International Journal of Innovative Mathematics, Statistics & Energy Policies
10(3):31-44, July-Sept., 2022

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Modelling The Impact of Foreign Monetary Policy on Market Performance of Selected West African Countries

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ABSTRACT
The study investigates the impact of foreign monetary policy and market performance of selected West African countries. Specifically, the objectives of the study include to**;** determine which panel data model best interprets the data; determine the effect of monetary policy on market performance in West Africa; and examine the relationship between monetary policy and market performance in West Africa. The study adopted an ex-post-facto design. The data for the study were extracted from the Index Mundi and the World Data Indicator websites for the period of 40 years (1980–2020). The data for the study were exchange rate, the inflation rate and the cotton price. Geographically, the four West African countries considered for the study include Cote d'Ivoire, Cameroon, Nigeria, and Ghana. The three-panel data analytical models used were the Pooled ordinary least squares (POLS) model, the Fixed Effect Model (FEM), and the Random Effect Model (REM). Model selection tests were also performed, using the F-Ratio Test, the Breush-Pagan Langrange Multiplier Test, and the Hausman Test. This was done to choose the model that best describes the data set. Results from the model selection tests show that the fixed effect model is the most appropriate model for estimating the panel data on the variables under investigations. However, the result of the Fixed Effect Model (FEM), is used to interpret the relationship between foreign monetary policy and market performance of selected West African countries. The result shows that there exists a relationship between foreign monetary policy and the market performance of selected West African countries. It was further revealed that 82.91% of the variation in the market performance of these countries were caused by a 1% increase in monetary policy, leaving 14% unexplained. This also means that the predictor variable is 82.91% very strong in explaining the response variable. Therefore, it was recommended that in an attempt to model the effect of monetary policy on market performance, it is better to use the fixed effect models since they capture each country's intercept but share the same slope with the regressors.
Keywords: Foreign, Monetary, Policy, Market Performance

INTRODUCTION
Several studies focus on US monetary policy and stock prices but the studies on foreign monetary policy and market performance of selected West African Countries are lacking. Therefore, it was found interesting to investigate the relationship between foreign monetary policy and market performance of selected West African Countries. The interest to investigate the relationship between foreign monetary policy and market performance stems from the fact that changes in the short-term interest rate affect stock markets through several transmission channels. So, there is need to identified these transmission channels through which foreign monetary policy influence market performance.

Also, Monetary policy is noted to have influence on economic growth, development and market performance in a number of diverse ways. Sometimes, it could be due to inconsistency in policy formulation, volatility and the inability to stabilized prices and financial indicators. An upsurge in stock market activity positively influences economic growth by encouraging savings, boosting investment activities allocating and utilizing resources in a more efficient manner. There are divergent views as to whether stock markets really play a pivotal role in economic growth.

Stiglitz in 1985 is of the view that stock market development may hurt economic growth. According to him this may be possible by allowing investors to sell their stocks easily, monitoring of firms for good corporate performance is loose and may result in poor firm management and hamper firm growth. Stock market development can also affect and be affected by economic growth variables. Exchange rates and interest rates are key monetary policy variables which are noted to influence stock market activity. At the same time these key variables could also be influenced significantly by stock market activity. Clearly there is a channel through which stock market activity is linked to economic growth. However, the nature and direction of linkage between stock market performance and monetary policy variables remain a largely empirical issue, with little evidence on the West African situations. Stock markets activities nevertheless continue to flourish and Africa has not been left out of this burgeoning phenomenon. It is, however, imperative to conduct more empirical studies to ascertain the relationship between stock market performance and monetary policy variables in Africa. African economies in particular have been in dire need of growth-augmenting factors to spur growth and development in a speedy manner. Therefore**,** the study is aimed at modelling impact of foreign monetary policy on market performance of selected West African Countries. Specifically to; determine which panel data model best interprets the data, determine the effect of Monetary policy on market performance in West Africa and to examine the relationship between monetary policy and market performance in West Africa.

METHODOLOGY

3.1 Sources of Data

The data for study was extracted from index mundi website and the World Data Indicators for the period of 40 years (1980-2020). The data for the study include; exchange rate, inflation rate and cotton price. Foreign exchange rate is used as a proxy for monetary policy while inflation rate and cotton price were used as proxies for market performance. Geographically, the four West African countries include; Cote d'ivoire, Cameroon, Nigeria and Ghana

3.2 Panel Unit Root Test

If the variables in a panel data set are nonstationary, estimates are inefficient and may result in erroneous regression unless they are cointegrated. Four panel unit root tests are performed to determine the order of integration of the variables utilized in the study: Levin, Lin, and Chu (Levin *et al*., 2002); Im, Pesaran, and Shin (IPS) (Im *et al.*, 2003); Fisher - Dickey Fuller (ADF) ((Dickey and Fuller, 1979); and Fisher – Philips – Perron (Phillips and Perron, 1988). The null hypothesis indicates that there is a unit root in all of these tests.

