International Journal of Innovative Mathematics, Statistics & Energy Policies
13(4):177-188, Oct-Dec., 2025

 www.seahipublications.org ISSN: 2467-852X

doi:10.5281/zenodo.17849129

Effects of Unemployment Rates and Trading Days on Share Value: A Quadratic and Cubic Trend Analysis

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ABSTRACT
The use of matrix algebra with stochastic terms were considered in modeling share prices on two trend functions. Firstly, the methods of rate of change were adopted to assess the value of share prices on two trend functions such as: Quadratic and Cubic respectively. From the results Mean Squared Error (MSE) were used as a criterion for selection based on this trend functions: the results show that the Quadratic trend function outperformed Cubic trend. However, the impact of unemployment rates and trading days on the share prices of Access Bank and Fidelity Bank were examined. The results show that low unemployment rates (0.2) have a strong positive effect on share prices, moderate unemployment rates (0.5) have positive a neutral effect, and high unemployment rates (0.8) have a strong negative effect. An increase in trading days is also found to positively impact share prices. The findings suggest that investors should consider these factors when making investment decisions.
Keywords: Quadratic trend, Cubic trend, Unemployment rates, MSE and Share prices

1.1 INTRODUCTION

The Nigerian banking sector is a crucial component of the country's economy and its performance is closely linked to the overall economic conditions. The understanding the factors that influence the share prices of Access Bank and Fidelity Bank is essential for investors and policymakers. Unemployment rates and trading activities are key indicators of a country's economic health and they can have a significant impact on the share prices of banks. Nigeria's unemployment rate has been a concern in recent years and the banking sector has experienced fluctuations in trading activities; see [1-4].

However, a matrix application is fundamental in mathematics and numerous also in other sciences. Matrix algebra has a lot of great content for discussion and research findings. It has enough theorems that are straight forward and yet striking on their formulation, uncomplicated and yet ingenious in their proof, and diverge as well as powerful in their application. Nevertheless, lots of authors on stock prices using different approaches in their respective modeling, for instance [5] considered the stochastic analyses of Markov chain in finite states which enabled them to proffer precise condition of obtaining expected mean rate of return of each stock. [6] Considered a matrix application to Dangote stock market prices is considered where an illustrative case is provided in different forms. In a similar manner, [7] examined stochastic system with changes to measure the value of wealth for each corporate investor through linear and quadratic returns. Also, [8] Investigated system of stochastic differential equations with prominence on disparities of drift parameter for stock market. In [9] the stochastic analysis of two asset values was successfully analyzed. [10]. Considered stability and controllability for stock exchange market were obtained; first by developing a vector valued stochastic differential system with control. [11] Investigated the applications of various stochastic volatility models in determining optimal investment strategies in the stock market. Yet [8] studied stochastic model of the fluctuation of stock market price. Numerous authors have comprehensively addressed the issues of stock prices namely [14 – 19].

This study aims to examine the impact of unemployment rates and trading days on the share prices of Access Bank and Fidelity Bank, providing insights into the relationships between these variables and informing investment decisions and policy formulation

2.1 MATERIAL AND METHODS

Firstly, our focus in definition 2.1 stochastic processes that would lead to stochastic differential equation, which gave rise to matrix algebra with stochastic terms.

Definition 2.1 Stochastic Processes: It can also be seen as a statistical event that evolves time in accordance to probabilistic laws. Mathematically, a stochastic process may be defined as a collection of random variables which are ordered in time and defines at a set of time points which may be continuous or discrete.

