Table: 2

T	B1	B2	B3	Variance
1.25 – 1.27	0.162436	0.137564	0.700000	1.0000000
1.28	0.181635	0.188914	0.629452	1.0000000
1.29	0.241555	0.349176	0.409269	1.0000000
1.30	0.301475	0.509438	0.189086	1.0000000 ***
1.31	0.375000	0.625000	0.000000	4.099982

The increment that yields the minimum variance with mixed investment opportunity is 30%. Hence the optimum solution to the model is b_1 = 30.15%, b_2 = 50.94% and b_3 = 18.91%

Where b_1 represent Zenith bank expected investment of the share holder, b_2 represent GTBANK bank expected investment of the share holder and b_3 represent First bank expected investment of the share holder.

VII. RECOMMENDATION

Based on the available data on bonus declared on share to shareholders of Zenith bank, GTBANK, First bank, any interested investor can decide to invest 30.15% of available fund on Zenith bank share, 50.94% on GTBANK share and 18.91% on First bank share. This will guarantee 30% increase of bonus payment on share of the shareholder in the

nearest future. It is also recommended that share holders and the company management should employ the help of portfolio manager with a good knowledge of operations research and keep a good and proper data bank for research for good decision making.

VIII. CONCLUSION

The purpose of this research work is to show how portfolio selection of bank share of the three most viable banks in Nigeria can be done using the past records of each bank bonus declarations for five years. It also shows how allocation of available fund by investors should be allocated to available investment open to investors. The research has answered the quest of how much an investor should allocate to each investment to minimize risk and maximize return.

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