3.3 Method of Estimation

One of the objectives of this study is to determine which panel data model best interprets the data. For this reason, the three panel data analytical models will be employed in this study; namely: Pooled Ordinary Least Squares Model (POLS), Fixed Effects Model (FEM) and Random Effects Model (REM). The variables are exch, denoted by exchange rate ; Int, denoted by interest rate; Agricultural Export Earnings, denoted by AE; and All share Index, denoted by ASI;

3.4 **Model Specification**

The following parameters used in the models:

β is the coefficient of the explanatory variables.

v_i denotes the unobservable individual-specific effect.

ε_{it} , u_{it} denotes the remainder disturbance, known as the idiosyncratic error term.

Mishra commented that these three panel data analytical models differ in their assumptions about the intercept (α) and the disturbance term (u_{it}).

3.5.1 Specification of Pooled Ordinary Least Squares Regression model (POLS)

According to Adesete (2017) and Zulfikar (2018), the pooled ordinary least squares regression model ignores the panel structure of the data, that is, the time and individual dimensions are not considered, it treats all observation as equivalent.

The POLS regression model for the study is

$$EXCh_{it} = \alpha + \beta_1 * \text{int} + \beta_2 * ASI + \beta_3 * AE + \beta_4 INFT + u_{it} \qquad (2.1)$$

Where,

$i = 1,2,\cdots,7$ (countries)

$t = 1,2,\cdots,10$ (year)

α is the common intercept.

u_{it} is the idiosyncratic error term.

β is the coefficient of the parameter estimates.

3.5.2 Fixed Effect Model

The fixed effects model arises from the assumption that the omitted, unobserved effect v_i are correlated with the regressors, x_{it}, it can be estimated in two ways: the within group estimator and the least squares dummy variable (LSDV) estimator.

3.5.3 Specification of Fixed Effect Within Group Model [FEM (WG)]

The WG regression model is, $\left(EXch_{it} - \overline{Exch}_i\right) = \beta_1\left(\text{int}_{it} - \overline{\text{int}}_i\right) + \beta_2\left(AEi_{it} - \overline{AE}_i\right) + \beta_3\left(ASI_{it} - \overline{ASI}_i\right) +$

$$\beta_4\left(IFT_{it} - \overline{IFT}_i\right) + \left(\varepsilon_{it} - \bar{\varepsilon}_i\right) \qquad (2.2)$$

Where, $\overline{EXCh}$, $\overline{\text{int}}$, $\overline{AE}$, $\overline{ASI}$, $\overline{IFT}$ are the sample mean values of Exch, Int, ASI and IFT respectively.

3.5.3.1 Specification of Fixed Effect Least Squares Dummy Variable Model [FEM (LSDV)]

An alternative way to estimate the fixed effects model is by least squares of y_{it} on x_{it} including a set of $N-1$ dummy variables which identify the individuals and hence an additional $N-1$ parameters. The individual effect is picked up by the dummy variable D_{mi} where $m = N-1$. The [FEM(LSDV)] allows for heterogeneity among subjects by allowing each country to have its own intercept value.

The LSDV regression model for this study is,

$$Exch_{it} = \gamma_i + \gamma_2 D_{2i} + \gamma_3 D_3 + \gamma_4 D_4 + \gamma_5 D_5 + \beta_1 * \text{int} + \beta_2 * ASI + \beta_3 * AE + \beta_4 INFT + u_{it} \qquad (2.3)$$

Where,

D_{2i} = 1 for Cameroon, 0 otherwise

D_{3i} = 1 for Ghana, 0 otherwise

D_{4i} = 1 for Nigeria, 0 otherwise

D_{5i} = 1 for Cote d'Ivoire, 0 otherwise

$\gamma_2 - \gamma_5$ are respectively parameter estimates of the dummy variables.

Cocoa Prices in Cameroon, Nigeria, Ghana, Côte d'Ivoire

3.6. Specification of Random Effects Model (REM)

The REM assumes that the errors v_i and ε_{it} are conditionally mean zero, uncorrelated and homoskedastic.

The Random Effect Model for the study is,

$$EXch_{it} = \alpha + \beta_1 * \text{int}_{it} + \beta_2 * AE_{it} + \beta_3 * ASI_{it} + \beta_4 * INFT_{it} + v_i + \varepsilon_{it} \quad (2.4)$$

Where; v_i is the individual-specific (unobserved) effects, assumed to be random variables that are independent of the regressors (explanatory variables), with a mean value of zero and a variance of σ_v^2.

ε_{it} is the idiosyncratic error term since it varies over cross section as well as time.

3.7 Model Selection Tests

Following the difference in assumptions and estimations of the panel data models, one is left with the question of; which is the best model. The F – test, the Breusch - Pagan Langrange Multiplier Test, and the Hausman Test are carried out to ascertain the most appropriate panel data model for the data set.