Definition 2.2 Stochastic Differential Equations: Here, consider a market where the underlying asset price v $,0 \le t \le T$ on a complete probability space $(\Omega, f, \wp)$ is governed by the following stochastic differential equation:.

$$dS(t) = \alpha S(t)dt + \sigma dw(t).\ 0 < v < \infty \tag{2.1}$$

2.2 Problem Formulation

We adopt matrix algebra to model the share prices of Access Bank, and Fidelity Bank. Considering two distinct trends namely Quadratic, and Cubic during the trading of shares. Hence, we say let $A_i(t)$, and $F_i(t)$ denotes the share prices of these banks at time t ,where $i = 1,2,3$ with respect to their corresponding trend functions. In particular $A_1(t)$, and $F_1(t)$ is associated with a quadratic trend, $A_2(t)$, and $F_2(t)$, is associated with a cubic trend and by using the last term of (2.1) the investment matrix follows a stochastic process. We consider the rate of change based on different trend functions, hence the investment dynamics is shown as follows:

- **Matrix of Quadratic trend function with stochastic terms:** A quadratic trend function with stochastic terms can be represented as follows:

$$A_1(t) = \begin{pmatrix} Xt^2{}_{011} + \sigma W_t & Xt^2{}_{012} + \sigma W_t & Xt^2{}_{013} + \sigma W_t \\ Xt^2{}_{021} + \sigma W_t & Xt^2{}_{022} + \sigma W_t & Xt^2{}_{023} + \sigma W \\ Xt^2{}_{031} + \sigma W & Xt^2{}_{032} + \sigma W & Xt^2{}_{033} + \sigma W_t \end{pmatrix} \tag{2.2}$$

$$F_1(t) = \begin{pmatrix} Xt^2{}_{011} + \sigma W_t & Xt^2{}_{012} + \sigma W_t & Xt^2{}_{013} + \sigma W_t \\ Xt^2{}_{021} + \sigma W_t & Xt^2{}_{022} + \sigma W_t & Xt^2{}_{023} + \sigma W \\ Xt^2{}_{031} + \sigma W & Xt^2{}_{032} + \sigma W & Xt^2{}_{033} + \sigma W_t \end{pmatrix} \tag{2.3}$$

- **Matrix of Cubic trend function with stochastic terms:** Matrix of cubic trend function can be represented as follow:

$$A_2(t)=\begin{pmatrix} Xt^3{}_{011}+\sigma W_t & Xt^3{}_{012}+\sigma W_t & Xt^3{}_{013}+\sigma W_t \\ Xt^3{}_{021}+\sigma W_t & Xt^3{}_{022}+\sigma W_t & Xt^3{}_{023}+\sigma W_t \\ Xt^3{}_{031}+\sigma W_t & Xt^3{}_{032}+\sigma W & Xt^3{}_{033}+\sigma W_t \end{pmatrix} \tag{2.4}$$

$$F_2(t)=\begin{pmatrix} Xt^3{}_{011}+\sigma W_t & Xt^3{}_{012}+\sigma W_t & Xt^3{}_{013}+\sigma W_t \\ Xt^3{}_{021}+\sigma W_t & Xt^3{}_{022}+\sigma W_t & Xt^3{}_{023}+\sigma W_t \\ Xt^3{}_{031}+\sigma W_t & Xt^3{}_{032}+\sigma W & Xt^3{}_{033}+\sigma W_t \end{pmatrix} \tag{2.5}$$

where $X_{011}+,...,+X_{033}$ represents initial monthly share prices under different trend functions at time t , σ is the volatility of the underlying share prices of the three banks under study, W_t is Brownian motion or wieners process according to [18].

2.1.1 Method of Solution

In this section, (2.2-2.5) is solved independently using the method of rate of change .The rate of change means the value of asset over time. Consequently, solving from (2.2-2.3) which is quadratic trend function with stochastic terms gives the following:

$$\frac{dA_1(t)}{dt}=\begin{pmatrix} 2Xt_{011}+\sigma\frac{W_t}{dt} & 2Xt_{012}+\sigma\frac{W_t}{dt} & 2Xt_{013}+\sigma\frac{W_t}{dt} \\ 2Xt_{021}+\sigma\frac{W_t}{dt} & 2Xt_{022}+\sigma\frac{W_t}{dt} & 2Xt_{023}+\sigma\frac{W_t}{dt} \\ 2Xt_{031}+\sigma\frac{W_t}{dt} & 2Xt_{032}+\sigma\frac{W_t}{dt} & 2Xt_{033}+\sigma\frac{W_t}{dt} \end{pmatrix} \tag{2.6}$$

$$\frac{dF_1(t)}{dt}=\begin{pmatrix} 2Xt_{011}+\sigma\frac{W_t}{dt} & 2Xt_{012}+\sigma\frac{W_t}{dt} & 2Xt_{013}+\sigma\frac{W_t}{dt} \\ 2Xt_{021}+\sigma\frac{W_t}{dt} & 2Xt_{022}+\sigma\frac{W_t}{dt} & 2Xt_{023}+\sigma\frac{W_t}{dt} \\ 2Xt_{031}+\sigma\frac{W_t}{dt} & 2Xt_{032}+\sigma\frac{W_t}{dt} & 2Xt_{033}+\sigma\frac{W_t}{dt} \end{pmatrix} \tag{2.7}$$

Solving from (2.4-2.5) which is cubic trend function with stochastic terms gives the following:

$$\frac{dA_2(t)}{dt}=\begin{pmatrix} 3Xt^2{}_{011}+\sigma\frac{dW_t}{dt} & 3Xt^2{}_{012}+\sigma\frac{dW_t}{dt} & 3Xt^2{}_{013}+\sigma\frac{dW_t}{dt} \\ 3Xt^2{}_{021}+\sigma\frac{dW_t}{dt} & 3Xt^2{}_{022}+\sigma\frac{dW_t}{dt} & 3Xt^2{}_{023}+\sigma\frac{dW_t}{dt} \\ 3Xt^2{}_{031}+\sigma\frac{dW_t}{dt} & 3Xt^2{}_{032}+\sigma\frac{dW_t}{dt} & 3Xt^2{}_{033}+\sigma\frac{dW_t}{dt} \end{pmatrix} \tag{2.8}$$

$$\frac{dF_2(t)}{dt}=\begin{pmatrix} 3Xt^2{}_{011}+\sigma\frac{dW_t}{dt} & 3Xt^2{}_{012}+\sigma\frac{dW_t}{dt} & 3Xt^2{}_{013}+\sigma\frac{dW_t}{dt} \\ 3Xt^2{}_{021}+\sigma\frac{dW_t}{dt} & 3Xt^2{}_{022}+\sigma\frac{dW_t}{dt} & 3Xt^2{}_{023}+\sigma\frac{dW_t}{dt} \\ 3Xt^2{}_{031}+\sigma\frac{dW_t}{dt} & 3Xt^2{}_{032}+\sigma\frac{dW_t}{dt} & 3Xt^2{}_{033}+\sigma\frac{dW_t}{dt} \end{pmatrix} \tag{2.9}$$

$$\frac{dM_2(t)}{dt}=\begin{pmatrix} 3Xt^2{}_{011}+\sigma\frac{dW_t}{dt} & 3Xt^2{}_{012}+\sigma\frac{dW_t}{dt} & 3Xt^2{}_{013}+\sigma\frac{dW_t}{dt} \\ 3Xt^2{}_{021}+\sigma\frac{dW_t}{dt} & 3Xt^2{}_{022}+\sigma\frac{dW_t}{dt} & 3Xt^2{}_{023}+\sigma\frac{dW_t}{dt} \\ 3Xt^2{}_{031}+\sigma\frac{dW_t}{dt} & 3Xt^2{}_{032}+\sigma\frac{dW_t}{dt} & 3Xt^2{}_{033}+\sigma\frac{dW_t}{dt} \end{pmatrix} \tag{2.10}$$

2.1.2 Actual and Predicted Share prices on the three Banks

Here, we compare the actual and predicted share prices that can help investors or the management of the three banks to make informed decisions. Hence, let each of the share prices and their predicted prices of the banks be represented as follows:

$(A_1, \mathrm{A}_2, \mathrm{A}_3, \cdots, \mathrm{A}_n)'$ and $(A_1', \mathrm{A}_2', \mathrm{A}_3', \cdots, \mathrm{A}_n')'$, $(F_1, \mathrm{F}_2, \mathrm{F}_3, \cdots, \mathrm{F}_n)'$ and $(F_1', \mathrm{F}_2', \mathrm{F}_3', \cdots, \mathrm{F}_n')'$, $(M_1, \mathrm{M}_2, \mathrm{M}_3, \cdots, \mathrm{M}_n)'$ and $(M_1', \mathrm{M}_2', \mathrm{M}_3', \cdots, \mathrm{M}_n')'$ for each of the trend functions: Quadratic, and Cubic be denoted as, and during the trading days.