3.7.1 The F – Ratio Test

According to Greene, the F- Ratio Test is used to decide between the POLS and the FEM. Under the null hypothesis that the constant terms (dummy parameters except for one that is dropped) are all equal to zero. The null hypothesis is:

$$H_0 = \gamma_1 = \gamma_2 = \cdots = \gamma_{n-1} = 0 \quad (2.5)$$

The F – Ratio test statistic is:

$$F_{(N-1, NT-N-K)} = \frac{(RRSS - URSS)/(N-1)}{(URSS)/(NT-N-K)} = \frac{\left(R^2_{LSDV} - R^2_{POOLED}\right)/(N-1)}{\left(1 - R^2_{LSDV}\right)/(NT-N-K)} \quad (2.6)$$

3.7.2 The Breusch - Pagan Langrange Multiplier Test (LM

Breusch and Pagan in 1980 devised a Langrange Multiplier (LM) Test for the random effects model based on the OLS residuals. The LM is used to decide between a RE regression and a simple OLS regression. The null hypothesis is that there is no significant difference across cross – sectional units (that is, no panel effect) implying that RE model is inappropriate. That is,

$$H_0 : \sigma_u^2 = 0 \quad \text{versus} \quad H_1 : \sigma_u^2 \neq 0 \tag{2.7}$$

The Breusch - Pagan Langrange Multiplier test statistic is:

$$LM = \frac{NT}{2(T-1)}\left[\frac{\sum_{i=1}^{N}\left(\sum_{t=1}^{T}\varepsilon_{it}\right)^2}{\sum_{i=1}^{N}\sum_{t=1}^{T}\varepsilon_{it}^2} - 1\right]^2 = \frac{NT}{2(T-1)}\left[\frac{\sum_{i=1}^{N}\left(T\bar{\varepsilon}_{i.}\right)^2}{\sum_{i=1}^{N}\sum_{t=1}^{T}\varepsilon_{it}^2} - 1\right]^2 \tag{2.8}$$

Under the null hypothesis, the limiting distribution of LM is Chi – squared with one degree of freedom.

3.7.3 The Hausman Test

In 1978, de Hausman vised a specification test for the test of orthogonality of the common effects and the regressors [22]. The Hausman test is used to decide between the REM and the FEM. The null hypothesis is that there is no dependence between the individual effects and the explanatory Variables. The Hausman test statistic is

$$H = \left(\widehat{\beta}_{fe} - \widehat{\beta}_{re}\right)' \operatorname{var}\left(\widehat{\beta}_{fe} - \widehat{\beta}_{re}\right)^{-1}\left(\widehat{\beta}_{fe} - \widehat{\beta}_{re}\right)$$

$$= \left(\widehat{\beta}_{fe} - \widehat{\beta}_{re}\right)' \left(V(\widehat{\beta}_{fe}) - V(\widehat{\beta}_{re})\right)^{-1}\left(\widehat{\beta}_{fe} - \widehat{\beta}_{re}\right) \tag{2.9}$$

Where both $V(\hat{\beta}_{fe})$ and $V(\hat{\beta}_{re})$ take the classical (non-robust) form.

Results

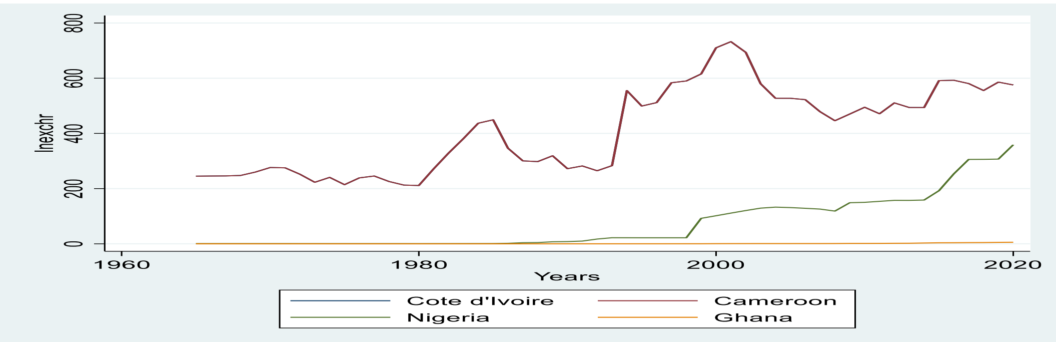

Figure 4.1: Time Plot of the Raw Series of Log Exchange Rate (Inexchr) from the Four selected Countries