2.1.3 Comparison of Estimation on the Trend functions

We have earlier defined our trend functions such as: Quadratic trend, and Cubic trend. The Mean Square Errors (MSE) shall be used as a criterion for selection of the best trend for each of banks. It is a measure of average squared difference between predicted and actual values. The mean squared error (MSE) criterion is given by:

$$MSE = \left(\frac{1}{n}\right)\sum\left(y_i - \hat{y}_t\right)^2 \tag{2.11}$$

where y_i is the actual share prices of Access Bank, Fidelity Bank and Merged Bank, $\hat{y}_i$ is the predicted values, n is the number of data points and $\sum$ is summation symbols , indicating the sum of the values. The method with the minimum mean squared error (MMMSE) becomes the best methods for the estimation of trend functions.

2.2 Effects of unemployment parameters on the value of share price changes

let $A_i'(t)$, and $\mathrm{F}_i'(t)$ denote the total effects of unemployment rates for Access Bank, where $i = 1,2,3$ and Fidelity Bank under the two trend functions during the period of trading. Also let

$(n_1, \mathrm{n}_2, ..., \mathrm{n}_n)'$ represents unemployment rates parameters. In view of the rate of change following:

$\frac{A_1(t)}{dt}$, and $\frac{A_2(t)}{dt}$ represents the matrices of Access Bank at different trend functions,

$\frac{F_1(t)}{dt}$, and $\frac{F_2(t)}{dt}$ represents the matrices of Fidelity Bank at different trend functions all in time t ;

hence the entire dynamics follows:

3.1.4. Effects of unemployment rates parameters to study the rate of change of Access Bank when the trend function is Quadratic with stochastic terms:

$$A_1'(t) = \begin{pmatrix} 2Xt_{011} + \sigma\frac{W_t}{dt} & 2Xt_{012} + \sigma\frac{W_t}{dt} & 2Xt_{013} + \sigma\frac{W_t}{dt} \\ 2Xt_{021} + \sigma\frac{W_t}{dt} & 2Xt_{022} + \sigma\frac{W_t}{dt} & 2Xt_{023} + \sigma\frac{W_t}{dt} \\ 2Xt_{031} + \sigma\frac{W_t}{dt} & 2Xt_{032} + \sigma\frac{W_t}{dt} & 2Xt_{033} + \sigma\frac{W_t}{dt} \end{pmatrix}\begin{pmatrix} n_1 \\ n_2 \\ n_3 \end{pmatrix} \tag{2.12}$$

$$F_1'(t) = \begin{pmatrix} 2Xt_{011} + \sigma\frac{W_t}{dt} & 2Xt_{012} + \sigma\frac{W_t}{dt} & 2Xt_{013} + \sigma\frac{W_t}{dt} \\ 2Xt_{021} + \sigma\frac{W_t}{dt} & 2Xt_{022} + \sigma\frac{W_t}{dt} & 2Xt_{023} + \sigma\frac{W_t}{dt} \\ 2Xt_{031} + \sigma\frac{W_t}{dt} & 2Xt_{032} + \sigma\frac{W_t}{dt} & 2Xt_{033} + \sigma\frac{W_t}{dt} \end{pmatrix}\begin{pmatrix} n_1 \\ n_2 \\ n_3 \end{pmatrix} \tag{2.13}$$