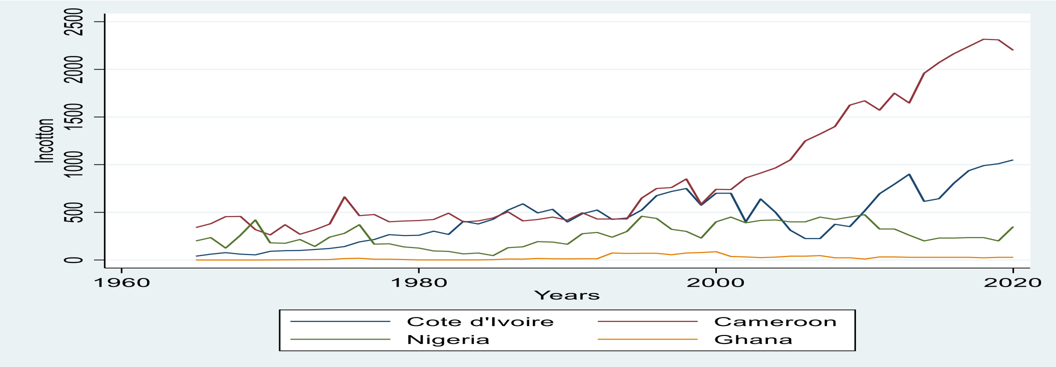

Figure 4.2: Time Plot of the Raw Series of Log Cotton (Incotton) from the Four Selected Countries

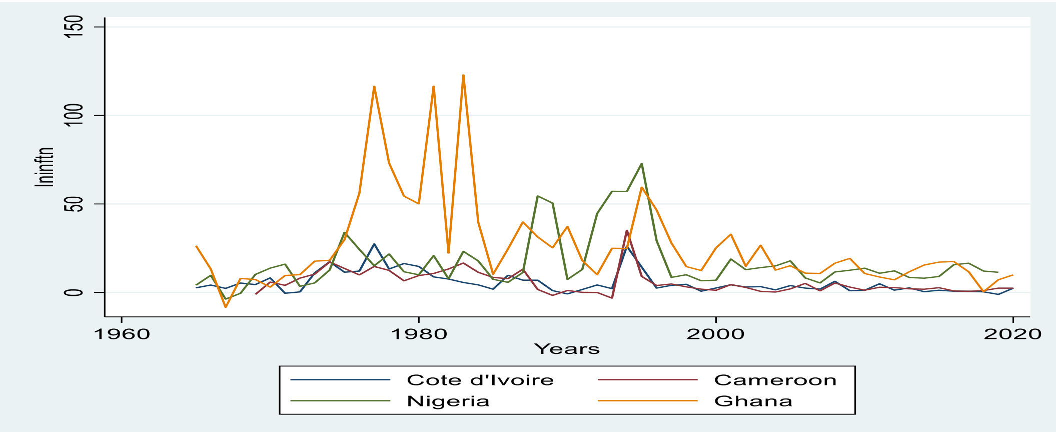

Figure 4.3: Time Plot of the Raw Series of Log Inflation (Ininflatn) from the Four selected Countries

Table 4. 1: Descriptive Statistics

Variable		Mean	Std. Dev.	Min	Max	Observations
Inexchr	overall	2.649996	4.620401	-9.547213	6.596323	N = 224
	between		4.554478	-3.706413	5.949046	n = 4
	within		2.391838	-3.190804	8.078408	T = 56
Incotton	overall	5.178976	1.686698	0	7.747597	N = 219
	between		1.699109	2.66674	6.543733	n = 4
	within		.8727266	2.512235	6.978143	T-bar = 54.75
Iniftn	overall	2.0497	1.247083	-2.812556	4.811163	N = 209
	between		.8777207	1.258022	2.934524	n = 4
	within		.9859601	-2.048189	4.32241	T-bar = 52.25

Table 4 2. Panel Unit Root Tests Results

	Im,Persaran& Shim		Levin,Lin&Chu		ADF-Fisher Chi square	
	Level	First Difference	First Difference	First Difference	Level	First Difference
Incotton	0.206	-9.369***	-0.280	-7.992***	6.784	-8.308***
Inexr	1.268	-7.1838***	-0.306***	1.334	1.333	-6.773***
InInftn	-3.196***	-	-0.306***	-10.142***	-3.172***	-

*Note: *** denotes significance at 1% level, ** denotes significance at 5% level, and * denotes significance at 10% level.*