3.2.2 Effects of unemployment rate parameters to study the rate of change of Access Bank when the trend function is Cubic with stochastic terms:

$$A_2'(t)=\begin{pmatrix} 3Xt^2{}_{011}+\sigma\frac{dW_t}{dt} & 3Xt^2{}_{012}+\sigma\frac{dW_t}{dt} & 3Xt^2{}_{013}+\sigma\frac{dW_t}{dt} \\ 3Xt^2{}_{021}+\sigma\frac{dW_t}{dt} & 3Xt^2{}_{022}+\sigma\frac{dW_t}{dt} & 3Xt^2{}_{023}+\sigma\frac{dW_t}{dt} \\ 3Xt^2{}_{031}+\sigma\frac{dW_t}{dt} & 3Xt^2{}_{032}+\sigma\frac{dW_t}{dt} & 3Xt^2{}_{033}+\sigma\frac{dW_t}{dt} \end{pmatrix}\begin{pmatrix} n_1 \\ n_2 \\ n_3 \end{pmatrix} \tag{2.14}$$

$$F_2'(t)=\begin{pmatrix} 3Xt^2{}_{011}+\sigma\frac{dW_t}{dt} & 3Xt^2{}_{012}+\sigma\frac{dW_t}{dt} & 3Xt^2{}_{013}+\sigma\frac{dW_t}{dt} \\ 3Xt^2{}_{021}+\sigma\frac{dW_t}{dt} & 3Xt^2{}_{022}+\sigma\frac{dW_t}{dt} & 3Xt^2{}_{023}+\sigma\frac{dW_t}{dt} \\ 3Xt^2{}_{031}+\sigma\frac{dW_t}{dt} & 3Xt^2{}_{032}+\sigma\frac{dW_t}{dt} & 3Xt^2{}_{033}+\sigma\frac{dW_t}{dt} \end{pmatrix}\begin{pmatrix} n_1 \\ n_2 \\ n_3 \end{pmatrix} \tag{2.15}$$

In the sequel, we will say the current week share prices of these banks in market. Thus, the vector C represents the current state, then:

$$C=\begin{pmatrix} 0 \\ 1 \\ 0 \end{pmatrix} \tag{2.16}$$

For simplicity the information needed to calculate the share prices of the two banks for market in the n coming weeks by using the following equation as defined:

$$A^n(t)C \tag{2.17}$$

$$F^n(t)C \tag{2.18}$$

where $A(t)$ *and* $F(t)$ is the share prices of Access and Fidelity Banks, respectively.

3.1. Results and Discussion

This Section presents analyzed results whose methods are stated in Section 3.1. Hence, we have the following parameter values: n = 0.2, 0.5 ,0.8, dW = 0.002, $\sigma = 0.25$, $dt = 0.005$ and $t = 1$. which were implemented using Matlab programming software:

3.2 Analysis of Rate of Change on the Share prices of Access Bank and Fidelity Bank through quadratic and cubic trends

$$\frac{dA_1(t)}{dt}=\begin{pmatrix}820.1 & 160.1 & 252.1\\158.1 & 196.1 & 184.1\\254.1 & 182.1 & 756.1\end{pmatrix}$$

$$,\frac{dF_1(t)}{dt}=\begin{pmatrix}830.1 & 124.1 & 270.1\\122.1 & 242.1 & 162.1\\278.1 & 160.1 & 568.1\end{pmatrix}\frac{dM_1(t)}{dt}=\begin{pmatrix}1650.1 & 284.1 & 528.1\\280.1 & 438.1 & 162.1\\532.1 & 160.1 & 568.1\end{pmatrix}$$

$$\frac{dA_2(t)}{dt}=\begin{pmatrix}1230.1 & 240.1 & 378.1\\158.1 & 294.1 & 276.1\\381.1 & 273.1 & 1134.1\end{pmatrix},\frac{dF_2(t)}{dt}=\begin{pmatrix}1245.1 & 186.1 & 414.1\\183.1 & 363.1 & 243.1\\417.1 & 240.1 & 852.1\end{pmatrix}$$

$$\frac{dM_2(t)}{dt}=\begin{pmatrix}2475.1 & 426.1 & 792.1\\420.1 & 657.1 & 519.1\\798.1 & 513.1 & 2286.1\end{pmatrix}$$

The above are predicted share prices of Access Bank and Fidelity Bank through their respective trend functions during period of trading. This trend functions shows different significant impacts on share prices based on their uniqueness which follows stochastic formation.