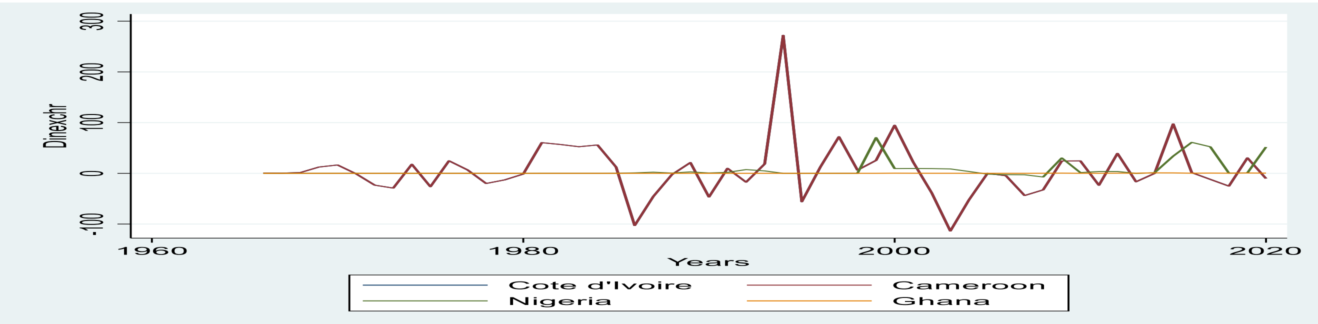

Figure 4.4: Time Plot of the Differenced Series of Log Exchange Rate (DInexchr) from the Four selected Countries

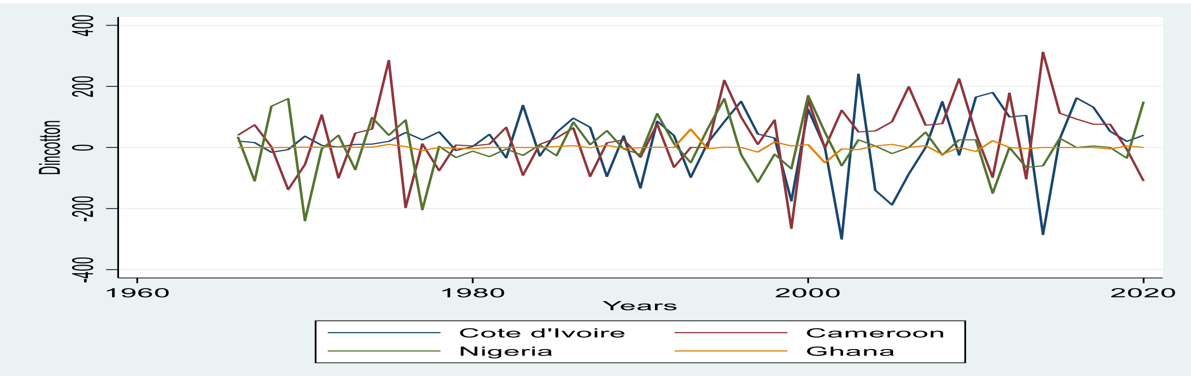

Figure 4.5: Time Plot of the Differenced Series of Log Cotton (Incotton) from the Four selected Countries

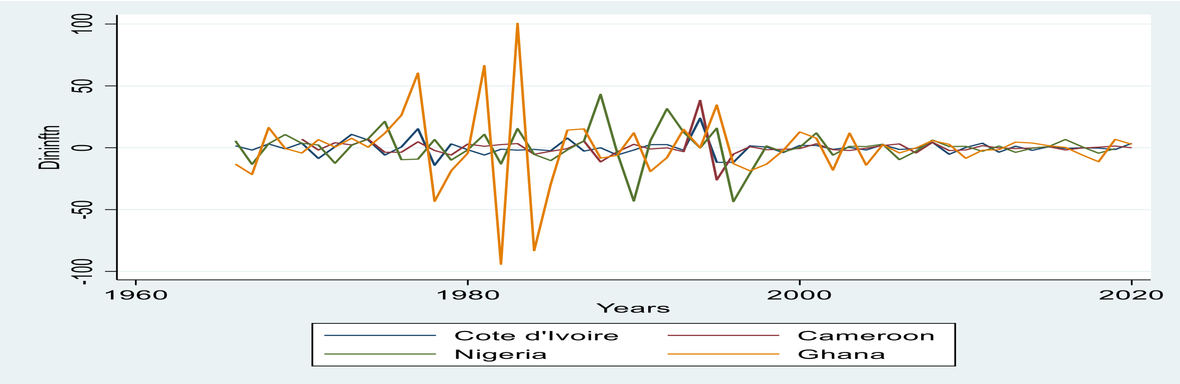

Figure 4.6: Time Plot of the Differenced Series of Log Inflation (DIninflatn) from the Four selected Countries

4.3 Estimation Results of Panel Data Models Using Stata

Table 4.3: Summary of the Estimation Results of the Panel Data Models

	Pooled OLS	**Fixed effect LSDV model**	**Fixed effect within group model**	**Random effect model**
Incotton	2.001***	1.537***	1.537***	1.677**
Inflation	-0.529***	-0.158(0.123)	-0.158(0.123)	-0.209(0.123)
intercept	-6.398***	-3.980***	-4.772***	-5.394***
C_1		1.169		
C_2		0.000(omitted)		
C_3		-1.538***		
C_4		-2.802***		
C_5		0.000(omitted)		
F – test (model)	347.18***	193.10***	21.14	
Prob (F-test)	0.000	0.000	0.000	
SSE	880.253	1.832		
RME	2.088	0.829		
DF	204	204		
R^2	0.775	0.829	0.769	0.770
Adj R^2	0.772	0.825		
Number of observations	205	205	205	205