Table 3.1: Summary of Best Trend Function for trading of Shares

QUADRATIC	**TREND**	**FUNCTION**
Banks	**Access Bank**	**Fidelity**
MSE	9.2346e+05	2.1218e+05**
CUBIC	**TREND**	**FUNCTION**
MSE	2.1160e+06	8.4818e+05

Table 3.1 talks about the comparison of trend function using Mean Squared Error (MSE). The results show that the quadratic trend function has the least minimal value of MSE, indicating it is the better than cubic trend. This suggests that the quadratic trend function is better suited for modeling the share prices of the two banks. This result has some implications for share prices of Access Bank, and Fidelity Bank.

3.2.1 Analysis of unemployment Rates on Share Price Changes

- **Effects of unemployment rates parameters to study the rate of change of Access Bank when the trend function is Quadratic with stochastic terms:**
- **Low unemployment rate of 2%:**

$$A_1'(t)=\begin{pmatrix}820.1 & 160.1 & 252.1\\ 158.1 & 196.1 & 184.1\\ 254.1 & 182.1 & 756.1\end{pmatrix}\begin{pmatrix}0.2\\ 0.2\\ 0.2\end{pmatrix}=\begin{pmatrix}246\\ 108\\ 238\end{pmatrix}$$

- **Moderate unemployment of 5%:**

$$A_1'(t)=\begin{pmatrix}820.1 & 160.1 & 252.1\\ 158.1 & 196.1 & 184.1\\ 254.1 & 182.1 & 756.1\end{pmatrix}\begin{pmatrix}0.5\\ 0.5\\ 0.5\end{pmatrix}=\begin{pmatrix}616\\ 269\\ 596\end{pmatrix}$$

- **High unemployment 8%:**

$$A_1'(t)=\begin{pmatrix}820.1 & 160.1 & 252.1\\ 158.1 & 196.1 & 184.1\\ 254.1 & 182.1 & 756.1\end{pmatrix}\begin{pmatrix}0.8\\ 0.8\\ 0.8\end{pmatrix}=\begin{pmatrix}985\\ 430\\ 954\end{pmatrix}$$

- **Low unemployment rates of 2%:**

$$F_1'(t)=\begin{pmatrix}830.1 & 124.1 & 270.1\\ 122.1 & 242.1 & 162.1\\ 278.1 & 160.1 & 568.1\end{pmatrix}\begin{pmatrix}0.2\\ 0.2\\ 0.2\end{pmatrix}=\begin{pmatrix}246\\ 105\\ 201\end{pmatrix}$$

- **Moderate unemployment rates of 5%:**

$$F_1'(t)=\begin{pmatrix}830.1 & 124.1 & 270.1\\ 122.1 & 242.1 & 162.1\\ 278.1 & 160.1 & 568.1\end{pmatrix}\begin{pmatrix}0.5\\ 0.5\\ 0.5\end{pmatrix}=\begin{pmatrix}615\\ 263\\ 503\end{pmatrix}$$

- **High unemployment rates of 8%:**

$$F_1'(t)=\begin{pmatrix}830.1 & 124.1 & 270.1\\ 122.1 & 242.1 & 162.1\\ 278.1 & 160.1 & 568.1\end{pmatrix}\begin{pmatrix}0.8\\ 0.8\\ 0.8\end{pmatrix}=\begin{pmatrix}984\\ 421\\ 805\end{pmatrix}$$