** *denotes significance at the 5% level, and* *** *denotes significance at 1% level.*

4.6 **Comparison Between fixed and Pools Regression Model Using F- Test**

The F- test is conducted to compare between fixed effect model and pools regression model is done to determine whether pool Effect (PE) or Fixed Effect (FE) is most appropriate model to be used in estimating the relationship between foreign monetary policy and market performance of selected west African Countries. Results of the F-test is shown in the table below

Table 4.4: Summary of the Model Selection Results using F-test, Lagrange Multiplier, and Hausman test

	F – Ratio Test	**Breusch-Pagan Langrange Multiplier Test (LM)**	**Hausman Test**
F – Test	21.14	-	-
Chi – square	-	103.69	-4.87
Degree of freedom	3, 199	1	3
P – value	0.000	0.000	failed

Decision rule: reject H_0 if p – value < 0.05

4.11 Diagnostics

The following diagnostic tests were done and they include; cross-sectional dependence/contemporaneous correlation using Breusch-pagan LM,cross-sectional dependence/contemporaneous correlation using Pasaran

CD test and heteroscedasticity. The result of the cross-sectional dependence/contemporaneous correlation using Breusch-pagan LM is shown in Table 4.5 below.

Table 4.5 Correlation Matrix of Residuals using Breusch-Pagan LM test of Independence

Correlation matrix of residuals:

	__e1	__e2	__e3	__e4
__e1	1.0000			
__e2	0.5144	1.0000		
__e3	-0.6682	-0.6257	1.0000	
__e4	-0.7179	-0.6684	0.9012	1.0000

Breusch-Pagan LM test of independence: chi2(6) = 138.099, Pr = 0.0000
Based on 44 complete observations over panel units

Table 4.5 contains the results of the correlation matrix of residual test using Breusch-Pagan LM test of Independence. The results that there is the absence of serial correlation. Similarly, the Cross-sectional dependence/contemporaneous correlation using Pasaran CD test was conducted with a view to examine the presence of serial correlation and the result is shown in Table 4.6 below.

Table 4.6: Results of Test for cross-sectional dependence/contemporaneous correlation using Pasaran CD test

Pesaran's test of cross sectional independence = -3.762, Pr = 0.0002

Average absolute value of the off-diagonal elements = 0.699

Table 4.6 contain the results of test for cross-sectional dependence/contemporaneous correlation using Pasaran CD test. From the results obtained there is absence of cross-sectional dependence/contemporaneous correlation. Also, the presence of heteroscedasticity and the result is shown in table4.7 below

5.1 DISCUSSIONS OF RESULTS

Figures 4.1, 4.2 and 4.3 show the time graph of the logarithmic transformation of the raw series on the exchange rate, cotton and inflation the four selected countries. The time plot of these series was done to examine the trend, direction of movement of the series and also the present of unit roots. A visual examination of all series shows that they show a positive volatile trend except in the case of Ghana exchange rate and cotton prices which do not show a definite trend during the study period.

Table 4.1 shows the results of descriptive statistics for the whole sample and their summary of the variables. This shows three different types of statistics and it include; overall, between, and within.

Overall statistics are based on their respective observations, the "Between" statistics are calculated on the basis of summary statistics of four countries (entities) regardless of time period, while "within" statistics by summary statistics of time periods regardless of the country. The mean of exchange rate per country (in 224 observations) is 2.650, with the range from -9.547(Cote d'Ivoire in 1965) to 6.596 (Ghana in 2020). Also, the mean of cotton price per country (in 224 observations) is 5.179, with the range from 0.000 (Cote d'Ivoire in 1965) to 7.748 (Ghana in 2020) and inflation had a mean of 2.050, with the range from -2.813 (Cote d'Ivoire in 1965) to 4.812 (Ghana in 2020).

Also, table 4.2 contains the panel unit root tests results and the study uses the individual root (Lm, Pesaran and Shin), common root (Levin, Lin, & Chu) and ADF-Fisher Chi-square. The table shows that log Cotton prices, exchange rate are all integrated in order 1 whilst log inflation is stationary in levels. From all indications, since they are of I (0) and 1(1) and none is I (2), we can develop a panel regression model.

Also, figure 4.4 , 4.5 and 4.6 shows a time plot of the differenced series of log exchange rate, cotton and Inflation from the four selected countries. In another development, the Interpretation of the results from the estimation results of panel data models using Stata are done under three categories and it include; the interpretation of the results from the pool regression model, fixed effect model (Least Squares Dummy Variable Model (LSDV)) regression model and the fixed effect model (Within Group Estimation).