- **Effects of unemployment rate parameters to study the rate of change of Access Bank when the trend function is Cubic with stochastic terms:**
- **Low unemployment rates of 2%:**

$$A_2'(t)=\begin{pmatrix}1230.1 & 240.1 & 378.1\\ 158.1 & 294.1 & 276.1\\ 381.1 & 273.1 & 1134.1\end{pmatrix}\begin{pmatrix}0.2\\ 0.2\\ 0.2\end{pmatrix}=\begin{pmatrix}370\\ 146\\ 358\end{pmatrix}$$

- **Moderate unemployment rates of 5%:**

$$A_2'(t)=\begin{pmatrix}1230.1 & 240.1 & 378.1\\ 158.1 & 294.1 & 276.1\\ 381.1 & 273.1 & 1134.1\end{pmatrix}\begin{pmatrix}0.5\\ 0.5\\ 0.5\end{pmatrix}=\begin{pmatrix}924\\ 364\\ 894\end{pmatrix}$$

- **High unemployment rates of 8%:**

$$A_2'(t)=\begin{pmatrix}1230.1 & 240.1 & 378.1\\ 158.1 & 294.1 & 276.1\\ 381.1 & 273.1 & 1134.1\end{pmatrix}\begin{pmatrix}0.8\\ 0.8\\ 0.8\end{pmatrix}=\begin{pmatrix}27187\\ 27185\\ 27187\end{pmatrix}$$

- **Low unemployment rates of 2%:**

$$F_2'(t)=\begin{pmatrix}1245.1 & 186.1 & 414.1\\ 183.1 & 363.1 & 243.1\\ 417.1 & 240.1 & 852.1\end{pmatrix}\begin{pmatrix}0.2\\ 0.2\\ 0.2\end{pmatrix}=\begin{pmatrix}369\\ 158\\ 302\end{pmatrix}$$

- **Moderate unemployment rates of 5%:**

$$F_2'(t)=\begin{pmatrix}1245.1 & 186.1 & 414.1\\ 183.1 & 363.1 & 243.1\\ 417.1 & 240.1 & 852.1\end{pmatrix}\begin{pmatrix}0.5\\ 0.5\\ 0.5\end{pmatrix}=\begin{pmatrix}923\\ 395\\ 755\end{pmatrix}$$

- **High unemployment rates of 8%:**

$$F_2'(t)=\begin{pmatrix}1245.1 & 186.1 & 414.1\\ 183.1 & 363.1 & 243.1\\ 417.1 & 240.1 & 852.1\end{pmatrix}\begin{pmatrix}0.8\\ 0.8\\ 0.8\end{pmatrix}=\begin{pmatrix}27187\\ 27185\\ 27187\end{pmatrix}$$

Unemployment rate Effect on share prices: Low (0.2) strong positive effect on share prices. Low unemployment rates indicate a robust economy, increased consumer spending and higher demand for loans. This can lead to increased revenue and profitability for banks, resulting higher share prices in the two banks under different trends. Moderate (0.5) neutral effect on share prices. Moderate unemployment rates indicate a stable economy but may not be driving significant growth. Share prices may remain stable, but not experience significant gains. High (0.8) strong negative effect on share prices. High unemployment rates indicate a weak economy, reduced consumer spending and lower demand for loans. This can lead to decreased revenue and profitability for banks, resulting in lower share prices.

Quadratic trend functions:

Access Bank: Predicting the market State in 1 week

$$\begin{pmatrix} 820.1 & 160.1 & 252.1 \\ 158.1 & 196.1 & 184.1 \\ 254.1 & 182.1 & 756.1 \end{pmatrix}^{1} \begin{pmatrix} 0 \\ 1 \\ 0 \end{pmatrix} = \begin{pmatrix} 160.1000 \\ 196.1000 \\ 182.1000 \end{pmatrix}$$

Fidelity Bank: Predicting the Market State in 1 week

$$\begin{pmatrix} 830.1 & 160.1 & 270.1 \\ 122.1 & 196.1 & 162.1 \\ 278.1 & 182.1 & 568.1 \end{pmatrix}^{1} \begin{pmatrix} 0 \\ 1 \\ 0 \end{pmatrix} = \begin{pmatrix} 124.1000 \\ 242.1000 \\ 160.1000 \end{pmatrix}$$

Access Bank: Predicting 4 weeks from now

$$\begin{pmatrix} 820.1 & 160.1 & 252.1 \\ 158.1 & 196.1 & 184.1 \\ 254.1 & 182.1 & 756.1 \end{pmatrix}^{4} \begin{pmatrix} 0 \\ 1 \\ 0 \end{pmatrix} = \begin{pmatrix} 2.7061 \\ 0.9880 \\ 3.6366 \end{pmatrix}$$

Fidelity Bank: Predicting 4 weeks from now

$$\begin{pmatrix} 830.1 & 160.1 & 270.1 \\ 122.1 & 196.1 & 162.1 \\ 278.1 & 182.1 & 568.1 \end{pmatrix}^{4} \begin{pmatrix} 0 \\ 1 \\ 0 \end{pmatrix} = \begin{pmatrix} 2.2030 \\ 0.6796 \\ 1.5798 \end{pmatrix}$$

Access Bank : Predicting 6 weeks from now:

$$\begin{pmatrix} 820.1 & 160.1 & 252.1 \\ 158.1 & 196.1 & 184.1 \\ 254.1 & 182.1 & 756.1 \end{pmatrix}^{6} \begin{pmatrix} 0 \\ 1 \\ 0 \end{pmatrix} = \begin{pmatrix} 3.3507 \\ 1.2032 \\ 3.0709 \end{pmatrix}$$

Fidelity Bank : Predicting 6 weeks from now

$$\begin{pmatrix} 830.1 & 160.1 & 270.1 \\ 122.1 & 196.1 & 162.1 \\ 278.1 & 182.1 & 568.1 \end{pmatrix}^{6} \begin{pmatrix} 0 \\ 1 \\ 0 \end{pmatrix} = \begin{pmatrix} 3.2791 \\ 0.9420 \\ 2.2140 \end{pmatrix}$$

Access Bank : Predicting 12 weeks from now

$$\begin{pmatrix} 820.1 & 160.1 & 252.1 \\ 158.1 & 196.1 & 184.1 \\ 254.1 & 182.1 & 756.1 \end{pmatrix}^{12} \begin{pmatrix} 0 \\ 1 \\ 0 \end{pmatrix} = \begin{pmatrix} 6.1794 \\ 2.2098 \\ 5.6250 \end{pmatrix}$$

Fidelity Bank : Predicting 12 weeks from now

$$\begin{pmatrix} 830.1 & 160.1 & 270.1 \\ 122.1 & 196.1 & 162.1 \\ 278.1 & 182.1 & 568.1 \end{pmatrix}^{12} \begin{pmatrix} 0 \\ 1 \\ 0 \end{pmatrix} = \begin{pmatrix} 1.9558 \\ 0.5418 \\ 1.3205 \end{pmatrix}$$

The above is show casing future prediction of market state which can be used for decision making. Hence, we have an increase in trading days can lead to increased liquidity and trading activity which can positively impact share prices of Access Bank and Fidelity Bank. This could mean increased investor interest and demand for shares, driving up prices, improved marketability and liquidity of shares, making them more attractive to investors, potential for increased trading volumes, leading to higher revenue for the banks. This scenario is good time to buy shares in Access Bank, anticipating increased demand and higher prices, hold onto existing shares, expecting increased liquidity and trading activity to drive up prices or consider selling shares if prices have increased significantly to lock in profits.

4.1 CONCLUSION

The study concludes that the quadratic trend function is most suitable for modeling share prices of Access Bank, and Fidelity Bank when compared with cubic trend function. The study further show that, unemployment rates and trading days are significant factors influencing the share prices of Access Bank and Fidelity. Investors should monitor these factors and adjust their investment strategies accordingly. The study provides insights for investors, policymakers, and financial analysts on the impact of economic indicators on share prices. Nevertheless, investors and financial analysts can use the quadratic trend function to predict share prices and identify potential opportunities for investment.

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