Therefore, table 4.3 contains Stata output of a pool regression model using ordinary least square regression estimation. The results have three layouts: the upper left contains the results of analysis of variance (ANOVA), the second upper right part shows other summary statistics including the F – statistic and the R – squared and the third layout of the table shows the estimated coefficients of the parameters. The ANOVA reported the total sum of squares as 3906.056 of which 3025.85 is accounted for by the model and 880.25 is leftward as residual (unexplained) of the model. The R – squared (R^2) from the regression model is 0.7746 indicating that our model accounts for (or explained) about 77.46% of the variation in market performance leaving 14% unexplained. It also means that the predictor variable is 77.46 % very strong in explaining the response variable. The t–test on the table of estimated coefficients of the individual indicator of market performance (cotton price and inflation) is significantly different from zero at the 5% level significance. Exchange rate has positive and negative significant negative effect on cotton price (2.001), and inflation rate (-0.529) and the constant term (-6.398). This simply means 1% increase in exchange rate will leads to increase the price of cotton all been equal. Similarly, this simply means 1% increase in exchange rate will leads to decrease inflation rate all been equal. The probability of the F – statistic is given as (0.000) which is statistically significant from zero at the 5% level of significance. This simply means that the simultaneous influence of predictor variable to the response variable have been proved to be statistically significance, Therefore, it can be concluded that the model as a whole is highly significant. Also, table 4.3 contain results of the fixed effect model (Least Squares Dummy Variable Model (LSDV)) Regression model. The R – squared (R^2) from the regression model is 0.8291 indicating that our model accounts for (or explained) about 82.91% of the variation in market performance leaving 14% unexplained. It also means that the predictor variable is 82.91% very strong in explaining the response variable. Looking the individual effect of inflation rate and constant are not significant while the and cotton price (Incotton) is significant from zero even at the 5% level of significance. The probability Value (P-value) is very low which shows that our model is highly significant. at the 5% level of significance. The LSDV model posits that each country has its own intercept but shares the same slopes of regressors. The parameter estimates of C_1 (dropped dummy) is presented in the LSDV intercept (-3.980) which is the baseline intercept. Each of $c_2 - c_5$ represents the deviation of the other country's specific intercept from the baseline intercept(-3.980). Therefore, alternative hypothesis is rejected while null hypothesis is accepted.

Similarly, table 4.3 contains the results of the fixed effect model (Within Group Estimation). The result obtained from the Within Group model (table 4.3) is similar to that of the LSDV; the parameter estimates and their standard errors are the same. However, the estimate of the constant intercept is different. This model returns incorrect F – statistic and R^2. There are three R^2: within, between, and overall. R^2 – within has all the properties of the usual Ordinary Least Square (OLS) R^2. According to Pillai (2016), the other two R^2s are correlation squared corresponding to the between estimator equation and an overall equation with a constant intercept. Therefore, the usual R^2 for the model is 0.7689 which indicates that the model accounts for about 76.89% of the variance the market performance of the countries. For this model, Stata reports a Poolability test at the bottom of the results; Stata uses u_i for γ_i as used in this work. The F – statistic rejects the null of zero country heterogeneity and asserts that the countries are unique, the FEM should be selected.

Table 4.3 contain the results of Random Effect Model (REM). The result from a Wald Chi – squared test indicates that the model as a whole (i.e., all coefficients taken jointly) is significant. The R^2 reported is 0.7704 which indicates that the model accounts for about 77.04% of the total variance in market performance. Inflation rate and the constant term are negatively correlated with foreign monetary policy, whereas, cotton price is positively correlated. Cotton price is statistically significant as shown in the p-value of the z-tests.

Table 4.4 contains the summary of the estimation results of the panel data models and the interpretation of the results from the summary of the estimated models. The results for the model selection using f-test, Lagrange multiplier, and Hausman tests were also estimated as shown in table 4.4. Table 4.4 contains the results of the f-test for fixed effect. The F-statistics (F (3,199) is 21.14 and P-value (F-statistics) is 0.000. Therefore, null hypothesis of F-test for a fixed effect model is rejected while the alternative hypothesis is accepted. The Prob>F is < 0.05, so we accept the null that the coefficients for all years are jointly equal to zero, therefore no time fixed- effects are needed in this case.

Similarly, the Breusch-Pagan Lagrange Multiplier (LM) test was done to determine whether Random

Effect model is better than common Effect (PLS) method used. With the large chi-squared of 103.69, we reject the null hypothesis in favour of the random group effect model (P-value<0.000)

Table 4.4 contain the results of Hausman test. This is done to determine whether Random Effect (RE) or Fixed Effect (FE) is most appropriate model to be used in estimating the relationship between foreign monetary policy and market performance of selected West African Countries. The Hausman test returns -4.87 but warns that the data fails to meet the asymptotic assumptions. However, the chi-squares score is small enough not to reject the null hypothesis. We may not conclude that the random effect model is better than its fixed effect counterpart; the test is not conclusive. In summary, null hypothesis of F-test is rejected while the alternative hypothesis of no time fixed- effects are needed in this case is accepted. Also, here we accept the null and conclude that random effects is not appropriate. This is, no evidence of significant differences across countries, therefore you can run a simple Ordinary Least Square regression. Similarly, the random effect model is better than its fixed effect counterpart; the test is not conclusive. The model selection was performed using the F – Ratio Test, the Breush – Pagan Langrange Multiplier Test, and the Hausman Test. The F –Ratio Test shows that the fixed effected model is more appropriate, in the Langrange Multiplier test, the null hypothesis was rejected in favour of the random effect model. Finally, the Hausman test indicates that the fixed effected model should be considered over random effect model.

In conclusion, based on the model selection tests, the most appropriate model for the data is the fixed effected model. Hence, the result of the fixed effected model will be used to interpret the relationship between foreign monetary policy and market performance of selected West African Countries.

For the diagnostics test, Baltagi (2008),revealed that some of the diagnostic checked to ascertain the level of model adequacy include; cross-sectional dependence, ross-sectional dependence/contemporaneous correlation: Using Pasaran CD test and heteroscedasticity test. Table 4.5 contains the results of the correlation matrix of residuals using Breusch-Pagan LM test of independence. The null hypothesis in the B-P/LM test of independence is that residuals across entities are not correlated is accepted. This simply means that no cross-sectional dependence

6.1 Conclusion

Based on the result of the selection tests, the most suitable model for the data is the fixed effect model. Also, the results show that using the pool regression, the study revealed that the R – squared (R^2) from the regression model is 0.7746 indicating that our model accounts for (or explained) about 77.46% of the variation in market performance leaving 14% unexplained. It also means that the predictor variable is 77.46 % very strong in explaining the response variable. The t–test on the table of estimated coefficients of the individual indicator of market performance (cotton price and inflation) is significantly different from zero at the 5% level significance. Exchange rate has mixed (positive and negative) significant effect on cotton price (2.001), and inflation rate (-0.529) and the constant term (-6.398). This simply means 1% increase in exchange rate will leads to increase in the price of cotton if all things been equal. Similarly, this simply means 1% increase in exchange rate will leads to decrease inflation rate all things been equal.

For the random effect model, the R^2 reported is 0.7704 which indicates that the model accounts for about 77.04% of the total variance in market performance. Inflation rate and the constant term are negatively correlated with foreign monetary policy, whereas, cotton price is positively correlated. Cotton price statistically significant as shown in the p-value of the z-tests.

The findings show that there exit a panel data model that best described the effect of monetary policy on market performance in west Africa countries. Based on the best fitted model selection technique, it was found that the fixed effect model can be used to interpret the relationship between foreign monetary policy and market performance of selected West African Countries.

However, the relationship between foreign monetary policy and market performance of selected West African Countries indicates 82.91% of the variation in the market performance of these countries leaving 14% unexplained. This also means that the predictor variable is 82.91% very strong in explaining the response variable. Looking the individual effect of inflation rate and constant are not significant while the cotton price is significant from zero even at the 5% level of significance. The P value is very low which shows that our model is highly significant at the 5% level of significance. This corroborates Dele (2007) investigations on monetary policy and economic performance of West African monetary zone countries. In Dele (2007) studied, it was found that expansion in domestic output dampened aggregate consumer prices (inflation), however, not adequate enough to dampen the fuelling effects of past inflation. This was accentuated by money supply variable (MS2) and aggravated by exchange rate variable which are mostly positive, confirming the a priori expectations that rapid monetary expansion and devaluations fuels domestic inflation. A country-by-country comparison of the single and simultaneous equations model results show that expansionary monetary policy contributed more to fuelling prices than it did to growth. It also shows that interest rates policy had adverse effects on GDP by exhibiting a positive sign contrary to the theoretical expectation of an inverse relationship. It can be concluded that there is evidence that monetary policy has negative impact on market performance (inflation), such that the estimated coefficient for exchange rate is highly significance. Also, many of the time dummies included in the model are significant as well which indicates that other time-varying exogenous shocks are important determinants when measuring the impact of monetary policy on market performance within the period under investigations.

6.2 RECOMMENDATIONS

1. In an attempt to model the effect of monetary policy on market performance, it is better to use the fixed effect models since it captured each country intercept but shares the same slopes of the regressors.

2. Having identify that monetary policy has significant effect on market performance in west Africa, there is need to considered country's specific response in the measure of its impact on the economy

3. There is need for government to develop the best strategies, ideas, and actions, deliberately to harmonized monetary policy across all the countries in West Africa. This will help in enhancing uniformity in market performance

4. Having examine panel data modelling of the relationship between foreign monetary policy and market performance of selected West African Countries, there is need to examine the relationship between foreign monetary policy and other critical aspect of the economy, for example the industrial sector in these West African Countries.

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